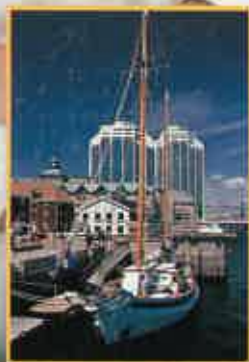


DENTISTRY • LAW • MEDICINE • GRADUATE STUDIES

DALHOUSIE

U N I V E R S I T Y

1999/2000



DALHOUSIE UNIVERSITY

1999/2000 CALENDAR

DENTISTRY
LAW
MEDICINE
GRADUATE STUDIES



DALHOUSIE
University

*Learning.
To make life better*

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important Notices

Students are advised that the matters dealt with in this Calendar are subject to continuing review and revision. This Calendar is printed some months before the year for which it is intended to provide guidance. Students are further advised that the content of this calendar is subject to change without notice, other than through the regular processes of Dalhousie University, and every student accepted for registration in the University shall be deemed to have agreed to any such deletion, revision or addition whether made before or after said acceptance. Additionally, students are advised that this calendar is not an all-inclusive set of rules and regulations but represents only a portion of the rules and regulations that will govern the student's relationship with the University. Other rules and regulations are contained in additional publications that are available to the student from the registrar's office, and/or the relevant faculty, department or school.

The University reserves the right to limit enrolment in any programme. Students should be aware that enrolment in many programmes is limited and that students who are admitted to programmes at Dalhousie are normally required to pay deposits on tuition fees to confirm their acceptance of offers of admission. These deposits may be either non-refundable or refundable in part, depending on the programme in question. While the University will make every reasonable effort to offer classes as required within programmes, prospective students should note that admission to a degree or other programme does not guarantee admission to any given class. Students should select optional classes early in order to ensure that classes are taken at the most appropriate time within their schedule. In some fields of study, admission to upper level classes may require more than minimal standing in prerequisite classes.

Dalhousie University does not accept any responsibility for loss or damage suffered or incurred by any student as a result of suspension or termination of services, courses or classes caused by reason of strikes, lockouts, riots, weather, damage to university property or for any other cause beyond the reasonable control of Dalhousie University.

Inquiries should be directed to:

The Registrar
Dalhousie University
Halifax, Nova Scotia
Canada B3H 4H6
Telephone: (902) 494-2450
Fax: (902) 494-1630
e-mail: Registrar@dal.ca

Dalhousie Calendars on the Web

The Dalhousie University calendars are available in electronic form on the World Wide Web. The primary access point is the Dalhousie University homepage at:

www.dal.ca.

From the Dalhousie homepage, choose:

Academics

and then follow the appropriate navigation path.

Other Programmes

Information on programmes offered in the Faculties of Architecture, Arts & Social Sciences, Computer Science, Engineering, Health Professions, Management and Science can be found in the Undergraduate calendar.

Important Notices

The first notice is regarding the upcoming meeting of the Board of Directors, which will be held on the 15th of the next month. All members are requested to attend and bring with them the necessary documents for the agenda items.

The second notice concerns the recent changes in the membership fees. The new rates have been determined after a thorough review of the organization's financial needs and are effective from the start of the next fiscal year.

The third notice is about the relocation of our office. Due to the expansion of our operations, we have moved to a larger premises at [Address]. Please update your contact information and direct all correspondence to the new location.

The fourth notice is regarding the annual general meeting, which will be held on the 30th of the next month. This is an important event where we will discuss the organization's performance over the past year and elect new members to the Board of Directors.

The fifth notice is about the upcoming conference. We are pleased to announce that we will be participating in the national conference on [Topic], which will be held in [City]. This is a great opportunity for us to share our research and network with other professionals in the field.

The sixth notice is regarding the recent developments in the industry. There have been several significant changes in the regulatory environment, and it is crucial for us to stay updated on these changes to ensure compliance and maintain our competitive edge.

The seventh notice is about the upcoming publication of our journal. The next issue will feature several articles on the latest research in the field, and we encourage our members to submit their work for consideration.

Delivered (Registered by the State)

The eighth notice is regarding the recent developments in the industry. There have been several significant changes in the regulatory environment, and it is crucial for us to stay updated on these changes to ensure compliance and maintain our competitive edge.

The ninth notice is about the upcoming publication of our journal. The next issue will feature several articles on the latest research in the field, and we encourage our members to submit their work for consideration.

The tenth notice is regarding the recent developments in the industry. There have been several significant changes in the regulatory environment, and it is crucial for us to stay updated on these changes to ensure compliance and maintain our competitive edge.

Academic Dates

ACADEMIC CLASS ADD/DROP DATES Classes in the Faculty of Graduate Studies* (See Fees Section for Fee Due Dates)				
SUMMER TERM 1999				
Part of Term Identifier	Duration of Class	Last Day to Register	Last Day for Late Registration Last Day to Cancel Registration Last Day to Add Classes	Last Day to Drop without "W" Last Day to Change from Audit to Credit and Vice Versa
S	May 3 - July 30, 1999	May 5, 1999	May 17, 1999	June 1, 1999
A	May 10 - June 25, 1999	May 5, 1999	May 14, 1999	May 26, 1999
D	May 10 - June 2, 1999	May 5, 1999	May 14, 1999	May 17, 1999
9	June 1 - August 31, 1999	May 27, 1999	June 14, 1999	June 30, 1999
E	June 3 - June 25, 1999	May 31, 1999	June 9, 1999	June 10, 1999
B	July 5 - August 20, 1999	June 28, 1999	July 9, 1999	July 19, 1999
F	July 5 - July 27, 1999	June 28, 1999	July 9, 1999	July 12, 1999
G	July 28 - August 20, 1999	July 23, 1999	August 4, 1999	August 5, 1999
FALL TERM 1999				
X/Y	September 9, 1999 - April 10, 2000	September 3, 1999	September 24, 1999	November 5, 1999
2	September 9, 1999 - December 3, 1999	September 3, 1999	September 24, 1999	October 8, 1999
WINTER TERM 2000				
2	January 10 - April 10, 2000	January 24, 2000	January 24, 2000	February 4, 2000
SUMMER TERM 2000				
S	May 1 - July 28, 2000	May 3, 2000	May 15, 2000	June 2, 2000
A	May 8 - June 23, 2000	May 3, 2000	May 12, 2000	May 24, 2000
D	May 8 - May 31, 2000	May 3, 2000	May 12, 2000	May 15, 2000
9	June 1 - August 31, 2000	May 29, 2000	June 15, 2000	June 30, 2000
E	June 1 - June 23, 2000	May 29, 2000	June 7, 2000	June 8, 2000
B	July 4 - August 18, 2000	June 26, 2000	July 10, 2000	July 19, 2000
F	July 4 - July 26, 2000	June 26, 2000	July 10, 2000	July 11, 2000
G	July 27 - August 18, 2000	July 21, 2000	August 2, 2000	August 3, 2000

* See below for dates in Law, Medicine and Dentistry.

1999

May

- 3 Classes begin, Dentistry Qualifying Programme (first year)
- 11-12 LMCC Examinations, Part I, Medicine
- 13 Last day to register in medicine (fourth year), without late fee
Classes begin, Medicine (fourth year)
- 21 Last day of classes, Dentistry (first and second year)
- 24 Victoria Day - University closed
- 25 Examinations begin, Dentistry (first and second year)
- 25-29 Spring Convocations
- 29 End of year, Medicine (first and second year)
- 31 Examinations end, Dentistry (first and second year)

June

- 18 Applications due for supplemental exams, Law
- 21 Orientation for PGY1's
- 23 Last day of classes, Dentistry (third year)
Last day of classes, Qualifying Programme (first year)
Postgrad Medicine academic year begins
Last day to register PGY (all years), without late fee

July

- 1 Canada Day - University closed
- 2 Last day to apply to graduate in October
- 5 Supplemental and special examinations begin, Law
- 5 Classes begin, Dentistry (fourth year)
Classes begin, Qualifying Programme (second year)
- 9 Supplemental and special examinations end, Law
- 15 Last day to apply for supplemental examinations in Dentistry and Dental Hygiene
Supplemental examinations begin, Dentistry and Dental Hygiene
- 26 Summer break begins, Dentistry (fourth year DDS and second year QP)
- 27 Last day for those expecting PhD degrees in October to submit one unbound copy of completed thesis (the External Examiner's copy) and submission form to Graduate Studies and four unbound copies of thesis to department

August

- 2 Halifax/Dartmouth Natal Day - University closed
- 3-6 Supplemental examinations, Medicine (first and second year)
- 10 Supplemental examinations end, Dentistry and Dental Hygiene
- 23 Classes resume, Dentistry (fourth year DDS and second year QP)

- 23 Classes begin, Medicine (first, second year)
- 24 Last day for those expecting Masters degrees in October to submit unbound theses to departments
- 30 Last day to have Leave of Absence approved by Graduate Studies
- 30 Classes begin, Medicine (third year)

September

- 1 Classes begin, Dentistry and Dental Hygiene
- 6 Labour Day - University closed
- 7 Classes begin, Library and Information Studies; Business Administration
- 8 Classes begin, Law
- 9 Classes begin, Human Communication Disorders (first year)
Classes begin, unless otherwise specified, Regular session
Orientation begins, Human Communication Disorders (first year)
- 13 Last day for those expecting to receive graduate degrees in October to submit approved unbound copies of theses to Faculty of Graduate Studies
- 16 Last day to add or drop fall term classes, Law

October

- 1 Applications available, Medicine
- 11 Thanksgiving Day - University closed
- 16 Fall Convocation

November

- 11 Remembrance Day - University closed
- 15 Application deadline, Medicine
Last day to apply for admission to winter term, Graduate Studies
- 30 Last day to change degree or attendance status (FT to FT, or FT to PT), Graduate Studies

December

- 1 Last day to apply to graduate in May
Application deadline, Dentistry and Qualifying Programme
- 3 Classes end Fall term, Law and Graduate Studies
Classes end, Dentistry (third year, fourth year Qualifying Programme Years 1 and 2)
- 6 Examinations begin, Law and Graduate Studies
- 8 Classes end, Dentistry (first and second year Dentistry), Dental Hygiene
Examinations begin, Dentistry (third and fourth year)
- 13 Examinations begin, Dentistry (first and second year), Dental Hygiene
- 15 Midterms end, Law (first year)
- 16 Examinations end, Graduate Studies
- 17 Examinations end, Law (second and third year)
Examinations end, Dentistry
Last day to submit approved, unbound theses to Graduate Studies for those registered in the fall term only
Last day to have Leave of Absence beginning in January approved by Graduate Studies

2000

January

- 3 New Year's Day - University closed
- 4 Classes resume, Medicine
- 10 Classes resume, Dentistry, Dental Hygiene, Graduate Studies, Law, classes resume
- 19 Last day to add or drop winter term classes, Law

February

- 2 Application deadline, Dental Hygiene
- 4 Munro Day - University closed (does not apply to Medicine clerkship years)
- 15 Last day for those expecting PhD degrees in May to submit one unbound copy of completed thesis (the External Examiner's copy) and submission form to Graduate Studies and four unbound copies of thesis to departments
- 28 Study break begins (does not apply to Medicine clerkship years)

- 29 Application deadline, Law

March

- 6 Classes resume
- 13 Last day for those expecting Masters degrees in May to submit unbound theses to departments

April

- 7 Classes end, Law
- 10 Classes end unless otherwise indicated
Examinations begin, Law
Last day for those expecting to receive graduate degrees in May to submit approved unbound copies of theses to Faculty of Graduate Studies
- 12 Examinations begin, Graduate Studies
- 14 Last day of classes, Dentistry (third and fourth year), Qualifying Programme (first and second year), Dental Hygiene (first and second year)
- 18 Examinations begin, Dentistry (third and fourth year), Qualifying Programme (first and second year) and Dental Hygiene (first and second year)
- 19 Examinations end, Law (first year)
- 21 Good Friday - University closed
- 25 Examinations end, Dentistry (third and fourth year), Dental Hygiene (first and second year), Qualifying Programme (first and second year)
- 26 Classes resume, Dentistry (third year), Qualifying Programme (first year)
- 29 Examinations end, Regular session

May

- 1 Examinations end, Law (second and third year)
- 9-10 LMCC Examinations, Part I, Medicine
- 19 Last day of classes, Dentistry (first and second year)
- 22 Victoria Day - University Closed
- 23-27 Spring Convocation
- 24 Examinations begin, Dentistry (first and second year)
- 27 End of year, Medicine (first and second year)
- 31 Examinations end, Dentistry (first and second year)

June

- 19 Applications due for Supplemental and Special exams, Law
- 23 Last day of classes, Dentistry (third year), Qualifying Programme (first year)

July

- 3 Canada Day - University closed
- 4 Last day to apply to Graduate in October
Classes begin, Dentistry (fourth year), Qualifying Programme (second year)
- 10 Supplemental and Special exams begin, Law
- 17 Supplemental and Special exams end, Law
- 27 Last day for those expecting PhD degrees in October to submit one unbound copy of completed thesis (the External Examiner's copy) and submission form to Graduate Studies and four unbound copies of thesis to department
- 31 Summer break begins, Dentistry (fourth year), Qualifying Programme (second year)

August

- 7 Halifax/Dartmouth Natal Day - University closed
- 24 Last day for those expecting Masters degrees in October to submit unbound theses to departments
- 30 Last day to have Leave of Absence approved by Graduate Studies

Admission Dates 2000/2001

Final Dates for Receipt of Applications for Admission

Regular Session

Dentistry	
DDS	December 1
Dental Hygiene	February 1
Dentistry Qualifying Programme	December 1

Medicine	
MD	November 15
Post-Graduate	December 1

Law ¹	February 29
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Graduate Studies ^{2,3} (except as below)	June 1
Non-Canadian Students (Graduate Studies)	April 1
Law (Doctoral level)	January 1
Environmental Studies and Social Work	February 1
Human Communication Disorders	March 1
Nursing	April 1
Health Services Admin. and Law (Master's level)	May 1
Oral and Maxillofacial Surgery ⁴	June 1

¹ Late applications may be considered up to August 1.

² All supporting documentation must be submitted by the appropriate deadline.

³ For Graduate Studies Scholarship consideration applications must be complete (including application fee and all supporting documents) by March 1. For consideration for Killam and other University scholarships, complete applications must be received by January 31.

⁴ Of year preceding commencement of programme

Definitions

The following definitions are intended to facilitate an understanding of the calendar and not to define all words and phrases used in the calendar which may have specific meanings.

Academic Dismissal

A student's required withdrawal from a programme due to unsatisfactory academic performance.

Academic Programme

A distinct group of classes and other requirements which lead to eligibility for a degree or other university-awarded credential.

Academic sessions

- Regular session: September - April
- Fall term: September - December
- Winter term: January - April
- Summer term: May - August

Advanced Standing

Students possessing advanced knowledge of a subject will be encouraged to begin their studies at a level appropriate to their knowledge, as determined by the department concerned. Unlike transfer credit, such students will still be required to complete the full number of credits required for the particular credential being sought.

Audit Student

A student permitted to attend classes but not expected to prepare assignments, write papers, tests or examinations. Credit is not given nor is a mark awarded for classes. Classes appear on the transcript with the notation "Aud". Audit students must apply in the normal way. Students may register to audit a class only after the last day to add classes in the term.

Class

A unit of instruction in a particular subject identified by a name and number.

Clerkship

See Internship

Clinical Practice

See Internship

Continuing Fees

The tuition fees charged to graduate students who have fulfilled their programme fee requirements but have yet to complete all their degree requirements. See Faculty of Graduate Studies Regulation 4.7.4.

Co-operative Education

A programme where academic study is combined with career related work experience.

Co-requisite

Requirement which must be fulfilled concurrently with the class being considered.

Course

The term "class" is used in place of the word course.

Credit

A unit by which University class work is measured. A full year class, i.e. September - April, is normally worth one credit.

CRN

Each class has a CRN attached to it (course registration number) This number is to be used when signing up for classes.

Exclusion

Students may not register for a class which lists, as an exclusion, a class the student is also taking or has already passed.

Externship

See Internship

Fieldwork

See Internship

Full-time Students

Those registered for three full classes or more, or the equivalent of three half credit classes or more in either the fall or winter term.

Grade Point Average (GPA)

Weighted sum of the grade points earned, divided by the number of classes enrolled.

- **Sessional GPA:** Classes taken in a single session, September - April.
- **Cumulative GPA:** All classes taken while registered in a programme.

Graduate Student (Regular)

A student with a Bachelor's degree, usually with Honours or equivalent, enrolled in a Master's or Doctoral programme, or a graduate diploma programme.

Internship, Fieldwork, Clinical practice, Externship, Practicum, Clerkship

These terms are used in Faculty of Health Professions' programmes to describe practical professional educational experiences that are conducted in a non-university setting such as a health or social service agency.

Letter of Permission

A Letter of Permission authorizes a Dalhousie student to take a class(es) at another institution for credit towards a Dalhousie qualification. Such permission must be obtained in advance of taking the class(es).

Non-thesis Programme

A Master's programme of study based on class work which may also include a research project. This includes many of the professional graduate programmes. Some of these programmes also offer a thesis option.

Part-Time Students - Graduate

Those carrying not more than two and one-half (2½) full-credit classes during the 12 months, September to August or a student who has not yet completed the minimum number of years of part-time study required to complete the residency requirement for a particular degree programme.

Practicum

See Internship

Prerequisite

Requirement which must be fulfilled prior to registering in a specific class.

Programme Fees

The tuition fees charged to graduate students completing a degree. The programme fee is based on total tuition for a specified number of years, varying according to academic programme. See Faculty of

Graduate Studies Regulation 4.7 for more details. Students who have not completed their programme after the specified number of years are required to pay a continuing fee.

Qualifying Students (Master's only)

A full-time or part-time student with a Bachelor's degree or its equivalent in whom a department has expressed an interest as a potential graduate student, but who is without a sufficiently strong academic background in a particular discipline to be enrolled directly in a Master's programme.

Required Withdrawal

A student's required withdrawal from a graduate programme due to unsatisfactory academic performance or failure to meet admission or programme conditions. See Faculty Regulation 4.1.4.

Residency

The period of time that graduate students are expected to be on campus for fulfilment of their formal programme requirements. In some programmes, part of the residency period may, with permission, include some time off campus (e.g. for fieldwork or research).

Special Students - Graduate Studies

A student who is not registered in a graduate programme but is taking graduate classes. Special students must satisfy normal admission requirements.

Thesis Only Fees

See Continuing Fees.

Thesis Programme

A Master's or Doctoral programme of study involving a major research component in the form of a written thesis. Some programmes offer a non-thesis option.

Transcript

A transcript is a complete history of a student's academic record at Dalhousie. Partial transcripts, e.g. a portion of a student's record pertaining to registration in a particular degree or faculty only, are not issued.

Transfer Student

A transfer student is one who is awarded credit towards a Dalhousie degree for academic work completed at a previous university or equivalent institution of higher learning.

Visiting Student

A person permitted to take classes at Dalhousie for transfer of credit to another university.

Work Term

Career related work experience required in Co-operative Education programmes. Work terms are usually of 13-16 weeks duration.

Class Codes

Numbers

1000-level classes are introductory undergraduate
2000-4000 level classes are advanced undergraduate
5000-9000 level are Graduate level (with some exceptions)

CRN

Each class has a CRN attached to it (course registration number) This number is to be used when signing up for classes.

Credit Hour Extension - examples only

0.06 credit hours = 1 full credit
0.03 credit hours = 1/2 credit
0.00 credit hours = no credit

Subject Codes

Four letter codes are used to describe the department offering a particular class as follows:

AGRE - Agricultural Engineering
 AGRI - Agriculture
 ANAT - Anatomy & Neurobiology
 ARCH - Architecture
 ASSC - Arts and Social Sciences Interdisciplinary
 BIOC - Biochemistry
 BIOE - Biological Engineering
 BIOL - Biology
 BIOP - Biophysics
 BUSI - Business Administration
 CANA - Canadian Studies
 CH&E - Community Health & Epidemiology
 CHEE - Chemical Engineering
 CHEM - Chemistry
 CIVL - Civil Engineering
 CLAS - Classics
 COMM - Commerce
 COMR - Comparative Religion
 CPST - Complimentary Studies
 CSCI - Computer Science
 CTMP - Contemporary Studies
 DEHY - Dental Hygiene
 DENQ - Dentistry Qualifying
 DENT - Dentistry
 ECED - Electrical and Computer Engineering
 ECMM - Electronic Commerce
 ECON - Economics
 EDUC - Education
 EINE - Engineering Internetworking
 ENGI - Engineering
 ENGL - English
 ENGM - Engineering Math
 ENVI - Environmental Studies
 EARTH - Earth Sciences
 FOSC - Food Science & Technology
 FREN - French
 GERM - German
 HAHP - Health and Human Performance
 HEED - Health Education
 HESA - Health Services Administration
 HIST - History
 HLTH - Health Professions, Interdisciplinary
 HUCD - Human Communication Disorders
 IDIS - Interdisciplinary Studies
 IENG - Industrial Engineering
 INTD - International Development Studies
 KINE - Kinesiology
 KING - King's Interdisciplinary
 LAWS - Law
 LEIS - Leisure Studies
 LIBS - Library & Information Studies
 MARA - Marine Affairs
 MATH - Mathematics
 MECH - Mechanical Engineering
 MEDI - Medicine

METL - Metallurgical Engineering
 MGMT - Management
 MICI - Microbiology & Immunology
 MINE - Mining Engineering
 MUSC - Music
 NESC - Neuroscience
 NURS - Nursing
 OCCU - Occupational Therapy
 OCEA - Oceanography
 OMFS - Oral & Maxillofacial Surgery
 ORAL - Oral Surgery
 PATH - Pathology
 PHAC - Pharmacology
 PHAR - Pharmacy
 PHIL - Philosophy
 PHSE - Physical Education
 PHYC - Physics
 PHYL - Physiology
 PHYT - Physiotherapy
 PLAN - Planning
 POLI - Political Science
 PSYO - Psychology
 PUAD - Public Administration
 RECR - Recreation
 RUSS - Russian Studies
 SCIE - Science
 SLWK - Social Work
 SOSA - Sociology and Social Anthropology
 SPAN - Spanish
 STAT - Statistics
 THEA - Theatre
 TYPR - Transition Year Programme
 WOST - Women's Studies

Dalhousie University

The influence of Nova Scotia's largest university is felt throughout Canada - and well beyond. Founded in 1818, Dalhousie University provides a wide range of programmes from the undergraduate to the doctoral level in a dozen Faculties. It offers more than 3,600 classes in over 170 undergraduate, graduate and professional degree programmes, as well as an extensive array of continuing education programmes. Dalhousie combines a tradition of excellence with learning for tomorrow. The university is proud of its excellent students and its loyal alumni, who play professional and community leadership roles across Canada and around the globe.

Dalhousie is located on a 79 acre campus in the heart of Halifax. Its 13,500 full and part-time students come from across the country and throughout the world. They benefit from personal education in an attractive environment, coupled with all the educational, cultural and recreational advantages of a major university. In addition to its teaching and research facilities, Dalhousie has a system of libraries, student residences of many kinds, an Arts Centre, an art gallery, a Student Union Building, athletic and recreational facilities and other facilities of many kinds. Major teaching hospitals, federal and provincial research laboratories and the provincial archives are all close at hand.

The amalgamation, in 1997, of Dalhousie University with the Technical University of Nova Scotia (now known as DalTech) has created a dynamic new centre of advanced technical education and research in Nova Scotia. DalTech, now a college within Dalhousie, houses the faculties of architecture, computer science and engineering. It continues the Technical University of Nova Scotia's tradition of leadership in education, research and technology transfer.

The University of King's College, situated adjacent to the Dalhousie campus, is an affiliated institution, and its students in Arts and Science receive Dalhousie degrees in the name of both institutions. By agreement with Mount Saint Vincent University students have access to various classes and services. Co-operation in a number of academic programmes, in administrative services, and in use of library resources is provided for in working arrangements with Saint Mary's University and other institutions in Halifax. Degrees in agriculture, awarded to students of the Nova Scotia Agricultural College, are awarded by Dalhousie in co-operation with the College.

Dalhousie University is a member of the Association of Universities and Colleges of Canada, the Atlantic Association of Universities, and the Association of Commonwealth Universities.

DalTech

As of April 1, 1997, Dalhousie University and the Technical University of Nova Scotia (TUNS) amalgamated. The former TUNS, now known as DalTech, is a constituent college within Dalhousie and comprises three Faculties (Architecture, Engineering and Computer Science). The amalgamated institution is known as Dalhousie University.

DalTech has a unique place in Canadian higher education, and is dedicated to professional education and research in engineering, architecture, planning and computer science. DalTech was originally founded as the Nova Scotia Technical College in 1907 and established itself in a single building on Spring Garden Road. The original faculty of six taught courses in mining, metallurgy, civil, electrical and mechanical engineering. Over the years new departments of agricultural, chemical, food science and industrial engineering were added. The first degrees were conferred in 1910 on nine students.

From a single building, very few faculty or students, and relatively few courses, DalTech has grown to be more than just a complex of buildings. The range of program offerings at the undergraduate and graduate level has broadened significantly since 1907. The original building is now occupied by the Faculty of Architecture, which was established in 1961, and today degrees are offered in environmental design, architecture, and urban and rural planning.

To encourage research activities DalTech supports or is associated with several research institutes and Centres: Centre for Water Resources Studies (CWRS); Canadian Institute of Fisheries Technology (CIFT); Centre for Marine Vessel Design and Research (CMVDR); Vehicle Safety Research (VSRT); Minerals Engineering Centre (MEC); Nova Scotia CAD/CAM Centre; Atlantic Industrial Research Institute (AIRI). The Faculty of Computer Science, established in 1997, maintains close contacts with industry through numerous joint research, co-operative programs, and an Advisory Board with broad industry representation.

With impressive academic and research standing on an international level, faculty and students continue to be attracted to DalTech from local and national regions, as well as from numerous countries around the world. An Alumni Association with an initial membership in 1920 of 33, now has grown to over 12,000 proud members who can be found around the globe.

Executive Officers

President and Vice-Chancellor

Tom Traves, BA, MA, PhD

Vice-Presidents

Academic and Research
Sam Scully, BA, Mliit, PhD

Principal - DalTech
Adam Bell, BSc, BEng, MEng, PhD

Finance and Administration
Bryan Mason, BA

Student Services
Eric McKee, BA, MA

External
Dale Godsoe, BA, BEd, MEd, LLD (Hon)

Associate Vice-President Research
Robert Fournier, BSc, MA, PhD

Assistant Vice-President, Personnel Services
Michael Roughneen, CPIR, BA, MSc, FIPM

Deans of Faculties

Architecture
Thomas Emodi, BArch, MIES, NSAA

Arts and Social Sciences
Binkley, M.E., BA, MA, PhD (Tor)

Computer Science
Jacob Slonim, BSc, MSc, PhD

Dentistry
William MacInnis, DSc, DDS, MEd, F.I.C.D.

Engineering
Adam Bell, BSc, BEng, MEng, PhD

Graduate Studies
Peter Ricketts, BA, PhD

Health Professions
Lynn McIntyre, MD, MHSc, FRCP(C)

Law
Dawn Russell, BA, LLB, LLM

Management

Phillip Rosson, DAS, DM, MA, PhD

Medicine

John Ruedy, MDCM, FRCP(C), FACP
Nori MacDonald, BSc, MSc, MD, FRCPC (effective July 1, 1999)

Science

Warwick Kimmins, BA, PhD

Henson College of Public Affairs and Continuing Education

Mary Morrissey, BA, MSW, MPA

College of Arts and Science, Provost

Warwick Kimmins, BA, PhD

Administrative Officers

University Secretary and Legal Counsel

Brian Crocker, QC, BA, LLB

University Librarian

William Maes, AB, MA, MLS

University Registrar

Gudrun Curri, MA, PhD

Coordinator of Policy Development

Julia Eastman, BA, MA

Associate Principal, Graduate Studies and Research, DalTech

Feridun Hamdullahpur, BSc, MSc, PhD

Executive Directors

Computer and Information Services (Acting)

John Sherwood, BSc, EP

Instructional Development and Technology

Alan Wright, BA, MA, PhD

Office of Institutional Affairs

Brian Christie, BSc, MA, Assistant to the President for Planning

Directors

Alumni Affairs

Lynne Sheridan, BA

Arts Centre (Acting)

Heather McGean, BA

Athletics and Recreational Services and Dalplex (Acting)

F.A. (Tony) Martin, BSc, MA

Capital Campaign

William Stratton

Counselling and Psychological Services

Judith Hayashi, BA, MA

Development

Charlotte Sutherland, BA, MEd

Environmental Health and Safety

William Louch, PhD

Facilities Management

William Lord, BASc, PEng

Financial Services

Ian Nason, BComm

Health Services

Joyce Curtis, MD

Housing and Conference and Ancillary Services

Heather Sutherland, BSc, MEd

Public Relations

Michelle Gallant, BPR

Student Resources

Susan McIntyre, MPA

Board of Governors

Under the University's statutes, the Board of Governors is responsible for the operation of the University. The Board consists of representatives named by the Government of Nova Scotia, the alumni, the Student Union and certain other bodies. Internal regulation of the University is the primary concern of the Senate, subject to approval of the Board of Governors.

The President and Vice-Chancellor is the Chief Executive Officer of the University, responsible to the Board of Governors and Senate for supervision of the University's administrative and academic work.

Chancellor

Sir Graham Day

Chancellor Emeritus

Rueben Cohen
Ruth Goldbloom

Officers

Mr. Allan C. Shaw, Chair
Mr. James S. Cowan, Vice-Chair
Mrs. Ann Petley-Jones, Vice-Chair
Mr. John C. Risle, Honourary Treasurer
Mr. Murray Coolican, Honourary Secretary
Mrs. Patricia Roscoe
Dr. Tom D. Traves

Members

Ms. Nancy Anderson
Mrs. Diane Bell
Mr. Ted Chiasson
Mr. Level Chan
Mr. Gerald A. Clarke
Ms. Karen Cramm
Mr. Robert Dexter
Mr. Fred Fountain
Mrs. Patricia Harris
Dr. Daurene Lewis
Mr. George W. MacDonald
Dr. John T. O'Brien
Mr. Andrew Philopoulos
Mr. Kenneth C. Rowe
Mr. Phillip Saunders
Dr. Alasdair Sinclair
Mr. Peter Stuart
Dr. Colin Stuttard
Dr. Daniel Tam
Mr. Bruce Towler

Secretary

Mrs. Shariene Drake

Observer for Faculty Association

Dr. Ismet Ugursal

Senate

Senate consists of the President, Vice-President (Academic and Research), the University Librarian, Deans of Faculties, Dean of Henson College, forty-eight elected Faculty members, four students elected by the Dalhousie Student Union, a representative of the University of King's College and a representative of the Nova Scotia Agricultural College.

Senate is the academic governing body of the University. Subject to the general approval of the Senate, faculties are responsible for supervision of programmes of study, of teaching and research, and for recommending candidates for degrees, diplomas, and university prizes. In addition, it is responsible for student discipline academic appeals, and faculty appointments, tenure and promotion.

Chair of Senate

Colin Stuttard, BA, PhD

Vice-Chair of Senate

Georges Kipouros, DipEng, MAsc, PhD

Academic Programmes

Faculty of Dentistry

- Doctor of Dental Surgery - 4 years
- Diploma in Dental Hygiene - 2 years Dental Hygiene following one year of Arts and Science

Faculty of Law

- Bachelor of Laws - 3 years
- Bachelor of Laws with Master of Business Administration - 4 years
- Bachelor of Laws with Master of Public Administration - 4 years
- Bachelor of Laws with Master of Health Services Administration - 4 years
- Bachelor of Laws with Master of Library and Information Studies - 4 years

Faculty of Medicine

- Bachelor of Science (Medical) - 4 years
- Doctor of Medicine - 4 years
- Residencies - various programmes ranging from 2-6 years post-MD
- Doctor of Medicine with Master of Science - 6 years - Master of Science thesis in: Anatomy, Biology, Microbiology, Oral and Maxillofacial Surgery, Pharmacology, and Physiology & Biophysics
- Doctor of Medicine with Doctor of Philosophy - 7 years - Doctor of Philosophy thesis in: Anatomy, Biology, Microbiology, Pharmacology, and Physiology & Biophysics.

Faculty of Graduate Studies

- Master of Architecture (First Professional) - 2 years
- Master of Architecture (Post-Professional) - 1 year
- Master of Applied Science
1 or 2 years with thesis: Biological Engineering, Biomedical Engineering, Chemical Engineering, Civil Engineering, Computer Science, Electrical and Computer Engineering, Industrial Engineering, Mechanical Engineering, Metallurgical Engineering, Mining Engineering
- Master of Arts
1 or 2 years with thesis: Classics, Economics, English, French, German, Health Education, History, International Development Studies, Leisure Studies, Philosophy, Political Science, Psychology, Sociology and Social Anthropology, Women's Studies
- Master of Business Administration - 1 or 2 years
- Master of Business Administration (Financial Services)
- Master of Business Administration (Information Technology)
- Master of Business Administration with Bachelor of Laws - 4 years
- Master of Computer Science (1 or 2 year project or thesis stream)
- Master of Development Economics - 2 years
- Master of Engineering
2 years: Biological, Biomedical, Chemical, Civil, Electrical, Fisheries, Industrial Mechanical, Metallurgical, Mining, Naval Architecture
- Master of Engineering in Internetworking
- Master of Environmental Studies - 1 or 2 years
- Master of Environmental Design Studies - 1 year
- Master of Health Services Administration - 2 years
- Master of Health Services Administration with Bachelor of Laws - 4 years

- Master of Health Services Administration with Master of Nursing - 3 years
- Master of Information Technology Education - 1 year
- Master of Laws - 1 year
- Master of Library and Information Studies - 2 years
- Master of Library and Information Studies with Bachelor of Laws - 4 years
- Master of Marine Management - 1 year
- Master of Nursing - 2 years
- Master of Nursing with Master of Health Services Administration - 3 years
- Master of Public Administration - 1 or 2 years
- Master of Public Administration (Management)
- Master of Public Administration with Bachelor of Laws - 4 years
- Master of Science
1 or 2 years with thesis in: Agriculture, Anatomy and Neurobiology, Atmospheric Science, Biochemistry, Biology, Chemistry, Community Health and Epidemiology, Computer Science, Earth Sciences, Engineering Mathematics, Food Science, Human Communication Disorders (3 years) (Audiology or Speech Pathology), Kinesiology, Mathematics, Microbiology and Immunology, Occupational Therapy, Oceanography, Pathology, Pharmacology, Physics, Physiology and Biophysics, Physiotherapy, Psychology, and Statistics, also Neuroscience (combined with Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology & Biophysics, and Psychology).
- Master of Social Work - 1 or 2 years
- Master of Urban and Rural Planning - 2 years
- Master of Engineering and Master of Urban and Rural Planning - 2 years
- Master of Applied Science and Master of Urban and Rural Planning - 2 years
- Master of Science with Doctor of Medicine
6 years - Master of Science thesis in: Oral and Maxillofacial Surgery
- Graduate Diploma in Public Administration - 1 year
- Doctor of Philosophy
2 or 3 years, with thesis in: Anatomy and Neurobiology, Atmospheric Science, Biochemistry, Biological Engineering, Biology, Chemical Engineering, Chemistry, Civil Engineering, Classics, Computer Science, Earth Sciences, Economics, Electrical and Computer Engineering, Engineering Mathematics, English, Food Science, French, History, Industrial Engineering, Interdisciplinary Studies, Mathematics, Mechanical Engineering, Metallurgical Engineering, Microbiology & Immunology, Mining Engineering, Oceanography, Pharmacology, Philosophy, Physics, Physiology & Biophysics, Political Science, Psychology, Sociology and Statistics, also Neuroscience (combined with Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology & Biophysics, and Psychology)
- Doctor of Philosophy with Doctor of Medicine
7 years - Doctor of Philosophy with thesis in: Anatomy & Neurobiology, Biochemistry, Microbiology & Immunology, Pharmacology, and Physiology & Biophysics
- Doctor in the Science of Law - 2 years, with thesis

Academic Regulations

Registration

Registration material for September 1999 will be sent to all eligible students in late June. Students are strongly encouraged to register early.

A student is registered only after financial arrangements have been made at the Student Accounts Office.

The final step is obtaining an ID or validating an existing ID from the Office of the Registrar. ID cards are mandatory and must be presented to write an officially scheduled examination. In addition, some services such as the issuance of bursary or scholarship cheques, library privileges and Dalplex require the presentation of a valid Dalhousie ID.

Class Withdrawal

Nonattendance does not, in itself, constitute withdrawal. Withdrawals are not effective until written notification is received at the Office of the Registrar.

University Regulations

General

1. The Senate is charged with the internal regulations of the University, including all matters relating to academic affairs and discipline, subject to the approval of the Board of Governors. Within the general policies approved by Senate, academic requirements are administered by the Faculty concerned.
2. All students must agree to obey all the regulations of the University already made or to be made; in addition to the above University regulations, students must also comply with the regulations of the Faculty in which they are registered, and pay the required fees and deposits before entering any class or taking any examinations. Additionally, students are advised that this Calendar is not an all-inclusive set of rules and regulations but represents only a portion of the rules and regulations that will govern the student's relationship with the University. Other rules and regulations are contained in additional publications that are available to the student from the Registrar's Office and/or the relevant Faculty, Department or School.
3. For the purpose of admission to the University, the place of residence of a student is the place of domicile. This is normally presumed to be the place (country, province, etc.) where the parents' or guardian's home is located. That place remains unchanged unless the Registrar is satisfied that a place of residence is established elsewhere. No person under sixteen years of age is admitted to any class except on the specific recommendation of the admissions committee of the relevant Faculty or School, which shall take into account all aspects of the applicant's preparedness for the class or programme involved, and which may attach such conditions to the applicant's admission as the committee judges appropriate.
4. All students must report their local address while attending the University to the Office of the Registrar, on registration or as soon as possible thereafter. Subsequent changes must be reported promptly.
5. Students who change their name while attending Dalhousie must provide proof of name change to the Registrar's Office.
6. Students taking classes in another Faculty as part of an affiliated course of study must conform to the regulations of that Faculty with respect to these classes. It should be noted, however, that regulations pertaining to the degree programme are those of the "home" Faculty.
7. In the interests of public health in the University, students are encouraged to have a tuberculin test. This is compulsory for Dentistry, Dental Hygiene, Physiotherapy and Nursing students. Facilities for testing are arranged by the University Health Services.
8. Except for university purposes, transcripts, official, or unofficial, will be issued only on the request of the student on payment of the required fee. A student may receive only an unofficial transcript. Official transcripts will be sent on a student's request to other universities, or to business organizations, etc.
9. Students withdrawing voluntarily from the University should consult the individual faculty regulations and the Fees section of this Calendar.
10. When the work of a student becomes unsatisfactory, or a student's attendance is irregular without sufficient reason, the faculty concerned may require withdrawal from one or more classes, or withdrawal from the Faculty. If a student is required to withdraw from a Faculty such a student may apply to another Faculty. However, in assessing the application, previous performance will be taken into consideration.

11. Any graduating student who is unable to appear at the convocation is expected to notify the Registrar in writing prior to May 1, for Spring convocations (or October 1 for Fall convocations), giving the address to which the degree/diploma is to be mailed. Students whose accounts are delinquent on April 15 will not receive their degree/diploma parchment nor their transcripts. For October graduation the date is September 1.
12. Students should be aware that certain classes at the University involve required laboratory work where radioactive isotopes are present and are used by students. Since there are potential health risks associated with the improper handling of such radioactive isotopes, Dalhousie University requires that, as a condition of taking a class where radioactive isotopes are to be used, students read and agree to comply with the instructions for the safe handling of such radioactive isotopes. In the event that students do not comply with the instructions for the safe handling of radioactive isotopes, students will receive no credit for the required laboratory work unless other acceptable alternatives are arranged with the instructor. In many cases, alternate arrangements are not possible and students should consider enrolling in a different class.

Official Examination Regulations

1. Candidates will not be admitted to the Examination Room more than thirty minutes after the beginning of the examination. Candidates will not be permitted to leave the examination within the first thirty minutes.
2. Candidates are required to present their valid Dalhousie ID card at all examinations scheduled during the official examination periods and sign the signature list.
3. No articles such as books, papers, etc. may be taken into the examination room unless provision has been made by the examiner for reference books and materials to be allowed to the students. All books, papers, etc. not specified on the printed paper must be deposited with the invigilator. Calculators may be used at the discretion of the instructor.
4. Candidates may not leave their seats during an examination except with the consent of the invigilator.
5. Answers to questions must be written on the right hand pages and properly numbered. The left hand pages may be used for rough work, but no sheets may be detached.
6. Each question should be started on a separate page.
7. If more than one book is used, the total number should be marked in the space provided above. The other books should be properly marked and placed inside the first book. All books supplied must be returned to the invigilator.
8. Candidates found communicating with one another in any way or under any pretext whatever, or having unauthorized books or papers in their possession, even if their use be not proved, shall be subject to expulsion.
9. After the first thirty minutes have elapsed, students may hand in their examination book(s) to an invigilator and quietly leave the examination room. Candidates may not leave the examination room during the last fifteen minutes of the examination.

Policy in Case a Formal Examination Cannot be Completed at the Regularly Scheduled Time

1. If more than fifty percent of the time allocated for the examination has elapsed, students' work up to the premature end of the examination, but prorated for the actual time written, will lead to the mark to be obtained from the formal examination.
2. If less than fifty percent of the time allocated for any examination has elapsed, the examination will be rewritten AS SOON AS POSSIBLE, normally on the Sunday immediately following. Students will be informed by the Registrar of the time and place of the rewrite both on the website of the Registrar (www.dal.ca) and on the formal examination bulletin boards in the A&A building, main level (next to the Registrar's Office) and at the Student Service Centre in DalTech.

3. In all cases in which a formal examination cannot be written at its scheduled time and special arrangements must be made, it is essential that faculty ensure that all students in the class are treated fairly and equitably and according to the procedures in the class description given to students at the beginning of the term.
If an examination is terminated as under point #1, any student who feels disadvantaged by not having been able to write an examination for the length specified in the class description, may appeal through the appropriate faculty appeal mechanism for an examination of the specified length. Appeals will be in writing and in a timely fashion. If the appeal is granted, arrangements for such a makeup examination will be made between the student and the class professor.
4. If a formal examination cannot be written at its scheduled time, it is the responsibility of students to check the Registrar's web site and/or examination bulletin boards for when the examination will be rewritten. Announcements will be made as soon as possible after the original time, normally within 24 hours, and rewrites will normally take place within the regular examination period.

Retention of Student Work

Faculties of Architecture, Computer Science and Engineering
All work executed by students as part of their academic programmes at DalTech automatically becomes the property of the University and may be retained for exhibition or other purposes at any time and for an indefinite period.

Release of Information About Students

1. *Disclosure to students of their own records*
 - (a) Students have the right to inspect their academic record. An employee of the Registrar's Office will be present during such an inspection.
 - (b) Students will, on submission of a signed request and payment of the appropriate fee, have the right to receive transcripts of their own academic record. These transcripts will be marked "ISSUED TO STUDENT". The University will not release copies of transcripts if students owe monies to the University.
2. *Disclosure to Faculty, Administrative Officers, and Committees of the University.*
Information on students may be disclosed without the consent of the student to University officials or committees deemed to have a legitimate educational interest.
3. *Disclosure to Third Parties*
 - (a) The following information is considered public information and may be released without restriction:
 - Name
 - Period of Registration
 - Certificates, Diplomas, Degrees awarded
 - Field of Study (as relates to degree awarded)
 - (b) Information will be released without student consent to persons in compliance with a judicial order or subpoena or as required by federal or provincial legislation.
 - (c) Necessary information may be released without student consent in an emergency, if the knowledge of that information is required to protect the health or safety of the student or other persons. Such requests should be directed to the Registrar.
 - (d) Other than in the above situation, information on students will be released to third parties only at the written request of the student, or where the student has signed an agreement with a third party, one of the conditions of which is access to her/his record (e.g. in financial aid). This restriction applies to requests from parents, spouses, credit bureaus and police.

Policy on Accessibility for Students with Disabilities

1. Dalhousie University is committed to the goal of providing equal opportunity for qualified students with disabilities. To demonstrate full respect for the academic capacities and potential of students with disabilities, the University seeks to

remove attitudinal and environmental restrictions which may hamper or prevent academically-qualified students with disabilities from participating fully in University life. The University understands that persons with disabilities may have different ways of doing things, recognizing that performance is not inferior merely because it is different.

2. The University recognizes, subject to its financial and other resource constraints, that qualified students with disabilities have a right to:
 - 2.1 full access to all educational programmes;
 - 2.2 full access to the educational process and learning environment (including but not limited to classes, laboratories, workshops);
 - 2.3 full access to the University campus; and
 - 2.4 full access to University facilities and services.
3. The University recognizes that qualified students with disabilities have a right to assistance that is individualized with respect to scope and pace, consistent with the student's needs, legitimate academic demands, and the University's capacity to respond.
4. To ensure that qualified students with disabilities may pursue quality post-secondary education, the University shall:
 - 4.1 be proactive in fostering, creating and maintaining a barrier-free environment, including:
 - (a) the provision of support services, within reasonable financial and resource limitations; and
 - (b) promoting an attitude of respect for persons with disabilities, and
 - (c) promoting sensitivity to the needs and abilities of persons with disabilities;
 - 4.2 inform the University community about the services available to qualified students with disabilities and seek to ensure that such services are delivered in ways that promote equity;
 - 4.3 where warranted and without compromising the academic standards, and through the relevant academic authority, modify:
 - (a) workload;
 - (b) examination procedures;
 - (c) other course requirements; and
 - (d) scholarship and other financial assistance requirements; and
 - 4.4 take all reasonable steps to consult students with disabilities as fully as possible about decisions relating to matters affecting them.
5. In accordance with provisions in the Human Rights Act, the University may also define essential requirements for professional performance for students in programmes, where these are appropriate, and this policy is not intended to replace or supersede these requirements.
6. Students with disabilities requiring assistance from the University shall:
 - 6.1 initiate contact with the Advisor to Students with Disabilities and make the nature of their disability and/or their needs known; and
 - 6.2 be expected to undertake a reasonable measure of self-advocacy to ensure they are provided with an equal opportunity by Dalhousie University.
7. The responsibility to implement these policies throughout the University rests on all members of the University community, including all faculty, administration, staff, students and the Advisor to Students with Disabilities.

Procedures Regarding Students with Learning Disabilities

Dalhousie University is committed to providing equal educational opportunities and full participation for students with learning disabilities. These procedures regarding students with learning disabilities derive from the University's Policy on Accessibility for Students with Disabilities as stated above. These students are intellectually capable and possess potential which may not be fully

realized without a recognition of their special needs. We are both morally and legally required to supply such support consistent with the Policy on Accessibility for Students with Disabilities.

I. Admission

Students with diagnosed learning disabilities who meet the current admission requirements for Dalhousie University may follow the current admission procedures. All new Dalhousie students will receive in the offer of admission a statement indicating that, if they have a learning disability or any other disability for which they will require accommodations or special assistance, they should contact the Advisor to Students with Disabilities, in order to ascertain the degree to which their needs can be met.

Students with diagnosed learning disabilities who do not meet the current admission requirements or who otherwise wish to have their learning disability considered may apply for special consideration as may all other students who have extenuating circumstances. These requests will be made to the appropriate admissions committee, acting in consultation with the Advisor to Students with Disabilities and the other knowledgeable professionals.

The following documentation must be submitted by students who wish to apply for special consideration:

1. Letter(s) of recommendation from the individual(s) most familiar with the applicant's academic performance and/or potential for success at university;
2. A written, oral or electronic statement from the student. In this brief personal statement, students should describe their learning disability, how this affected their grades and the type of assistance they would require while at Dalhousie University;
3. A current (within three years) psychological assessment based on standard diagnostic instruments administered by a registered psychologist documenting the presence of learning disabilities. If a current report is not possible, Dalhousie University may accept an earlier report along with a current opinion (i.e., within the past year) expressed in a letter by a registered psychologist (or individual supervised by a registered psychologist) that the student has a learning disability. This letter should specify the nature, extent and rationale for programme modifications or accommodations that were deemed appropriate in the student's last two years of schooling.

ii Academic Accommodation for Students with Learning Disabilities

Students requesting academic accommodation will arrange a personal interview with the Advisor to Students with Disabilities. Schools and Faculties will provide relevant Faculty committees and individual Faculty members with fairly specific instruction as to the circumstances in which certain types of accommodation are normally to be made (e.g., the language requirement of the Faculty of Arts and Social Sciences). The Advisor to Students with Disabilities will assist faculty and students in developing reasonable accommodations.

A. Documentation Required

The student will provide the Advisor with a current (within three years) psychological report documenting the presence of a learning disability as outlined in Section A. above.

B. Procedures Regarding Academic Accommodation

Students are expected to identify themselves as having a learning disability and inform the Advisor to Students with Disabilities as early as possible and preferably before the beginning of the term. They should make this initial contact during office hours and be prepared to discuss strengths, weaknesses and the types of accommodation that may be necessary.

The Dalhousie University Policy on Accessibility for Students with Disabilities will guide the Faculties and the relevant committees in their deliberations. That policy specifies three factors that must be taken into account when considering requests for accommodations from students with disabilities: the needs of the students; preservation of the academic integrity of the programmes; and the ability of the University to provide resources.

C. Types of Academic Accommodation

The types of academic accommodation provided for students with learning disabilities may vary depending on the nature of the learning disability and the class content. For example, a student may benefit from an oral exam in one subject area, but not in another. It is not unusual for there to be an initial trial-and-error period of finding the best way to evaluate a student's ability to demonstrate mastery of class material.

Accommodations for students with learning disabilities typically can include but are not necessarily limited to the following:

- a. Extend the time permitted for a student with a learning disability to earn a degree;
- b. Modify programme requirements (e.g., class substitutions);
- c. Permit examinations to be proctored, read orally, dictated or typed;
- d. Allow extra time for completion of examinations and extend the time for the examination period;
- e. Change the test format (e.g., multiple choice to essay);
- f. Provide alternative formats for class materials;
- g. Permit basic four-function calculators and standard desk dictionaries during examinations;
- h. Use alternative methods for students to demonstrate academic achievement (e.g., a narrative tape instead of a journal);
- i. Permit review of final drafts of term papers with a proofreader and make changes without altering content; and
- j. Use computer software programs to assist in test-taking.

D. Appeals

Admission and programme appeals by students with learning disabilities will follow the usual procedures of the relevant Faculty at Dalhousie University.

E. Release of Information About Students

A student will be told before disclosing any information on learning disabilities that such information will be governed by the University Regulations on the Release of Information as indicated in this calendar.

III. Support Services

Dalhousie University endeavors to provide a broad range of support services to all of its students. Students wishing to obtain assistance from the University shall be expected to undertake a reasonable measure of self-advocacy to ensure that they are provided with the support services necessary. Such support services may include personal counseling, academic counseling, academic advising, and academic skill training.

NOTE 1: Accommodation of a student's needs due to disability will be facilitated if the student self-discloses and makes prior arrangements. Accommodation may be hindered if advance notification and/or prior arrangements have not been made.

Intellectual Honesty

A University should epitomize the quest for intellectual honesty. Failure to measure up to the quest for such a standard can result in an academic offence. The seniority of the student concerned, the presence of a dishonest intent, and other circumstances may all be relevant to the seriousness with which the matter is viewed.

Examples of Academic Offences

1. Plagiarism or Self-Plagiarism

Dalhousie University defines plagiarism as the presentation of the work of another author in such a way as to give one's reader reason to think it to be one's own. Plagiarism is a form of academic fraud.

Plagiarism is considered a serious academic offence which may lead to loss of credit, suspension or expulsion from the University, or even the revocation of a degree.

In its grossest form plagiarism includes the use of a paper purchased from a commercial research corporation, or prepared by any person other than the individual claiming to be the author.

Self-plagiarism is the submission of work by a person which is the same or substantially the same as work for which he or she has already received academic credit.

The University attaches great importance to the contribution of original thought to scholarship. It attaches equal importance to the correct attribution of authorities from which facts and opinions have been derived.

The proper use of footnotes and other methods of attribution varies from discipline to discipline. Failure to abide by the attribution standards of the discipline concerned in the preparation of essays, term papers and dissertations or theses may, in some cases, constitute plagiarism.

Students who are in any doubt about the proper forms of citation and attribution of authorities and sources should discuss the matter in advance with the faculty members for whom they are preparing assignments. In many academic departments, written statements on matters of this kind are made available as a matter of routine or can be obtained on request.

2. *Irregularities in the Presentation of Data from Experiments, Field Studies, etc.*

Academic research is predicated on the presentation of accurate and honestly derived data. The falsification of data in reports, theses, dissertations and other presentations is a serious academic offence, equivalent in degree to plagiarism, for which the penalties may include revocation of degrees, loss of credits or suspension or expulsion from the University.

Students who are in any doubt about the proper forms of citation and attribution of authorities and sources should discuss the matter in advance with the faculty member for whom they are preparing assignments. In many academic departments, written statements on matters of this kind are made available as a matter of routine or can be obtained on request.

4. *Irregularities in Admissions Procedures*

A person who gains admission or assists any other person in gaining admission by any irregular procedure, for example, by falsifying an academic record or by forging a letter of recommendation or by impersonating any other person, commits an academic offence and is liable to a penalty (see Senate Discipline Committee).

5. *Irregularities in Evaluation Procedures*

A member of the University who attempts or who assists any other person in an attempt to obtain, by irregular procedures, academic standing in a course related to any degree, diploma or certificate programme, commits an academic offence and is liable to a penalty. Without limiting possible irregularities in evaluation procedures that may be considered by the Senate Discipline Committee, the following examples shall be considered irregular procedures:

- (a) arranging for or availing oneself of the results of any personation at any examination or test, or
- (b) attempting to secure or accepting assistance from any other person at any examination or test, or
- (c) having in one's possession or using any unauthorized material during the time that one is writing any examination or test, or
- (d) without authorization procuring a copy of an examination, test or topic for an essay or paper, or
- (e) in the absence of any enabling statement by the Faculty member in charge of that course, submitting any thesis, essay, or paper for academic credit when one is not the sole author, or
- (f) without authorization submitting any thesis, essay or term paper that has been accepted in one course for academic credit in any other course in any degree, diploma or certificate programme.

Discipline

1. Members of the University, both students and staff, are expected to comply with the general laws of the community, within the University as well as outside it.
2. Alleged breaches of discipline relating to student activities under the supervision of the Dalhousie Student Union are dealt with by the Student Union. Alleged breaches of discipline

relating to life in the residences are dealt with by the appropriate Dean or Director of Residence in consultation with the relevant Residence Council. Senate is charged with the authority to deal with cases of alleged academic offenses, see examples above, (as delegated to the Senate Discipline Committee), as well as with certain other offenses that are incompatible with constructive participation in an academic community.

3. On report of a serious breach of the law, or a serious academic offence deemed by the President, or in his or her absence by a Vice-President or the Dean of a Faculty, to affect vital University interests, a student involved may be temporarily suspended and denied admission to classes or to the University by the President, Vice-President or Dean, but any suspension shall be reported to the Senate, together with the reasons for it, without delay.
4. No refund of fees will be made to any student required to lose credit for any course taken, required to withdraw or who is suspended or dismissed from any class or any Faculty of the University.

Senate Discipline Committee

A. Composition

The Committee comprises six representatives of the faculty elected by Senate for staggered three-year terms, one of whom shall be the Chair (chosen annually by the Committee), and four representatives of the student body. A student who is a member of the Judicial Board of the DSU may not at the same time be a member of the Senate Discipline Committee.

The Senate Nominating Committee shall arrange for nominations to fill casual vacancies for the remainder of the second term.

B. Functions

The Senate Discipline Committee shall:

1. consider all complaints or allegations respecting offences or irregularities of an academic nature, including those relating to admissions procedures and evaluation procedures, and may impose penalties in cases where the Committee finds an offence or irregularity has occurred;
2. have the power to discipline a student who, before or during the course of the disciplinary process involving him or her but prior to adjudication, has:
 - (i) been compelled to withdraw academically;
 - (ii) chosen to withdraw from the University prior to being disciplined; or
 - (iii) chosen not to register at the University;
3. assume jurisdiction when a complaint or allegation respecting offences or irregularities of an academic nature are brought to its attention by the Secretary of Senate; complaints or allegations may be made by faculty or other evaluators of academic work done by students; a panel of Student-Discipline Officers is available to assist and advise evaluators, and guidelines for evaluators are set out in the document entitled *Guidelines for Academic Evaluators Regarding Violations of Academic Regulations by students*;
4. conduct open hearings according to the rules of natural justice and such other procedures as the Committee may decide in advance, with due notice to all interested parties. A panel of three faculty and two students shall hear each complaint, including complaints made under the Code of Student Conduct. The Committee Chair or alternate chosen by and from the Committee shall chair each hearing;
5. evaluate the evidence of innocence or guilt of an accused student. This evaluation shall include the premise that the more senior the student in terms of chronological age, year of university registration, extent of other exposure to university rules and regulations at Dalhousie University or elsewhere, the less credible are assertions of ignorance or innocence and the stronger is the case for a more severe penalty than would be imposed on a less senior student;
6. report its findings, and any penalty imposed to the Secretary of Senate who shall forward a copy of the report to the student; if the alleged offender is not a student, a copy shall also be sent to the Vice-President (Academic and Research)

C. Appeals

An appeal from the decisions of the Senate Discipline Committee may be made to the Senate on such grounds as it determines are appropriate.

Where a Faculty, such as Health Professions, wishes to dismiss a student for their unethical conduct or unsuitability for any health profession, there is no appeal to the Senate Discipline Committee. Instead, an appeal may be made to a Senate *ad-hoc* committee.

D. Penalties

The range of penalties which may be imposed by the Senate Discipline Committee be circumscribed only by the requirement that such penalty or penalties be of an academic nature and, without restricting the generality of the foregoing, may include any one or more of:

- (i) notation of the fact of discipline on the offender's transcript for a period of one (1) or more years, but not exceed five (5) years;
- (ii) repeat of the assignment that triggered the discipline;
- (iii) a failing grade or mark or assessment in the piece of work triggering the discipline;
- (iv) failure of the class or seminar or programme;
- (v) failure of the academic year;
- (vi) suspension for an academic term or year (to a maximum suspension of three (3) academic years);
- (vii) expulsion from the University;
- (viii) loss of a current or continuing scholarship, or both, or loss of eligibility to receive or to maintain scholarships or prizes or bursaries; and
- (ix) removal from the Dean's List.

PLEASE NOTE: Transcripts will not be issued for a student while a Senate Discipline case is pending.

Code of Student Conduct

Commentary

1. Dalhousie University is a community of faculty, support staff and students, involved in teaching, research, learning and other activities. Students are members of the University for the period of their registration in the academic programme to which they have been admitted and as such assume the responsibilities that such registration entails.
2. The University does not stand *in loco parentis* to its student members, that is, it has no general responsibility for the moral and social behaviour of its students, as if they were its wards. In the exercise of its disciplinary authority and responsibility, the University treats students as free to organize their own personal lives, behaviour and associations subject only to the law and to University regulations that are necessary to protect the integrity of University activities, the peaceful and safe enjoyment of University facilities by other members of the University and public, the freedom of members of the University to participate reasonably in the programmes of the University and in activities in or on the University's premises, or the property of the University or its members. Strict regulation of such activities by Dalhousie University is otherwise neither necessary nor appropriate.
3. University members are not, as such, immune from the criminal and civil laws of the wider political units to which they belong. Provisions for non-academic discipline should not attempt to shelter students from their civic responsibilities nor add unnecessarily to these responsibilities. Conduct that constitutes a breach of the Criminal Code or other statute, or that would give rise to a civil claim or action, should ordinarily be dealt with by the appropriate criminal or civil court. In cases, however, in which criminal or civil proceedings have not been taken or would not adequately protect the University's interest and responsibilities as defined below, proceedings may be brought under a discipline code of the University.
4. The University must define standards of student behaviour and make provisions for student discipline with respect to conduct that jeopardizes the good order and proper functioning of the academic and non-academic programmes and activities of the University or its faculties, schools or departments, or that endangers the health, safety, rights or property of the University or its members or visitors.

5. The University may also define standards of professional conduct for students in programmes where these are appropriate, and this Code is not intended to replace or supersede such standards.

A. Definitions

1. In this Code, the word "premises" includes lands, buildings and grounds of the University, or other places or facilities used for the provision of the University's programmes or services or for University-approved events and activities.
2. In this Code, "student" means a person:
 - (i) engaged in any academic work or placement which leads to the recording and/or issue of a mark, grade or statement of performance by the appropriate authority in the University or another institution; and/or
 - (ii) registered in, enrolled in, or attending any course or class, or otherwise participating as a learner in any activity which entitles the person to the use of a University library, library materials, library resources, computer facility or dataset.
3. In this Code, the words "Dalhousie University" refer to Dalhousie University and include any institutions affiliated with it, where such inclusion has been agreed upon by the University and the affiliated institution, with respect to the premises, facilities, equipment, services, activities, students and other members of the affiliated institution.
4. Unless otherwise stated, a student will only be liable for conduct that she or he knew or ought reasonably to have known would constitute conduct prohibited under this Code.
5. Nothing in this Code shall be construed to prohibit peaceful assemblies and demonstrations, or lawful picketing, or to inhibit freedom of speech.

B. Offences

The following conduct shall be deemed to be an offence under this Code, when committed by a student of Dalhousie University, provided that such conduct:

- (i) occurs on premises of Dalhousie University or elsewhere in the course of activities sponsored by Dalhousie University or by any of its faculties, schools or departments; and
- (ii) is not specifically assigned to another disciplinary body within the University as in the case of sexual harassment as described in the Policy and Procedures: Sexual Harassment; and
- (iii) (a) has not already been dealt with as failure to meet standards of professional conduct as required by a college, faculty or school; or
(b) is not subject to the disciplinary authority of the Dalhousie Student Union; or
(c) is not subject to action under a residence discipline policy unless some non-residence University interests are deemed to be involved, in which case the President may specifically authorize proceedings under this Code.

1. Offences Against Persons

- (a) No student shall assault another person sexually or threaten any other person with sexual assault.
- (b) No student shall otherwise assault another person, threaten any other person with bodily harm, or cause any other person to fear bodily harm.
- (c) No student shall create a condition that unnecessarily endangers the health or safety of other persons.
- (d) No student shall threaten any other person with damage to such person's property, or cause any other person to fear damage to her or his property.

2. Disruption

No student shall undertake by action, threat or otherwise, to disrupt, obstruct or adversely affect any activity organized by Dalhousie University or by any of its faculties, schools or departments, or the right of another person or persons to carry on their legitimate activities, to speak or to associate with others.

3. Offences Involving Property

- (a) No student shall take without authorization, mis-use, destroy or damage the property or premises of Dalhousie University,

or property that is not her or his own, or information or intellectual property belonging to Dalhousie University or to any of its members.

- (b) No student shall deface the property of Dalhousie University.
- (c) No student shall possess the property of Dalhousie University, property in the custody of Dalhousie University, or property that is not her or his own, if the student knows that property to have been appropriated without authorization.
- (d) No student shall create a condition that unnecessarily endangers or threatens destruction of the property of Dalhousie University or of any of its members.

4. Unauthorized Use of University Facilities, Equipment or Services

- (a) No student shall use any facility, equipment or service of the University, or enter or remain on any premises, to which he or she does not have legitimate access, or contrary to the expressed instruction of a person or persons authorized to give such instruction, unless the student has good reason for doing so.
- (b) No student shall gain access to or use any University computing or internal or external communications facility to which legitimate authorization has not been granted. No student shall use any such facility for any commercial, disruptive or unauthorized purpose, or in any other way that is incompatible with the principles in the Guide to Responsible Computing.
- (c) No student shall mutilate, misplace, misfile, or render inoperable any stored information such as books, film, data files or programmes from a library, computer or other information storage, processing or retrieval system.

5. Aiding in the Commission of an Offence

No student shall encourage or aid another student in the commission of an offence defined in this Code, or encourage or aid behaviour by a non-student which, if committed by a student, would be an offence under this Code.

6. Alcohol and Drug Use

No student shall contravene the Liquor License Act of Nova Scotia or a provision of the Campus Alcohol Policy, nor shall any student possess, use or sell a drug to which access is restricted by the Narcotics Control Act.

7. False Information and Identification

- (a) No student shall knowingly furnish false information to any person or office acting on behalf of the University.
- (b) No student shall forge, alter or misuse any document, record or instrument of identification.

8. Unauthorized Possession of a Firearm or Weapon

No student shall possess a firearm or other weapon on the University premises without the specific written permission of the Chief of Security.

9. Contravention of University Regulations

When a rule, regulation or policy of the University prohibits or proscribes certain conduct but does not provide any penalty for breaches of the rule, regulation or policy, breaches shall be dealt with under this Code.

10. Other

No student shall contravene any provision of the Criminal Code or any other federal, provincial or municipal statute on the premises of the University or in the course of the University's programmes or services, or University-approved events or activities.

C. Procedures

1. Whenever possible and appropriate, reason and moral suasion shall be used to resolve issues of individual behaviour before resort is made to formal disciplinary procedures.
2. Any person may make a complaint against any student for misconduct. A complaint shall be prepared in writing and directed to the Vice-President, Student Services. Any complaint should be submitted as soon as possible after the event takes place. All complaints shall be presented to the accused student in written form.
3. The Vice-President, Student Services, or designate shall conduct an investigation to determine if the complaint has

merit and/or if it can be disposed of informally by mutual consent of the parties involved on a basis acceptable to the Vice-President, Student Services. The Vice-President, Student Services, shall invite the President of the Student Union or his or her designate to participate in any attempts to resolve the matter informally. If an informal disposition of the complaint results, such disposition shall be final and there shall be no subsequent proceedings.

4. If the complaint cannot be resolved informally through the procedures described in section 3, or if in the judgment of the Vice-President, Student Services, it is not appropriate for the complaint to be so resolved, the Vice-President, Student Services, shall refer the complaint to the Senate Discipline Committee for a formal hearing.
5. Hearings shall be conducted by the Senate Discipline Committee according to procedures determined by the Committee.
6. The President or designate shall appoint a person to present the complaint.
7. If a student fails to appear at a hearing, the hearing may proceed, provided that the student has been given adequate notice. Except in the case of a student charged with failing to obey the summons of the Committee or University official, no student may be found to have violated the Student Code solely because the student failed to appear before the Committee. In all cases, the evidence in support of the complaint shall be presented and considered.

D. Sanctions

1. In each case in which the Senate Discipline Committee determines that a student has violated the Student Code, the sanction(s) shall be determined and imposed by the Committee.
2. The following sanctions may be imposed upon any student found to have violated the Student Code:
 - (a) Warning—A notice in writing to the student that the student is violating or has violated institutional regulations.
 - (b) Probation—A written reprimand for violation of specified regulations. Probation is for a designated period of time and includes the probability of more severe disciplinary sanctions if the student is found to be violating any institutional regulation(s) during the probationary period.
 - (c) Loss of Privileges—Denial of specified privileges for a designated period of time.
 - (d) Fines—Previously established and published fines may be imposed.
 - (e) Restitution—Compensation for loss, damage or injury. This may take the form of appropriate service and/or monetary or material replacement.
 - (f) Discretionary Sanctions—Work assignments, service to the University or other such discretionary assignments that are considered appropriate by the Discipline Committee.
 - (g) Conditions—Conditions may be imposed upon a student's continued attendance.
 - (h) University Suspension—Suspension of the student from the University for a specified period of time, after which the student is eligible to return. Conditions for readmission may be specified.
 - (i) University Expulsion—Permanent separation of the student from the University.
3. More than one of the sanctions listed above may be imposed for any single violation.
4. Other than expulsion from the University and suspension for the duration of its effect, disciplinary sanctions shall not be made part of the student's academic record, but shall be kept on file in the Office of the Vice-President, Student Services, for use in the event of further breaches of this Code.
5. No student found guilty of an offence under this Code shall refuse to comply with a sanction or sanctions imposed under the procedures of this Code. Such refusal will constitute grounds for the imposition of additional sanctions.
6. The Committee may direct that a sanction be held in abeyance if a student's registration at the University is interrupted for any reason.

E. Interim Suspension

In the following circumstances, the President of the University, or a designate, may impose an interim suspension prior to the hearing before the Committee.

1. Interim suspension may be imposed only: (a) to ensure the safety and well-being of members of the University community or preservation of University property; (b) to ensure the student's own physical or emotional safety and well-being; or (c) if the student poses a threat of disruption or of interference with the normal operations of the University.
2. During the interim suspension, students may be denied access to specified campus facilities (including classes) and/or any other University activities or privileges for which the student might otherwise be eligible, as the President or the designate may determine to be appropriate.
3. A student who is the subject of an interim suspension may request a hearing before the Senate Discipline Committee on the issue of the interim suspension itself. This request shall be submitted in writing, with reasons, to the Secretary of Senate. The Committee shall hear the matter, including submissions by the President or designate, within ten working days, and shall have the authority to confirm, negate, or alter the terms of the interim suspension.

Suspension or Dismissal from a Programme on the Grounds of Professional Unsuitability - Faculty of Health Professions

The Faculty of Health Professions, acting through its Committees on Studies at the School/College and Faculty levels, and in consultation with the Directors and Dean, may suspend or terminate a student from a programme if the student is judged to be unsuitable for the profession in which s/he is studying. Because of the nature of the study and practice of the various health professions, which places caregivers in a position of special trust, certain impairments or some types of conduct unbecoming to a member of a health profession may be grounds for suspension or dismissal.

The following list includes examples of behaviours that might indicate unsuitability for the various health professions. The nature of these behaviours is such that, should any of them ever be repeated, grievous harm could be caused to clients. This list should not be considered to be all inclusive:

- (i) a criminal act (e.g., assault, sexual assault, fraud, and drug trafficking) which according to established Faculty processes was determined to be of such a nature as to bring disrepute to the profession, or by which in the opinion of the Faculty, the student demonstrated poor judgment, lack of integrity or (other) unsuitability for the profession; or evidence that, on the balance of probability, the student had committed such an act;
- (ii) being under the influence of alcohol or drugs while participating in client care, any other professional activity, or any activity related to the practice of the health profession;
- (iii) in accordance with provisions of the Nova Scotia Human Rights Act, the occurrence of a health condition that impairs essential performance required for the health profession;
- (iv) unethical behaviour as specified by the code of ethics/standard of practice of the health profession.

The student's situation will be considered with discretion throughout the investigation of the allegation of unsuitability and these deliberations shall determine whether suspension, dismissal or neither is recommended. The principles of natural justice and due process will be observed in all investigations.

Any member of the University community can bring to the attention of the Director behaviours that are deemed unsuitable. These behaviours will be investigated and allegations heard.

Appeals will follow the appeal procedure for academic matters within the Faculty of Health Professions notwithstanding that the criteria are different. At the University level, appeals will require formation of an *ad hoc* Senate Committee.

Guide to Responsible Computing

In recognition of the contribution that computers can make to furthering the educational and other objectives of the University, this Guide is intended to promote the responsible and ethical use of University computing resources. It is in the best interests of the community as a whole that these resources be used in accordance with certain practices which ensure that the rights of all users are protected and the goals of the University are achieved.

This Guide applies to all computer and computer communication facilities owned, leased, operated, or contracted by the University. This includes word processing equipment, micros, mainframes, minicomputers, and associated peripherals and software, regardless of whether used for administration, research, teaching, or other purposes.

It should be noted that system administrators of various campus computing facilities and those responsible for the computer access privileges of others may promulgate regulations to control use of the facilities they regulate. System administrators are responsible for publicizing both the regulations they establish and their policies concerning the authorized and appropriate use of the publicly available equipment for which they are responsible.

A. Basic Principles

Individuals should use only those University computing facilities they have been authorized to use. They should use these facilities:

- (a) with respect to the terms under which they were granted access to them;
- (b) in a way that respects the rights of other authorized users;
- (c) so as not to interfere with or violate the normal, appropriate use of these facilities;
- (d) so as not to impose unauthorized costs on the University without compensation to it.

B. Elaboration

1. Individuals should use only those University computing facilities they have been authorized through normal University channels to use. They should use these resources in a responsible and efficient manner consistent with the objectives underlying their authorization to use them.
2. Individuals should respect the rights of other authorized users of University computing facilities. Thus, they should respect the rights of other users to security of files, confidentiality of data, and the benefits of their own work. Users should respect the rights of others to access campus computing resources and should refrain from:
 - (a) using the computer access privileges of others without their explicit approval;
 - (b) accessing, copying, or modifying the files of others without their permission; and
 - (c) harassing others in any way or interfering with their legitimate use of computing facilities.
3. Individuals should respect the property rights of others by refraining from the illegal copying of programs or data acquired by the University or other users or putting software, data files, etc. on University computers without the legal right to do so.
4. Individuals should not attempt to interfere with the normal operation of computing systems or attempt to subvert the restrictions associated with such facilities. They should obey the regulations affecting the use of any computing facility they use.

C. Disciplinary Actions

Reasonable suspicion of a violation of the principles or practices laid out in this Guide may result in disciplinary action. Such action will be taken through normal University channels.

Nothing in this Guide diminishes the responsibility of system administrators of computing services to take remedial action in the case of possible abuse of computing privileges. To this end, the system administrators with the approval of the President and with due regard for the right of privacy of users and the confidentiality of their data, have the right, to suspend or modify computer access privileges, examine files, passwords, accounting information, printouts, tapes, and any other material which may aid in an investigation of possible abuse. Whenever possible, the cooperation

and agreement of the user will be sought in advance. Users are expected to cooperate in such investigations when requested. Failure to do so may be grounds for cancellation of computer access privileges.

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 Thompson, A.F., BDS (Dundee), DDS (Dal), Dip Ortho (Tor), Orthodontics
 Wilson, J., BSc (UNB), DDS (Dal), MS (Ohio State), Prosthodontics
 Wright, B.A., BDS, (Lond) LDS, RCS (Eng), DDS (Dal), MS (Indiana), MD (Dal), RCPS, Oral and Maxillofacial Surgery

Adjunct Professor

Farag, T., MBBCH, DCH, DMSc (Ain Shams), MSc, FRCP (Edinburgh), Oral and Maxillofacial Pathology

Adjunct Assistant Professor

Taheri, F., DEng (SMU), BEng, MASC, PhD (TUNS), Biomaterials

Lecturers

Abbass, S., BSc (St. FX), DDS (Dal), Prosthodontics
 Ams, P.W.H., BSc, DDS (Dal), Prosthodontics
 Bonang, D., DDS (Dal), FICD, Ethics, Patient and Community Care
 Hart, B., DDS (Dal), Prosthodontics
 MacLean, H., DDS (Dal), Patient and Community Care
 Middlebrook, H., BDS (London), LDS, RCS, DDS (Dal), Periodontics
 Nette, A., DDS (Dal), Prosthodontics
 Fyke, S., BSc (MtA), DDS (Dal), Prosthodontics
 Ramier, W., BSc (UNB), DDS (Dal), Patient and Community Care
 Rix, R., BSc, DDS (Dal), Pediatric Dentistry
 Salyzyn, M., BSc, DDS (Dal), Patient and Community Care
 Stirling, P., DDS, MSc (Dal), FRCD(C), Oral & Maxillofacial Surgery
 Trider, D.J., BSc, MSc, DDS (Dal), Prosthodontics
 Zwicker, G., BSc (Acadia), DDS (Dal), Prosthodontics

Instructors

Anderson, G., DDS (Dal), Patient and Community Care
 Baker, C., BSc, DDS (Dal), Pediatric Dentistry
 Bell, P., DipDH, DDS (Dal), Periodontics
 Blanchard, K., DDS (Dal), Prosthodontics
 Boyle, T., DDS (Dal), Prosthodontics
 Buchanan, D.G., BSc, DDS (Western), Prosthodontics
 Canning, C., BSc, DDS (Dal), Oral and Maxillofacial Radiology
 Chiasson, M., BN, DDS (Dal), Periodontics
 Chisholm, A., BSc (St.FX), DDS (Dal), Patient and Community Care
 Creaser, B., BSc, DDS (Dal), Prosthodontics
 Cullinan, J., DDS (Dal), Patient and Community Care
 Davis, B., BSc (St.FX), DDS (Western), MSc (Tor), Oral and Maxillofacial Surgery
 Fischel, A., BSc, DDS (McGill), Periodontics
 Goodline, B., DDS (Dal), Endodontics
 Grantmyre, C., BSc, DDS (Dal), Prosthodontics
 Haidar, N., BSc, DDS (Dal), Patient and Community Care

Hatheway, R., Orthodontics
 Hoetten, F., DDS (Dal), Prosthodontics
 Kendall, J., BSc, DipDH (Dal), Periodontics
 MacIsaac, B., BSc (SMU), DipDH (Dal), Periodontics
 MacSween, R., BSc (Acadia), DDS (Dal), Patient and Community Care
 McGrail, K., DipDH (Dal), Oral and Maxillofacial Radiology
 Miller, D., BSc (Mem), DDS (Dal), Prosthodontics
 Moller, M., BSc (SMU), DDS (Dal), Patient and Community Care
 Moore, D., BSc, DDS (Dal), Periodontics
 Nichols, M., BSc (MSVU), DDS (Dal), Patient and Community Care
 Poon, A., BDS (Hong Kong), Patient and Community Care
 Rhodenizer, K., BSc (Acadia), DDS (Dal), Patient and Community Care
 Raftus, R., DDS (Dal), Prosthodontics
 Richardson, S., BSc (PEI), MSc, DDS (Dal), Cert. Pros (State Univ NY), Cert. Maxill. Pros (Roswell Park Cancer Instit.), Prosthodontics
 Silver, T., BSc (St.FX), DDS (Dal), Prosthodontics
 Smith, B., BComm, LLB (Dal), Patient and Community Care
 Smyth, B.A., BSc (UNB), MSc (TUNS), Biomaterials
 Stewart, A., DDS (Dal), Prosthodontics
 Underhill, K., BSc (UNB), DDS (Dal), Prosthodontics
 Usher, G., BSc (MtA), DDS (Dal), Cert in Endo (Tufts), Endodontics
 West, D., BSc (MtA), DDS (Dal), Prosthodontics
 Zwicker, P., BSc, DDS (Dal), Prosthodontics

I. Introduction

The Maritime Dental College was founded in 1908 and quartered in rooms provided by Dalhousie University in the Forrest Building. In 1912 the Maritime Dental College became the Faculty of Dentistry of Dalhousie University. The Dentistry building, which was opened in 1958 and extensively enlarged and renovated in 1980, serves as the principle clinical, didactic teaching and research base of the Faculty. Medical science classes of the Dentistry course are offered by Departments of the Medical Faculty located in the Sir Charles Tupper Medical Building.

The educational programme is supplemented by clinics and demonstrations in metro hospitals and Faculty operated community-based clinics. These arrangements enable students to obtain extensive and varied clinical instruction and experience.

In addition to the DDS Programme the Faculty also offers a six-year combined graduate programme leading to the Degrees of MD/MSc in Oral Surgery, a two-year programme leading to a Diploma in Dental Hygiene, and a two-year Qualifying programme which is one of the requirements for graduates of foreign dental programmes for certification by the National Dental Examining Board of Canada.

The Faculty also has an office for Continuing Education which arranges short classes primarily for dentists and dental hygienists. Alumni are a vital part of the Faculty through the office of Alumni Affairs.

II. Doctor of Dental Surgery Programme

A. Admission

1. Minimum Academic Requirements

While enrolled in a regular bachelor's degree programme whose sole entrance requirement is Nova Scotia grade 12 or its equivalent, completion of the following by the end of the Spring Session of the year of expected entry to the Faculty of Dentistry: a minimum of 10 full-year academic classes* (usually during two years of full-time attendance), including university classes of a full academic year's* duration in: Introductory Biology (with lab), Introductory Chemistry (with lab), Introductory Physics (with lab), and Organic Chemistry (with lab). Other classes required are: Introductory Microbiology, Introductory Biochemistry, and Vertebrate Physiology as well as three full year academic classes* chosen from the humanities and/or social sciences, one of which must involve a significant written component. Content must be similar to that as prescribed by the Dalhousie Dental School. Classes must have been completed within a reasonable time period prior to admission.

Credit will be given for correspondence classes that are offered by a university as credit classes. Such classes must have their content, sequence, format and testing well defined.

A current Level C CPR - Basic Rescuer certificate is required prior to admission.

*a combination of two one-term academic classes in the same discipline is considered equivalent to one full-year academic class.

The Faculty of Dentistry considers it desirable that all students intending to proceed to the study of dentistry should acquire a broad academic background and attain facility in the use of the written and spoken word. Therefore, while minimum entrance requirements are established, students are encouraged to proceed to a Bachelor's degree before seeking admission to the Faculty of Dentistry, particularly if there is any intention or likelihood of proceeding to graduate programmes in dentistry or associated sciences. This statement is not to be interpreted to mean that any penalty will be imposed upon those who do not have more than the stated minimum requirements and truly outstanding candidates may be admitted after completion of the minimum entrance requirements.

Prior to or after making application to the first year of the DDS Programme, applicants are strongly encouraged to spend time in the office of their family dentist to learn about the dental profession.

Because of the difficulty in comparing marks and grades from the various universities from which dentistry students are drawn, it is not possible to state a minimum standard that ensures serious consideration for admission. Completion of advanced level classes with grades which are better than average is an indication of ability to succeed academically as a dentistry student. An academic record which shows failed or repeated classes, classes passed with low grades or supplementary examinations, particularly in the two years prior to anticipated entry to dental school, makes the prospect of admission unlikely.

Applicants with the best academic record have the greatest chance of admission. Nonetheless, the Admissions Committee can and does make significant use of non-academic factors in deciding which applicants are admitted (e.g. Dental Aptitude Test, interviews, references).

For the information of potential applicants, the following is provided showing the characteristics of the applicants and entering class of 1997/98.

- Number of applicants: 177
- Number enrolled: 36 (14 males, 22 females)
- Age of Students: Range: 20-36, Mean 24
- Residence: Atlantic Provinces - 26; Other Canadian Provinces - 2; International - 8 (Malaysia - 7, US - 1);
- Mean DAT, reading comprehension - 21; Mean DAT, PAT - 16; Mean DAT, chalk carving - 16; Mean DAT, science average - 18; Mean University final two year - 86.5%; Mean University higher sciences average - 84.1.

B. Application Procedure

The Faculty of Dentistry application form must be submitted to the Office of the Registrar by December 1. Applications from all students, including those who have attended Dalhousie or King's must be accompanied by a \$60.00 admission fee, which is not refundable and is not applicable to tuition fees. A new application form must be submitted in each year in which application is made. Applications must be complete before they will be considered by the Admissions Committee. Applications submitted by the deadline may be completed at any time up to June 30, however, applicants are encouraged to submit supporting documents by February 1. Applications completed after February 1 are considered when completed if unfilled places remain in the entering class. The following documentation must be submitted in support of the application:

- a) Faculty of Dentistry application form
- b) Applicants must submit results from an approved Dental Aptitude Testing Programme. Applicants must complete the Dental Aptitude Test no later than February to be considered for admission to the following September. Information

regarding the Canadian Dental Aptitude Testing Programme may be obtained from the Office of the Registrar, from the Faculty of Dentistry, or by writing to the Administrator, Dental Aptitude Test Programme, Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6.

- c) Official transcripts in support of the applicant's academic record must be forwarded by the Institution or Institutions at which the applicant completed his pre-professional studies. If the applicant is still engaged in university studies, it would be advantageous to forward an interim transcript and a final transcript must be forwarded on completion of these credits. Dalhousie University regards an applicant's failure to disclose all his/her previous academic experiences to be an academic offence which could lead to subsequent dismissal from the University. Applicants must ensure that all successful or unsuccessful university attendance is indicated on the application form.
- d) Three completed confidential evaluation forms (provided in the application package) in regard to the applicant's character are to be forwarded directly to the Registrar. Two of these forms must be from a university faculty member who has taught the applicant recently or from a recent employer if the applicant is employed. The remaining forms should be from someone (not a relative) known to the applicant.
- e) Competitive applicants will be required to attend an admissions interview.

An application will not be considered if the applicant has been required to withdraw from studies at any other School of Dentistry or Medicine at the request of the Faculty of that Institution, unless the application is supported by a recommendation from the Dean of that School.

On notice of acceptance to the Faculty of Dentistry, applicants must deposit with the Registrar the sum of \$200.00 before a specified date. This amount is credited toward tuition fees if the student registers, but is not refundable if he/she withdraws.

The admissions procedures may be amended without notice by the Faculty of Dentistry.

C. Place of Residence of Students

The number of students admitted in any one year is limited by the availability of physical facilities.

Preference is given to residents of the Atlantic Provinces but applications from well qualified applicants from other provinces and countries may be considered.

To qualify as a permanent resident of any province, an applicant must meet the following criteria:

- i. his/her parent(s), guardian, or spouse must reside in that province on a permanent basis;
- or
- ii. if the applicant is independent of his/her parent(s) or guardian, he/she must have lived and worked on a full-time basis in that province (not attending school on a full-time basis) for a minimum of one full year.
- iii. an applicant whose parent(s), guardian, or spouse do not meet the residency requirements as a direct result of a recent employment transfer, either into or out of a particular province would be given the choice (either the province of immediate former or future residency) of his/her province of residence.

D. Assessment of Applicants with an International Educational Background

The Faculty of Dentistry will consider applications to the Doctor of Dental Surgery degree programme from individuals who have received their former education outside the Canadian educational system. Such applicants will be assessed on an individual basis and may be required to fulfil specific criteria, such as, but not confined to those outlined below.

- A. If the applicant's first language is not English, he/she must complete the TOEFL (Test of English as a Foreign Language) with a minimum score of 600 and the TWE (Test of Written English) with a minimum score of 5.0.
- B. Complete an approved Dental Aptitude Test.

- C. Original supporting documents from previous education completed must be provided, including class descriptions, and explanation of the grading system used, and class standings.
- D. Completion of the prerequisite university study in North America.

E. Immunization Policy

The Faculty of Dentistry's immunization policy requires that all students show documented appropriate immunization for tetanus, diphtheria, polio, measles, mumps, rubella and chicken pox. Proof of immunization must be written documentation obtained from a physician and/or public health facility, including the date of the immunization. All students must be immunized against Hepatitis B, which will be made available in a three injection series in the autumn of first year. It is strongly recommended that all students be immunized against influenza. During week 1, students are skin tested to establish their tuberculin status.

F. Students with Learning Disabilities

Dalhousie University is committed to providing equal educational opportunity and full participation for students with learning disabilities.

See University Regulations, page 11.

III. Qualifying Programme

As a result of changes to the certification process of the National Dental Examining Board of Canada (NDEB), graduates of programmes not accredited by the Commission on Dental Accreditation of Canada, i.e., Non-Canadian and Non-USA graduates, will be certified by successfully completing a two-year "Qualifying Programme" and the same NDEB examinations as those taken by Canadian and USA graduands and graduates.

The purpose of the Qualifying Programme is to provide an educational opportunity for Non-Canadian and Non-USA dentists to prepare for the NDEB certification examinations.

The Faculty of Dentistry accepts up to eight students into the Qualifying Programme.

Applicants must be Canadian citizens or residents.

A. Application Procedure

Application forms, accompanied by a \$55.00 application fee, must be submitted to the Office of the Registrar, Dalhousie University by December 1. The following documentation must be submitted by February 1 at the latest in support of an application.

1. Dental graduation certificate or equivalent.
2. University transcript (or equivalent) and calendar class descriptions, indicating the classes completed for the dental degree referred to in No. 1.
3. Demonstrated proficiency in English, e.g. An acceptable score in English tests such as TOEFL, IELTS, MELAB, CanTEST, TWE (see Dalhousie University guidelines).
4. Results of the Eligibility Examination (EE). The Eligibility Examination is coordinated by the Association of Canadian Faculties of Dentistry / l'Association des facultés dentaires du Canada (ACFC/AFDC) and is the initial screening examination for acceptance into one of the Qualifying Programmes. Inquiries regarding the Eligibility Examination should be directed to the Central Office of the Association of Canadian Faculties of Dentistry / l'Association des facultés dentaires du Canada, telephone number (613) 237-6505.

Competitive applicants will be required to complete an admissions interview and a further evaluations. Inquiries regarding the Qualifying Programme at Dalhousie University should be directed to the Office of the Dean, telephone number (902) 494-2274.

B. Tuition

Tuition cost is \$30,000.00 per year. A fee of \$4000.00 per year includes student kit, clinic user fee, manuals and handouts, mandatory vaccinations and the fee for the required successful completion of Level C CPR Basic Rescuer certificate. The cost of textbooks is NOT covered in the tuition cost.

IV. Academic Regulations

The following section describes academic regulations within the Faculty of Dentistry. More detailed information is provided to each student at the beginning of the academic year in the Academic Policy Manual and the Clinic Policy Manual. These Policy Manuals contain information for students and faculty members on the following areas: Evaluation of Students, Grade Procedures, Remedial Opportunities, Supplemental Examinations, Promotion and Graduation, Examination Regulations, Appeal Procedures, Class Waivers, Students Absences, Senate Discipline, Student Class Evaluation and Clinic Protocol and Procedures.

A. Academic Programme

The course for the degree of Doctor of Dental Surgery extends over four years. The course for the Qualifying Programme extends over two years. It is to be distinctly understood that the regulations regarding courses of study, examinations, fees, etc., contained in this calendar are intended for the current year only, and that the University does not hold itself bound to adhere absolutely to the curriculum and conditions laid down.

B. Academic Year - DDS Programme

The academic year for years one and two commences in early September and continues until the latter part of May. The academic year for year three commences in early September and continues to late June. The academic year for the fourth-year class begins in July with 4 weeks vacation in August and terminates in the early part of May. Late registration will be permitted only under most exceptional circumstances, if approved by the Dean. Total length of the programme is currently 144 weeks in actual attendance: two 35.5-week sessions of two terms each, a 38.5-week session of three terms in third-year, and a 35-week session of two terms in the fourth year.

C. Academic Year - Qualifying Programme

The academic year for year one commences in early May and continues to late June. The academic year for year two commences in early July, with 4 weeks vacation in August and terminates in the early part of May. Late registration will be permitted only under the most exceptional circumstances, if approved by the Dean. Total length of the programme is currently 90.5 weeks in actual attendance: one 55.5 week session of 4 terms in the first year and one 3 term session in second year.

D. Class Outlines and Program Changes

Before the beginning of term, each Class Director must provide a copy of the class outline, including evaluation methods, according to University and Faculty format with any individual additions, to the Office of the Associate Dean for Academic Affairs. Students will be provided with a class outline by the instructor at the first meeting of the class.

Programme changes as to content, requirements, etc., may be necessary and may not be reflected in a given edition of the Calendar. Such changes will be included in the class outline provided to students at the first meeting of the class. Instructors may make changes to class outlines at any time. However, if these changes affect any of the following areas, at least two-thirds of enrolled students must approve the changes in order for them to be valid: (a) assessment components; (b) weight of individual assessment components; (c) examination requirements with a value of 10% or greater.

E. Class Waiver Policy

Entering Students

Class waivers may be granted by the Academic Standards Class Committee upon the recommendation of the Class Director. Requests for such waivers must be directed to the Associate Dean for Academic Affairs, and must be accompanied by university transcripts and class descriptions. Such requests should be initiated prior to registration and a request will not be considered after the class has been in progress for two weeks. Students must attend all classes and complete all class requirements until notified by the Associate Dean (Academic) that a class waiver has been granted.

Repeating Students

Individual class waivers for students repeating the year as a result of failing grades may be granted by the Class Committee and only for classes in which a grade of B or higher was obtained. A student thus repeating a year is not permitted to register concurrently for classes in any other year of the Dentistry/Dental Hygiene programme.

Class waivers will not normally be granted for classes with preclinical/clinical components.

Students who are granted a class waiver shall, for the purpose of establishing (1) class rank; (2) grade point average; and (3) prizes and awards, have their final grades computed using only the required classes being taken.

Policies and procedures regarding application for and awarding of class waivers are outlined in the Academic Policy Manual.

F. Review of Students

Student academic and professional progress is reviewed at least twice each term by the appropriate Academic Standards Class Committee (membership - Class Directors of the respective year of the programme), and each student is provided with his/her Achievement Classification (I to VI as described in the Academic Policy Manual). Appropriate remedial actions will be initiated for students with Classifications II to VI. Students with Classifications IV to VI may be placed on probation.

G. Guidelines for Student Probation

1. A student may be placed on probation for academic or professional reasons, described in classifications IV, V, VI in the Academic Policy Manual.
2. Probation shall usually occur when there are multiple concerns in one or both of the above parameters.
3. Probation shall only be implemented following thorough review of a student's progress by the appropriate Academic Standards Class Committee.
4. Student(s) on probation must be reviewed regularly at the meeting of the appropriate Academic Standards Class Committee.
5. A student who has fulfilled all of the conditions of probation, in the opinion of the Class Committee, shall be removed from probation and permitted to proceed in the appropriate class as recommended by the Class Committee.
6. A student shall not be eligible to sit final examinations and may not be promoted while on probation.
7. A student who has not met the conditions of probation shall be required to (a) enroll in a supplementary educational programme; or (b) repeat an academic year; or (c) withdraw from the Faculty.

H. Academic Accommodation for Students with Learning Disabilities

See University Regulations, pg. 11.

Students wishing to discuss accommodation for disabilities within the Faculty of Dentistry should contact the Assistant Dean for Student Affairs, Faculty of Dentistry.

I. Examination and Class Grades

1. Admission to Examinations

In order to qualify for admission to examinations, candidates must attend the prescribed classes of the curriculum regularly and punctually. Students are expected to attend all lectures, seminars, preclinical and clinical sessions. A student shall not be eligible to sit final examinations while on probation. The Examination Regulations of the University are followed, as well as specific Faculty of Dentistry regulations which are provided to students in the Academic Policy Manual.

2. Promotion and Graduation

A student will not normally be promoted or graduated unless a passing grade in all subjects and a clinical, didactic and overall grade point average of 2.00 has been achieved.

A student who has achieved an overall grade point average of at least 2.00 and received one or two marginal failure grade(s) may be offered the privilege of taking the required remedial steps to prepare for a supplemental examination(s). Successful passing of the supplemental examination(s) prior to commencement of the academic year will permit promotion. Failure to pass the supplemental examination may result in the student being offered the privilege of repeating the year.

A student who has passed all classes and failed to achieve a clinical, didactic, and overall grade point average of 2.00, but has attained a grade point average of 1.70 or greater, may be offered the privilege of repeating the year.

A student who has attained a minimum clinical, didactic, and overall grade point average of 2.00, but has obtained an F grade in one class, may be offered the privilege of repeating the year.

A student who has obtained an overall grade point average of less than 1.70, or who has obtained an F grade in two or more classes or who has obtained a grade point average less than 2.00 with one or more failing grades will normally be required to withdraw from the Faculty.

Summary

- Minimum GPA 2.00 and no failing grades = promotion, graduation
- Minimum GPA 2.00 and one or two marginal failure (FM) grades = supplemental privileges
- Minimum GPA 2.00 and one F grade = may be offered privilege of repeating year
- Minimum GPA 1.70 and no failing (F or FM) grades = may be offered privilege of repeating year
- GPA below 2.00 and one or more failing (F or FM) grades = required to withdraw
- GPA below 1.70 (with or without F/FM grades) = required to withdraw

As an academic requirement, students are assessed in each year on their aptitude and fitness for the profession of Dentistry. A student who, in the judgment of the Faculty, fails to attain satisfactory standard on this assessment may be retired from the Faculty.

Students must prepare exercises, reports, etc., as may be prescribed, and in classes involving laboratory or practical work they must complete such work satisfactorily before any credit for that class can be given. If Faculty deems it advisable, giving consideration to the students' overall performance in the programme and the constraints of available time and resources, students may be given the opportunity to clear any deficiencies by means of remedial programmes.

Students who, in the judgment of the Faculty, are deficient for any reason in their clinical practice may be required by Faculty to return for a special clinical session or to repeat the year. The satisfactory completion of this clinical session is required in order to allow students either to continue in their regular class or to graduate at the Fall Convocation.

Individual class waivers for students repeating the year as a result of failing grades may be granted by the Class Committee and only for classes in which a grade of B or higher was obtained. A student thus repeating a year is not permitted to register concurrently for classes in any other year of the programme. Class waivers will not normally be granted for classes with preclinical/clinical components.

a. Graduation with Distinction

Graduation with Distinction will be awarded to graduating Dentistry students whose cumulative grade point average is at least 3.60.

3. Class Grades

Upon completion of a class, a student is awarded a grade of A+, A, A-, B+, B, B-, C+, C, C-, D, FM, F, T or INCOMPLETE, or for classes designated a grade of PASS or FAIL.

In this system; A is the highest and D is the lowest passing grade; FM is a failing grade that allows an otherwise qualified candidate to take a supplemental examination; an INC grade allows an otherwise

qualified candidate to fulfil the class requirements within a specified time in a programme determined by Faculty; an F is a failing grade normally disqualifying the student from further evaluation without repeating the class and/or the entire academic year.

The class directors concerned are responsible for defining the requirements for grades.

4. Grade Point Equivalents and Averages

The numerical percentage score-letter grade equivalency scale for all classes in the Faculty of Dentistry is as follows:

Numerical Score	Letter Grade	Grade Point Equivalent
95-100	A+	4.30
90-94	A	4.00
85-89	A-	3.70
80-84	B+	3.30
74-79	B	3.00
70-73	B-	2.70
67-69	C+	2.30
64-66	C	2.00
60-63	C-	1.70
50-59	D	1.00
45-49	FM	0.00
N/A	INC*	0.00
0-44	F	0.00
N/A	ILL**	Neutral
N/A	P	Neutral
N/A	W	Neutral
N/A	T***	Neutral

* INC - Incomplete: Students are expected to complete class work by the prescribed deadlines. Only in special circumstances may an instructor extend such deadlines. Incomplete work in a class must be completed by February 1 for first term classes and June 15 for second term and full year classes. Students who receive an incomplete will receive a Grade Point Equivalent of 0.00 for the class. An INC will be converted to the earned grade if completed by the deadline. Otherwise, the class grade point value will be calculated as a 0.00 on the student's grade point average.

** ILL: Students who are given special consideration by the Academic Standards Committee for compassionate reasons, illness or other special circumstances may be given a grade of ILL. This grade has a neutral Grade Point Equivalent and will be converted to an earned grade upon completion of the class. If the class is not completed in the time period indicated by the Academic Standards Committee, the student will receive no credit for the work done in the class.

*** Transfer credit on admission.

5. Calculation of Average

Each class, except classes with final grades of PASS or FAIL, is assigned a class weight based on its length and the mix of lecture, laboratory or clinical components. An individual student's point equivalent for each class is multiplied by the adjusted class weight. The student's yearly grade point average is calculated by adding up the weighted grade point equivalents earned for all the separately numbered classes for the academic programme year and dividing by the sum of the adjusted class weights for all classes.

A Cumulative Grade Point Average is calculated by adding the total weighted grade point equivalents earned and dividing by the sum of the adjusted class weights for all classes taken. The Cumulative GPA is used for awarding of certain prizes, awards and scholarships.

6. Supplemental Examinations

A candidate who has received FM grades in not more than two subjects of any year, and who has attained the required overall grade point average of 2.00, may be offered the privilege of taking supplemental examinations in such subjects, provided he or she is qualified in attendance and class work for admission to examination.

Other forms of supplemental evaluations may be prescribed for different aspects of the programme such as laboratory and clinical assignments. These are carried out in periods determined by the

Faculty. Supplemental examinations are written after July 15 and before August 10, and are written at Dalhousie, unless approval is obtained to do otherwise.

Application for admission to a supplemental examination must be made on or before July 15th. Application forms may be obtained from the Dean of Dentistry's Office and must be accompanied by a supplemental examination fee.

On passing a supplemental examination or evaluation the candidate receives no higher than a D grade for the class. Marginal failure (FM) grades must be replaced by passing grades before a student is promoted to the next year of the programme.

7. Illness or Absence

It is the student's responsibility to immediately inform Class Directors, the Office of the Dean and, when clinical activities are involved, the Director of Clinics and any scheduled patients, of any absence due to illness, injury, or other serious cause. Application for special consideration due to injury, documented illness, or other serious cause shall be made to the Dean not later than three days (excluding holidays) after the student's return to classes following an injury or illness.

8. Failure to Report

Failure to report to classes or clinic or to report an absence due to injury or illness as required may result in suspension of clinic privileges and may limit a student's right to appeal an unsatisfactory class grade or the failure of an academic year. Written policies describing the responsibilities of students in such cases are available to all students in the Academic Policy Manual.

9. Appeals

Students have the right to appeal their assigned grade in a given class as well as decisions regarding their failure of an academic year. Written policies describing the Faculty's appeal procedures are available to all students in the Academic Policy Manual.

J. Provincial Regulation

Students are reminded that the degree in Dentistry is not the only requirement for admission to practice in any province. The regulations for admission to practice are established by the licensing board of the province in which the person desires to practice. Information on these requirements may be obtained from the respective Dental Registrars whose names and addresses may be obtained from the Office of the Dean.

The National Dental Examining Board of Canada incorporated under Federal Statute offers an examination leading to a certificate which is recognized by the dental Licensing Boards in all ten provinces of Canada. Holders of the certificate may be licensed to practice in all provinces, sometimes after meeting additional provincial requirements. For further information inquiries should be addressed to: Registrar, National Dental Examining Board of Canada, Suite 103, 100 Bronson Ave., Ottawa K1R 6G8.

The programme of dental education in the Faculty has received approval of the Canadian Dental Association and the Council on Dental Education of the American Dental Association. The Dalhousie Doctor of Dental Surgery Degree is, therefore, an accepted educational qualification for obtaining a certificate from the National Dental Examining Board of Canada, the National Board of Dental Examiners of U.S.A., and the Boards of many of the states of the United States.

K. Instruments, Equipment and Books

Larger items of equipment and some clinical instruments are provided on loan by the University. All other instruments and material for practical instruction must be procured by the students. Normally, the Faculty obtains these for the students to ensure delivery in time for the start of the academic year. This practice, however, does not prohibit students from purchasing their instruments and material from any source or sources they wish provided that: (a) the instruments are in a new condition and of the particular type and manufacture prescribed by Faculty. (b) the instruments and material are available in time for the start of the academic year (c) advice is received by the Office of the Dean not later than 28 February from any student who intends to purchase instruments and material privately for the ensuing academic year.

Experience has shown that Faculty must place orders not later than March 1 to ensure the likelihood of delivery in time for the start of the academic year.

The textbooks prescribed for the various classes are available for purchase at the University Bookstore in the Student Union Building. The following estimate of the cost of instruments and books for each year is subject to change without notice, but it can assist the students in estimating their expenses.

Doctor of Dental Surgery Programme

	Instrument Purchase	Instrument User Fee	Textbooks Manuals & Handouts
Year 1	3,956.00	500.00	1,482.00
Year 2	3,609.00	500.00	1,356.00
Year 3	402.00	500.00	415.00
Year 4	0.00	500.00	275.00

Qualifying Programme

Tuition cost is \$30,000.00 per year. A fee of \$4000.00 per year includes student kits, clinic user fee, manuals and handouts, mandatory vaccination and the fee for the required successful completion of a Level C CPR Basic Rescuer certificate. The cost of textbooks for the 1998/99 year was \$1,385.00 in year one and \$275.00 for year two.

V. Doctor of Dental Surgery Degree Requirements

First Year

Foundation Sciences I, which include:

- DENT 1112.01: Human Biochemistry
- DENT 1113.06: Gross Anatomy/Neuroanatomy
- DENT 1114.03: Histology
- DENT 1115.01: Physiology
- DENT 1116.03: Basic Mechanisms of Disease
- DENT 1117.03: Pharmacology
- DENT 1118.01: Infectious Diseases

Patient Care I

- DENT 1211.06: Patient Care I

Dental Sciences I, including:

- DENT 1311.03: Growth and Development I
- DENT 1411.06: Cariology I
- DENT 1511.03: Periodontology I
- DENT 1611.03: Occlusion and Neuromuscular Function I
- DENT 1502.06: Elective

Second Year

Foundation Sciences II, which include:

- DENT 2111.06: Dental Biomaterials Science
- DENT 2117.01: Pharmacology II
- DENT 2119.03: Systematic Pathology and Immunology

Patient Care II

- DENT 2211.03: Clinical Patient Care II
- DENT 2212.06: Patient Care II

Dental Sciences II, which include:

- DENT 2311.03: Growth and Development II
- DENT 2411.09: Cariology II
- DENT 2511.03: Periodontology II
- DENT 2611.06: Occlusion and Neuromuscular Function II
- DENT 2504.06: Elective

Third Year

Foundation Sciences III, which include:

- DENT 3116.01: General Medicine and Patient Health Assessment
- DENT 3117.01: Foundation Sciences in Clinical Practice

Patient Care III, which includes:

- DENT 3211.01: Clinical Seminars
- DENT 3212.06: Comprehensive Patient Care
- DENT 3215.03: Clinical Pediatric Dentistry
- DENT 3216.03: Clinical Orthodontics
- DENT 3217.03: Clinical Endodontics
- DENT 3218.03: Clinical Oral Surgery
- DENT 3219.03: Clinical Periodontics
- DENT 3220.01: Clinical Oral Diagnosis and Treatment Planning
- DENT 3911.12: Clinical Prosthodontics

Dental Science III, including:

- DENT 3318.01: Growth and Development III
- DENT 3411.03: Cariology III
- DENT 3611.03: Occlusion and Neuromuscular Function III
- DENT 3811.01: Oral Pathology, Medicine and Radiology
- DENT 3203.01: Oral and Maxillofacial Surgery
- DENT 3711.01: Periodontology
- DENT 3505.06: Elective

Fourth Year

Patient Care IV, which includes:

- DENT 4211.03: Seminars
- DENT 4212.06: Comprehensive Patient Care
- DENT 4215.03: Clinical Pediatric Dentistry
- DENT 4216.03: Clinical Orthodontics
- DENT 4217.03: Clinical Endodontics
- DENT 4218.03: Clinical Oral and Maxillofacial Surgery
- DENT 4219.03: Clinical Periodontics
- DENT 4220.01: Clinical Oral Diagnosis and Treatment Planning
- DENT 4911.12: Clinical Prosthodontics

Dental Science IV, which include:

- DENT 4001.01: Oral and Maxillofacial Surgery
- DENT 4411.01: Cariology IV
- DENT 4418.01: Growth and Development IV
- DENT 4611.01: Removable Prosthodontics
- DENT 4711.01: Periodontology
- DENT 4811.01: Oral Pathology, Medicine and Radiology
- DENT 4507.06: Elective

VI. Qualifying Programme Degree Requirements

Students will be required to successfully complete the following classes and progress will be monitored by instructors, class directors and the Qualifying Programme Academic Standards Class committees (QP I and II).

Year I

D3000.06	Foundation Sciences for Dentistry in Canada	May-Jul/Aug
D3001.06	Clinical Dental Sciences for Dentistry in Canada	May-Jul/Aug
DENQ 2411.09	Cariology II	Sep-May
DENQ 3116.01	General Medicine/Patient Health Assessment	Sept-Apr
DENQ 3117.01	Foundation Sciences for Clinical Practice	Sept-Apr
DENQ 3203.01	Oral and Maxillofacial Surgery	Sept-Apr
DENQ 3211.01	Patient Care III Seminar	Sept-Apr
DENQ 3212.06	Clinical Comprehensive Patient Care	Sept-Jun
DENQ 3215.03	Clinical Pediatric Dentistry	Sept-Jun
DENQ 3216.03	Clinical Orthodontics	Sept-Jun
DENQ 3217.03	Clinical Endodontics	Sept-Jun
DENQ 3218.03	Clinical Oral and Maxillofacial Surgery	Sept-Jun
DENQ 3219.03	Clinical Periodontics	Sept-Jun
DENQ 3220.01	Clinical Oral Diagnosis and Treatment Planning	Sept-Jun
DENQ 3711.01	Periodontology	Sept-Apr
DENQ 3811.01	Oral Pathology, Medicine and Radiology	Sept-Apr
DENQ 3911.12	Clinical Prosthodontics	Sept-Jun
DENQ 3411.03	Cariology III	Sept-Apr
DENQ 3318.01	Growth and Development III	Sept-Apr
DENQ 3611.03	Occlusion and Neuromuscular Function	Sept-Apr
DENQ 3505	Elective	Sept-Apr

Year 2

DENQ 4211.03	Patient Care IV Seminar	Sept-Apr
DENQ 4212.06	Clinical Comprehensive Patient Care	Jun-May
DENQ 4911.12	Clinical Prosthodontics	Jun-May
DENQ 4215.03	Clinical Pediatric dentistry	Jun-May
DENQ 4216.03	Clinical Orthodontics	Jun-May
DENQ 4217.03	Clinical Endodontics	Jun-May
DENQ 4218.03	Clinical Oral and Maxillofacial Surgery	Jun-May
DENQ 4219.03	Clinical Periodontics	Jun-May
DENQ 4001.01	Oral and Maxillofacial Surgery	Sept-Dec
DENQ 4711.01	Periodontology	Sept-Dec
DENQ 4811.01	Oral Pathology, Medicine and Radiology	Sept-Dec
DENQ 4411.01	Cariology IV	June-Dec
DENQ 4418.01	Growth and Development IV	Sept-Dec
DENQ 4611.01	Removable Prosthodontics	
DENQ 4507	Elective	

V. Classes of Instruction

Foundation Sciences I

DENT 1112.01: Human Biochemistry.

This class covers a very broad spectrum of biochemistry. It will highlight selected dental topics such as structures of connective tissue macromolecules; endocrine control of tissue remodelling; fluoride, calcium and phosphorus metabolism; pH, saliva and dental caries; genetics and molecular biology as a tool in dental research.

PREREQUISITE: Undergraduate biochemistry

DENT 1113.06: Gross Anatomy/ Neuroanatomy.

This class presents an integrated description of the anatomical organization of the central and peripheral nervous systems, and the gross anatomy of the head and neck, thorax and abdomen. Lectures, laboratories and dissections are used with special attention given to oral and dental structures. Texts: B. Liebgott, *Anatomical Basis of Dentistry*; Rohen/Yokochi, *Color Atlas of Anatomy*; and Crossman and Neary, *Neuroanatomy: An Illustrated Text*. Class Study and Dissection Guides are provided.

DENT 1114.03: Histology.

This class describes the structure of the body at the level of tissues and organs as seen with the microscope. Oral structures and tissues are emphasized. It is a Foundation Class for Physiology, Pharmacology and Pathology. Text: Stevens and Lowe, Latest Edition, *Histology*; Tencate, *Oral Histology*.

DENT 1115.01: Physiology.

Physiology is the study of body function. Function occurs at three levels: molecular, subcellular, and cellular. Events at these levels in turn determine the activities of tissues, organs, and systems. Understanding at each level is necessary to appreciate the overall function or dysfunction of an individual. This context-directed learning (CDL) class is designed to provide comprehensive knowledge in seven essential areas of medical physiology with a dental perspective: general, CNS, cardiovascular, respiratory, renal, gastrointestinal, and endocrine. Each section of the course involves the presentation by students of clinical cases, where aspects of diseases which are of concern to dentistry, as related to clinical care and strategies for effective oral health delivery, are discussed in the context of the underlying physiology, physiology objectives keyed to the required physiology textbook will be developed from the case reports. Overview-type lectures will subsequently provide the framework to meet the objectives of an area by covering its key principles in broad conceptual terms. Upon successful completion of the class, students should be able to completely analyze and discuss problems of medically comprised dental patients in terms of their underlying physiology.

TEXT: Johnson, *Essential Medical Physiology*

DENT 1116.03: Basic Mechanisms of Disease.

This class uses patient cases in a modified problem-based learning format to introduce students to the basic concepts and fundamental mechanisms of disease. Supplementary lectures are provided as indicated. Topics include cell injury, adaptation and death, inflammation, repair, immunology, vascular disease and neoplasia.

DENT 1117.03: Pharmacology.

This class is built on other Foundation Science classes and serves as a basis to Therapeutics (Patient Care) and Pharmacology and treatment planning in years 2 and 4. It emphasizes the basic principles of drug action, with special attention given to drugs used commonly in dental practice (local anaesthetics, antimicrobial agents, analgesics, anti-inflammatories) and on drugs whose presence in the body may affect dental procedures. Text: Yagiela, Neidel, *Pharmacology and Therapeutics for Dentistry*

DENT 1118.01: Infectious Diseases.

This class builds upon a required prerequisite in Microbiology and assumes a general knowledge of the major groups of clinically important bacteria and their properties. The class focuses on the etiology, pathogenesis, epidemiology, diagnosis and treatment of major infectious diseases by bacteria and viruses.

Patient Care I

DENT 1211.06: Patient Care I.

Using a clinical setting and initial patient care experiences, this class will present basic dental terminology and develop skills that are common to all areas of dentistry. Students will be exposed to most areas of patient assessment and care through observation and participation in patient treatment. Psychomotor and behavioural skills will be developed by learning clinical protocols, dental radiographic techniques and communication skills. Examination, history taking, diagnosis, risk assessment and problem list formation will be performed on simulated and clinic patients.

Dental Sciences I

DENT 1311.03: Growth and Development I.

This class provides the student with basic concepts and principles required for understanding pre-natal and post-natal human physical growth and development. It includes both growth and development of the body in general, and the dentofacial region. This class also provides an introduction to the application of this knowledge to clinical practice.

DENT 1411.06: Cariology I.

This class introduces the diagnosis, etiology, prevention and operative management of dental caries. The class is designed to present the foundation for caries management in dental practice. The major areas covered include: diagnosis, histopathology, etiology, prevention and operative principles. In addition, the scientific basis for caries management, and epidemiology are presented. Lectures, laboratory, clinical exercises and class discussions are used to present the topics covered during the class.

DENT 1511.03: Periodontology I.

This class will provide students with a basic knowledge of the periodontium in health and disease. The identification of etiologic factors, their significance and methods for their control will be included. Clinical experience in basic identification of the features of health and disease, risk assessment and etiology control and management will be provided as part of this class.

DENT 1611.03: Occlusion and Neuromuscular Function I.

This class consists of two parts. In the first term, a laboratory class in Dental Anatomy is designed for the study of tooth morphology and the structure of teeth and their parts. During the second term, in a clinical and laboratory setting, students will be exposed to the functional anatomy of the stomatognathic system. Cognitive and psychomotor skills will be developed while learning occlusal morphology related to mandibular movement.

Foundation Sciences II

DENT 2111.06: Dental Biomaterials Science.

This class aims to help the student develop critical thinking skills appropriate to the application of biomaterials science in dentistry. The student will acquire a fundamental background and be able to critically evaluate and optimize the selection, manipulation and

long-term observation of clinical materials. In addition, the student will be able to interpret and apply the results of laboratory and clinical research papers. The class will involve the applied study of structure/property relationships, mechanical, physical and chemical properties of solids and biocompatibility. Class content will include a range of metals, polymers, ceramics and glass-like material, which have applications in dentistry. Texts: Anusavice, *Science of Dental Materials* (10th ed.) and Ratner, *Biomaterials Science*. Reference Texts: Craig, *Restorative Dental Materials* (8th ed.); McCabe, *Applied Dental Materials* (7th ed.); O'Brein, *Dental Materials: Properties and Selection*.

DENT 2117.01: Pharmacology II.

This class builds on the student's foundation established in year 1. It will continue to emphasize the basic principles of drug action with special attention to drugs used commonly in dental practice (antimicrobial agents, analgesics, sedatives, centrally acting agents) and on drugs whose presence in the body may affect dental procedures management. Texts: Neidle and Yagiela, *Pharmacology and Therapeutics for Dentistry*

DENT 2119.03: Systemic Pathology and Immunology.

The systemic pathology class, for second year dental students, uses patient cases in a problem-based learning approach. Supplementary lectures are provided where indicated. Cases involving the organ systems, such as cardiovascular, respiratory, hematopoietic, gastrointestinal, genitourinary, endocrine, central and peripheral nervous system, and musculoskeletal are presented. Cases focus on diseases important in the management of dental patients and those which illustrate important mechanisms of disease. Students will gain a deeper understanding of the basic mechanisms of disease, including principles of immunology, and will apply knowledge acquired in basic science classes to the patient cases.

Patient Care II

DENT 2211.03: Clinical Patient Care II/ DENT 2212.06: Patient Care II.

These classes are designed to familiarize the student with the basic principles and knowledge for patient care activities. In a clinical setting, students will gain experience in such basic patient care activities as: use of diagnostic aids, risk assessment, diagnosis, basic level treatment planning, pain control, utilization of dental auxiliaries, use of a dental computer system, preventative dental procedures and basic level dental restorative procedures. Students will also acquire skills for the diagnosis and management of patients with early stages of periodontal disease.

Dental Sciences II

DENT 2311.03: Growth and Development II.

A preclinical class that applies concepts and principles learned in Growth and Development I to clinical situations. The scope of this class includes: the examination and diagnosis of growing and non-growing patients with specific reference to their orthodontic needs and elements of treatment planning such that consideration is provided regarding future developmental processes. The effects of environmental factors to growth and developmental processes, and the consideration of motivational factors necessary to assist in achieving treatment success will also be discussed. This class provides an opportunity to develop skills related to the fabrication and analysis of specific diagnostic records and design of interceptive and corrective orthodontic appliances.

DENT/DENQ

2411.09: Cariology II.

This technique class will build upon Cariology I and will provide a foundation in restorative therapy for the individual tooth. Opportunity will be provided for the development of judgment and psychomotor skills in restorative technique, making use of plastic filling materials, cast metal restorative materials and provisional restorative materials. Theory and technique involved in the management of the diseased dental pulp will also be presented and practiced. Lectures, seminars and preclinical demonstrations will be the methods of instruction for deciduous and permanent teeth.

DENT 2511.03: Periodontology II.

This class is designed to provide a foundation in the management of a patient with periodontal disease. This patient oriented clinical and didactic experience will provide an opportunity for the student to develop skills necessary for the diagnosis and prognosis of periodontal diseases, as well as the nonsurgical management of patients with early attachment loss.

Treatment planning for periodontal diseases as it interrelates with comprehensive dental care will also be introduced.

DENT 2511.06: Occlusion and Neuromuscular Function II.

A series of lectures, seminars, demonstrations, laboratory and clinical experiences dealing with the fundamental principles and techniques of treating partially and completely edentulous patients.

Foundation Sciences III

DENT/DENQ 3116.01: General Medicine and Patient Health Assessment.

The first term is devoted to lectures by physicians and is designed to give the student a broad understanding of the problems and procedures involved in the practice of medicine and to prepare for intelligent cooperation with physicians and other health workers. The class also prepares the student to render a better health care service by recognizing the signs and symptoms of general diseases which require the services of a physician. This series of lectures is followed in the second term by seminars devoted to clinical management of patients with specific disease processes.

DENT/DENQ 3117.01: Foundation Sciences in Clinical Practice.

A small group case centred, problem-based class format will be utilized in this class. The aim of this class is to enable students to develop critical thinking and life long learning skills and utilize a scientific approach/basis towards clinical decision-making process. In this class students will identify, review and integrate basic science (Biochemistry, Physiology, Microbiology, Anatomy, Pharmacology, Pathology) in the diagnosis, risk assessment and management of dental patients.

Patient Care III

DENT/DENQ 3211.01: Patient Care III - Seminars.

This class provides students with an introduction to many of the issues facing dentists today. The topics include community oral health care, ethics, practice management, organized dentistry, geriatric dental care, and therapeutics. Lectures, seminars and cases are methods of instruction.

As part of the class, students will prepare and present a table clinic on a topic they have chosen. The topic may be based on an aspect of clinical dentistry or on a research project that the student has completed. The presentation is graded on a pass/fail basis.

DENT/DENQ 3212.06: Patient Care III - Clinical Comprehensive Patient Care.

Students will gain clinical experience while treating patients in a comprehensive care clinic. The experience gained will be based on a number of patient care assignments.

DENT/DENQ 3215.03: Patient Care III - Clinical Pediatric Dentistry.

Third year students will experience their first clinical contact with children and adolescent patients in this full-year clinical class offered through the Division of Pediatric Dentistry. Children and adolescent patients will be assigned to students for comprehensive primary and essential oral health care with particular emphasis on behaviour management, diagnosis, treatment planning, prevention, sealant applications and preventive resin restorations under the close supervision of faculty. Students will receive experience in managing their children and adolescent patients based on individual oral health needs, risk assessment and outcomes, and by using the most appropriate and least invasive dental restorative procedures in their treatment of the different stages of the dental

caries process. In addition to the restorative treatment component, interceptive orthodontic care will be provided by students for the children or adolescent patients who may require it. Clinical experience and patient contact will be gained through rotations scheduled at the main clinic in the Faculty of Dentistry, Harbour View School Dental clinic in Dartmouth, the North Preston Community Oral Health Clinic in North Preston and the Dental clinic at the IWK - Grace Health Centre for Children in Halifax.

DENT/DENQ 3216.03: Patient Care III - Clinical Orthodontics.

Students will attend a weekly orthodontic clinical rotation comprised of a preclinical seminar where orthodontic cases are presented and discussed followed by a clinical session where appropriate orthodontic treatment is provided to an assigned group of patients by a team of third and fourth-year students.

DENT/DENQ 3217.03: Patient Care III - Clinical Endodontics.

While providing comprehensive patient treatment to assigned patients, students will develop experience and competence in designated endodontic procedures.

DENT/DENQ 3218.03: Patient Care III - Clinical Oral and Maxillofacial Surgery.

Students will have the opportunity to reinforce their knowledge and abilities to assess the health status of patients who are frequently medically compromised, in a clinic and hospital setting. They will have the opportunity to develop clinical skills and provide for supportive care in Oral Surgery by treating patients in the Oral Surgery Clinic.

DENT/DENQ 3219.03: Patient Care III - Clinical Periodontics.

While providing comprehensive patient treatment to assigned patients, students will develop experience and competence in the management of patients with early to moderate periodontal attachment loss.

DENT/DENQ 3220.01: Patient Care III - Clinical Oral Diagnosis and Treatment Planning.

This third year class is designed to create an environment that promotes the philosophy of comprehensive patient care. This goal can be achieved by placing significant emphasis on the oral diagnosis and treatment planning of patients who present to our comprehensive treatment planning clinic. Each third year student will develop a comprehensive problem list for each patient assigned to him/her during the oral diagnosis/treatment planning clinic rotation. The comprehensive problem list will be developed after a thorough examination of the patient which will include a detailed medical/dental history, intra/extra oral examination and development of a diagnostic summary from which a properly sequenced and logical active/inactive problem list will be created. In this clinical environment students will gain experience by beginning at the basic level and progressing to the more advanced concepts of comprehensive treatment planning during his/her senior year.

DENT/DENQ 3911.12: Patient Care III - Clinical Prosthodontics.

While providing comprehensive patient treatment to assigned patients, students will gain experience and begin to develop competence in various aspects of operative dentistry and removable prosthodontics, including procedures involving composite resins, amalgam alloy, veneers, inlays, onlays, crowns, post-core systems, complete dentures and removable partial dentures. Decision making will be developed through patient treatment. There will be pre-clinical and clinical competency testing of identified procedures.

Dental Sciences III

DENT/DENQ 3318.03: Growth and Development III.

Students will be exposed to the differential diagnosis, treatment planning, and treatment methodology, including appliance selection, of Orthodontic cases appropriate for the general dentist as well as those cases treated by an Orthodontic Specialist.

DENT/DENQ 3411.03: Cariology III.

This class is an extension of Cariology I and II and combines Prosthodontics, Endodontics and Dental Biomaterials Sciences. The class is designed to reinforce the knowledge base for a third year student's clinical experience. The content covers the fundamental principles and techniques for the construction of fixed prostheses for replacing missing natural teeth and providing the patient with aesthetic restorations. This class consists of a series of lectures, seminars and a preclinical laboratory section that covers porcelain veneers, resin bonded fixed partial dentures, post and cores, porcelain fused to metal and all metal fixed bridges. Instruction is also given in the diagnosis and design of fixed partial dentures, as well as in the associated areas of dealing with commercial dental laboratories, clinical management of fixed prosthodontic treatment, trouble shooting and dentin bonding. Various clinically related subjects in general patient care, treatment and prevention will be covered with a particular emphasis on the management of caries as a disease and the repair or replacement of teeth destroyed by dental caries. The application of biomaterials in prosthodontics, caries prevention and management will be investigated. The Endodontic section of Cariology III consists of a series of lectures dealing with the basic biological principles and techniques in the area of endodontic failures, retreatment, management of dental traumatic injuries, endodontic surgery, and new instrumentation techniques.

DENT/DENQ 3203.01: Oral and Maxillofacial Surgery.

A lecture class throughout the year, covering topics of oral surgery and orientation to general anaesthesia. Examination takes place on completion of each component.

DENT/DENQ 3611.03: Occlusion and Neuromuscular Function III.

Using large group discussion, lectures and seminars by specialists in various disciplines, the basic concepts of occlusion and the interrelationship between dental, skeletal, neuromuscular form and function will be reviewed. In particular the diagnosis and treatment of partially edentulous patients and patients with temporomandibular dysfunction will be emphasized. During the second term the biological basis for dental implants and a multidisciplinary approach to implant treatment are presented.

DENT/DENQ 3711.01: Periodontology.

This class will emphasize surgical procedures and other advanced techniques used in management of periodontal diseases. It assists the student in developing an appreciation and understanding for the interrelationships between periodontics and other disciplines. A component of the class is devoted to implant treatment planning. The clinical component of the third year programme will afford the student an opportunity to be involved in the application of many of the procedures and concepts that are presented.

DENT/DENQ 3811.01: Oral Pathology, Oral Medicine and Oral Radiology.

Students will study the etiology, pathogenesis, clinical, radiographic and microscopic characteristics of diseases affecting the head and neck area. Emphasis is placed on recognition of abnormalities, construction of differential diagnoses; arrival at definitive diagnoses and patient management.

Patient Care IV

DENQ 3000.06: Foundation Sciences for Dentistry In Canada.

Modules included in this course are: Foundation Sciences, Pharmacology, Biomaterials Science and Growth & Development. These modules help the candidate to develop critical thinking skills. Lectures and patient care in a problem-based learning approach will

be the norm. Candidates will review clinical presentation, differential diagnosis, approaches and management for specific diseases related to the practice of dentistry in Canada. The principle of patient health assessment will also be presented. The assessment level will be equivalent to that at the end of Year 2 of the DDS programme.

DENQ 3001.06: Clinical Dental Sciences for Dentistry in Canada.

Modules in this course are: Patient Care, Periodontology, Cariology A, Cariology B, Cariology C, Endodontics, Removable Prosthodontics (C), Removable Prosthodontics (P), and Pedodontics. These modules are designed as presented in years one and two of the DDS programme to familiarize the candidates with the basic principles and knowledge for treating the patient at the end of year 2 of the DDS programme. In a clinical setting, candidates will demonstrate such clinical activities as: use of diagnostic aids, risk assessment, diagnosis, treatment planning, pain control, utilization of allied dental personnel, use of the dental computer system, preventive dental procedures, basic restorative procedures, diagnosis and management of early types of periodontal disease, removable dentures and endodontics.

DENT/DENQ 4001.01: Oral and Maxillofacial Surgery.

Surgical conferences held weekly during the first term permitting the review of management of a broad range of current surgical procedures. A comprehensive examination is held at the end of first term covering principles involved in specific surgical problems.

DENT/DENQ 4211.03: Seminars.

Through integrated seminars and class discussions students learn, in greater depth, issues related to community oral health such as: professional dentistry, geriatric patient care, ethics, jurisprudence, dental practice management, therapeutics and advanced clinical patient care. Students also learn to critically evaluate dental literature, and the principles of research and scholarship. Through small group, case-based seminars, students continue to identify, review and integrate foundation sciences in the diagnosis, risk assessment and management of dental patients; developing critical thinking and life-long learning skills.

DENT/DENQ 4212.06: Clinical Comprehensive Patient Care.

Students continue to gain clinical experience while treating patients in a comprehensive care clinic. The experience gained will be based on a number of patient care assignments.

DENT/DENQ 4215.03: Clinical Pediatric Dentistry.

Fourth year students will continue their clinical experience with children and adolescent patients in this full-year clinical class offered through the Division of Pediatric Dentistry. Throughout this clinical class, the fourth year students will be expected to apply the didactic and clinical knowledge acquired during the previous three years to the diagnosis, treatment planning, behaviour and oral health care management of the children and adolescent patients assigned to them. Emphasis will be placed on individual oral health needs, risk assessment and outcomes, as well as the rendering of the most appropriate oral health care using the least invasive restorative treatment dictated by the different stages of the dental caries process. Clinical experience and patient contact will be gained by rendering oral health care for children and adolescent patients assigned to students through scheduled rotations at the Harbour View School Dental Clinic in Dartmouth and the North Preston Community Oral Health Clinic in North Preston.

DENT/DENQ 4216.03: Clinical Orthodontics.

Students attend a weekly orthodontic clinical rotation comprised of a preclinical seminar where orthodontic cases are presented and discussed followed by a clinical session where appropriate orthodontic treatment is provided to an assigned group of patients by a team of third and fourth-year students.

DENT/DENQ 4217.03: Clinical Endodontics.

While providing comprehensive patient treatment to assigned patients, students will develop experience and competence in designated endodontic procedures. In term II, students attend a weekly seminar where they present and discuss their clinical endodontic cases.

DENT/DENQ 4218.03: Clinical Oral and Maxillofacial Surgery.

Senior students develop clinical skills by practicing clinical oral surgery under supervision in the Oral Surgery clinic in the dental building. On a rotational basis, minor and major oral and maxillofacial surgery is demonstrated in the following affiliated hospitals: IWK Grace Health Centre for Children Women and Families and the Queen Elizabeth II Health Sciences Centre Victoria General Hospital Site. During the rotation an orientation to admission procedures, operating room protocol and support management of hospitalized patients is provided.

DENT/DENQ 4219.03: Clinical Periodontics.

While providing comprehensive patient treatment to assigned patients, students will develop broad experience and competence in the management of patients with periodontal diseases.

DENT/DENQ 4220.01: Clinical Oral Diagnosis and Treatment Planning.

This fourth year class is designed as a continuation and advancement from the third year class that promotes the philosophy of comprehensive patient care. This goal can be achieved by placing significant emphasis on the oral diagnosis and treatment planning of patients who present to our comprehensive treatment planning clinic. Each fourth year dental student will develop a comprehensive and timely treatment plan for each patient assigned to him/her during the oral diagnosis/treatment planning clinic rotation. Each treatment plan will be developed after a thorough examination of the patient, which will include a detailed medical/dental history, intra/extra oral examination and development of a diagnostic summary, from which a proper and logical active/inactive problem list will be created. Treatment planning experiences will encompass various degrees of patient complexities. In this clinical environment, students will continue to gain experience and apply more advanced concepts of oral diagnosis and treatment planning during their senior year, in preparation for general practice.

DENT/DENQ 4911.12: Patient Care IV - Clinical Prosthodontics.

While providing comprehensive patient treatment to assigned patients, students will gain experience and become competent in various aspects of prosthodontics, including procedures involving composite resins, amalgam alloy, veneers, inlays, onlays, crowns, post-core systems, fixed partial dentures, removable partial dentures and complete dentures. Decision making will be developed through patient treatment. There will be clinical competency testing of identified procedures.

Dental Sciences IV

DENT/DENQ 4411.01: Cariology IV.

This class is an extension of Cariology III and consists of weekly lecture or seminar in the first term of Fourth Year. The content expands on the fundamental principles and techniques for the construction of fixed prostheses for replacing missing natural teeth and providing the patient with aesthetic restorations. Instruction is also given in aesthetic dentistry, dentin bonding, and trouble shooting problems associated with fixed prosthodontic treatment. The endodontic section of this class deals with the basic biological principles and techniques in the area of endodontic failures, retreatment, management of dental traumatic injuries, endodontic surgery, and new instrumentation techniques.

DENT/DENQ 4418.01: Growth and Development IV.

A seminar class to provide the forum for an exchange of ideas, and debate of orthodontic topics of current interest to a general practitioner. The class provides the opportunity for discussion of selected areas of interest which are clinically relevant. It also

provides the opportunity for a review of basic treatment principles and knowledge important for the general dentist and to focus the role that the dentist has in the provision of orthodontic services in a general dental practice.

DENT/DENQ 4611.01: Removable Prosthodontics.

This class explores areas of controversy, while correlating clinical experiences in removable prosthodontics.

DENT/DENQ 4711.01: Periodontology.

Advanced topics in periodontology will be presented in a series of lectures and seminars. Emphasis is placed on critical evaluation of the literature and application of basic science foundations to clinical practice.

DENT/DENQ 4811.01: Oral Pathology, Medicine and Radiology.

Students will study the etiology, pathogenesis, clinical and microscopic characteristics of diseases affecting the head and neck area. Emphasis is placed on recognition of abnormalities, construction of differential diagnoses, arrival at definitive diagnoses and patient management. Appropriate topics in oral medicine, dental oncology and interpretation of oral radiology will be included. Students will attend a rotation in the Mouth Clinic.

VII. Faculty of Medicine

3. Demonstrated proficiency in Anatomy, Biochemistry, Immunology, Microbiology, General Pathology, Pharmacology, and Physiology will be provided by the Faculty of Medicine.

Department of Anatomy and Neurobiology

Head of Department: D.A. Hopkins (494-6850)

Faculty Advisor Gross Anatomy: W.B. Mathieson (494-2239)

Faculty Advisor Microanatomy: M. M. Hansell (494-2006)

Instruction by the staff, Department of Anatomy and Neurobiology, Faculty of Medicine.

Department of Biochemistry

Head of Department: W. Carl Breckenridge (494-2480)

Faculty Advisor: K. Too (Co-ordinator) (494-1108)

Instruction by the staff, Department of Biochemistry, Faculty of Medicine

Department of Microbiology and Immunology

Head of Department: G.C. Johnston (494-3587)

Instruction by the staff, Department of Microbiology and Immunology, Faculty of Medicine and Faculty of Dentistry.

Department of Pharmacology

Head of Department: H. Robertson (494-3430)

Instruction by the staff, Department of Pharmacology, Faculty of Medicine.

Department of Physiology and Biophysics

Head of Department: A.S. French (494-3517)

Faculty Advisor: D. Petzer (494-3312)

Instruction by the staff, Department of Physiology and Biophysics, Faculty of Medicine.

IX. Elective Programme

DENT 1502, DENT 2504, DENT/DENQ 3505, DENT/DENQ 4507.

This programme is offered in all years. It is designed to allow students to pursue, in depth, dental related and to a lesser extent other topics of their particular interest that are not covered in other scheduled classes.

X. Graduate Studies in Oral and Maxillofacial Surgery

The department of Oral and Maxillofacial Sciences offers a six-year combined graduate programme leading to the degrees of MD/MSc. Graduates of this programme are eligible for examination by the Royal College of Dentists (Canada). Details covering the programme are contained in the Calendar of the Faculty of Graduate Studies.

Graduate Biomaterials Class Part I and Part II

ORAL 5301.06:

This is a full credit class (6 credit hours) of combined lecture, seminar and reading assignments at the PhD, MSc level. The class provides an applied and working understanding of the fundamental nature and behaviour of selected biomaterials used as artificial substitutes for natural tissues. The class will cover various aspects of materials science and biocompatibility of materials used in, on and about the body. Consideration will be given to evaluation of the effects of the body on materials as well as the effect of materials on the body tissues. Part I of the class (3 credit hours) will cover fundamental principles, whilst Part II will cover the material in greater depth using specific examples.

XI. Continuing Dental Education

Manager, Continuing Dental Education: Alumni Affairs and Development: Jane Bolivar (494-1674)

The Faculty of Dentistry has an office for Continuing Dental Education which organizes short ADA CERP accredited classes for dentists, dental hygienists, and other allied dental health personnel. The principal objective of these classes is to assist in the maintenance of competence for the dental profession. Presentations include the review of basic knowledge and introduction of new concepts and techniques. Members of faculty, local resource people, and visiting clinicians are employed. Most of the continuing education programmes are offered in Halifax, but some are also presented in other centres. Current Dental and Dental Hygiene students are also allowed to attend regular sessions at no charge. The content, location, and scheduling of the various classes are based on advice received from professional associations, assessment of client needs, current trends, and the Faculty Continuing Education Committee, a sub-committee of the Faculty of Dentistry Curriculum Committee. Tuition fees are cost related and are set individually for each class.

Interested persons should address inquiries to:

Continuing Dental Education
Faculty of Dentistry
Dalhousie University
Halifax, NS B3H 3J5
Phone: (902) 494-1674
Fax: (902) 494-2527

Dental Hygiene

School of Dental Hygiene

Location: 5981 University Avenue
Halifax, NS B3H 3J5
Telephone: (902) 494-1672
Fax: (902) 494-2111

Director

Butt, G.M., DipDH (Dal), BA (SMU), MEd (Queen's)

Academic Staff

Associate Professors

Clovish, J., DipDH, BEEd, MSc (Alberta)

Assistant Professors

Mitchell, T., DipDH, BSc, MEd (Dal)

Neish, N., DipDH (Dal), BA (Acadia), MEd (Dal)

Adjunct Assistant Professor

Homett, P., DDS (WNSM), MSc (London)

Lecturers

Blei Gregg, B., DipDH (Dal), LLBC

Gillis, A., BSc, MAHEd (MSVU)

Grant, P.D., DipDH, BA (SMU), MEd (Dal)

Harrigan, K., BSc (MSVU)

Kinnear, M.E., DipDH (Dal)

MacDonald, S., DipDH (Dal)

Maillet, P.J., DipDH, BA (Dal), MEd (Dal)

Tax, C., DipDH, BA (Mann)

Instructors

Bouchard-Salyzyn, G., DipDH (Dal)

Cameron, S., BSc (Dal), DipDH (Dal)

Fortune, B., DipDH (Dal)

Haslam, K., DipDH (Dal)

MacIsaac, B., BSc (St. Mary's), DipDH (Dal), MEd (MSVU)

McConaghy, B., DipDH (Dal)

Mulak-MacPhee, N., DipDH (Dal), LOA

Noye, J., DipDH (Dal)

Pitman-Locatelli, H.E., DipDH, BSc (Dal)

Robb, C.L., DipDH (Dal), BA (Moncton), MEd (Dal)

Thistle, C., DipDH, BSc (Dal)

I. Introduction

Dental Hygiene was first offered as a formal educational programme in 1913 at the Fones School in Bridgeport, Connecticut, USA. Since then the profession has grown steadily and there are now more than two hundred dental hygiene programmes in North America. In recent years, the movement has spread to other countries as well. In 1961 a diploma programme in dental hygiene was established in the Faculty of Dentistry, Dalhousie University.

Dental Hygienists are health professionals educated to prevent dental disease and help people maintain oral health. Their activities in oral health promotion are both clinical and educational and take place in private dental offices, schools, clinics, hospitals and other settings in the community.

Most Dental Hygienists are employed in private dental offices. There are, however, other areas of practice such as local governments and schools, provincial and federal government departments, industry, hospitals and teaching in allied dental health programmes.

Classes in the dental hygiene programme are offered within the Faculties of Medicine and Dentistry. The educational programme is supplemented by student attendance in Faculty-operated community-based clinics. The School of Dental Hygiene is located on Carleton Campus at Dalhousie University.

University regulations applicable to the students of all Faculties are found in the general section of this Calendar.

A. Provincial Regulations

Students are reminded that the Diploma in Dental Hygiene is not the only requirement for admission to practice in any province. The regulations for admission to practice are established by the licensing board of the province in which the person desires to practice. Information on these requirements may be obtained from the respective licensing boards whose names and addresses are available from the School of Dental Hygiene.

B. Diploma

The two-year programme leads to a Diploma in Dental Hygiene.

C. Transfer Credits from Dental Hygiene to the Faculties of Arts and Social Sciences and Science

Dental Hygiene graduates are eligible to receive credit towards a BA or BSc with a major in Biology for Biology 2100.03 and Biology 4430.06. These classes are to be included within the 10 full credits which the Dental Hygiene students are eligible to receive as credit for a BSc or BA degree upon completion of the diploma requirements. Thus for a BA or BSc in Biology (15 credit degree) students who hold a diploma in Dental Hygiene will be required to complete five additional credits, at least 2.5 of which must be Biology classes.

Applicants should seek additional information from the Faculty of Science.

II. Admission

Applicants must have completed before May 1 of the year of expected entry to Dental Hygiene, at least five full year university classes*, including full-year classes in biology, psychology, sociology, an approved writing class and one elective. Applicants must have Nova Scotia grade 12 Chemistry or its equivalent.

*a combination of two one-term academic classes in the same discipline is considered equivalent to one full-year academic class.

Applicants who have completed the entrance requirements and are members of a minority group may apply as "special category" applicants and may submit additional information (forms provided in application package) in support of their application for review by the Admissions Committee.

Selection of accepted candidates is primarily based on academic performance in the required classes and overall academic standing in university. The Admissions Committee also makes significant use of non-academic factors in the selection process including the candidate's questionnaire, personal statements for competitive applicants and information submitted by "special category" applicants. Males are encouraged to apply to the Dental Hygiene programme.

A current Level C CPR-Basic Rescuer certificate is required prior to admission.

A. Admission of Applicants from other Countries

Further information can be obtained by writing to the Registrar's Office at Dalhousie.

B. Assessment of Applicants with an International Educational Background

The Faculty of Dentistry will consider applications to the Diploma in Dental Hygiene programme from individuals who have received their former education outside the Canadian educational system. Such applicants will be required to fulfil specific criteria, as outlined below.

1. If the applicant's first language is not English, he/she must complete the TOEFL (Test of English as a Foreign Language) with a minimum score of 600 and the TWE (Test of Written English) with a minimum score of 5.0.
2. Original supporting documents from previous education completed must be provided, including class descriptions, and explanation of the grading system used, and class standings. If this documentation does not clearly indicate completion of the prerequisite classes at a competitive level, the applicant must complete one year of prerequisite university study in North America.

C. Students with Learning Disabilities

Please refer to Academic Accommodation for Students with Learning Disabilities, page .11

D. Application Procedure

Persons who have satisfied the entrance requirements may apply for admission. Applications must be made on the regular application forms, and must be submitted to the Office of the Registrar by February 1st in order to be considered for admission in the following academic year. Applications must be complete with academic grades by February 1 to be considered by the Admissions Committee. However, applications filed by the deadline can be completed any time up to May 1st and will be considered when completed if unfilled places remain in the entering class. Preference will be given to residents of the Atlantic Provinces. While all applications will be reviewed by the Admissions Committee, the Committee will decide on an annual basis if any positions will be offered to applicants who are not residents of the Atlantic Provinces. To qualify as a permanent resident of any province, an applicant must meet the following criteria:

- i. his/her parent(s), guardian, or spouse must reside in that province on a permanent basis;
- or
- ii. if the applicant is independent of his/her parent(s) or guardian, he/she must have lived and worked on a full-time basis in that province (not attending school on a full-time basis) for a minimum of one full year;
- or
- iii. an applicant whose parent(s), guardian, or spouse do not meet the residency requirements as a direct result of a recent employment transfer, either into or out of a particular province would be given the choice (either the province of immediate former or future residency) of his/her province of residence.

A new application form must be submitted each year in which application is made. Official transcripts in support of the academic record must be forwarded by the institution or institutions at which the applicant completed pre-profession studies. If the applicant is still engaged in university studies, an interim transcript should be submitted. However, a final transcript must be forwarded on completion of these credits. Dalhousie University regards an applicant's failure to disclose all his/her previous academic experiences to be an academic offence which could lead to subsequent dismissal from the University. Applicants must ensure that all successful or unsuccessful high school and/or university attendance is indicated on the application form.

An application will not be considered if the applicant has been required to withdraw from studies at any other School of Dental Hygiene at the request of the Faculty of that institution, unless the application is supported by a recommendation from the Director of that School.

Competitive applicants will be requested to make themselves available for an admissions interview or an orientation session.

These regulations may be amended without notice by the Faculty of Dentistry.

III. Academic Regulations

The following section describes academic regulations within the Faculty of Dentistry. More detailed information is provided to each student at the beginning of the academic year in the Academic Policy Manual. The Academic Policy Manual contains information

for students and faculty members on the following areas: Evaluation of Students, Grade Procedures, Remedial Opportunities, Supplemental Examinations, Promotion and Graduation, Examination Regulations, Appeal Procedures, Class Waivers, Students Absences, Senate Discipline, Student Class Evaluation.

Students and faculty members are also provided with a Clinic Policy Manual each year which provides information on policies and procedures related to the treatment of patients in the dental clinic.

A. Academic Year

The academic year for the first and second year in Dental Hygiene begins in early September and continues until the latter part of April. Classes begin immediately after the regular registration date. Late registration will be permitted only under exceptional circumstances and with the approval of the Dean.

B. Class Outlines and Programme Changes

Before the beginning of term, each Class Director must provide a copy of the class outline, according to University and Faculty format with any individual additions, to the Associate Dean for Academic Affairs.

Students will be provided with a class outline by the instructor at the first meeting of the class. Programme changes, as to content, requirements, etc., may be necessitated and may not be reflected in a given edition of the calendar. Such changes will be included in the class outline provided to students at the first meeting of the class. Instructors may make changes to class outlines at any time. If, however, these changes affect any of the following areas, at least two-thirds of enrolled students must approve the variations in order for them to be valid: (a) assessment components; (b) weight of individual assessment components; (c) examination requirements with a value of 10% or greater.

C. Class Waiver Policy

(i) Entering Students

Class waivers may be granted by the Academic Standards Class Committee upon the recommendation of the Class Director. Requests for such waivers must be directed to the Associate Dean for Academic Affairs, and must be accompanied by university transcripts and class descriptions. Such requests should be initiated prior to registration and a request will not be considered after the class has been in progress for two weeks. Students must attend all classes and complete all class requirements until notified by the Associate Dean (Academic) that a class waiver has been granted.

(ii) Repeating Students

Individual class waivers for students repeating the year as a result of failing grades may be granted by the Class Committee and only for classes in which a grade of B or higher was obtained. A student thus repeating a year is not permitted to register concurrently for classes in any other year of the Dentistry/Dental Hygiene programme.

Class waivers will not be normally granted for classes with preclinical/clinical components.

Students who are granted a class waiver shall, for the purpose of establishing (1) class rank; (2) grade point average; and (3) prizes and awards, have their final grades computed using only the required classes being taken.

Policies and procedures regarding application for and awarding of class waivers are outlined in the Academic Policy Manual.

D. Review of Students

Student academic and professional progress is reviewed at least twice each term by the appropriate Academic Standards Class Committee (membership - Course Directors of the respective year of the programme), and each student is provided with his/her Achievement Classification (I to VI as described in the Academic Policy Manual). Appropriate remedial actions will be initiated for students with Classifications II to VI. Students with Classifications IV to VI may be placed on probation.

E. Guidelines for Student Probation

1. A student may be placed on probation for academic or professional reasons, described in classifications IV, V, VI in the Academic Policy Manual.
2. Probation shall usually occur when there are multiple concerns in one or both of the above parameters.
3. Probation shall only be implemented following thorough review of a student's progress by the appropriate Academic Standards Class Committee.
4. Student(s) on probation must be reviewed regularly at the meeting of the appropriate Academic Standards Class Committee.
5. A student who has fulfilled all of the conditions of probation, in the opinion of the Class Committee, shall be removed from probation and permitted to proceed in the appropriate class as recommended by the Class Committee.
6. A student shall not be eligible to sit final examinations and may not be promoted while on probation.
7. A student who has not met the conditions of probation shall be required to (a) enroll in a supplementary educational programme; or (b) repeat an academic year; or (c) withdraw from the Faculty.

F. Academic Accommodation for Students with Learning Disabilities

See University Regulations, page 11. Students wishing to discuss accommodations for disabilities within the Faculty of Dentistry should contact the Assistant Dean for Student Affairs, Faculty of Dentistry.

G. Examinations and Class Grades

1. Admission to Examinations

In order to qualify for admission to examinations, candidates must attend the prescribed classes of the curriculum regularly and punctually. Students are expected to attend all lectures, seminars, preclinical and clinical sessions. A student shall not be eligible to sit final examinations while on probation. The Examination Regulations of the University are followed, as well as specific Faculty of Dentistry regulations which are provided to students in the Academic Policy Manual.

2. Promotion and Graduation

A student will not normally be promoted or graduated unless a passing grade in all subjects and a clinical, didactic and overall grade point average of 2.00 has been achieved.

A student who has achieved an overall grade point average of 2.00 and received one or two marginal failure grades may be offered the privilege of taking the required remedial steps to prepare for a supplemental examination(s). Successful passing of the supplemental examination(s) prior to commencement of the academic year will permit promotion. Failure to pass the supplemental examination may result in the student being offered the privilege of repeating the year.

A student who has passed all classes and failed to achieve a clinical didactic and overall grade point average of 2.00, but has attained a grade point average of 1.70 or greater, may be offered the privilege of repeating the year. A student who has attained a minimum grade point average of 2.00, but has obtained a F grade in one class may be offered the privilege of repeating the year. A student who has obtained an overall grade point average of less than 1.70, or who has obtained an F grade in 2 or more classes, or who has obtained a grade point average less than 2.00 with one or more failing grades, will normally be required to withdraw from the Faculty.

Summary

- Minimum GPA 2.00 and no failing grades = promotion, graduation
- Minimum GPA 2.00 and one or two marginal failure (FM) grades = supplemental privileges
- Minimum GPA 2.00 and one F grade = may be offered privilege of repeating year
- Minimum GPA 1.70 and no failing (F or FM) grades = may be offered privilege of repeating year
- GPA below 2.00 and one or more failing (F or FM) grades = required /to withdraw

GPA below 1.70 (with or without F/FM grades) = required to withdraw

As an academic requirement, students are assessed in each year on their aptitude and fitness for the profession of Dental Hygiene. A student who, in the judgment of the Faculty, fails to attain satisfactory standard on this assessment may be retired from the Faculty.

Students must prepare exercises, reports, etc. as may be prescribed, and in-class laboratories or practical work satisfactorily before any credit for that class can be given. If Faculty deems it advisable, giving consideration to the student's overall performance and the constraints of time and resources, students may be given the opportunity to clear any deficiencies by means of remedial programmes.

Students who, in the judgment of the Faculty, are deficient for any reason in their clinical practice may be required to return for a special clinical session or to repeat the year. The satisfactory completion of this clinical session is required in order to allow students either to continue in their regular course or to graduate at the Fall Convocation.

Individual class waivers for students repeating a year as a result of failing grades may be granted by the Class Committee and only for classes in which a grade of B was attained. A student thus repeating a year is not permitted to register concurrently for classes in any other year of the Faculty of Dentistry programme. Class waivers will not normally be granted for classes with preclinical/clinical components.

3. Class Grades

Upon completion of a class, a student is awarded a grade of A+, A, A-, B+, B, B-, C+, C, C-, D, FM, F, T, or INCOMPLETE, or for classes designated a grade of PASS, FAIL.

In this system; A is the highest and D is the lowest passing grade; FM is a failing grade that allows an otherwise qualified candidate to take a supplemental examination; an INC grade allows an otherwise qualified candidate to fulfil the class requirements within a specified time in a programme determined by Faculty; an F is a failing grade normally disqualifying the student from further evaluation without repeating the class and/or the entire academic year.

The class directors concerned are responsible for defining the requirements for grades.

4. Grade Point Equivalents and Averages

The numerical percentage score-letter grade equivalency scale for all classes in the Faculty of Dentistry is as follows:

Numerical Score	Letter Grade	Grade Point Equivalent
95-100	A+	4.30
90-94	A	4.00
85-89	A-	3.70
80-84	B+	3.30
74-79	B	3.00
70-73	B-	2.70
67-69	C+	2.30
64-66	C	2.00
60-63	C-	1.70
50-59	D	1.00
45-49	FM	0.00
N/A	INC*	0.00
0-44	F	0.00
N/A	ILL**	Neutral
N/A	P	Neutral
N/A	W	Neutral
N/A	T***	Neutral

*INC - Incomplete: Students are expected to complete class work by the prescribed deadlines. Only in special circumstances may an instructor extend such deadlines. Incomplete work in a class must be completed by February 1 for first term classes and June 15 for second term and full year classes. Students who receive an incomplete will receive a Grade Point Equivalent of 0.00 for the class. An INC will be converted to the earned grade if completed by the deadline. Otherwise, the class grade point value will be calculated as a 0.00 on the student's grade point average.

ILL - Illness: Students who are given special consideration by the Academic Standards Committee for compassionate reasons, illness or other special circumstances may be given a grade of ILL. This grade has a neutral Grade Point Equivalent and will be converted to an earned grade upon completion of the class. If the class is not completed in the time period indicated by the Academic Standards Committee, the student will receive no credit for the work done in the class.

T - Transfer Credit on admission

5. Calculation of Average

Each class, except classes with final grades of PASS or FAIL, is assigned a class weight based on its length and the mix of lecture, laboratory or clinical components. An individual student's point equivalent for each class is multiplied by the adjusted class weight. The student's yearly grade point average is calculated by adding up the weighted grade point equivalents earned for all the separately numbered classes for the academic programme year and dividing by the sum of the adjusted class weights for all classes.

A Cumulative Grade Point Average is calculated by adding the total weighted grade point equivalents earned and dividing by the sum of the adjusted class weights for all classes taken. The Cumulative GPA is used for awarding of certain prizes, awards and scholarships.

6. Supplemental Examinations

A candidate who has received FM grades in not more than two subjects of any year and who has attained the required overall grade point average of 2.00 may be offered the privilege of taking supplemental examinations in such subjects, provided he or she is qualified in attendance and class work for admission to examination.

Other forms of supplemental evaluations may be prescribed for different aspects of the programme such as laboratory and clinical assignments. These are carried out in periods determined by the Faculty. Supplemental examinations are written after July 15 and before August 10, and are written at Dalhousie, unless approval is obtained to do otherwise.

Application for admission to a supplemental examination must be made on or before July 15th. Application forms may be obtained from the Dean of Dentistry's Office and must be accompanied by a supplemental examination fee.

On passing a supplemental examination or evaluation the candidate receives no higher than a D grade for the class. Marginal failure (FM) grades must be replaced by passing grades before a student is promoted to the next year of the programme.

7. Illness or Absence

It is the student's responsibility to immediately inform Class Directors, the Office of the Dean and, when clinical activities are involved, the Director of Clinics and any scheduled patients, of any absence due to illness, injury, or other serious cause. Application for special consideration due to injury, documented illness, or other serious cause shall be made to the Dean not later than three days (excluding holidays) after the student's return to classes following an injury or illness.

8. Failure to Report

Failure to report to classes or Clinic or to report an absence due to injury or illness as required may result in suspension of Clinic privileges and may limit a student's right to appeal an unsatisfactory class grade or the failure of an academic year. Written policies describing the responsibilities of students in such cases are available to all students in the Academic Policy Manual.

9. Appeals

Students have the right to appeal their assigned grade in a given class as well as decisions regarding their failure of an academic year. Written policies describing the Faculty's appeal procedures are available to all students in the Academic Policy Manual.

H. Provincial Regulation

Students are reminded the diploma in Dental Hygiene is not the only requirement for admission to practice in any province. The regulations for admission to practice are established by the licensing

board of the province in which the person desires to practice. Information on these requirements may be obtained from the respective Dental Registrar's whose names and addresses may be obtained from the Office of the Dean.

I. Instruments, Equipment, Textbooks

All instruments, equipment, and supplies are provided on loan by the University. Students are responsible for broken or damaged equipment and instruments. There is a \$250 fee for the use of instruments. The cost for textbooks, manuals, project fees and miscellaneous items is approximately \$1,300 for first year and \$350 for second year not including the cost of uniforms or lab coats. (Based on 1998/99 costs).

Students desiring further information may write to the Director, School of Dental Hygiene, Dalhousie University. Those desiring to submit applications for admission should write directly to the Office of the Registrar, Studley Campus, Dalhousie University, Halifax, Nova Scotia, B3H 3J5.

IV. Academic Programme

First Year

DEHY 2803.03: Oral Anatomy.

A study of the gross anatomy and morphology of the structures of the mouth, with emphasis on primary and permanent dentitions, tooth anatomy, eruption patterns, and occlusion.

DEHY 2804.01: Radiology.

This class includes the technical and theoretical aspects of radiology, preliminary interpretation of radiographs, as well as the hazards and safety of radiation. Class material will be presented through lectures, small group activities and laboratory sessions. Laboratory sessions include a "hands on" portion which allows students to take radiographs using prototype heads and placement on each other.

DEHY 2805.01: Periodontics.

This class involves clinical, histologic and radiographic parameters to assess normal and diseased periodontal structures. An introduction to classification and non-surgical management of periodontal diseases is also included.

DEHY 2806.01: Dental Biomaterials Science.

This class involves the study of the composition and properties of dental materials that are relevant to dental hygiene practice. The application of biomaterials science to clinical practice is considered through lectures, demonstrations and laboratory exercises. Emphasis is focused upon instructing students on the reasons why specific materials are employed and how these materials interact with their environment.

DEHY 2808.06: Communications.

The constructs, principles, and methods of effective communication and motivation in health education and behavioral change will be examined. Emphasis will be on the one-on-one clinical setting with reference to the community environment. Learners will be prepared in this class for the second year clinic class where they will critique their communication skills in clinical patient interaction using video tape.

DEHY 2809.03: Nutrition for Preventive Dentistry.

This class provides information and an opportunity for discussion on nutrition, how it impacts on our way of life, our health and dental hygiene. The learner will be exposed to Canada Food Guide for Healthy Eating, the Recommended Nutrient Intakes for Canadians, and will interpret food intakes in relation to a healthy eating style.

DEHY 2812.03: Fundamentals of Clinical Dental Hygiene - Theory.

This full year lecture class is an introduction to the knowledge and concepts necessary to understand and practice clinical dental hygiene as a process of care.

DEHY 2816.01: Dental Hygiene Ethics.

Dental Ethics is presented in a series of lectures and problem solving exercises on the theory and important principles of ethics. Topics discussed include respect for autonomy, beneficence, justice and veracity. In addition application to the CDA and CDHA codes of ethics are practiced.

DEHY 2817.06: Fundamentals of Clinical Dental Hygiene.

This class is an introduction to the knowledge, concepts and skills necessary to understand and practice clinical dental hygiene as a process of care. This process of care involved four phases: assessment, planning, implementation and evaluation. This class is competency based, with an expectation that the student will master specified didactic (theory) material as well as laboratory and clinical competencies.

ANAT 1020.03: Basic Human Anatomy.

This class is offered by the Department of Anatomy and Neurobiology to Dental Hygiene, Recreation, Physical & Health Education and Kinesiology students. The class uses a systems approach to examine the cellular and gross anatomy of the human body. There are no formal laboratory sessions. Three lecture hours per week.

ANAT 1030.01: Gross Anatomy of the Head and Neck.

This class is taught by the Department of Anatomy and Neurobiology in the Faculty of Medicine and is designed specifically for and restricted to Dental Hygiene students. It deals with the detailed gross anatomy of the head and neck. This class complements ANAT 1020.03 and PHYL 1010.06.

PHYL 1010.06: Human Physiology.

This class is taught by the Department of Physiology and Biophysics in the Faculty of Medicine and is an introductory human physiology class directed mainly towards health profession students. The function of body organs and body systems, and the integration of functions in the whole organism are studied. Three (3) lecture hours per week, supplemented by tutorials.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

MICR 1200.03: Introduction to General and Oral Microbiology.

This class is given by the Department of Microbiology and Immunology of the Faculty of Medicine to meet the needs of the students in School of Dental Hygiene. Introductory microbiology includes a study of the structure and physiology of microorganisms, the ways microorganisms cause diseases in humans and the ways they affect humans' well-being. Roles of microorganisms in oral health and diseases will be emphasized. Laboratory work provides experience in basic microbiological techniques including those used in oral microbiology.

Second Year

DEHY 3001.09: Dental Hygiene Clinic.

Clinical practice in dental hygiene, utilizing the dental hygiene process of care model as a focus.

DEHY 3002.06: Community Oral Health.

An introduction to the promotion of oral health and the prevention of oral disease through organized community-based programmes. Class requirements include practical experience in community settings such as health centres, schools, and extended care facilities.

DEHY 3003.03: Care of Exceptional Patients.

A lecture and seminar class discussing preventive dental care for exceptional populations including the visually, hearing and intellectually impaired, the medically compromised, and people receiving treatment for cancer.

DEHY 3004.01: Periodontics.

Continued study of the pathogenesis and microbiology of periodontal diseases affecting supporting structures of teeth and dental implants. The class provides an overview of current surgical and non-surgical therapies using a clinical problem-based approach.

DEHY 3005.03: Professional Issues.

A study of the ethical, legal and practice management issues related to dental hygiene practice and regulation.

DEHY 3006.01: Embryology, Histology and Pathology.

This class covers the areas of embryology, histology, and pathology. The embryology portion of the class covers gametogenesis and fertilization, cleavage and implantation, formation of the bilaminar germ disc, establishment of body form, fetal membranes and placenta, orofacial development I and II, and branchial arch development I and II. A histological background is provided for the development of bone, cartilage, teeth, oral mucosa, and salivary glands. Principles of general and oral pathology follow. Principles covered include: introduction to pathology, inflammation and repair, sequelae of dental infections, immunity, congenital defects/genetic disorders, neoplasia and white lesions. Medical conditions of importance to dental hygienists are discussed. Oral Pathology is emphasized and includes: oral mucous membrane pathology and mucocutaneous disorders, soft tissue lesions, cysts of the jaws and odontogenic tumors, disorders and neoplasms of bone, salivary gland disorders and neoplasms, and miscellaneous conditions. A session is devoted to learning how to describe oral lesions.

DEHY 3007.01: Pharmacology.

A broad overview of the drugs which are used frequently in dental practice, and drugs used by dental patients which influence choice of treatment, may have significant interactions, may lead to complications during dental/dental hygiene treatment.

DEHY 3009.01: Dental Specialties.

An introduction to six specialties of dental practice, particularly as they relate to the active roles of the dental hygienist in collaborative practice settings, and to the specific needs of patients. The six specialties are endodontics, fixed and removable prosthodontics, pediatric dentistry, orthodontics, and oral surgery.

DEHY 3010.03: Dental Hygiene Theory.

Builds and integrates didactic material (theory) into clinical practice so that students develop the skills and knowledge necessary to provide comprehensive dental hygiene care for their clientele.

DEHY 3011.03: Study Group - Clinical Cases.

This class is designed to develop critical thinking skills in clinically based situations. Through case based learning the students will be given an opportunity to demonstrate integration, application, synthesis and evaluation of didactic knowledge gained from all disciplines and their clinical experience. They will be expected to research the various issues which arise while working through the cases and present their findings within a study group learning situation. Initial cases will introduce the students to the process of case based learning and the final cases will be of a more complex nature.

DEHY 3013.03: Dental Hygiene Restorative Technique.

This class includes lecture and laboratory procedures in the placing, contouring, and finishing of restorations in prepared teeth, placement of temporary restorations, and related supporting procedures.

DEHY 2601.00: Table Clinic.

Second Year Students will prepare and present a table clinic on a topic they have chosen. The topic may be based on an aspect of clinical practice or on a research project that the student has completed. The table clinic is graded on a pass/fail basis and the presentation is judged for prizes during a public presentation.

DEHY 2800/DEHY 3900: Elective Programme.

This programme is offered in first and second year dental hygiene. It is designed to allow students to pursue, in depth, dentally related, and to a lesser extent, other topics of their particular interest that are not covered in other scheduled classes.

Law

The Law School

Location: 6061 University Avenue
Halifax, NS B3H 4H9

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Academic Staff 1998-99

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Duquette, L.M., BA (Waterloo), MLIS (Dal), Public Services Librarian

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Malcolm, C.E., BA, LLB (Dal), Secretary to the Faculty and Director of Studies

I. Introduction

Dalhousie Law School is the oldest university common law school in the British Commonwealth, and in 1983 celebrated the 100th anniversary of its founding. From its inception in 1883, the school has sought to perpetuate the vision of its founder and long-term Dean, Richard Chapman Weldon, a vision which encompasses a solid preparation for the practice of law and which encourages respect for and participation in public life. Despite its regional base, Dalhousie is perceived as a "national" law school, and encourages applicants from all parts of Canada. Indeed, over the years graduates of Dalhousie have had a distinguished influence on the development of law, legal education and public institutions throughout Canada. The LLB degree from Dalhousie is recognized for the purposes of Bar admission in all Canadian provinces.

The Law School is located in the Weldon Law Building on the main university campus. Designed to meet the special needs of law students and staff, the building contains class and seminar rooms, faculty and administrative offices and lounge space for students and staff. A new Law Library, opened in October 1989, houses our collection of over 145,000 volumes of common law materials and legal periodicals which includes a very good selection of international legal materials, and a fast-growing marine and environmental law section. Our marine and environmental law holdings represent one of the best collections of its kind in the world, attracting scholars from many countries. The law school publishes the Dalhousie Law Journal, a well-respected legal periodical.

The full-time LLB programme at Dalhousie entails three years of study. The first year programme is entirely compulsory, while the second and third year programmes are, for the most part, optional. The first year programme consists of the following seven classes: Judicial Rule-Making and the Law of Contract, Criminal Justice: The Individual and the State, Orientation to Law, Fundamentals of Public Law, Legal Research and Writing, Property in its Historical Context, and Tort Law and Damage Compensation. The second year required classes are Civil Procedure and Constitutional Law. The third year required class is The Legal Profession and Professional Responsibility. As well, students in second and third year are required to complete at least one "major paper" class per year. A more detailed description of all our class offerings follows.

A limited number of students are permitted to complete their LLB on a part-time basis, subject to more detailed regulations set out below. The intent of this programme is to accommodate the special needs of individuals for whom three years of full-time attendance at Law School could cause hardship or even inability to attend at all.

Dalhousie Law School offers a wide range of optional classes, but is particularly known for its offerings in the marine and environmental law area, with special emphasis on law of the sea. The "Marine and Environmental Law Programme" (MELP) now offers about a dozen classes in maritime and environmental law related areas - perhaps the largest curricular offering within the field in North America.

The Law School has recently joined with the Dalhousie faculties of Medicine, Dentistry and Health Professions to create the multi-disciplinary Health Law Institute, based in the Law School. This initiative has permitted the enrichment of the graduate and undergraduate Law School curriculum with several new or expanded classes in the field of health law, ethics and policy. Inquiries should be directed to the Health Law Institute Director, Professor Jocelyn Downie.

Since July 1996, Dalhousie Law School is also home to the prestigious James Robinson Johnston Endowed Chair in Black Canadian Studies, a national initiative which was established to bring Black culture, reality, perspectives, experiences and concerns into the Academy. The Chair also includes funds to support curriculum development, an Eminent Speakers Programme, a Special Library Collection housed in the Killam Library, and postgraduate scholarships, two of which may be awarded annually to Black Canadian students.

Dalhousie Law School has an active clinical law programme, Dalhousie Legal Aid Service. Through its community law office in downtown Halifax, the Clinic provides a legal aid service for low-income clients in the Halifax-Dartmouth area. Students, lawyers and paralegals conduct cases for individual clients and also work in areas of community development, preventive law and law reform, all under the supervision of staff lawyers and faculty members. The Clinic also acts as a teaching centre for third-year students. The law school offers another type of clinical experience, dealing solely with criminal law, in which, to complement special classes and seminars, students are assigned to either a judge, a Crown Counsel, or a defence lawyer, to observe and participate in criminal law work. Students receive academic credit for both clinical programmes.

The Law School, in conjunction with several other faculties, offers four combined degree programmes. The LLB/MBA programme allows students to obtain the Bachelor of Laws degree and the Master of Business Administration in four years instead of the five which would be required to take the degrees separately. The LLB/MPA (Bachelor of Laws/Master of Public Administration), the LLB/MLIS (Bachelor of Laws/Master of Library and Information Studies), and the recently developed LLB/MHSA (Bachelor of Laws/Master of Health Services Administration) are similarly structured to permit the completion of the two degrees in four years instead of the usual five. Students intending to make application to any of the combined programmes should inquire directly to the Registrar's Office, Dalhousie University.

Students are able to participate in several mooting programmes. All second and third year students are required to participate in Moot Court, second year students as counsel, and third year students as judges. The best second year counsel compete in their third year for the Smith Shield, a prestigious Dalhousie award. As well, students can participate in the Jessup International Moot Court Competition, a world-wide competition on a problem of international law, the Canadian-American (Trilateral) Moot Court Competition (among Dalhousie, the University of New Brunswick and the University of Maine), the Laskin Moot (an administrative-constitutional moot), a Securities Law Moot and the Gale Cup Moot Court Competition (among all Canadian common law schools).

Dalhousie, in cooperation with the Supreme Court of Nova Scotia, offers a voluntary Judge's Clerkship Programme for third year students. This programme, which is in addition to regular classes and not for credit, allows qualified students to spend one week during the term with a Supreme Court Justice in Chambers, and offers a valuable and practical learning experience. Some students each year may also have the opportunity to act as student assistants, for credit, to the N.S. Appeal Court and some may do the same with the Nova Scotia Supreme Court (see the class descriptions under Independent Research).

Dalhousie Law School has established exchange programmes with the University of Maine School of Law at Portland, National University of Singapore, Laval University and the University of Sherbrooke, the latter two being Quebec civil law schools. Third year students may do one term at these schools for academic credit at Dalhousie. There is also the possibility of directed research classes to be taken at the Vrije Universiteit, the Netherlands, for academic credit at Dalhousie. Students may also participate in a one-term Health Law exchange programme with Loyola University in Chicago.

The law school has an active graduate degree programme, offering both the Master of Laws (LLM) and the JSD (Doctor of Laws) degrees. The Master's degree is normally acquired on the basis of thesis and class work, and can be taken either full-time in one year or part-time over two years. The Master's degree may also be taken on the basis of class work only, which is particularly appropriate for

part-time students. In recent years, supervision has been offered in the following areas, among others: international law, human rights law, health law, administrative law, constitutional law, taxation, business law, labour law, law of the sea, maritime law, fisheries law, environmental law, critical race and legal theory and feminist legal scholarship. A particular interest has been developed in marine and environmental law, which has been designated as a field of special emphasis in the faculty. More detailed information on the graduate degree programme follows.

A. Student Life

The first year class normally consists of 156 people, of whom about 50% are women, and the total student population in the LLB programme is approximately 460. Many of our students, perhaps 40%, are residents of provinces outside the Atlantic region. In addition to the LLB students, approximately 20 students are in the LL.M programme, and several students are enrolled in the JSD programme each year. The student body is very diverse, with students from a wide variety of backgrounds and experience. We are sometimes able to accept, for advanced standing, a small number of students who wish to transfer to Dalhousie from another law school, or who have received their law degree in Québec or in a common law jurisdiction outside Canada. Application for advanced standing may be made to the Director of Studies, Dalhousie Law School, Halifax, B3H 4H9.

All law students are members of the Law Students' Society which appoints representatives to faculty committees, arranges for speakers to visit the school, and organizes social events and programmes. It also oversees publication of a law students' newspaper, *The Weldon Times*, *The Dalhousie Journal of Legal Studies*, and the annual yearbook. Dalhousie has an active sports and social programme with something to appeal to most students. Some of the student organizations active at the school are the Association of Women and the Law, the Environmental Law Students' Society, the Dalhousie Aboriginal Law Students Association, the Dalhousie Black Law Students Association, the John Read International Law Society, and the Speakers' Committee. The *Domus Legis* Society, a pub open for membership to all law students and graduates, occupies a house which provides accommodation for a few students and serves as a social centre for law students generally. Dalhousie University features a major athletics and sports complex known as Dalplex. Indoor facilities there include a 50 metre swimming pool and a gymnasium/field house the size of a football field.

B. Dalhousie Law Alumni Association

President: Roberta Clarke, Q.C.

Alumni Affairs Director: Stephen G. Coughlan

Hearsey Editor: Stephen G. Coughlan

The association has over 4,000 members composed of graduates and faculty of the Dalhousie Law School. In addition, current students are considered non-voting members until graduation. The aims of the Dalhousie Law Alumni Association are to promote and encourage active participation of graduates in the life of the school and to establish and maintain strong relationships among alumni.

The Dalhousie Law Alumni mission statement: To promote cohesion of the community of Dalhousie Law graduates and support the Law School in its mission to provide a first class legal education incorporating liberal and professional elements, to students interested in the study of law.

The association has established branches in Alberta, British Columbia, Saskatchewan, Manitoba, New Brunswick, the Yukon and the Northwest Territories, Southern Ontario, Southeastern Ontario, Québec, Newfoundland, Prince Edward Island, and Cape Breton, Nova Scotia. Each branch organizes its own local activities. Association members participate in admissions interviews, recruitment fairs and articling receptions. They act as firm contact persons for articling applicants, and take part in student information seminars on practice and law-related careers. Locally, the Alumni Association runs a mentor program for first year students. In addition, each year the Association organizes an Alumni dinner, held in conjunction with class reunions.

Hearsey, the law alumni magazine, is sent twice a year to all graduates of the school to keep them informed of the latest events at the law school. In conjunction with the Law Students Society, the Law Alumni Association administers the Award for Excellence in Teaching Law. The Dalhousie Law Alumni Association also sponsors The Weldon Award for Unselfish Public Service. This annual award is given to a graduate for recognition of their unselfish public service to the community, and serves as a tribute to the school's first dean, Richard Chapman Weldon.

C. Law Placement Office

Law Placement Officer: Stephen G. Coughlan

The Law Placement Office provides resource materials to assist students and graduates in finding articling positions, permanent jobs, summer jobs, and law-related opportunities. Individual career and job search counselling is also available to students. Some law firms, particularly from the Atlantic Provinces and central Canada, conduct interviews at the law school. Placement Office materials and notice boards communicate information on specific jobs, scholarships and clerkships and about graduate law study programmes and awards.

Articling opportunities surveys are conducted for most provinces in Canada and articling receptions are held in a couple of major cities to introduce students to practicing lawyers in those provinces while students are interviewing there.

Students on the Placement Committee participate in organizing placement seminars and recruitment days to assist students in pursuit of the diverse range of opportunities available to graduates with a legal education.

Preliminary placement surveys of students conducted in June of their graduating year indicate that placement has been well over 90% for the past several years.

ii. Admission

Students are admitted to classes as regular or part time undergraduates in law, as occasional students, or as graduate students.

A. General Information

All applicants must have completed their applications (subject to filing LSAT scores, the current year's academic transcript, and letters of reference) and sent them to the Admissions Office, by February 28. Late applications may be accepted in the discretion of the Committee. LSATs written in June will not be considered for positions in the class commencing the following September. LSATs written prior to June 1991 will not be considered. It is the responsibility of the applicant to ensure that all materials relevant to the application are received by the committee. Applicants who have failed first year law and are applying for readmission in the year immediately following the failure must do so by September 1.

B. Bachelor of Laws (Full and Part Time)

1. Regular Applicants

The Admissions Committee of the Faculty of Law may admit applicants as regular candidates for the LLB degree if they meet the following qualifications:

- The applicant must have received, with standing satisfactory to the Admissions Committee, the degree of Bachelor of Arts, Science or Commerce, or an equivalent degree from Dalhousie University or from another degree-granting college or university recognized by the Senate.
- An applicant with no degree within rule (a) must have completed, with standing satisfactory to the Admissions Committee, at least three full years' studies after junior matriculation or two full years after senior matriculation of a course leading to the degree of Bachelor of Arts, Science or Commerce or an equivalent degree at Dalhousie or at another degree-granting college or university recognized by the Senate. Normally, this means that the applicant is within one year of receiving a degree in the undergraduate programme followed.

For the purposes of this rule junior matriculation means Nova Scotia Grade XI or equivalent and senior matriculation means Nova Scotia Grade XII or equivalent.

2. Special Status Applicants

An applicant who is considered as a regular applicant may also be considered as a special status applicant if the application indicates a significant amount of non-academic involvement to which the Admissions Committee is prepared to direct special consideration. Generally, a special status applicant will be a person not less than twenty-five years of age who has had at least five years' experience in a significant employment capacity or in a significant community activity. A special status applicant must submit a Personal Statement and should arrange to have additional Reference Statements forwarded to the Admissions Committee from persons familiar with the applicant's non-academic experience.

Applicants who, despite economic, cultural, racial, or ethnic disadvantages, have made significant contributions to the community or who have shown exceptional capacity to respond to the challenges of employment, may be given special consideration.

3. Mature Applicants

Where the applicant has not met the foregoing formal educational requirements the Admissions Committee may, in very exceptional circumstances, admit a limited number of applicants as mature students where it is of the opinion that, in all the circumstances, the applicant has demonstrated by the length and quality of non-academic experience the equivalent in substance of the formal education specified in paragraph (b). Mature applicants must normally be twenty-six years of age on or before September 1st of the year for which they seek admission to law school. Mature applicants are also required to write the Law School Admissions Test, to have an interview with the Admissions Committee, and to submit to the Committee a detailed resume of their non-academic experience along with letters of assessment from persons who are familiar with their contributions and achievements. The Committee is particularly interested in gathering information with respect to the candidates' ability to organize their life and their work in order to cope with the demands of law school, their ability to reason and analyze, their ability to express themselves orally and in writing, and their potential for contribution to the community. Generally, the Committee requires, as a minimum, an accumulation of five or more years of experience in a candidate's particular field of endeavour.

4. Applicants to Indigenous Black and Mi'kmaq Programme

Candidates for admission to this programme must be either indigenous Nova Scotia Black or Mi'kmaq persons, or persons with a "substantial connection" to either a Black community in Nova Scotia or in other Atlantic provinces or in other provinces in Canada or, in the case of Mi'kmaq, a substantial connection to an Aboriginal community wherever they may be located, and should indicate this on their application materials. Otherwise the documentation is similar to the regular admission process. The Admissions Committee conducts interviews with applicants to the Programme.

Applicants who are accepted in one of the designated special categories may, as a condition of their acceptance to law school, be required by the Admissions Committee to successfully complete, either prior to or during their first year of law school, a designated course of study.

5. Native Applicants

Those native applicants who are not eligible for the Indigenous Black and Mi'kmaq Programme and whose previous academic background does not meet the admissions standards, are eligible to apply for admission to the Faculty of Law through successful completion of the Programme of Legal Studies for Native People at the University of Saskatchewan, College of Law. Application forms and further information are available from Professor Ruth Thompson, Director, Programme of Legal Studies for Native People, University of Saskatchewan, College of Law, Saskatoon, Saskatchewan, S7N 0W0.

C. Additional Information for Part Time Applicants

Students interested in pursuing a part-time LLB at Dalhousie should do the following:

1. In addition to completing the regular admissions package, submit a brief written statement outlining your reasons for seeking admission to the Part-time Studies Programme and indicating whether you wish to do First Year on a full-time or half-time basis. This statement should be in addition to the Personal Statement which forms part of the regular application material. Admission to the Part-time Programme is limited. Not all students who meet the standards for acceptance to the LLB programme will be permitted to do the degree on a part-time basis. You should note that, in considering whether to admit an applicant into the Part-time Studies Programme, the Committee in its discretion will give special consideration to factors such as family responsibilities, financial hardship, employment commitments, health problems, physical handicap, age, racial and ethnic background or economic disadvantage.
2. Students already accepted into the full-time LLB who wish to enter the Part-Time Studies Programme should write a letter supplying the information requested in the previous paragraph and send it to Ms. Rose Godfrey, Admissions Office, Dalhousie Law School, Halifax, Nova Scotia, B3H 4H9. This letter may be sent along with your confirmation of acceptance and your deposit. It may also be sent at any time before registration, though earlier applications are likely to fare better than later ones. Take note that, even for those already accepted into the full-time LLB, acceptance into the Part-Time Studies Programme is by no means automatic.
3. When you decide to do the Part-Time programme you should contact the bar society of any province in which you might want to practice law, in order to ascertain whether they will accept a Part-time LLB from Dalhousie as meeting their requirements.

D. LLB/MBA, LLB/MPA, LLB/MLIS, LLB/MHSA

Students intending to make application for any joint programme should inquire directly to the Registrar's Office, Dalhousie University.

E. Admission From Another Law School

Students seeking admission from another law school, who have failed to satisfactorily complete studies there, must submit with their application a letter from the Dean or Registrar stating that in all respects they are eligible to repeat or continue studies at that school. A student not permitted to continue will be considered ineligible for admission at Dalhousie. Undergraduates of other law schools who satisfy the standards for admission to the LLB programme may be admitted with advanced standing, provided they are in good standing where previous studies have been undertaken, the work they have completed is satisfactory to the Studies Committee, and the classes to be completed for an LLB degree can be arranged. To qualify for a degree the student must normally complete two full years at Dalhousie. In some cases, a degree may be granted after one full year. Well qualified graduates of a Québec law school or persons with a law degree from outside Canada may be admitted into a special one or two year programme. Enquiries should be directed to the Administrative Officer at the law school.

F. Admissions Policy

In assessing applications, emphasis is placed primarily on an applicant's academic record and LSAT score. The Admissions Committee also considers non-academic experience, letters of reference and other factors in making its decisions. Interviews by the Admissions Committee of applicants with significant non-academic experience may be held at the discretion of the Committee.

G. Students with Learning Disabilities

Dalhousie University is committed to providing equal educational opportunity and full participation for students with learning disabilities. See University Regulations, pg. 11, for details.

H. Admissions Procedure

Students seeking admission to the Law School for the first time must complete an application on the form provided, and forward this to the Admissions Office, Dalhousie University, Halifax, N.S. B3H 4H6. An application fee, which is not refunded, must accompany each application. Students applying for admission are required to submit

results of the Law School Admissions Test of the Educational Testing Service, Princeton, New Jersey. Students inquiring about admission are advised of arrangements to take the test at Canadian universities.

The Admissions Committee may consider applications as soon as they are received or it may postpone consideration of some or all applications until June. A non-refundable deposit of \$200 is required to hold a place in the law programme. All prepaid deposits are applied to the first instalment due for tuition fees. Prospective applicants should confirm from the faculty that this information has not been changed subsequent to this printing.

I. Admission as an Occasional Student

Subject to University and Law School regulation a student may be admitted as an occasional student to attend one or two classes. Attendance or performance in classes or any examinations is not credited for degree qualifications. As a general rule, occasional students are not permitted to attend first year law classes. Those wishing to be admitted as occasional students should apply to the Law School Studies Committee.

J. Exchange Programmes

1. Semester at a Québec Law School

Faculty Council has passed a resolution in favour of the development of student exchanges with Québec Law Schools at the undergraduate level, and an agreement has been reached with Laval University and the University of Sherbrooke to enable Dalhousie students to receive credit for a semester of work at those institutions.

Students interested in getting involved in such a programme must have sufficient capacity in the French language to attend classes given in French, although examinations could be written in English. Interested students should contact Professor Philip Girard at the Dalhousie Law School.

2. The Vrije Universiteit Amsterdam Exchange Programme

Dalhousie Law School and Vrije Universiteit (VU) Amsterdam Faculty of Law are party to an exchange agreement which enables Dalhousie law students to study for one term in Amsterdam free of tuition if they have paid a full year's tuition at Dalhousie. Details of classes available at VU, including a full semester's worth of classes offered in English, are available from the coordinator of the exchange programme, Professor Innis Christie.

VU offers its classes in three trimesters, the normal class load being for four (4) credit classes in the Autumn, three in the Winter and three in the Spring, for a total of 40 credits. Students can go there for the third trimester without missing any class time at Dalhousie and can earn seven Dalhousie credits for one Amsterdam Trimester. Acceptance into the programme is at the discretion of the Studies Committee on application by interested students, and may be based on the applicant's academic record and other classes taken as well as those s/he proposes to take at VU. Places are limited so selection may be competitive.

Exceptionally, a student who has planned his or her classes properly may be granted 14 credits for the equivalent of a full term's work at VU. Such a student would have to attend both second and third trimester at VU in third year. It may also be possible to attain this level of Dalhousie Law School credit by attending VU twice, in the third trimester after completion of Dalhousie's second year and in the second or third trimester in Dalhousie's third year, with the permission of the Studies Committee.

A student taking this programme is responsible for ensuring that the coordinator of the exchange programme at Dalhousie Law School receives official notification when s/he has satisfactorily completed the VU classes approved for credit by the Dalhousie Law School Studies Committee.

FORMAT: Worth up to 14 credits, as approved by the Studies Committee

PREREQUISITES: Available to student with high academic standing immediately following the completing of the regular work of second or third year for up to seven credits, or to

students in third year for the period January to June for up to 14 credits (which will necessitate delaying graduation until the following autumn).

J. Semester at the University of Maine Law School
Students who have completed half the work needed for graduation from the Faculty of Law are eligible to spend one semester at the University of Maine School of Law in Portland and receive full credit towards their degree at Dalhousie. Such students are registered at Dalhousie and pay tuition here only. The programme has received the approval of the Qualifications Committee of the Nova Scotia Barristers' Society. This opportunity to live in the United States and study at an American Law School should interest both students who contemplate graduate work in the United States and those who would find background in American law helpful. Students interested in participating in this programme should contact the Dean's Office for further information on application procedures.

K. A Health Law Exchange Programme with Loyola University in Chicago is now in place. Interested upper year students may complete a semester there for credit to their Dalhousie LLB. For information, contact the Director of the Health Law Institute, Professor Jocelyn Downie.

Dalhousie has recently set up an exchange programme with the National University of Singapore. Those interested should contact the Director of Studies at the Law School.

K. Admission to the Practice of Law

Prospective students are advised to consult the Law Society in the law district where they hope to practice for specific information on qualifications for admission to the Bar. Some bar societies may require more extensive university training for admission to the Bar than is required for admission to Law School. Specific inquiries should be directed to the appropriate bar society.

Under the Rules and Regulations of the Nova Scotia Barristers' Society a student desiring admission to the Bar of Nova Scotia must serve under articles of clerkship with a practicing solicitor for a period of twelve consecutive months after receiving a degree in Law from Dalhousie or any other approved University. Students are also required to complete the Bar Admission Course, and to pass examinations given during the Course.

Students who complete a period of articles in another province may apply to the Qualifications Committee of the Barristers' Society for credit towards the twelve month requirement.

The Law Society of Upper Canada admits holders of the Dalhousie Bachelor of Laws degree to the Bar Admission Course conducted by the Society for candidates for admission to the practice of law in Ontario.

In other provinces of Canada where the common law system is in effect the degree of LLB from Dalhousie is recognized as fulfilling academic qualifications and as preparation for practical training for admission to the Bar. Information concerning particular elective classes recommended by the law society of a Province for inclusion in a student's course of studies is available from the Placement Office.

III. Faculty Regulations (1998-99)

The Academic Year consists of one session of two terms* covering a period of about thirty weeks. Please consult the faculty for final confirmation of start and end dates.

*There is a third term in the summer for Dalhousie Legal Aid Clinic students only, the dates of which are May 1 - August 31 inclusive.

A. Registration

Students are registered for the whole session only and not for one or other of the terms. Late registration requires the approval of the Dean of the Faculty, and payment of an extra fee.

B. Class Work and Attendance

In order that their class work may be recognized as qualifying for a degree, candidates must conform to the following requirements:

1. All students are expected to attend the classes of their prescribed courses regularly and punctually.
2. They must appear at all examinations and prepare all essays and assignments satisfactorily.
3. In determining pass lists the standings attained in prescribed class exercises and research work and in the various examinations are taken into consideration.
4. A student whose work becomes unsatisfactory or attendance irregular is reported to the Dean, and the Faculty may require the student to discontinue attendance in the class or classes concerned and to be excluded from the examination(s).

C. Class Outlines

Students will be provided with a class outline by the instructor at the first meeting of the class. Changes to the outline which affect assessment components, the weight of individual assessment components, or examination requirements with a value of ten percent or more must have the unanimous approval of all enrolled students in order to be valid. Within four weeks after the beginning of each term class outlines will be placed on file with the Faculty of Law Office.

D. Classes from Another Faculty for Law School Credit

Law students may take a university class(es) from another faculty for credit at the Law School, if that class (or classes) is sufficiently relevant to the student's law programme. The non-law class(es) should be at the graduate level, and may be the equivalent of no more than a total of 4 hours per year credit, as determined by the Administrative Officer. The grades awarded in non-law classes will be on the basis of Pass/Fail, and a student's average will be computed on the basis of law classes only. Non-law classes cannot be included in a student's programme to satisfy the major paper requirement. Students wishing to take non-law classes must obtain the written consent of the particular university department, and arrange to have the class description sent to Candace Malcolm. Normally, students may take non-law classes in their third year only. (Please note that students registered in the combined LLB/MBA, LLB/MPA, LLB/MLIS and LLB/MHSA programmes are governed by separate regulations.)

E. Auditing Classes

A law student* may audit a class in one of two ways, by:

- 1) Sitting in on classes with the permission of the instructor, but without writing the examination. The instructor may require a student to keep up with class work. There is no official recognition given to this type of audit on the student's transcript; or
- 2) Arranging with the instructor to write the examination (or do any necessary assignments) and receive a grade. The grade will not be for credit and will not be included in the student's weighted average. If the examination is written, a notation will be made on the student's transcript that the class was audited. Any student choosing to audit a class in this way must obtain the permission of the Administrative Officer and the appropriate professor.

* PLEASE NOTE: The audit regulations for law students differ from the general definition in the Definitions section of this calendar.

F. Examinations and Pass Requirements

Regular Examinations and Assignments: Final examinations are held immediately before the December vacation and after the completion of lectures in the spring.

1. Special Examinations and Assignments

Where it can be established that, for medical or personal reasons, a student's ability to pursue a class or to write an examination or complete an assignment for credit was significantly hampered, the Faculty may allow the student to write a special examination or complete a special assignment.

A student who wishes to petition the Faculty for permission to write a special examination or complete a special assignment must, if possible, notify the Dean or his/her nominee prior to, and in no case later than the end of the examination or assignment in question.

2. Supplemental Examinations and Assignments

A student who attains the required average of 55% by regular and special examinations or assignments and who has failed not more than two classes is entitled to write supplemental examinations or to complete supplemental assignments in the classes failed. The student must pass the supplemental examination(s) before advancing to the next year, unless the student is in Second Year and is eligible under one of the other rules relating to pass requirements.

Students permitted to write special examinations or complete special assignments will be entitled to write supplemental examinations or complete supplemental assignments should they fail the special, provided they otherwise meet the requirements for entitlement to write supplementals. Moreover, a student who encounters medical or personal difficulties in preparing for or writing a supplemental assignment may, upon petition, be granted permission to complete the class requirements by supplemental procedures at a later date.

Where a student fails a class and writes a supplemental examination, both the mark in the final examination and the mark in the supplemental examination appear on the record. Supplemental examinations and assignments are marked "Pass" or "Fail". A student's mark in the regular examination or assignment is used for all purposes connected with the computation of the average, including class standing. Marks in supplementals are used for all purposes relating to the satisfactory completion of a particular class.

3. Dates for Supplemental and Special Examinations

Supplemental and special examinations are written in July and, in exceptional circumstances, on other occasions specially arranged. Application to write a supplemental examination must be made on or before Friday, June 19, 1998 on a form to be obtained from the Office of the Dean and must be accompanied by the proper fee.

G. Examination Regulations

1. Students writing examinations in Dalhousie Law School are expected to act honourably, in accordance with the spirit as well as the letter of these regulations. Invigilation is provided primarily to assist students with problems. Where there is no invigilation, and particularly in the case of supplementals, specials and other examinations not written in the normal course of events, these rules apply with such variations as are practically required.
2. Time for Writing Examinations - All examinations in the Law School shall commence at the appointed hour and, in the absence of an extension of time granted to the class generally by the instructor who sets the paper, they shall end at the appointed time. Except for justifiable cause, a student will not be permitted to enter the examination room after the expiration of one hour from the commencement of the examination nor will any student be permitted to leave the examination room during the first hour or the last half hour of the examination except as provided by Regulation (9). In the event of a student being late for an examination for justifiable cause, he or she shall report this fact as soon as is reasonably practicable to the Associate Dean or his or her nominee, and the Associate Dean, or nominee, in consultation with the examiner, shall have authority to make immediate alternative arrangements for the student to sit the examination. The term "justifiable cause" includes, but is not restricted to, temporary illness, delay caused by a snowstorm or transportation difficulties.
3. Identification of Examination Booklets - Examinations in the Law School are written by "code number" only and students will not write their names on booklets or otherwise seek to indicate their authorship. Students will be provided with code numbers before the commencement of examinations and must record their code number on each examination booklet. Students should also indicate the name of the class, the professor's name and the date of the examination in the space provided on the first page of the examination booklet, and nothing else should appear on the first page.
4. Answering Examination Questions - Unless otherwise instructed, students shall write their answers on the right hand pages of the answer booklet only, reserving the left hand pages for sketching answers and making rough notes. Each question should be correctly numbered.

5. Use of Materials by Students - Unless otherwise specified by the instructor concerned, no printed or written materials may be consulted by a student during the examination. When reference to printed or written materials by a student during the examination is permitted the instructor or nominee will indicate this fact to the class in advance and will list at the beginning of the question paper all permitted materials.
6. Disposition of Prohibited Materials - Briefcases (i.e., carrying cases and attaché cases) and notes, books and other materials not permitted for reference in an examination must be left outside the examination room but not in the hallways or lavatories in general use during the examinations.
7. Communication Between Students - Students shall not communicate or attempt to communicate with other students during examinations.
8. Smoking and Noise in the Examination Room - Smoking is not permitted in the Law School. Students are reminded that any noise is distracting to others writing an examination.
9. Leaving the Examination Room During Examination - A student may, with the permission of the invigilator, but only then, be permitted to leave the room and return to the examination. Only one student may be excused at a time, and, when permitted to leave, must do so as quietly as possible. The only areas considered "in bounds" for students outside the examination room are the hallways adjacent to the room, and corridors and stairways connecting student lavatories. All other areas are out of bounds, including lockers.
10. Submission of Examination Papers to Invigilator at end of Examination - Students must submit their answer booklets promptly when the invigilator signifies that time has expired, whether the answers are completed or not. Students are responsible for keeping track of time and must organize themselves to answer the examination questions in the time allotted.

H. Academic Accommodation for Students with Learning Disabilities

Students are expected to self-identify that they have a learning disability with the Advisor to Students with Disabilities as early as possible and preferably before the beginning of the term and to provide the Advisor with a current (within three years) psychoeducational report documenting the presence of a learning disability. They should make this initial contact during office hours and be prepared to discuss strengths, weaknesses and the types of accommodation that may be necessary.

The types of academic accommodation provided for students with learning disabilities may vary depending on the nature of the learning disability and the class content.

It is not unusual for there to be an initial trial and error period of finding the best way to evaluate a student's ability to demonstrate a mastery of class material.

The policy on release of information about students with learning disabilities is consistent with the University Regulation on the Release of Information as detailed on page 11.

NOTE: Where self-disclosure or prior arrangements have not been made with the University, Dalhousie is not liable to accommodate your special needs due to your disability.

I. Grading Information

Grade Equivalents - Letter grades are used for all purposes at the Law School; however, the numerical equivalent is used to determine the student's weighted average. The numerical equivalents to the letter grades are as follows:

Letter Grade	Equivalent
A+	85-100
A	80-84
B+	75-79
B	70-74
C+	65-69
C	60-64
D+	55-59
D	50-54

F Below 50 (clear failure)
 INC Incomplete

The grade 'INC' is a transitional grade and will be replaced by a letter grade upon the student completing the requirements of the academic year. Subject to writing supplemental examinations, a student must attain a grade of 'D' or better in each class, and in any event an overall weighted average of 55% to complete the work of any year. Pass or Fail grades are assigned to supplemental examinations and non-law classes for LLB credit, as well as to some Clinical Law classes. Non-law classes (except classes by students registered in the combined LLB/MBA, LLB/MPA, LLB/MLIS and LLB/MHSA programmes) are not used to determine a student's average. Honours/Pass/Fail grades are assigned to Clinical Law and the Criminal Clinic. An Honours or Pass grade in these classes is not used in determining a student's average, except in certain circumstances where the student would otherwise fail the year, and a Fail grade in these classes is assigned a numerical value and is used in determining a student's average.

J. Pass Requirements

1. First Year

The pass mark in a class is 50%, but an overall weighted average of 55% is required for advancement. A student who fails to attain the required average of 55% by regular and special examinations or assignments fails the year. Students in first year must attain an overall weighted average of 55% and pass every subject, either by regular, special, or supplemental examination, before advancing to Second Year. A student who fails in more than two classes also fails the year regardless of overall average. Students who fail the year are not permitted to advance to Second Year or to write the supplementals. They may apply for readmission. The success of any such application depends on all the factors considered by the Admissions Committee. Readmission in the year immediately following failure is only possible if vacancies develop in the first year class after the Admissions Committee has closed its wait list, but not later than the first Friday in October. The Admissions Committee has imposed a deadline of September 1 for receipt of applications for readmission in the year immediately following failure.

In December, 1993, the following grade distribution scheme for First-Year marks was adopted by Faculty Council. Any variation from the permissible range of marks must be approved by Faculty Council:

Permissible Grade Distribution

First-Year	Grades
A	10-20%
B	35-55%
A & B together	50-65%
C	15-30%
D	5-20%
F	0-5%
Median grade 70-72	

2. Second and Third Year

The pass requirements for Second and Third years are the same as for First Year, except in the following respects:

- a) **Applicable only to Third Year - The University "up-and-down" Rule:** A Third Year student who, without recourse to supplementals, fails only one class and attains an average on the work of the year that exceeds 50% by twice as much as the failure in the class is below 50% is permitted to graduate.
- b) **The "60-40" Rule:** A student in either Second or Third Year who, without recourse to supplementals, fails only one non-compulsory class, makes 40% or more in that class and has an average of 60% or more on the work of the year is permitted to advance or graduate, as the case may be. Students who have satisfied these conditions may, if they wish, write a supplemental examination in the class failed to improve their record in that class.
- c) **Applicable only to Second Year - Carrying a Failure into Third year:** A student in Second Year who fails only one class and has an average of 60% or more on the work of the year is permitted to advance and may carry the failed class as an integral and

additional part of the Third Year programme. Where the failed class is optional, the student may petition the Committee on Studies for permission to take a class or classes other than the one that was failed.

- d) **A Part-time Rule for Those with One Failure:** A student in Second or Third Year who fails only one class and who is not eligible for or does not opt for advancement or graduation under (a), (b), or (c), supra, may take the class again on a part-time basis and may write the next regular examination or assignment in the class. Where the failed class is optional, the student may petition the Committee on Studies for permission to take a class or classes other than the one that was failed. This part-time year counts as one of the four years during which a student must complete the full-time LLB course to qualify for the degree.
- e) **Supplemental Privileges - Clinical Law, Clinical Course in Criminal Law**

i) For the purposes of paragraphs (a), (b) and (d) of these Pass Requirement rules, a failure in Clinical Law or in the Clinical class in Criminal Law shall be deemed to be a failure in more than one class.

ii) Except as provided in clause (iii) hereof, a student who fails Clinical Law or the Clinical Course in Criminal Law shall not be entitled to supplemental privileges and shall be deemed to have failed the academic year.

iii) The Committee on Studies may permit supplemental privileges to a student who has failed either Clinical Law or the Clinical Course in Criminal Law where:

- a) The basis of a failing grade is the student's paper, in which case a written memorandum may be authorized as the mode of supplemental examination; or
- b) The failure is recorded on the basis of a discrete evaluative device of which replication is feasible in the opinion of the Committee.

NOTE: Students are advised that while second and third year grades are not strictly governed by a grade distribution curve, several requirements are in place which encourage uniformity of grades between sections. The following requirements were adopted by Faculty Council in the fall of 1979, and apply as well to the December 1993 grade distribution scheme.

K. Grade Distribution

- 1. The bell curve will continue to apply to the evaluation of first year classes.
- 2. Those teaching second and third year classes should take note of the first year grade curve in their evaluation and use it as a general guiding principle. The larger and more traditional (i.e. lecture method, examination) the class, the more likely it is that some rough concordance with the first year curve will emerge.
- 3. The Studies Committee should perform an overseeing function with respect to second and third year grades. Prior to the Faculty marks meeting, the Studies Committee should be provided with a breakdown of the grades awarded in each of the second and third year classes and should make appropriate enquiries concerning any obvious anomalies. In the event that the committee is not satisfied with the explanation offered by a faculty member for an apparent anomaly, the committee should direct him/her to reconsider his/her marks and the Committee may bring the matter to the attention of the Faculty marks meeting.
- 4. A full breakdown of marks awarded in individual classes should be available to members of the faculty at the Faculty marks meeting.

Excessive Disparity Between Sections:

- 1. A faculty member who teaches any class in which there is an "examination", must provide a draft of the "examination" to colleagues for their comments.
- 2. Before handing in his/her grades, a faculty member teaching any sectioned class must provide to his/her colleagues the best, an average and the worst (including all failures, if any) papers for their consideration. (This also applies to those teaching major paper classes).
- 3. The Studies Committee will again have an overseeing role in the matter.

1. Before submitting grades to the administration, a faculty member teaching any non-sectioned class must provide a sample of his/her papers or examinations (i.e. the best, an average and the worst) to a colleague for review.

L. Major Paper Classes

Each second or third year student must take at least one class which has been designated as a major paper class per year. Some classes are available on the basis of evaluation by examination, or by major paper, the difference being that when the class is evaluated by examination, two credit hours are earned, and where a major paper is written, three credit hours are earned. In choosing one of these classes, please indicate which method of evaluation you choose, by including it for 3 hours (paper) or 2 hours (examination).

M. Major Paper Guidelines

Students are reminded that guidelines for major papers were adopted by Faculty Council on March 31, 1980, amended on November 23, 1984, amended in Summer 1991 and again in December 1993 as follows:

A "major paper" is a writing requirement worth not less than 60% of the final mark awarded in a class.

No method of evaluation in any class may require a major paper unless that requirement has received the approval of Faculty Council. Students should not be faced with a method of evaluation different from that which appears in the latest published description of the class. Any student may, however, be given the option of writing a major paper in any class, provided the current rules on numbers of major papers are respected. Obviously, all of these constraints can be evaded by assigning papers worth only slightly less than 60%, assigning several papers, and so on; but the wish of Faculty Council is that their spirit is to be respected.

1. Objective of Major Paper Requirement

The major paper requirement is intended to assist in the improvement of the legal research and writing skills the student already has. It is to be, in effect, an extension of the first year legal writing program. The topics upon which the written assignments are undertaken should be of a type suitable for in-depth research in a limited field of inquiry and substantial Faculty input is essential.

2. Performance Expectation

The aim should be writing of publishable quality. It is to be expected that most students will not achieve such a high level of quality, just as most students will be unable to achieve an A standing in other classes. Papers should exhibit at least some level of legal analysis and not consist of a mere recitation of decisions and facts. Supervision should be sufficient to make the writing requirement a real learning experience. This necessarily involves feedback to the student during the preparation of the paper and after its completion.

3. Curve Does Not Apply

The curve does not apply as a guideline in the marking of major papers.

4. Criteria

The criteria of (a) Research; (b) Organization: Logic/Coherence; (c) Analysis-Insight-Synthesis; (d) Literary Style and (e) Originality are adopted explicitly as the ones relevant to evaluation of major papers. The definition of these criteria and the alphabetical grade equivalents and weights assigned to them as set out in the following table are adopted.

Please see Major Paper Guidelines Table at the end of this section.

(a) Research involves the ability to find, select and use effectively all primary materials (case, statutes, regulations) and secondary sources (books or articles) relevant to the topic. In many classes, a comparative analysis of material from other jurisdictions (e.g. Britain and the United States) is appropriate or even essential. Students should not rely exclusively on secondary sources, but should read the original text of major cases and statutes referred to in the literature. Research materials should include, where appropriate, non-legal sources. Empirical research by students ought to be encouraged.

The table adopts the following descriptors for research (horizontal axis):

- i) Outstanding - as defined above
 - ii) Thorough- no important area of research has been missed but there are a few loose ends or other sources that ought to have been explored.
 - iii) Not quite thorough - an important area of research has been missed or there are both loose ends and other sources to be explored.
 - iv) Serious but Unsuccessful canvass of sources contains the failings of (iii) only more so.
 - v) Mere attempt to consider sources - distinguishable from (iv) as being cursory rather than serious in considering main sources or there are clear errors in research, e.g. student fails to check for appeals of relevant decisions, and bases much of the analysis on a court of appeal case that has been reversed by the Supreme Court of Canada.
 - vi) No serious research effort - self explanatory
- (b) **Organization: Logic/Coherence** relates to the logical and coherent presentation of the subject matter, so that it is readily intelligible to the reader.

The introduction should assist the reader by providing both a clear statement of the problem that the student has chosen to analyze, the goal she/he seeks to achieve and a brief overview of the subjects she/he intends to discuss. The conclusion should play a similar role at the end of the paper, except that it should also summarize the student's conclusions. Topics should appear in a logical sequence. Legal and factual material that provides the foundation for discussion of a particular issue should be set out before that issue is reached. The student should use headings to structure the paper and indicate when she/he is moving to a new topic or subtopic. There should also be transitional text to justify the shift to a new topic, explain its connection to issues previously discussed, and the like.

The table adopts the following descriptors for Organization (vertical axis):

- Excellent Organization
- Well organized: A few minor flaws, but generally good logical flow
- Moderate Disorganization throughout, but paper is generally intelligible
- Substantial Disorganization: paper hard to follow
- Incoherent: Disorganization is so great that paper is unintelligible

(c) **Analysis-Insight-Synthesis:** These criteria relate to the evaluation of the student's ability to understand and utilize effectively the materials that she/he has found through research. They require an understanding of the subject matter that goes beyond the ability to merely recite the rationales of cases, the conclusions reached by other authorities or bare statistics.

Analysis relates to the student's detailed use of cases, statutes, and secondary sources within the paper to explore particular issues that she/he has identified. Good analysis will assist the reader to achieve a sophisticated understanding of the issues and relevant legal authorities without the need to read all the various sources that the student had identified through research. The student should provide a factual background adequate to permit the reader to understand the context in which legal problems arise. She/he should describe relevant legal material (cases/statutes) and important policy analysis (for example, Law Reform Commission materials) in sufficient detail to provide the reader with a clear view of any legal controversies that exist and reasoning that has been put forward to support the various positions. There are a wide variety of analytical weaknesses that may be displayed by students. Examples include missing a relevant issue or legal argument, identifying legal problems but not exploring available legal principles that may have a bearing on their solution, or stating the conclusions of cases significant to analysis of an issue without setting out the reasoning that the court used to justify its conclusions.

"Insight" involves an in-depth understanding of the fundamental issues. Good "Synthesis", which usually demonstrates this understanding, reflects the ability of the student to integrate the

diverse material that she/he has found into a conceptual framework that is clearly explained to the reader. Insight and synthesis would probably show up in a strong statement of thematic material at the outset, its use as an organizing device in the paper, and a serious attempt in the conclusion either to determine whether the initial hypothesis had been proven or to assess the conceptual apparatus for its explanatory power. Weak insight and synthesis may be demonstrated by a student's failure to integrate relevant authorities for some or all of the paper.

A better paper will draw inferences from the digested material as to the present state and future development of the law in the area researched, as well as formulating recommendations for legal changes that might improve the situation and serve appropriate policy goals. Good analysis without much insight or synthesis may be average depending on the complexity or the novelty of the topic or research method. For instance, good analysis of an original topic (see Originality *infra*) may be as much as can be expected and should be rewarded highly. The same quality of analysis of a topic on which there is already a body of published critical writing that provides a framework or platform for the student's paper would have to show its own insight and synthesis to rate equally highly. A paper that sets out numerous cases or articles or otherwise merely describes the results of the student's research efforts, however extensive, without attempting to extract common principles or create an analytical basis is likely to be judged as poor.

The table adopts the following descriptors for analysis-insight-synthesis (vertically within each box in the table):

- Excellent
- Very Good
- Average
- Weak
- Poor

(d) **Literary Style:** This criterion relates to the linguistic style in which the paper is written. Most Dalhousie law students do a competent job with grammar and spelling and many have excellent literary style. The stylistic problems present in papers are of two

sorts. Legal writing should be formal but clear and straightforward. Some students tend to be too colloquial, using slang or contractions such as "won't". Other students try too hard to be formal, producing convoluted sentences, making excessive use of the passive voice, and the like.

Because most students are competent in terms of literary style, this criterion is used to make adjustments in the grades produced by the table set out above only in extreme cases. The professor may increase or reduce the alphabetic grade result produced by the table set out above by one grade level for exceptionally strong or exceptionally weak literary style as described below:

Descriptors for literary style:

Excellent: Literary style is significantly above the norm for Dalhousie Law students.

Raise table mark by one alphabetic grade level, e.g. B to B+

Average: Literary style is consistent with that demonstrated by the majority of Dalhousie law students, i.e. some stylistic weaknesses but basically competent

No change in table grade level as determined above

Weak: Student's literary style falls significantly below the norm for Dalhousie Law Students and demonstrates serious, persistent weaknesses in grammar, spelling, or style

Reduce table mark by one alphabetic grade level, e.g. B to C+

(e) **Originality:** A highly prized, all-too-rare quality that cannot be easily defined, is used in the Table to raise the alphabetic grade that would have been assigned otherwise by a maximum of two grade levels. A paper may demonstrate good "analysis-synthesis" but still be lacking in originality. There are two different kinds of originality: topic originality and substantive originality.

The first sort of originality relates to the topic itself. This kind of originality exists when the student selects a topic where no research has been previously undertaken in Canada (i.e. there are no Canadian secondary sources that deal with the issue that the student has selected). There may or may not be articles or books that have been published on the topic in foreign jurisdictions (e.g. the United States or Britain), but even when such foreign sources do exist, a

Major Paper Guidelines Table

Research:		Out-standing	Thorough	Not quite thorough	Serious but un-successful canvass of sources	Mere attempt to consider the issues	No serious research effort
Organization	Analysis- Insight Synthesis						
Logical Flow	Excellent	A+	A	B+	B	C+	F
Organization	Very Good	A	B+	B	C+	C	F
^	Average	B+	B	C+	C	D+	F
^	Weak	B	C+	C	D+	D	F
^	Poor	C+	C	D+	D	F	F
Well Organized	Excellent	A	B+	B	C+	C	F
^	Very Good	B+	B	C+	C	D+	F
^	Average	B	C+	C	D+	D	F
^	Weak	C+	C	D+	D	F	F
^	Poor	C	D+	D	F	F	F
Moderate Disorganization	Excellent	B+	B	C+	C	D+	F
^	Very Good	B	C+	C	D+	D	F
^	Average	C+	C	D+	D	F	F
^	Weak	C	D+	D	F	F	F
^	Poor	D+	D	F	F	F	F
Substantial Disorganization	Excellent	B	C+	C	D+	D	F
^	Very Good	C+	C	D+	D	F	F
^	Average	C	D+	D	F	F	F
^	Weak	D+	D	F	F	F	F
^	Poor	D	F	F	F	F	F
Incoherent	Excellent	C+	C	D+	D	F	F
^	Very Good	C	D+	D	F	F	F
^	Average	D+	D	F	F	F	F
^	Weak	D	F	F	F	F	F
^	Poor	F	F	F	F	F	F
Literary Style							
Excellent	Raise table mark by one alphabetical grade e.g. B to B+						+
Average	No change in table grade level as determined above						+
Weak	Reduce table mark by one alphabetical grade e.g. B to C+						+
Originality	Raise table mark by one or two alphabetical grade levels e.g. B+ to A, or B+ to A+						+

significant degree of creativity and extrapolation is required on the part of a student who undertakes to write on a topic where no previous Canadian research is available to help with all or part of the topic. This kind of originality may exist in major papers that display weaknesses in other areas. Indeed, some kinds of analytical or organizational problems may be attributable precisely to the fact that the student is working in an area where no guidance is available from previous research carried out by more experienced scholars. The professor may recognize this kind of originality relating to topic by increasing the alphabetic grade produced by the table above by one level (e.g. from a B to a B+).

The second kind of originality may appear in the way the research is approached or in the understanding that the writer has gained of the topic and is able to convey to the reader, or in the form of new and convincing insights that are unique to the student author. This kind of originality, which is the hallmark of a paper of "publishable quality", is not mere novelty although in other contexts the word may have that meaning: the new position advocated by the student must be credible, as well as novel. A major paper may demonstrate this kind of originality, even though the topic has been previously considered by other researchers in Canada. Originality of this kind will normally be associated with good "insight-synthesis-analysis". The professor may recognize this kind of substantive originality by increasing the alphabetic grade produced by the table above by either one or two levels depending on the extent of the originality demonstrated by the paper (e.g. from a B+ to an A, or from a B+ to an A+ grade).

The cumulative effect of increases for originality is restricted to a jump of two grade levels. In other words, a professor cannot award a student an originality increase of three grade levels by accumulating an award of one grade level for topic originality, and two grade levels for substantive originality.

5. Guidelines for Major Paper Classes

- a) Normally the paper will not be shorter than 25 pages.
- b) Normally a paper of a general descriptive nature will not meet the standards.
- c) Normally the topic undertaken will be suitable for in-depth research with legal emphasis in a limited field of inquiry.
- d) Normally the supervisor should approve the topic and the outline or draft of the paper.
- e) Faculty members should make themselves available to meet with students to discuss the graded papers.
- f) At each stage of the supervision of major papers, both the supervising faculty member and the student should pay explicit attention to each of the criteria relevant to the evaluation of the paper.
- g) Copies of the major paper guidelines should be made available to students.

N. Review Process

The following review procedures were passed by Faculty Council in October 1980, as amended March 1987 and are now in effect.

Part I

1.(a) A student who is dissatisfied with the grade received in a class or in a component of a class may discuss the grade informally with the Faculty member involved.

(b) A student, having received the final grade in a class, may seek a review of the grade given in any written component of the class on the basis that an error has been made in grading.

(c) A student may seek a review of the result of a special or supplemental examination on the basis that an error has been made in grading.

(d) The Request for Review shall be made by letter to the Associate Dean not later than 21 days following distribution of the grade. If special circumstances or cause exists, the Associate Dean may permit a Request for Review to be filed after the 21 day period has elapsed.

(e) The written Request for Review shall be accompanied by the sum of \$15.00 (refundable if the appeal succeeds). The Committee on Studies may waive the \$15.00 fee on the basis payment would cause financial hardship. The written Notice shall also contain:

- (i) The student's name and code number;
- (ii) The name of the class and of the faculty member(s) who taught and/or evaluated it; and
- (iii) A reasonable explanation of the nature of the error in grading which the student believes affected the mark or grade received.

(f) The Associate Dean shall notify the faculty member or members in question of the Request for Review immediately, unless the provisions of paragraph 2(a) apply, and shall provide to the faculty member a copy of the Request for Review or of the Notice.

2. (a) Upon receiving a written Request for Review in accordance with paragraphs 1(d) and 1(e) hereof, the Associate Dean shall, where the Request or Notice concerns a grade of 60 or higher, and in any other case may refer the matter to the Committee on Studies to consider whether or not to allow the review to proceed.

(B) Where, pursuant to (a) hereof, the Associate Dean refers a Request for Review and in its opinion, but subject to sub-paragraph (c) hereof:

- (i) The Request or Notice is not being made on the basis that an error has been made in grading or
- (ii) A successful review is highly unlikely, having regard to the additional marks needed in a particular class, or the number of classes in which improvement is needed to materially or significantly affect the standing* of the student, the Committee on Studies may refuse to allow the review to proceed. (*The Committee on Studies interprets "standing" to mean weighted average for the year.)

(c) A student whose request for review is referred to the Studies Committee shall be given an opportunity to meet the Committee or, if that is not practical, to write on the matter.

(d) The Associate Dean may join in the deliberations of the Studies Committee but shall withdraw before the Committee makes its decision.

(e) The Associate Dean shall notify the faculty member(s) and student(s) involved of the decision of the Committee on Studies to permit a Review to proceed.

3. Subject to paragraph 4 hereof, within five (5) working days of receipt of notification of a Request for Review pursuant to paragraph 1(a) or paragraph 2(f) hereof, the faculty member shall advise the Associate Dean whether he or she agrees that an error in grading occurred and shall recommend to the Faculty Council that:

- (i) The grade or mark remain unchanged;
- (ii) That the grade or mark be lowered, and by how much; or
- (iii) That the grade or mark be increased and by how much.

4. (a) When, in the opinion of the Associate Dean, it is impossible or impractical within the time limits prescribed above:

- (i) to notify the faculty member affected of the Request for Review;
- (ii) To obtain from him or her the decision called for in paragraph 3 hereof; or
- (iii) To receive the cooperation of the affected member of the faculty in the conduct of the review, the Committee on Studies may extend the time within which: (i) to notify the faculty member of the Request for Review; or (ii) the faculty member shall make the decision and recommendation required by paragraph 3 hereof; and

(b) where the cooperation of the faculty member affected cannot be obtained at all or obtained within a time-frame that would not prejudice the student, the Committee on Studies may proceed with the Review by:

- (i) Requiring another member of faculty to evaluate the written component in respect to which the Review has been requested and to comply with paragraphs 3 and 5 hereof; or
- (ii) Omitting (a) hereof entirely and, after receiving a submission, if desired, from the student, deciding upon a reasonable method of review.

5. The faculty member's decision shall include a report of his or her deliberations, containing inter alia, an indication (a) of the mode of grading the assignments in the class and (b) an assessment of the student's work.

6. The Associate Dean shall write to the student indicating the result of the review and enclosing a copy of the decision.

The student may discuss the decision with the faculty member but his or her unavailability or unwillingness to participate in a discussion shall not justify the student's failure to take the next step called for in paragraph 8 hereof and in the time there provided.

8. Any student may initiate a review from the decision of a Faculty member by giving written notice to the Associate Dean within seven (7) days of its receipt, which shall indicate the basis for the review.

9. Upon receipt of the notice of review, the Associate Dean shall appoint two persons, preferably with expertise in the subject, as a review board, to review the grade assigned and to determine whether an error has been made in evaluating the student's work.

10. (a) The Associate Dean shall provide the review board and the student with unmarked copies of all documents relevant to the review together with a copy of the faculty member's decision.

(b) The Associate Dean shall provide the review board with a copy of all documents relevant to the review of:

- (i) At least one other student whose mark or grade was five (5) or more higher than that obtained by the student seeking the review;
- (ii) At least one other student whose mark or grade was five (5) or more lower; and
- (iii) The student whose mark or grade was the best in the class.

11. (a) The members of the review board shall independently review the grade assigned to determine whether, in their opinion, an error has been made in grading the work of the student in the context of the mode of grading and the grades assigned the other students whose work is being used for comparison.

(b) Subject to sub-paragraphs (c) and (d) hereof, the members of the review board shall meet and shall assign a final grade on the work received.

(c) Where the grade being reviewed is an D or an F, (or a mark within those grades), or where the student's eligibility to register for the next year of study in law or to graduate may depend upon the mark or grade assigned by the review board, and where it finds that there has been an error in grading, it shall have an unrestricted power to assign such mark or grade, whether the same as or higher than that assigned by the professor affected, as it deems appropriate.

(d) Except as otherwise provided in sub-paragraph (c) hereof, where the grade being reviewed is a D+ or higher, (or a mark encompassed within the grade of D+ or higher), the review board shall retain the mark or grade assigned by the professor unless it finds that there has been an error in grading, and it recommends that the mark or grade in the written component under appeal be increased by such an amount that it will cause the student's final mark in the class to be changed by three (3) marks or more.

(e) When the review board cannot agree upon a change in mark or grade, the mark or grade under review shall remain unchanged.

(f) The review board shall report its decision to the Associate Dean within twenty-one (21) days of its appointment.

(g) The Associate Dean shall report the decision of the review board to the student and provide a copy of its decision.

12. The Associate Dean shall report periodically to Faculty Council concerning the results of Part I appeals.

Part II: Other Academic Matters

1. Student appeals and grievances on all other academic matters relating to academic standards, class requirements, examinations and other evaluative procedures, grades, pass requirements, advancement requirements, graduation requirements and other University or Faculty academic regulations, including matters decided in the first instance by the Studies Committee, may be made by notice in writing to the Studies Committee. A student who had made an appeal or grievance to the Studies Committee shall be given an opportunity to meet the Committee or, at the student's option, to write on the matter. The Studies Committee shall decide each such appeal or grievance and report its decision to the student forthwith and to Faculty Council. If the Studies Committee has not

decided an appeal or grievance written one month after receipt by the Committee of the notice in writing, the student may appeal the matter to Faculty Council.

On February 15, 1985, Faculty Council adopted as a standard for a Part II Review that an evaluation fails to satisfy the requirements of a Part II Review where it is shown that the evaluation was not conducted fairly, was not conducted properly or was not conducted by competent evaluators. For the purposes of this section, "conduct" will include the setting, administration and marking of the evaluative device.

2. A Part II appeal shall be initiated within 21 days following distribution of the grade by a notice in writing to the Associate Dean, and shall be accompanied by:

(a) a concise statement identifying the teacher and class that is the subject of the appeal;

(b) the sum of \$15.00 refundable if the appeal succeeds: (The Committee on Studies may waive the fee on the basis payment would cause financial hardship);

(c) where applicable, a statement of the reasons why the student alleges that the evaluation was not conducted (i) fairly; (ii) properly; or (iii) by competent evaluators;

(d) the order in which the student wishes the appeal to be heard, where a Part I appeal was also filed by the student.

3. If special circumstances or cause exists, the Committee on Studies may permit a Part II appeal to be filed after the 21 day period provided in paragraph 2 of this Part hereof has elapsed.

4. (a) As soon as possible after receipt of Notice of Part II Appeal, the Associate Dean shall meet or otherwise communicate with the student, invite him or her to make written submissions in support of the appeal which shall be responded to, in writing, by the professor affected or by such other person as the Dean may designate in case of the unavailability of the professor and, if requested by the student, arrange for a hearing to be held at a mutually convenient time and date.

(b) The Committee on Studies shall hear and decide the appeal, granting such remedy or remedies as it deems to be appropriate in the circumstances, and shall provide written reasons for its decision.

5. The Committee on Studies shall notify the student and faculty member affected of its decision and shall report the same to Faculty Council.

The attention of students in the Faculty of Law is directed to the Minutes of the Senate of the University for March 21, 1983 adopting the following recommendation:

3. That Senate appoint a Senate Academic Appeals Committee to hear student academic appeals beyond the Faculty level and that:

(a) the Senate Academic Appeals Committee be vested with the jurisdiction by the Senate to hear student appeals on academic standards, class requirements, examinations and other evaluative procedures, grades, pass requirements, advancement requirements, graduation requirements and other University or Faculty academic regulations, and

(b) the Senate Academic Appeals Committee be given authority to develop hearing procedures and policy guidelines relating to said student appeals, and

(c) the Jurisdiction of the Senate Academic Appeals Committee to hear said student appeals would only exist in those instances when the approved appeal regulations and procedures of the respective Faculty had been fully exhausted by the student, and

(d) the Senate Academic Appeals Committee would have no jurisdiction to hear student appeals on a matter involving a requested exemption from the application of Faculty or University regulations or procedures except when irregularities or unfairness in the application thereof is alleged.

V. Academic Programmes

The degrees in law conferred by the University are the Bachelor of Laws (LLB), the Master of Laws (LLM), and the Doctor in the Science of Law (JSD).

A. Bachelor of Laws

1. Full-Time Studies in Law

The LLB course is designed to train students in those qualities which distinguish the educated lawyer, whether engaged in the practice of law, in government service or elsewhere. Among the qualities stressed are an understanding of the process of ensuring order in a complex and evolving society, precision of thought, an appreciation of the use of the English language in writing and speaking, thoroughness, and the avoidance of superficiality.

The full-time course extends over three academic years, from September to May. A student who has failed the work of a year may, subject to the limitations of space, be readmitted, but the course must be completed in four academic years. Any academic session in which a student has registered and has not formally withdrawn by the date of the first Fall term examination constitutes an academic year. Where a student establishes, to the satisfaction of the Committee on Studies, that for medical or personal reasons, ability to pursue the course was significantly hampered, the Committee on Studies may rule that a student has not used up one of the four academic years.

The regular course requires the full time attendance of students. In the first year all subjects are prescribed; in second and third year most subjects are optional, with counselling by faculty members to assist students in selecting areas for study. Second and third year students must complete at least 29 credit hours, including a major paper writing requirement, each year. Permission is required before any regular law student may undertake classes in another Faculty of the University.

The policy of maintaining fairly small classes reflects the nature of teaching at the Law School. Classes are conducted by the "case method" or otherwise but with emphasis upon discussion between teacher and students, based upon assigned materials and topics that students are expected to have considered in advance. Research and written assignments are required of all students. These may involve substantial time in addition to regular class periods. The work submitted is carefully examined and then critically assessed by the teacher concerned and whenever possible a detailed criticism is provided in an oral interview.

In addition to class and writing requirements all students are required to participate in mootng exercises. Third-year students may be required to attend legal aid clinics, the law courts, and special lectures.

2. Degree Requirements: Full-time programme

(a) First Year Required Classes

- LAWS 1000.06R: Contracts & Judicial Rule-Making
- LAWS 1001.06R: Criminal Justice
- LAWS 1002.01A: Orientation to Law
- LAWS 1003.05: Fundamentals of Public Law
- LAWS 1004.03R: Legal Research and Writing
- LAWS 1005.06R: Property in Historical Context
- LAWS 1006.06R: Tort Law and Damage Compensation

(b) Second Year Required Classes

- LAWS 2061.05R: Civil Procedure
- LAWS 2062.05R: Constitutional Law
- An elective class with evaluation by major paper (i.e. a "paper class"). A student must include at least one major paper class per year.
- Additional elective classes to make up a full year of studies of approximately 15 hours per week in each term. A student must have a minimum of 29 hours and may have a maximum of 31 hours per year; each term's work must include a minimum of 13 and a maximum of 16 hours. Where a student

chooses the maximum load of 31 hours, he or she must achieve a passing grade in all classes, subject to the normal requirements.

(c) Third Year Required Classes

- LAWS 2099.02A: The Legal Profession and Professional Responsibility
- Electives: As for second year, above

3. Part-Time Studies in Law

Dalhousie Law School has instituted a part-time LLB programme in order to facilitate legal studies for those unable to take the full-time programme. Students admitted to the part-time programme may complete their degree by one of two methods:

(a) Full-Time First Year

Students may take their first year programme on a full-time basis, and thereafter apply to be admitted to the part-time programme for the remainder of their LLB studies. After first year, students in the part-time programme are required to complete a minimum of 58 hours over a maximum of six academic years, with a minimum course load of 8 hours in each academic year. Part-time students must complete at least one optional class involving a major written paper in each 29-hour block over the period of part-time study. Students who enter the programme after completion of first and second years on a full-time basis are required to complete their minimum of 29 hours over a maximum of three academic years, with a minimum course load of 8 hours in each academic year.

(b) Half-Time First Year

Part-time students who choose to do first year on a half-time basis are required to complete 17½ hours of the first-year programme in their first year, completing Contracts and Judicial Rule-Making, Tort Law and Damage Compensation, Fundamentals of Public Law and ½ credit of Legal Writing. The remaining 15½ hours of the first year programme consisting of Property in its Historical Perspective, Criminal Justice: the Individual and the State, Orientation to Law, and the remaining 2½ credits of Legal Writing must be completed in the second year. Thereafter, students in the part-time programme are required to complete a minimum of 58 hours over a maximum of five academic years, with a minimum course load of 8 hours in each academic year. Part-time students must complete at least one optional class involving a major written paper in each 29-hour block over the period of part-time study. The Faculty encourages part-time students, wherever possible, to do first year on a full-time basis.

4. Class Hours (Second and Third Year): Full-time programme

Each student must complete a minimum of 29 and a maximum of 31 hours per year, and a minimum of 13, maximum of 16 hours each term. A student enrolled in the Clinical Class in Criminal Law may take 17 hours in the term in which the Clinical Class is taken. This is also true of the Legal Aid Clinic, with permission of the Clinic Director.

* See Major Paper requirements.

PLEASE NOTE: Teaching assignments are subject to change. Please consult the current Law School timetable for an update.

B. Master of Laws (LLM) and JSD

A graduate programme in Law, leading to a Master of Laws (LLM) degree, is offered at the Law School. Candidates register with the Faculty of Graduate Studies, and are normally expected to remain in residence as full-time students for one year or as part-time students for two years. The programme may consist of either a combination of class work, seminars and a thesis, or a combination of class work and seminars involving substantial written papers. Thesis topics may be concerned with any area of law for which the faculty and library resources will support original and useful work. In recent years, supervision has been provided in the following areas: international law, administrative law, labour law, commercial law, tax law, torts, health law, criminal law and criminology, law of the sea, maritime law and environmental law. Special interests have been developed in maritime and environmental law, which has been designated as a field of special emphasis in the Faculty of Law, and in Health Law under the Health Law Institute which is a joint initiative of the faculties of Law, Medicine, Dentistry and Health

Professions. Students may also enroll in a special programme for graduate students in Family Law. The Faculty's academic plan recognizes particular research capacity in the areas of public law and feminist legal scholarship.

To be admitted to the programme, an applicant must normally have obtained a high second-class standing (B average) in completing the Bachelor of Laws (LLB) degree from Dalhousie University, or commensurate standing and completion of a corresponding degree from another recognized Law School inside or outside Canada.

Applicants who plan to write a thesis are required to submit an outline of their proposed thesis topic at the time of application.

The doctoral (JSD) programme is offered to a very limited number of highly qualified candidates seeking a doctorate as the peak of their legal education. Four areas of the Dalhousie law curriculum have been designated as being especially suited to the advanced research required at the JSD level: marine law, environmental law, international law and comparative law.

Applicants for admission must have:

- (i) Attained a first degree in law with at least an A- average, First Class honours, or the equivalent;
- (ii) Completed a Master's degree in law;
- (iii) Submitted an outline of their proposed dissertation and a detailed description of their research plans with their application. Preference will be given to candidates with established credentials in published scholarship of a professional calibre. The ability to conduct independent research and to converse fluently in the English language are prerequisites to admission.

The requirements for the doctoral degree are as follows:

- (i) Continuous residence at Dalhousie for at least one full year (usually September to August);
- (ii) Fully supervised research work leading to a substantial and significant dissertation;
- (iii) Preliminary examination on and oral defence of the dissertation;
- (iv) Class work and other examinations as required by the Graduate Studies Committee.

More detailed information on the requirements for the graduate law degrees offered at Dalhousie may be found in the calendar of the Faculty of Graduate Studies. There are two graduate law classes described below.

- LAWS 3069.03: Graduate Directed Research Paper
- LAWS 3000.03: Graduate Seminar on Legal Education and Legal Scholarship

C. Combined LLB/MBA

This is a four-year programme which enables students to select classes leading to degrees of Bachelor of Laws and Master of Business Administration. The usual order of the programme is:

Year 1

- Full First Year MBA classes

Year 2

- Full First Year LLB classes.

Year 3

- Civil Procedure
- Constitutional Law
- A major paper class
- 7-9 hours of law classes from the "Business Law" area (see below).
- Other elective classes for a total of 25 law credits
- 3 half classes from the MBA programme given a total of 6 hours credit at the Law School.

Year 4

- The Legal Profession
- A major paper class
- Three to five hours of law classes from the "Business Law" area
- Other elective law classes for a total of 23-25 law hours.
- Two half classes from the MBA programme
- Business Policy done over the whole year and given 4 hours credit at the Law School

- One other half class, given 2 hours credit at the Law School.

The third and fourth year programmes may be done in reverse order, with permission, except for the required law classes Civil Procedure and Constitutional Law (3rd year) and the Legal Profession (4th year).

Classes in the "Business Law" area:

- Bankruptcy & Insolvency, 2 hours
- Business and Environment, 2 hours
- Business Associations, 4 hours
- Commercial Law, 4 hours
- Taxation of Corporations, 2 hours
- Creditors Rights 2 hours
- Insurance 2 hours
- International Trade Law, 3 hours
- International Trade Transactions, 3 hours
- Law of Succession, 3 hours
- Legal Accounting, 2 hours
- Oil & Gas Law, 2 hours
- Real Estate Transactions, 4 hours
- Taxation I, 4 hours
- Taxation II, 2 hours
- Taxation III, 2 hours
- Securities Regulation, 3 hours
- Regulation of Financial Institutions, 3 hours
- Additional recommended classes: Evidence, Trusts

Students intending to make application for the joint LLB/MBA programme should inquire directly to the Admissions Officer, LLB/MBA Programme, Registrar's Office, Dalhousie University.

D. Combined LLB/MPA

This is a four-year programme which enables students to select classes leading to degrees of Bachelor of Laws and Master of Public Administration. The suggested order of the programme is:

Year 1

- First year classes of the MPA programme.

Year 2

- First year classes of the LLB programme.

Year 3

- One and a half credits from the MPA
- Civil Procedure
- Constitutional Law
- 16 credit hours of classes from the LLB programme including a major paper class.

Year 4

- One credit from the MPA programme
- A minimum of 23 credit hours of classes from the LLB programme, which must include The Legal Profession and Professional Responsibility, and a major paper class.

Candidates for the LLB/MPA programme must satisfy the entrance requirements of both the LLB and MPA programmes, and may obtain further information about the combined programme by writing either to the Faculty of Law or to the Co-ordinator of the MPA programme. For admission, students must apply to both the Law School and the School of Public Administration individually. Students applying for the MPA programme may submit LSAT results in lieu of GMAT results.

E. Combined LLB/MLIS Programme

Students who apply for the combined LLB/MLIS programme (Masters of Library and Information Sciences/Bachelor of Laws) must meet the admissions standards of both the Faculty of Law and the School of Library and Information Sciences. At the end of the four year programme, they will have obtained both degrees. The programme consists of the following:

Year 1

- First year classes of the MLIS programme (7 required, 1 elective)

Year 2

- First year classes of the LLB programme

Year 3

- Two of 3 remaining required MLIS classes
- 25 hours of LLB classes

Year 4

- 1 MLIS class each term (1 required, 1 elective)
- 23 hours of LLB classes

F. Combined LLB/MHSA Programme

Students applying for this programme must meet the admission standards of both the Bachelor of Laws and the Masters of Health Services Administration programmes. The combined programme is structured as follows:

Year 1

- First year of MHSA Programme

Summer

- MHSA 6390.06R: Health Services Residency

Year 2

- First year of LLB Programme

Year 3

- MHSA 6315.03A: Organizational Theory
- MHSA 6330.03A Health Care Planning
- One 0.5 credit MHSA elective
- 25 hours of classes from the LLB programme, including Civil Procedure, Constitutional Law, a major research paper, and Health Law, LAWS 2132.03.

Year 4

- 1.5 credits MHSA elective
- MHSA 6380.03B: Senior Seminar
- MHSA 6360.03B: Health Care Law or Health Law from the Law School
- Minimum 21 hours of classes from the LLB programme, including Professional Responsibility and a major research paper.

G. Indigenous Black and Mi'kmaq Programme

In July of 1989, Dalhousie Law School implemented a new programme aimed at attracting applicants from the Indigenous Black and Mi'kmaq communities of Nova Scotia. The Admissions Committee is prepared to apply broader criteria when assessing applicants to this Programme.

Although most applicants to the Programme will have completed a degree from Dalhousie University or another degree granting college or university recognized by the Senate, or will have completed two full years of study leading to any recognized degree, a limited number of applicants may be admitted to the Programme as mature students where it is determined that, under the circumstances, the applicant has demonstrated by the length and quality of his/her non-academic experience the equivalent in substance of the formal education required by regular applicants.

The Programme, apart from the regular Law School curriculum, incorporates a Pre-Law class which will be an evaluation for admission purposes.

H. Marine and Environmental Law Programme (MELP)

In 1974 the Faculty of Law initiated the Marine and Environmental Law Programme (MELP) in recognition of the increasing importance to society of marine and environmental law and policy. MELP provides a range of educational opportunities for students, a forum for the exchange of views among scholars and a focus for interdisciplinary research. MELP has worked towards the progressive development of the national and international regimes which govern marine and environmental issues through public interest oriented research and education.

The Programme currently involves at least ten full and part-time faculty members. The present director is Prof. Moira McConnell.

Dalhousie now offers more than a dozen classes in marine and environmental law and cognate areas - the largest curricular offering within this field in Canada.

The classes offered in MELP are:

- LAWS 2001.03A or B: Maritime Law and Practice
- LAWS 2020.02B: Fisheries Law
- LAWS 2022.03B: Law of the Sea
- LAWS 2041.02: Coastal Zone Management
- LAWS 2051.03B: International Environmental Law
- LAWS 2068.03B: Ocean Law and Policy: International Fisheries
- LAWS 2104.03A or B: Environmental Law I
- LAWS 2124.03: Marine Environmental Protection
- LAWS 2133.03: Environmental Law II - Environmental Law as Regulatory, Political and Social Process
- LAWS 2134.03A or B: Advanced Maritime Law and Policy
- LAWS 2153.03A: Business and Environmental Law
- LAWS 2119.02A/2120.03A: Aboriginal law
- LAWS 2015.03B: Land Use Planning
- LAWS 2079.02B: Oil and Gas Law
- LAWS 2012.03A: International Law
- LAWS 2130.03: International Trade Transactions

A detailed description of each class appears in the alphabetical list of Classes of Instruction set out below. In addition to these classes, a limited number of Environmental Law Placements may be offered to qualifying students. These Placements afford students the opportunity to earn academic credit (organized as a Directed Research Paper) within MELP while working on legal matters within the office of an environmental organization in the local community.

LLB students may specialize in Marine Law or Environmental Law and the specialization will be recognized on their academic transcript. To specialize in Marine Law, a student must take Maritime Law and Practice, Law of the Sea and two additional elective classes from Maritime Law and Policy, Ocean Law and Policy, Marine Environmental Protection Law, Fisheries Law, Oil and Gas Law and Coastal Zone Management. At least one of the elective classes must be Maritime Law and Policy, Ocean Law and Policy or Marine Environmental Protection.

To specialize in Environmental Law, a student must take Environmental Law, International Environmental Law and two other elective classes from Business and Environmental Law, Environmental Law II, Marine Environmental Protection, Fisheries Law, Oil and Gas Law, Coastal Zone Management, and Land Use Planning. At least one of the elective classes must be Environmental Law II or Business and Environmental Law. One class for either specialization may be replaced by suitably equivalent work, with the consent of the Director of MELP and the Legal Studies Committee. For both specializations, all four classes must be completed with an average grade of B and no grade below C.

Law students may also take a limited number of classes for credit towards their law degree in related subjects offered in other academic departments of the University, such as the Marine Affairs Programme. Students with such interests should seek the permission of the Department or School involved as well as the Legal Studies Committee of the Law School. Students wishing assistance in the selection of classes within the area of MELP are advised to consult the current director or an instructor in the programme.

In the years since its foundation, MELP has also been active in library development. The maritime and environmental law holdings at Dalhousie's Law Library represent one of the best collections of its kind in the world, attracting scholars from many countries. Moreover, with shelf listings from over a dozen major libraries in Europe and North America, computer-assisted access to an extensive listing of marine-related materials is now possible.

As a consequence of these curricular and library developments, and of a steady involvement by faculty members in research, writing and conference activities in the field, a growing number of students are attracted to Dalhousie in order to undertake specialized studies in maritime, marine, and environmental law. In most years over half

of the LLM students at Dalhousie do their supervised these work within MELP. In addition, opportunities exist for students to pursue their marine and environmental interests beyond the academic programme. Two students associations, the Environmental Law Students' Society and the John E. Read International Law Society, organize a range of activities, including speakers, meetings and symposia on topics of current concern. The journal *International Insights* is also written, edited and published by law students, together with political science students.

I. Marine Affairs Programme

Location: 1234 Seymour Street
Halifax, NS B3H 3J5
Telephone: 902-494-3555
Facsimile: 902-494-1001
E-Mail: patricia.roberts@dal.ca
Co-ordinator: A. Chircop, BA, LL.D. (U. of Malta), LLM, JSD (Dal)
WWW: www.dal.ca/MMM

J. Master of Marine Management (MMM)

The Master of Marine Management is a one-year, professional, non-thesis, interdisciplinary degree. Students are expected to take required classes covering the marine and social sciences, as well as a number of electives from approved marine-related classes. Students are required to prepare a graduate project.

1. Admissions

Enrolment is limited to 20 students. Applicants must satisfy general requirements for admission to the Faculty of Graduate Studies. These include a Bachelor's Degree from a university of recognized standing with honours or its equivalent with a minimum average of B. Selection criteria include relevant work experience and career objectives. Applicants from outside Canada whose native language is not English must also submit a Test of English as a Foreign Language (TOEFL) score, its equivalent, or have completed a university degree in English. Dalhousie sets a minimum acceptable TOEFL score of 580. Deadlines for applications are January 31st for applicants requesting financial assistance, and March 31st for all other applicants.

Students with Learning Disabilities: See Students with Learning Disabilities in the Law Admission section.

2. Required Classes

MARA 5001.06R: Contemporary Issues in Ocean Management and Development:

This class offers an introduction to integrated planning and management for coasts and oceans. Subject areas addressed include coastal zone management, sea use planning, fisheries management, marine law and policy, maritime transport, development of non-living resources, protection and preservation of the coastal and marine environment, coastal tourism, maritime enforcement and conflict management. Much of the course consists of small group work, simulation exercises and fieldwork. Instructors for the various subjects come from Halifax universities, federal and provincial government agencies and the private sector.

MARA 5002.06R: Graduate Project

Students are required to apply the knowledge gained through class work to a specific planning and management problem or issue. As part of the project, students participate in internship programs with a local public or private sector agency of relevance to the project topic.

MARA 5003.03A: Marine Science and Technology

This class provides a general introduction to the marine sciences and technology. Subject areas addressed include physical, chemical, and biological oceanography, coastal zone, climate and ocean weather, remote sensing, toxins, fisheries, and ocean technology and management. Instructors are drawn from Halifax universities, government agencies and the private sector. This course has extensive small group work.

MARA 5004.00B: Communications Management (non-credit)

This class develops skills of marine managers for handling information and communications, including crisis management, with decision-makers and various stakeholders in ocean development and management processes such as special interest groups, the media, business interests (shareholders), and the public at large

3. Electives

Students select the remaining complement of classes from the broad range of electives available in the marine field at Dalhousie University, Saint Mary's University and the Technical University of Nova Scotia.

MARA 5005.03: Independent Readings

This class is an option for MMM students who wish to pursue independent research into a specific topic not covered in another class. The topic area of research must be approved by the MAP Coordinator and the research supervisor.

MARA 5008.03: Integrated Maritime Enforcement

The aim of this elective class is to sensitize students to the complexities of maritime enforcement within a coastal and ocean management framework by building an understanding of the roles of maritime enforcement in integrated planning and management. In doing so, students are introduced to concepts, tools, techniques and procedures of enforcement.

MARA 5009.03: Coastal Zone Management.

This seminar is designed to introduce students to the concepts, principles, approaches, and issues associated with integrated management of coastal zones worldwide. This course addresses the legal, policy, and administrative frameworks prevailing in Canada, but will do so within the global context of coastal zone management. Case studies and examples from developed and developing countries are used to present practical approaches to the management of multiple uses in the coastal zone, including community-based management models.
CROSS-LISTINGS: LAWS 2041.03; ENVI 5204.03

IV. Classes Offered: LLB and LLM

PLEASE NOTE: Every class listed may not be offered each year. As well, teaching assignments may be subject to change. For an up-to-date listing, please consult the current law school timetable.

A. First Year Classes (all compulsory)

Contracts and Judicial Rule-Making: LAWS 1000.06

This class has two primary objectives: the first is to provide an understanding of the process of development of the common law through judicial decisions; the second is to provide a basic knowledge of the doctrines and precepts of the law governing the making and performance of contracts. As a means of attaining the first objective, the "case method" of teaching is used to enable students to acquire a lawyer-like understanding of such concepts as "stare decisis", the use of precedent, and the technique of distinguishing. A critical evaluation of judicial law-making is undertaken through an examination of the developing phenomenon of legislative intervention in the field of contract law. In order to fulfil the second objective, substantive rules of contract law are examined.

FORMAT: 3 hours a week

EVALUATION: For large-group classes, written examination in December (with option to count as 30% of the final mark), and a final examination. For small group classes, written examinations 50% and a combination of class assignments, oral advocacy exercise(s) and class participation worth 50%, with written exam in December (with option to count as 30% of the exam component)

Criminal Justice: The Individual and the State: LAWS 1001.06

Relationships between the community and individuals are considered in the context of Canadian criminal law. The legal rights provisions of the Charter of Rights and Freedoms, selected topics in criminal procedure and the principles of the substantive criminal law will be the main focus of this class. The latter concentrates on elements of offences, justifications, excuses, non-exculpatory defenses, inchoate crimes and secondary liability for offences. Teaching is conducted by lecture and discussion of assigned materials including the Criminal Code (which is also used to illustrate methods and problems of statutory interpretation) and a volume of cases and materials.

FORMAT: 3 hours a week

EVALUATION: For large group classes written examination in December (with option to count as 30% of final mark), and a final examination. For small group classes, the mark is composed of a combination of class assignments, an oral advocacy exercise, class participation and written examinations.

Orientation to Law: LAWS 1002.01

The objective of the class is to orient students to the study of law by introducing them to four fundamental perspectives in the law: the comparative, the historical, the philosophical and the professional. Within each perspective several Faculty members will lecture, both to convey information deemed essential and to give a sense of the variety and contingency within each perspective. Mandatory readings will be presented in advance by each faculty speaker.

INSTRUCTORS: The Dean et al

FORMAT: 3 to 4.5 hours a week for the first 6 - 8 weeks of the fall term

EVALUATION: Pass/Fail oral conducted by a faculty member. If the oral is unsatisfactory the student will be re-examined by a three person group: class co-ordinator (the Dean), and two others

Fundamentals of Public Law: LAWS 1003.05

This class provides students with an understanding of the constitutional and administrative structures of Canadian law and government. An emphasis is placed on developing the skills required of lawyers whose public law work may range from appearances before administrative tribunals, to giving advice on the formulation and articulation of policy. Primary among the emphasized skills is the ability to work with and interpret constitutional, statutory and regulatory texts. A perspective on the administrative model of decision making will also be developed. As a necessary background for the development of these skills and for the general study of law, this class introduces students to the Canadian governmental and constitutional system. Students will explore the legislative process, statutory interpretation, and the administrative system using human rights legislation as a model. Further, students will develop an understanding of the analytical framework of the Canadian Charter of Rights and Freedoms, through the study of the interpretation and development of equality rights.

EVALUATION: Written examination in December (with option to count as 30% of the final grade), and a final examination

Legal Research and Writing: LAWS 1004.03

The main objectives of this class are to familiarize students with source materials commonly used by lawyers, to acquaint students with the generally accepted principles of proper citation in legal writing, and to assist students in acquiring a degree of proficiency in legal writing and research by introducing them to the techniques of discovering authorities and applying them to the solution of legal problems. The class is conducted by lectures, tutorials, reading of assigned materials and individual research. From the start, students are required to be familiar with the World Wide Web for accessing and answering assignment questions. During the early part of the second term, students are introduced to computer-assisted legal research through a series of class lectures and computer laboratory sessions.

INSTRUCTOR: M. Deturbide

FORMAT: 1 hour a week

EVALUATION: Three assignments

Property in its Historical Context: LAWS 1005.06

The purpose of this class is two-fold: first, to provide a basic understanding of property concepts and principles in both real and personal property; second, to provide a sense of the historical development of the law through emphasis on the evolution of fundamental principles and rules of real property since the feudal period in England.

This class introduces the student to the concept of property, its evolution, types and fundamental principles. It illustrates ideas such as possession and ownership by reference to the law of finders and bailment and to various transactions in which land or goods are the common denominators. It also explores the doctrines of aboriginal title and the principles of real property, including tenure, estates, future interests, matrimonial property, private and public controls on land use, the registry system and adverse possession.

FORMAT: 3 hours a week

EVALUATION: Written examination in December (with option to count as 30% of the final mark), and a final examination

Tort Law and Damage Compensation: LAWS 1006.06

This class has two major objectives: the first is to examine the judicial process as a means of resolving social and economic problems as opposed to the use of legislated alternatives; the second is to provide a basic understanding of the manner in which law distributes losses from injuries to personal, proprietary and economic interests through tort law and through such compensation schemes as no-fault auto insurance, workers' compensation, and compensation to victims of crime funds. Materials to be studied include cases, appropriate legislation and doctrinal writings related to the problem of damage compensation.

FORMAT: 3 hours a week

EVALUATION: For large-group classes, written examination in December (with option to count as 30% of the final mark), and a final examination. For small group classes, the mark is composed of a combination of class assignments, an oral advocacy exercise, class participation and written examinations.

B. Second Year Required Classes

Civil Procedure: LAWS 2061.05

This required 2nd year class is designed to develop an understanding of the importance of procedural law as it relates to various areas of substantive law. It is essential for students intending to practice law, since much of a lawyer's work and ability to serve members of the public depends upon an understanding of the procedural modes for attaining results. The class involves a study of court practice and procedures from the commencement of a lawsuit through to judgment, including pre-trial procedures and considerations relating to settlement. This is followed by a study of chambers practice and procedures, the interpretation of the Rules of Court, and the preparation and use of court forms. Practice examined includes originating and interlocutory applications in chambers and involves default judgments, amendments to pleadings, third party proceedings, various remedies before and after judgment, originating notices, remedies, pleadings and discoveries, etc. Alternatives to litigation and reform of the civil process are also addressed. In addition to regular classes in the class, students will take part in approximately ten one-hour workshops. The workshops will be conducted in groups of 15 students or fewer and will meet throughout the academic year. Each workshop will have an assigned problem which will require preparation and delivery of oral argument or the drafting of documents or both. The class will be taught by lecture and discussion.

FORMAT: 2 hours a week and workshop

EVALUATION: Workshop and written examination. The student will be evaluated in each workshop on the basis of preparation, presentation and participation. In total, the workshop portion of the class will be worth 20% of the final grade. There will also be a final examination.

Constitutional Law: LAWS 2062.05

This required 2nd year class concerns itself with three main themes; the distribution of powers under the Constitution Act 1867, the Canadian Charter of Rights and Freedoms, and Aboriginal rights. This will follow from the basic introduction to and foundation for

the class laid during first year by the class in Public Law. In Professor MacKay and Professor Pothier's sections, the class makes an effort to integrate division of powers, Charter and Aboriginal rights discussion to highlight both points of overlap and points of departure. The organization of the class is topical, rather than by sections of the constitution. The first few chapters provide a general overview of constitutional principles. The later chapters focus specifically on such particular contexts as the economy, education, language and culture, and penal regulation. Throughout the class emphasis will be placed on the roles of the constitution in our governmental structure and of the courts as its elaborator and guardian, and on constitutional litigation as a problem-solving process through which fundamental values are examined. For Professor Wildsmith's section, the division of power component is organized largely around the major heads of federal power, namely POGG, trade and commerce, federal undertakings and criminal law. The emphasis is on problem-solving and doctrinal evolution. The Charter component looks at the leading SCC decisions with a particular focus on the fundamental freedoms in s.2.

EVALUATION: Written final exam, with an opportunity for students to earn partial marks through other components during the term

C. Third Year Required Class

The Legal Profession and Professional Responsibility: LAWS 2099.02

This required 3rd year class examines various aspects of the nature and organization of the legal profession in Canada, including its history and evolution, the legal and ethical responsibilities of lawyers and the influences of the adversary system. In particular, the class covers specific ethical rules which affect all lawyers in their practices and also the wider public protection issues which face the organized legal profession. The class will be conducted by lecturers and discussions involving the whole class (1 hour per week) and by small group discussions (1 hour per week). These will include special presentations, simulations and problem-solving projects. Serious attention will be given to dilemmas facing lawyers and the legal profession today.

INSTRUCTORS: I. Christie, D. Pink, J. Downie

FORMAT: 2 hours a week

EVALUATION: Based partially on the results of a final examination and partially on small group performance

D. Second and Third Year Optional Classes

Aboriginal Peoples: LAWS 2119.02/2120.03

This class will examine the unique legal position of the aboriginal peoples of Canada. Problems abound in developing appropriate responses within the majority society to the needs and aspirations of Canada's Indian, Metis and Inuit populations. The objective of the class is to sensitize students to the legal and policy issues surrounding these problems. Thus, in addition to standard legal materials, the class will expose students to aspects of Colonial history, aboriginal conditions and culture, and government programmes and policies. Particular topics may include sources of law on aboriginal peoples, unique constitutional provisions, the special position of Indian reserves, the nature of aboriginal title and rights, Indian treaties, fiduciary obligations, taxation, and self-government/self determination.

FORMAT: Major paper or examination, with any class participation mark to be determined at the beginning of the term. Two credit hours or 3 credit hours if a major paper is written

INSTRUCTOR: B. Wildsmith

Administrative Law: LAWS 2000.04

This class is an advanced study of the public law process. It studies external controls upon the exercise of statutory authority, primarily through the vehicle of judicial review. It also attempts to develop an inside perspective upon the exercise of discretion. The purpose of the class is to introduce the student to the general principles of judicial review as well as to develop an understanding of the workings of the administrative process and the role of the subordinate legislation. Materials include case studies, scholarly commentary and accounts of the administrative process at work.

FORMAT: 4 hours a week fall term or winter term, or 2 hours a week both terms

EVALUATION: Three hour examination or determined by the instructor at the beginning of the term

Advanced Health Law: LAWS 2159.03

This class offers students the opportunity to consider particular health law issues in greater depth than is possible in the context of the survey Health law class. The specific subject matter of the class will vary from year to year in response to developments in the field of health law.

For 1998-99, the topic will be Public Policy and Regulations. This class will survey the institutional design of Canada's health care system and the incentives provided by current laws and regulations to government, private insurers, doctors and other health professionals, public and private hospitals, pharmaceutical companies, and patients. It will explain the peculiarities and similarities of Canada's health care system compared to other countries' systems and locate Canada's system amongst the variety of approaches taken internationally to the financing and allocation of health insurance and health services and to the regulation of the quality of health services. The class will examine the legal and institutional implications of three broad forms of health reform presently occurring internationally: managed competition, managed care, and internal markets. A number of jurisdictions will be discussed but special emphasis will be given to reforms in the United States, the United Kingdom, the Netherlands, and New Zealand. The class will consider: the prospects of similar types of system reform in Canada; the approaches taken by different provinces to date; and what the future may hold for lawyers as both practitioners and policy advisors in the health sector.

INSTRUCTOR: Health Law Institute faculty

FORMAT: 2 hours per week

EVALUATION: Major research paper (70%), class presentation (15%), and class participation (15%)

Alternate Dispute Resolution: LAWS 2129.03

This seminar class will provide students with an opportunity to learn about and develop negotiation and conflict management skills. The class will examine the range of decision making options that currently exist, such as consensus process, mediation, and arbitration and their relationship to court-related processes. Some topics considered will be conflict prevention, conflict resolution and a critical evaluation of the framing of problems for resolution. The class will also focus on providing students with an opportunity to consider the theory and practice of negotiation, ethics and problem solving. The class will involve conflict analysis and skills development exercises, and guest lectures from people actively involved in justice mediation, arbitration, commercial negotiation, ethics, consensus process and organizational/systems analysis.

INSTRUCTORS: M. McConnell, D. Evans

EVALUATION: Students are required to do several written assignments and carry out simulated negotiation/facilitation exercises

Banking Law and Negotiable Instruments: LAWS 2166.03

This class (which replaces the existing Negotiable Instruments class) introduces the student to basic problems in the use of commercial paper and to the law of banking. In dealing with commercial paper the class concentrates on disclosing an understanding of the mechanisms of negotiable instruments such as promissory notes and cheques and the practicalities of using them and suing on them. The law of banking as it pertains to bank/customer relations will be examined in the domestic and, briefly, the international sphere. Additionally, modern payment mechanisms such as credit cards, travellers cheques and electronic transfers will be analyzed.

INSTRUCTOR: P. Thomas

FORMAT: 1 hour per week (fall term) and 2 hours per week (winter term)

EVALUATION: By mid-term examination and final examination

Bankruptcy and Insolvency: LAWS 2081.02

This class will deal with various federal and provincial legislative provisions governing bankruptcy and insolvency; fraudulent conveyances; assignments and preferences; the status of receivers, private and public, at common law and by statute; the status of agents appointed pursuant to security instruments including chattel mortgage, conditional sale, assignment of book debts, and section 427 Bank Act, the status of engagements such as look-sees, and mortgages; informal and formal proposals; the role of trustees, receivers and lawyers; creditors and debtors and the administration of insolvent estates; priorities within and without bankruptcy including other competing interests between classes of creditors; the distribution of the estate among creditors within and without bankruptcy; consequences of bankruptcy and the alternatives to bankruptcy; dealing with insolvent persons and corporations in the consumer and business community; ethical considerations in the delivery of legal advice and services in insolvency; new developments and proposals for reform of insolvency laws in Canada.

INSTRUCTOR: D. B. Clarke

FORMAT: 2 hours a week

EVALUATION: Final examination

The Bertha Wilson Visorship in Human Rights: LAWS 2139.01

Every second year, beginning in 1992-93, the Oslar Hoskin/Honorable Bertha Wilson Visiting Professor in Human Rights delivers an intensive 14-hour class in the area of human rights law, domestic or international. A more detailed class description will be provided each time the class is offered. Precise timetabling will be announced later, but it is understood that for the brief period involved this class will in all likelihood encroach on students' regularly scheduled classes.

FORMAT: 2 hour lectures daily for 2 weeks at the beginning of term

Business and Environmental Law: LAWS 2153.03

This class deals with issues which arise because enterprises operate in a legal and social milieu which has an increasing concern for protection of the environment. The class will be of interest to students planning to work with corporations and also for students intending to focus more directly on environmental law. The class will provide an overview of a number of legal and policy issues and students will be required to prepare and present a paper focusing on aspects of these topics. Some of the topics to be covered include: national and international regulatory/constitutional context, corporate/ directors liability, environmental auditing, international trade (GATT/FTAA/NAFTA) issues, investment/banking concerns, contaminated site/real estate concerns, and industry specific concerns e.g. mining, fishing, pulp and paper, transportation. As well, economic incentives, ethical considerations, sustainable development.

INSTRUCTOR: M. McConnell

PREREQUISITES: Business Associations and Environmental Law I

FORMAT: Seminar, paper, case study

Business Associations: LAWS 2002.04

This class provides an introduction to the law governing the conduct of business in the corporate form. The class deals with the following topics: the choice of form of business enterprise; the legal effect of incorporation; disregarding the corporate entity; the different systems of incorporation; the corporate constitution; contracts between corporations and outsiders; the control and management of the corporation, especially the relationship among promoters, directors, executive committees, officers and shareholders; the raising and maintenance of a corporation's capital; the liability of directors and officers and remedies available to shareholders. An introduction to the principles of partnership will also be included. The class is taught by discussion of selected cases, statutes and other materials which students are expected to read carefully in advance of class.

INSTRUCTORS: M. Deturbide, D. Russell, C. Nicholls

FORMAT: 4 hours a week

EVALUATION: Problem-oriented written examination

Canadian-American Moot Court Competition (Trilateral Moot): LAWS 2108.02

This class is a high level moot competition among Dalhousie, University of Maine and University of New Brunswick. The competition is held in November and the location is rotated among the competing schools. The problem is traditionally based on a moot case in an area of domestic law raising important legal issues in Canada and the United States. The class requires research in Canadian and American Law, the writing of a factum and preparation of the moot case, performance in moot trials and argument of the case at the host school.

The class will include exposure to appellate advocacy techniques and instruction therein together with simulations and experience before practicing lawyers. Evaluation will be by the faculty advisor and the Canadian American Moot Court Competition judges.

This class is limited to third year students. Eligibility for the class is determined by the Moot Court Committee based on performance in the second year qualifying moots.

FORMAT: Major paper class

EVALUATION: Numerical and letter grade evaluation for moot performance. Participation in the class satisfies the major paper writing requirement

Children and the Law: LAWS 2018.03

The class focuses upon the position of children within the legal system. Focus is on the role of lawyers, inter-disciplinary perspectives upon children. Topics include: private custody, access, enforcement of custody and access orders, domestic violence and custody access, gay/lesbian issues and custody, mediation, parenting plans, sexual abuse allegations, child protection, adoption, and young offenders. Throughout the emphasis will be upon the respective roles of parents, children, the state, lawyers and the judiciary in decision-making concerning children.

INSTRUCTORS: J. Williams, R. Thompson

PREREQUISITE: Family Law I

EVALUATION: Major paper, book review and class participation for 3 credit hours

Civil Trial Practice: LAWS 2040.03

This seminar provides an intensive introduction to civil litigation. It requires students to have knowledge and understanding of substantive law in basic common law fields, e.g., Torts, Contracts, and Remedies, and of procedural law from Civil Procedure and Evidence. The class is designed to develop the students' awareness of the procedures required to prepare a civil case for trial and to develop their skills in interviewing parties and witnesses, conducting discovery examinations, conducting direct and cross-examination at trial, evaluating evidence in the case and considering settlement. The class is conducted on a seminar method involving in-class participation by the students in the various aspects covered in the class while at the same time developing the model case for trial. Out-of-class work consists of readings which are provided, preparations for class performance and preparation of various aspects of the model case. The seminar is conducted one night per week, the model trial being held on a Saturday. Attendance at all classes is essential.

FORMAT: 2-4 hours a week

PREREQUISITES: Evidence, Judicial Remedies and Civil Procedure

Restriction: Open to third-year students only

EVALUATION: In-class participation and participation at the model trial. Some portion of the final mark will be based on a written component. Evaluation will be clearly explained at the first class

Clinical Law: LAWS 2003.13

Students taking Clinical Law in the Fall Term are not required, although they may choose, to enrol in The Legal Profession; they must do the required readings for The Legal Profession and are expected to attend the lectures, but the seminar component of education in professional responsibility will be conducted at the Clinic. Students in the Fall term Clinic must indicate on their class selection form whether or not they wish to enrol in the Legal Profession.

Dalhousie Legal Aid Service, also known as "The Clinic", provides third-year students with an opportunity to learn practical lawyering skills in a community law office serving low-income clients.

Education at the Clinic takes four forms:

1. **Seminars and Simulations:** Seminars will be held Monday, Tuesday, and Thursday afternoons. In the first six weeks of the term, students participate in an intensive schedule of seminars and simulations. The first week of the term involves an introduction to the Clinic, its clients, office procedures and the Courts. The first weeks involve seminars and simulations designed to address issues related to issue-identification, negotiating, counselling and basic trial skills (examination, cross-examination and closing argument). Each week, for the first six weeks, there will be a seminar and a simulation/workshop. Seminars cover social assistance, housing and tenancy, child protection, debtor/creditor and bankruptcy, young offenders, ethics, poverty practice. Simulations will include: direct and cross-examination, negotiation and a mini-trial at midterm. The intensive programme ends after the first six weeks. Thereafter, seminars will continue twice a week. Topics in these seminars will be designed to provoke students to reflect on the impact of legal institutions on the low income community, the delivery of legal services to the poor, poverty law and law reform strategies and matters of professional responsibility. Throughout the term, students may be called upon to give a case presentation on a file from their caseload which raises an interesting legal or ethical issue and to conduct a discussion of the issue with other students.
2. **Supervision:** Initially, each student receives about 20 files, for which they are responsible. There is a supervisor assigned to each of a student's files, and students are required to confer with those supervisors on a regular basis. As well, there is a "Supervisor of the Day" assigned to advise students when the File Supervisor is not available.
3. **Experience:** Students are responsible for handling their own files, under supervision. They draft letters and documents, interview clients and witnesses, counsel clients, negotiate with other lawyers, prepare cases and conduct hearings in Family, Provincial and Supreme Court and before administrative tribunals. Students are required to interview new clients on a variety of cases, including family, criminal, administrative law, (social assistance, landlord/tenant, police complaints), and other civil matters. Students will also participate with staff members in poverty law issues separate from the regular caseload involving law reform and community development. In brief, students will conduct themselves as lawyers, in a poverty law context.
4. **Paper:** Each student, or a group of students, will be required to prepare a memorandum of approximately 15 pages (or more, depending upon the number of students involved), for completion by the end of the term. The topic of the memorandum must first be approved. Topics must be of practical importance or usefulness to the work of the Clinic. Special stress will be placed upon field research into how the law actually works in affecting our clients and the possibilities for reform of the law.

At mid-term and term end, students will be given a written evaluation, including comments upon their memoranda. In respect to the fall and winter terms, enrolment in Clinical Law will, whenever possible, be equalized between the two terms.

As Clinical Law comprises 13 credit hours, students are encouraged to arrange their schedules to avoid the necessity of taking any other classes during their winter or fall Clinical Law term. Students wishing to take an additional class during their Clinical Law term must have their class selection approved by one of Professors Black, Kaiser, Gibson, Thompson, Evans, Coughlan, Franey.

FORMAT: Fall, winter or summer term

PREREQUISITES: Evidence, Civil Procedure, Family Law

RESTRICTION: Third-year students only; students in Clinical Law cannot take the Clinical Course in Criminal Law

ENROLMENT: Limited to 16 students in Fall and Winter, 12 in Summer

NOTE: The application deadline for the Summer term of the clinic is January 31. The application deadline for the Fall and Winter terms of the clinic is March 31.

The selection process is as follows:

Interested students will be required to fill out an application form indicating why they wish to complete a term at Dalhousie Legal Aid Service.

Each student must indicate a preference for one of the three Clinic terms available: summer, fall, or winter. A student may provide details on the application form of any special circumstances which he/she would like taken into consideration in being selected for a particular term.

In the event that there is an over subscription for a particular term:

A. The majority of the positions will be selected by draw (10 of 12 in the summer session; 12 of 16 in the fall and winter session);

B. The remaining positions will be filled on the basis of the merits of an individual student's application;

C. Once positions have been filled for all of the over-subscribed terms, any remaining student applications will be used to select for available positions in an under-subscribed term.

The application selection process of students applying for all three terms will be done together. It is preferable that the selection process be fairly early in the winter term.

All applications received after the application deadline will be dealt with on a first-come-first-served basis. If there are unfilled positions after the application deadline, late applicants would fill those positions until there are no positions left. Subsequent applicants will be wait-listed.

WITHDRAWAL: Summer term, April 1. Fall term, August 1.

Winter term, Dec 1

EVALUATION: Clinical Law is graded honours/pass/fail. At midterm and at term end students will be given a written evaluation. The evaluation is based upon the student's total performance at the Clinic in relation to the following categories: client relations, legal analysis, pre-trial proceedings, trial and hearing conduct, professional responsibility, written competence, practice management, community file, seminars, workshops and simulations.

In the normal course a student will not be assigned any numerical grade and the student's performance will not be counted in determining his/her weighted average. However, in the event of a Failure, or that the student is otherwise no longer entitled to complete third year or to write supplementals because he/she does not have an average of 55, a numerical grade will be assigned and this grade will be counted in the weighted average.

Clinical Course in Criminal Law: LAWS 2092.09

This class has both a clinical and an academic component. The clinical component operates for eleven weeks of the term. Each student is assigned to a crown counsel defence lawyer or possibly a judge, and observes and participates as far as possible in the criminal law work of that person. For this eleven-week period each student must spend a minimum of 16-20 hours a week with the principal. The academic component is dealt with in two weekly seminars, each of two hours, which run throughout the term. The seminars focus upon lawyering skills including interviewing, trial preparation and advocacy skills using simulation exercises as the vehicle for learning. The seminars also focus upon matters relating to criminal law, criminal procedure, evidence, criminology and legal ethics. All-day tours of facilities such as penitentiaries and crime labs may also be arranged. Students are required to complete written memoranda. The time commitment to the field placement component of the class is extensive and students ought to take care in their other class selections in order to avoid significant scheduling problems. Students ought not to take a major class with classes scheduled in most weekday mornings as, at these same times, the criminal courts are in session (possible examples Business Associations, Tax, Administrative Law). Students are advised to consult with the instructors concerning their winter term class selection if they wish to be considered for the clinical class in Criminal Law.

INSTRUCTORS: B. Beach, J. Gumpert, S. MacDonald

RECOMMENDED: Criminal Procedure and Evidence

Restriction: Students who have completed or wish to complete Clinical Law or Criminal Trial Practice are not eligible

EVALUATION: Honours/Pass/Fail. Individual feedback is given to students throughout the class. An evaluation of each student's performance in each aspect of the class is provided at the end. A student's grade is not counted in determining his/her weighted average. However, in the event of Failure, or, as with the Legal Aid Clinic, where the student may fail third year because of an average below 55, a numerical grade will be assigned for inclusion in the weighted average

Coastal Zone Management: LAWS 2041.03

Coastal areas, home to nearly three quarters of the world's population, support some of the most biologically diverse and productive ecosystems. The number and variety of uses and user groups competing for this land, air and sea space is ever-increasing; resource-use conflicts are increasing and are often difficult to effectively resolve; whilst the resources in these coastal environments are decreasing and deteriorating. As a result, there is an urgent need for integrated coastal management (ICM) in Canada and other coastal States to plan, manage and regulate multiple uses and achieve sustainable use of the coastal environment. This is a complex challenge and raises many legal and policy issues at all levels, from community-based efforts to global initiatives.

This seminar examines the legal framework, concepts, principles, tools and models associated with coastal zone management worldwide. The approach will be comparative and inter-disciplinary, examining coastal zone management from a community, national, regional and international perspective. The various legal and theoretical concepts, legislative and administrative responses will be analyzed through lectures (including guest lecturers from Canada and abroad), case studies, simulation exercise(s) and class discussion. There will be specifically assigned readings for each class and general class materials. Class outline is available.

INSTRUCTOR: E. Meltzer

EVALUATION: Major paper (80%) and class participation (20%)

Commercial Law: LAWS 2004.04

This class focuses on sales of goods and secured transactions in personal property. The sales portion of the class focuses on agreements that support the supply of goods and the statutes that bear on those transactions. The Sale of Goods Acts, the federal Competition Act and a variety of consumer protection legislation, as they build on common law principles of contract, negligence and personal property law, will be studied. The secured transactions part of the class considers consensual arrangements to finance the supply of goods, together with other competing interests. The operation of the modern provincial personal property security statutes will be examined, as well as their relation to security interests under the federal Bank Act.

INSTRUCTORS: V. Black, R. Devlin, H. Kindred, M. Deturbide, C. Nicholls

FORMAT: 2 hours per week, both terms

EVALUATION: By examination

Comparative Criminal Law: LAWS 2009.03

The aim of this class is to examine criminal law and the administration of criminal justice in Canada by means of comparison with analogous aspects of the legal systems of selected foreign countries. The particular countries emphasized are the United States, France, the People's Republic of China and Islamic countries, since they represent a spectrum of models which differ in varying degrees from the Canadian legal system. They include common law, continental European, Communist and religious traditions which when compared with Canada can bring the most important characteristics of our own system into sharp focus. An opportunity will be given for students to explore issues of Canadian Aboriginal justice in this comparative context. All systems examined will be viewed in the light of international human rights standards thought to be applicable to criminal justice.

INSTRUCTOR: B. Archibald

EVALUATION: Class participation and the writing and presentation of a major term paper

Conflict of Laws: LAWS 2005.04

This class is concerned with legal issues in private law arising out of transactions and occurrences with connections to two or more legal unity (provinces or countries). Examples would be contracts made in one country but to be performed elsewhere, torts with a cross-border element (such as goods negligently manufactured in one country which injure persons in another) and international child custody disputes. The type of problems associated with such occurrences include (1) which law applies to the determination of liability in such situations, (2) which country's or province's courts have jurisdiction to entertain such disputes, and (3) the enforcement in one country or province of court judgments and arbitral awards emanating from another. The objective of the class is for students to learn to recognize conflict of laws situations, to deal with those situations by accepted methods, and to appreciate the results from a variety of points of view. The extent to which the federal nature of Canada affects such matters will be critically examined.

INSTRUCTORS: V. Black

CO-REQUISITE: Constitutional Law

EVALUATION: Final exam and optional mid-class assignment

Copyright, Industrial Designs, Trade Secrets, Semi-Conductor Chip Protection and Technology Transfers: LAWS 2028.03

This class is designed to provide students an opportunity to do research in all areas of intellectual property law, and to offer a basic introduction to selected areas of intellectual property law. The portion of the class taught by the professor will cover copyright, trade secrets, industrial designs and technology transfer through licensing. This material will be of value both to students who wish to specialize in the intellectual property field, and to the general practitioner who will be increasingly likely to encounter legal problems in the area of copyrights and trade secrets. We will explore the effectiveness of the various modes of protection in a variety of fields, e.g. literary works, music and other artistic works, computer software, databases and computer conferences, videotapes and photocopying. A comparative analysis of American, Australian, or European law will be offered in contexts where this will provide useful insights.

Paper topics will not be restricted to the areas of intellectual property law referred to in the class title. Students may also select topics related to patents or trademarks. Prior participation in the patents and trademark class is not a prerequisite for the selection of such a topic, although it is encouraged.

INSTRUCTOR: T. Scassa

EVALUATION: Major paper and class participation

Corporate Transactions: LAWS 2129.03

The purpose of this class is to provide exposure to the legal issues involved in several types of transactions in which corporations will typically engage. Students will be introduced to several types of corporate transactions and pertinent legal considerations associated with each, will consider specific fact situations relevant to the transactions, and will negotiate and draft agreements that address the specific factual and legal issues raised. The responsibilities of the lawyer involved in these transactions will also be examined, including conflict of interest considerations. Examples of corporate transactions that might be explored include financing agreements, purchase and sale of a business, amalgamations, and franchise agreements.

INSTRUCTOR: M. Deturbide

FORMAT: 3 hours per week, one term

PREREQUISITE: Business Associations

RECOMMENDED: Commercial Law, Taxation

EVALUATION: Assignments (80%), Class Participation (20%)

RESTRICTIONS: This class is open to third year students only.

Creditors' and Debtors' Rights: LAWS 2044.02B

This class is designed to provide a comprehensive introduction to rights and remedies of debtors and creditors. It includes, among other elements, techniques of prejudgment collection, debtor harassment, the role of the courts and the execution order in with respect to real and personal property. There is a general discussion of rights of secured creditors, fraudulent transfer by insolvent

debtors and an introduction to bankruptcy as an ultimate collection remedy. The class is conducted by lecture and discussion of cases, statutes, and other materials.

INSTRUCTOR: M. Ryan

EVALUATION: Final examination

Criminal Procedure: LAWS 2091.04

This is an introduction to criminal procedure. As such, it provides a fairly comprehensive examination of the procedural aspects of the individual's experience with the criminal justice system. Therefore, in general, it concerns the provision and regulation of methods for dealing with those who have or are alleged to have violated the criminal law. A sampling of topics would include jurisdiction (time and territorial limits, among other subjects), pre-trial procedure and practices (such as search and seizure, wiretapping and bail), the trial process (covering the preliminary inquiry and plea bargaining, as examples) and post-trial remedies (such as appeals and extraordinary remedies). Consideration will be given throughout to the impact of the Charter of Rights and Freedoms and frequently to proposals for law reform.

INSTRUCTORS: H.A. Kaiser

EVALUATION: Written examination

Criminal Trial Practice: LAWS 2046.03

This class uses simulated court proceedings, including arraignments, bail hearings and trials, to develop skills of advocacy and trial preparation. Trials later in the term are heard before Judges of the Provincial Court, and the final case is heard by a judge of the Supreme Court. Each student assumes the role of prosecutor, defence counsel and witness on different occasions. Preparation for classes involves some research in matters of evidence and criminal procedure. Presentations are discussed at the conclusion of each proceeding for the purpose of providing constructive criticism. Classes are held one night per week during the fall term.

PREREQUISITE: Evidence

Restriction: Students taking this class cannot take the Clinical class in Criminal Law

EVALUATION: Class participation 75%, written examination 25%

Criminology: LAWS 2064.03

This seminar introduces the law student to the field of Criminology, a broadly based discipline utilizing a multidimensional approach to the study of criminal law. The class is organized around major questions in Criminology. How are crimes defined? Why do people commit crimes? How does society react to crime (e.g. courts, police, media, citizens, prisons)? What are the aims of the criminal justice system? What are the alternatives to the present structure? Substantial discussion will focus on theories of criminality and sentencing. These questions are explored by seminar discussion (based on assigned readings for each class.)

EVALUATION: Class presentation and major paper

Critical Race and Legal Theory: "Race", Racism and Law in Canada: LAWS 2161.04

This class is a critical examination of Canadian legislation, the exercise of Authority, and an in-depth study of jurisprudence and legal doctrine using the prism of "race" and culture. Through an analysis of legal instruments such as legislation, treaties and case law, this class explores both the historical and contemporary impact the social construct of "race" has on law. Upon completion, students will benefit from an enhanced understanding of the ways in which law comes value laden and can, *ipso facto*, contribute to and perpetrate both inequality and discrimination. This critical race format will also explore the strengths and weaknesses of existing as well as new and creative remedies.

INSTRUCTORS: Professors Thornhill and Aylward

FORMAT: 4 credit hours, two hours per week in both terms

EVALUATION: Assignment and final examination

Directed Research Paper: LAWS 2069.03

Directed Research Paper: LAWS 2070.04

Directed Research Paper: LAWS 2071.05

Directed Research Paper: LAWS 2072.06

A student may undertake an original research project for credit under the direction of a faculty member. The topic should be one that falls outside the parameters of seminar classes offered in the year, and there must be a faculty member willing to supervise the project.

A student who is interested in doing a DRP should have demonstrated, in written assignments already completed in the law school, ability for independent research and writing. The student must also have achieved high academic standing in classes related to the subject of the proposed paper.

Third year students may undertake a Directed Research Paper (DRP) of 3, 4, 5, or 6 credit hours, under the supervision of a faculty member. For third year students a proposal for a 3 credit hour DRP must be approved by the Administrative Officer, while a proposal of 4, 5, or 6 credit hours must be approved by the Studies Committee. Second year students must obtain permission from the Studies Committee to do a DRP of 3, 4, 5 or 6 credit hours. The Committee will consider the proposal and the prior performance of the student in Law School, plus any other relevant factors, in making its decision.

A DRP for 3 credit hours would be of greater scope and depth than a paper submitted for a regular class, and the student's research and writing would be expected to be of very high quality. A student, with the consent of the faculty member concerned, may apply to the Studies Committee for permission to undertake a DRP for 4-6 credit hours, depending on the quality and extent of the work to be done. Four or five credit hours would be given for projects requiring research in greater depth than is required for a 3 credit hour DRP. Six credit hours may only be given for work of highest quality, of some originality, and prepared for presentation to faculty and students in seminars or workshops to be arranged. It is likely that 6 credit hours would be given only for projects extending over both terms. The number of credit hours and the term or terms in which the DRP is completed will be determined by the Studies Committee, in consultation with the faculty member and the student, when the DRP is for more than 3 credit hours. If the DRP is being completed in the fall term, the student must submit a detailed outline and bibliography to the supervisor and to the Studies Committee by the end of September. If the class is being completed over the full year, the outline and bibliography must be submitted by the middle of November. If the DRP is being completed over the Winter term, the outline and bibliography must be submitted by the end of January. The Studies Committee will NOT entertain requests to change the credit weight after the regular class change date in each term. It is important to be aware that if the above deadlines are not met the Studies Committee will revoke permission to submit the DRP for credit.

In all applications to do DRPs the student must arrange by the above deadlines that the supervisor either sign the DRP form (when the DRP is for 3 credit hours), or write a brief letter to the Committee (when the DRP is for 4 or more credit hours) attesting to the fact that the paper comprises sufficient depth and weight of research and writing to merit the credit load applied for.

Academic Credit for Major Media Contributions - DRP variation: In 1992-93, two students enrolled in General Jurisprudence completed a series of radio shows which were broadcast on CKDU (the Dalhousie University station) and which sought to put legal issues and theory in lay terms. This endeavour was closely supervised by Professor Richard Devlin and was determined to be a success by him and the students. Many hours of work were required to complete each 15 minute show and, in the final analysis, this endeavour satisfied the major paper requirement for the class. Arising out of this experience, the Community Affairs Liaison Department of CKDU has asked whether the Faculty of Law would permit other students to engage in similar projects. The Academic Committee has considered this matter carefully and is prepared to make some statements concerning a proposed policy in this regard.

There is already considerable flexibility at the Law School concerning evaluation. Recognizing this, the Academic Committee supports similar projects as a matter of policy in the future, subject to some basic guidelines:

1. Major projects requiring the production of media contributions (that is to radio, television, newspapers or magazines) may be accepted for academic credit at Dalhousie Law School. It is recognized that such endeavours deserve recognition both as legitimate academic exercises and as contributions to the public service mission of students and faculty.
2. These projects may satisfy a major paper or examination component, as arranged between the professor and student.
3. A high level of professional involvement is expected from the time the project is conceptualized until completion.
4. Students and faculty should employ the guidelines for Directed Research papers (DRPs) in planning and evaluating such projects, with appropriate changes.
5. Some limitations may be imposed upon the student's right to appeal a grade with which he or she is dissatisfied, given that this mode of evaluation does not fit within the usual Law School grading patterns.

The above guidelines are intended to assist faculty and students in formulating and supervising any proposals for contributions to radio, television, newspapers, or magazines. In the final analysis, although the Faculty encourages such innovative undertakings, the professor and student will be responsible to ensure that the academic standards of the Law School are maintained, albeit in this distinct context.

Education Law: LAWS 2116.02/2117.01

The purposes of the class include assessing the relation between law and government policy; breaking down the barriers between different disciplines; evaluating the impact of the Charter in a discrete setting and considering the links between law and values in Canadian society. The class will be offered in seminar form with discussion as the norm. There may be some guest lecturers and student presentations. The class will be broad in scope and useful to students who do not intend to directly pursue a career related to education, as well as those who do. Without limiting the instructor, the kinds of topics which might be covered include the following: judicializing education, jurisdiction over schools, the impact of the Charter, discipline and enforcing rules, schools as microcosms of society; and the limits of rights discourse. The impact of the Charter equality provisions on the field of education will also be an important theme. While there will be a high profile Charter component to the class, there will also be an examination of administrative law issues, collective bargaining concerns, negligence and denominational school structures. There will be specifically assigned readings for each class and general class materials.

INSTRUCTOR: W. MacKay

FORMAT: 2 credit hours, or 3 credit hours if a major paper is written

EVALUATION: Twenty percent by class discussion or oral presentation and 80% either by paper or by a written or oral examination for those who are claiming two credit hours. These two-credit students can also reduce the examination component by doing a class presentation for 20%

Employment Law: LAWS 2047.02/2048.03

This class will review Canadian employment law. Areas to be covered may include: constitutional jurisdiction, the primary components of the employment relationship, Employer and Employee status, basic elements of the employment relationship, employment contracts, implied rights and obligations in the employment relationship, the right to terminate the employment relationship, reasonable notice of dismissal, constructive dismissal, cause for summary dismissal, fiduciary obligations, and employee obligations express and implied. Additional topics may include current employment law problems, Occupational Health & Safety legislation, Human Rights legislation.

INSTRUCTOR: A. Gillis

FORMAT: 2 credit hours, or 3 credit hours if a major term paper is written

EVALUATION: Class participation, paper presentation for those doing a paper, and exam or paper, at the student's option. The paper or exam will be worth at least 60%. There is a possibility that a portion of the grade may be based on an oral exam. Evaluation will be reviewed at the first class.

Environmental Law I: LAWS 2104.03

Environmental laws in support of sustainable development are explored through six class themes. The ethical foundations and principles of environmental law are reviewed including the principles of precaution, integration, polluter pays and public participation. The role of common law in preventing and redressing environmental degradation is considered. Constitutional realities and restrictions to environmental management are examined. The traditional command-control approach to environmental regulation is critiqued and possible strengthenings discussed with emphasis on toxic chemical control and water quality protection. Environmental impact assessment law and practice is covered. The class concludes by highlighting alternative approaches including alternative dispute resolution, the public trust doctrine, crimes against the environment and pollution prevention legislation.

INSTRUCTORS: P. Saunders, D. VanderZwaag

EVALUATION: Final examination

Environmental Law II - Environmental Law as Regulatory, Political and Social Process: LAWS 2133.03

In this class, students will participate in the process of regulating a hypothetical project from an environmental law perspective. The process will start with the planning stage of the project, address applicable environmental assessment processes and municipal (land use) planning issues, and conclude with the operational stage of the project.

INSTRUCTOR: M. Doelle

FORMAT: 2 hours a week

RECOMMENDED: Environmental Law I or International Law

EVALUATION: Major paper and class participation

Equity and Trusts: LAWS 2033.03

This class surveys the historical evolution of equity, and its emergence as a separate jurisdiction. It also analyzes the principal doctrines of equity, the distinction between legal and equitable interests and the meaning of the statutory fusion of law and equity. The class also surveys the historical development of the trust, its conceptual nature, the certainties necessary for creation, the types of trusts; the appointment of trustees and their principal rights and duties; the tracing of trust assets and some modern uses of the trust.

INSTRUCTOR: P. Girard

EVALUATION: Written examination

Estate Planning: LAWS 2050.02

This course deals with the financial aspects of the aging of the "baby-boomers". The course will begin with a consideration of the tax consequences of death and of efforts to reduce taxes before death. The second part of the course will be a supervised project (group or individual) in which students will draft wills, powers of attorney, documents relating to family businesses and consider insurance and other estate planning issues. Some attention will be paid to health care and mental capacity to issues. The class will also discuss particular problems including those arising from the handicapped child, spendthrift heir, and the blended family. Those who have taken an advanced tax course (or have the equivalent) may separately examine more complex taxation issues including estate freezes and the sale of a business.

INSTRUCTOR: F. Woodman

FORMAT: 2 credit hours

PREREQUISITE: Taxation I

EVALUATION: 50% test during term; 50% project

Evidence: LAWS 2008.04

This class is an introduction in the law of evidence. Basic concepts of relevancy and admissibility are considered in light of fundamental policy objectives served by the law of evidence. The policy considerations underlying particular rules and the origins, development and constitutional significance of such rules are examined and critically assessed. A comprehensive coverage of the

basic exclusionary rules of civil and criminal evidence is undertaken. This class is conducted by lecture and discussion on the basis of assigned materials.

INSTRUCTORS: B. Archibald, R. Thompson

EVALUATION: Written examination and assignments

Family Law I: LAWS 2110.03

This class is intended as a general survey of the area. It will include the following areas: constitutional issues, court structure, formation and validity of marriage, the doctrine of nullity, separation and separation agreements, the law of divorce. In the context of divorce law there will be a review of the issues of jurisdiction, bars to divorce, grounds for divorce. As well, a portion of the class will be devoted to reviews of property division both under the *Matrimonial Property Act* and by way of trust doctrine, maintenance, both spousal and child support, and custody and access. Child protection, adoption and children's rights will also be considered. An introduction to alternate dispute resolution techniques will be incorporated into the class.

INSTRUCTORS: E. Gibson, P. Thomas, R. Thompson, Judge J. Williams

EVALUATION: Written examination

Family Law and Social Science: LAWS 2162.03

Family law by its nature involves diverse aspects of social science. This major paper class will, through lectures and seminars, introduce students to the jurisprudential origins of social science in the law, critical evaluations of social science methods, uses of social science in family law and the ways in which social science comes to courts - including Brandeis brief, expert testimony and judicial notice. Supreme Court of Canada Justice Claire L'Heureux Dube's advocacy for the expanded use of judicial notice will be critically examined. Students will, through a paper, have an opportunity to examine specific aspects of family law and social science. Issues covered may include identifying and assessing allegations of child sexual abuse; child sexual abuse accommodation syndrome; battered wife syndrome; feminization of poverty; domestic violence and custody/access issues; joint custody; effects of separation/divorce on children; parent education programmes; and repressed memory.

FORMAT: 2 hours per week (3 credit)

PREREQUISITE: Family Law I, LAWS 2110.03

EVALUATION: By major paper and assignment(s)

Family Law Dispute Resolution: LAWS 2163.03

Family law involves issues that are emotional, rooted in a family history, and, often, ongoing and reviewable (for e.g. custody, support). Parties to family law disputes often have a history and future of interaction. Family law is in these regards unique.

This class will examine the unique nature of family law and examine how the nature of family law impacts upon forms of dispute resolution, imposing at times limitations, at times impetus for change or innovation.

Negotiation, mediation, arbitration and adjudication will be critically discussed. Specific issues such as the use of Referees in Nova Scotia; case management; the impact of domestic violence; child support guidelines; child welfare mediation; judicial settlement conferences; the impact of language; the role of children, counsel and judges; and parent education programmes may be discussed.

FORMAT: 12 hours over 8 weeks (1 credit)

PREREQUISITE: Family Law I, LAWS 2110.03

EVALUATION: By assignment and class participation in experiential dispute resolution

Family Law Problems: LAWS 2148.02/2149.03

This class provides the opportunity for students to pursue in depth some of the issues either introduced briefly or not covered in Family Law I. The rich theoretical concepts underlying legislative involvement in the family provide the basis for examination of such topics as conceptions of the family, the public/private split, family violence, the feminization of poverty, and the family and the welfare state. The changing family form, the financial implications of marriage and other forms of union and their breakdown, and alternate court structures and methods of dispute resolution will be

examined. The class materials draw on feminist, socialist and critical legal academic writing. The focus of the class is expected to alter somewhat from year to year as law reform occurs rapidly in this area.

INSTRUCTOR: E. Gibson

FORMAT: 2 credit hours, or 3 credit hours if a major paper is written

PREREQUISITE: Family Law I

EVALUATION: Major paper and class participation (3 credit hours), or examination and class participation (2 credit hours)

LAWS 2111.02: Financial Consequences of Marriage and Marriage Breakdown.

This is a limited enrolment seminar intended to allow students to explore in detail areas involving financial and asset matters outlined in Family Law I. Discussion and student research may cover such areas as separation agreements, marriage contracts, the philosophy and practice of spouse and common law spousal support obligations; child support problems and the Federal Guidelines; division of assets on separation or divorce under the *Matrimonial Property Act* or equivalent legislation including a detailed look at such problem areas as, for example, pensions, business assets and severance packages. Also division of assets in common law relationships will be examined. Tax and practice problems inherent in dealing with these areas will be part of on-going discussions. Students will be encouraged to deal with these areas on a comparative basis whenever appropriate.

INSTRUCTOR: P. Thomas

FORMAT: Two credit hours

PREREQUISITE: Family Law I

EVALUATION: By examination

Fisheries Law: LAWS 2020.02

This seminar is designed to acquaint students with the public and private law aspects of fishing and fishery management in Canada. While the central focus is on law and the regulatory framework, questions of policy frequently arise for discussion. The class is taught by a combination of questioning, lectures and guest speakers. Problems unique to fisheries regulation and methods of fishery management will be discussed to set the context in which the law operates. International considerations, constitutional problems, fisheries legislation, the interplay between private rights and public rights, and problems of enforcement and environmental protection will be the central topics discussed.

INSTRUCTOR: W. Moreira

FORMAT: Two credit hours

EVALUATION: Minor paper and class participation

Gale Cup Moot Court Competition: LAWS 2107.02

This class is a high level moot competition among all common law schools in Canada, and is held in late February at Osgoode Hall in Toronto. The class requires individual and collective work on a moot case in an area of domestic law. Extensive research, the writing of a factum, the preparation of argument, performance in moot trials at Dalhousie and final presentation of the case in Toronto are all involved.

The class will include exposure to appellate advocacy techniques and instruction therein together with simulations before practicing lawyers. Evaluation is by the faculty advisor, although the Gale Cup judges will also likely provide comment and grading at the actual competition. Students should be aware that preparation for the Moot or the Moot itself may interfere with travel plans during Reading Week.

This class is limited to 4 third year students. Eligibility for the class is determined by the Moot Court Committee based on performance in the second year qualifying moots.

INSTRUCTOR: S. Coughlan

EVALUATION: Numerical and a letter grade evaluation for moot performance. Participation in the class satisfies the major paper writing requirement.

General Jurisprudence LAWS 2086.02/2087.03

It is not easy to answer "What is jurisprudence?", the question of most students considering enrolment in this elective class. It is probably simpler to ask "What is jurisprudence about?", for there

are few parameters on its field of inquiry. Questions as diverse as "What is the basic nature of law?", "What can law achieve?", "What is the relationship between law, morality and politics?", "Should we obey the law?", and "Whom does it serve?" are appropriate subjects for the jurisprudence student. In trying to answer these questions, an effort is made to ensure that the class maintains some balance between conceptualism, the students' perceptions and experience, and contemporary Canadian legal dilemmas.

Students will be exposed to a survey of the major schools of jurisprudence, ranging widely from legal positivism and liberalism to feminism, critical legal studies and critical race theory. Each view of the law will be analyzed carefully and students will be expected to contribute their own critical insights on the questions and purported answers of the day. A high level of participation is therefore essential. In addition to regular contributions to discussions, students will be required to make presentations.

A major text will form the basis of the class materials. Handouts will also be distributed.

EVALUATION: This seminar may be taken as an examination class (2 credit hours), as a major paper class (3 credit hours), or possibly as a combination of the two methods, subject to Faculty regulations. Credit is given for class participation including a class presentation.

Health Care Ethics and the Law: LAWS 2115.03

The purpose of this class is to develop an understanding of health law and health care ethics and of the relationship between law and ethics. Topics will include: Informed choice, death and dying, genetics, reproduction, and medical research. Each issue will be examined in an effort to determine what the law is and what the law ought to be.

INSTRUCTOR: J. Downie

FORMAT: 2 hours per week, 3 credits

EVALUATION: Major research paper (70%), reaction papers (20%), and class participation (10%)

Health Law: LAWS 2132.03

This class is designed to expose students to a wide range of legal issues that arise in the field of health law. It will also introduce students to the topics of health care reform and policy, and ethical issues pertaining to health care. Topics covered include: licensing and regulation of health care professionals; malpractice and negligence; consent; disclosure of information; reproduction; death and dying; and Canadian health care reform initiatives.

INSTRUCTOR: Health Law Institute faculty

FORMAT: 3 hours per week

ENROLMENT: Limited to 60 students

EVALUATION: Final examination (100%)

Health Law Exchange: LAWS 2157.14

This programme is intended to give students the opportunity to study law (with an emphasis in health law) at one of the leading Health Law programmes in the United States. Students who have completed two years of full-time study may spend one semester at the Loyola University School of Law in Chicago and receive full credit towards their degree at Dalhousie. Health Law classes offered at the Loyola University School of Law include the following: Introduction to Health Law; Legal Issues in Health care Delivery Organizations; Medical Malpractice, Bioethics and the Law; Law, Medicine and Technology; Mental Health Law; Food, Drug, Cosmetic & Medical Device Regulation; Comparative Health Law; Managed Care; Tax-Exempt Organizations; Law and Aging; AIDS and the Law; Government Health Policy; and Medicare Law.

COORDINATOR: Health Law Institute faculty

ENROLMENT: Limited to 2 students per term

EVALUATION: Depends upon the classes taken at Loyola

CREDIT: Up to 14 credit hours

PREREQUISITE: Health Law, LAWS 2132.02

Human Rights Commission Placement: LAWS 2155.03

For the 1998-99 academic year, two students per term will be able to participate in a placement at the Nova Scotia Human Rights Commission. The placement will include a range of opportunities, including assisting legal counsel in legal research and analysis in

relation to human rights and administrative law, in preparation for Boards of Inquiry, in the development of interpretive policies and guidelines, in review of provincial legislation for compliance with the Human Rights Act; working with the Race Relations and Affirmative Action and Public Education Divisions; and observing/assisting staff in the Investigation and Compliance Division. Evaluation will be on the basis of performance in the placement and written components to be agreed upon. This placement is not a "major paper" class.

Students will be selected by the Executive Director (Professor A. Wayne MacKay) and Legal Counsel at the Commission on the basis of good academic standing and experience of demonstrated interest in the field of human rights. Interested students should apply through the regular class selection process, providing a written statement confirming their academic standing and experience/interest in human rights.

INSTRUCTOR: W. MacKay, M. Shebib

EVALUATION: Pass/Fail

Immigration and Refugee Law: LAWS 2097.03

The class will deal with aspects of law, policy and procedure relating to immigration into Canada. The areas covered will include: Immigration legislation in an historical perspective; the constitutional basis for legislating in immigration matters; the role of the provinces in immigration, including federal-provincial immigration agreements; how to immigrate to Canada under the Immigration Act, 1976, and the Immigration Regulations, 1978 as either a member of the family class, a member of the business immigration program, or as an independent. Discussion will also include: how to acquire Canadian protection as a Convention refugee; issues related to refugees; procedures before immigration inquiries; appeals and judicial review and enforcement of the Immigration Act.

INSTRUCTOR: A. Macklin

CO-REQUISITE: Administrative Law

EVALUATION: Major research paper and class attendance

Independent Research (Court of Appeal): LAWS 2195.03

Student assistant to Nova Scotia Court of Appeal. The Judges of the Court of Appeal have agreed to have two students in the fall term and two students in the winter term serve as student researchers. Students will take part in the work of the Court of Appeal, assisting Judges with research and reviewing appeal books and factums as requested.

Only third year students with very good academic standing will be eligible. In carrying out any task for the Court students are strongly reminded that confidentiality is essential. Note: this class does not fulfil the major paper requirement

INSTRUCTOR: P. Thomas

EVALUATION: Based on satisfactory completion of assigned tasks including an assessment of any written work e.g. memoranda provided to the Court. Evaluation shall be on the basis of consultation between the Faculty Supervisor and the Chief Justice of Nova Scotia and/or the Chair of the Clerks Committee

Independent Research (Supreme Court of Nova Scotia): LAWS 2160.06

Student assistant to the Supreme Court of Nova Scotia, the Province's General Jurisdiction Trial court. The judges of the Supreme Court have agreed to have one student in each of the fall and winter terms to serve as student researchers. Students will be assigned to one of the case management teams of judges and will take part in the work of the Court, assisting the judges with research and other tasks as requested.

Only third year students with very good academic standing will be eligible. This exercise does not fulfil the major paper requirement. In carrying out any task for the Court, students are strongly reminded that confidentiality is essential.

SUPERVISOR: P. Thomas

EVALUATION: Based on satisfactory completion of assigned tasks including assessment of any written work provided to the Court. Evaluation will be on the basis of consultation between the faculty supervisor and the supervising justices of the Supreme court of Nova Scotia.

Insurance Law: LAWS 2010.02

This class examines the basic principles underlying the law relating to various types of insurance, e.g., fire, life, sickness and accident, motor vehicle, liability and marine. Attention is directed particularly to: (a) the nature of the insurance contract and its formation, (b) agency principles applying to insurance agents or brokers, (c) the insurable interest, in property or in liability for damage to property or persons, that a person must have to enter into a valid contract of insurance, (d) the effects of nonrepresentation in applying for insurance, or omission of necessary information, and of failure to meet the special conditions made part of the contract under legislation, and (e) rights of third parties against the insurer. Students must critically examine existing law, its function in modern society and its fairness to the insured person, and consider desirable reforms. Class materials include an examination of insurance cases, the Nova Scotia Insurance Act and pertinent standardized insurance contracts.

INSTRUCTOR: G. Machum

EVALUATION: Examination; to be clarified by the instructor at the beginning of the term

International Advocacy: LAWS 2109.02

This is a skills-training class, from which are selected the team members for the Jessup International Law Moot Court competition (see separate entry). The experience will enhance a student's ability to discover and apply international law. The programme consists of exercises in international legal research, writing, and argument. The centre-piece is a moot in which each student is required to prepare a written memorial on, and to argue each side of, an international dispute. Note: this class does not qualify as a major paper class.

INSTRUCTOR: P. Saunders, H. Kindred

CO-REQUISITE: International Law

EVALUATION: Performance in assigned exercises

International Environmental Law: LAWS 2051.03

The progression of international environmental law from "customary" co-existence to "conventional" cooperation is explored through nine topics: (1) State Responsibility and Liability for Transboundary Pollution; (2) "Soft Law" and Sustainable Development Principles: From Stockholm to Rio; (3) The Legal Waterfront of Marine Environmental Protection; (4) The International Law of the Atmosphere: Climate Change, Ozone-Depletion; (5) The Protection of Biodiversity; (6) The International Framework for Controlling Transboundary Movements of Hazardous Wastes and Toxic Chemicals; (7) The Protection and Management of International Water Courses; (8) Polar Regions and the Environment: The Arctic and Antarctica; and (9) Free Trade and the Environment.

CO-REQUISITE: International Law or Environmental Law

EVALUATION: Major paper 80%, class presentation 10%, and class participation 10%

International Human Rights Law: LAWS 2074.03

This class will examine international Human Rights law, policy and process using primary source documents, jurisprudence, and the experiential evidence gleaned and provided by nongovernmental organizations (NGOs), the "conscience" of the International community. The class is intended to introduce students to International Human Rights Law as a discrete and significant area of law that is intersecting with increasing impact on Domestic Law. Using the prism of "Race"/colour, national and ethnic origin, the class examines the quality of international Human Rights protection by focusing on the plethora of instruments and mechanisms put in place for enforcement.

INSTRUCTOR: E.M.A. Thornhill

EVALUATIONS: By major research paper in English or French

International Law: LAWS 2012.03

Public international law is concerned with the legal relations of states and the individuals who compose them. The class explores the bases of the international legal system. Methods of international law creation and law enforcement are examined in comparison with municipal machinery. Processes of international adjudication and the interaction of international and Canadian law are discussed. Later, the application of substantive principles of international law are considered in selected areas such as law of the sea, international protection of the environment, international criminal law, protection of human rights and the use of force. In this context, students may have an opportunity to research and present their insights on a topic of their choice. The class is conducted by discussion of edited materials and other sources presented by student rapporteurs.

INSTRUCTORS: H. Kindred, D. Russell

EVALUATION: Written examination; possibly a combination of examination and class presentation or written assignment, where numbers permit

International Trade Transactions: LAWS 2130.03

International trade is the aggregate of thousands of individual transactions. This seminar will offer students the opportunity to investigate the different types of transactions involved in international trade and the laws which regulate them. The initial classes will expose students to the elements of a traditional documentary transaction in international trade, namely the sale agreement for the export or import of goods, the carriage contract for delivery abroad, and the payment mechanism by letter of credit. Subsequent classes will be devoted to specialized aspects of these transactions including export and import controls, customs requirements and national dumping and subsidies rules, as well as other forms of international trade as students may select for their own research. Topics might include Canadian and American import controls, Canadian export credit guarantees, counter trade, technology transfers, trade in services, leasing, factoring, electronic data processing (EDI), distributorships, restrictive business practices, codes of conduct for multinational business, and aspects of international commercial arbitration to name some examples. Papers investigating the relations between trade and the environment, and the legal implications of electronic commerce, will be encouraged.

The discussion of Canadian laws and practices of foreign trade will be supplemented by the comparative treatment of American and other foreign legal regimes at appropriate points. International legal sources will also be studied to the extent they increasingly affect the law applied in Canada.

INSTRUCTOR: H. Kindred

EVALUATION: Class assignments and a major research paper

Internet and Media Law: LAWS 2168.03

This course deals with the law that governs the disseminating of information and the regulation of information providers. In this course, "media" is defined broadly to include broadcasters, newspapers and magazines, the internet, and the entertainment industry. Topics that will be addressed include: defamation; liability of service providers; privacy issues; publication bans; regulation of telecommunications and related industries; media content regulation; copyright issues; and media ownership. The impact of the internet on the legal regulation relating to each of these topics will be explored throughout the course. An introduction to finance and tax issues relating to the film industry may be incorporated if time permits.

INSTRUCTOR: Michael Defurblide

FORMAT: Lecture/discussion 3 hours

EVALUATION: Written examination. Students will also have the option of writing a paper on a topic covered by this course, counting for 40% of the total grade.

Introduction to Law: LAWS 1500.06

This course, offered by the Law School exclusively to undergraduates, is designed to introduce students to the workings of the Canadian legal system, and to the basics of several fundamental areas of law. The focus of the course will be the decisions which have actually been made by courts in Canada. There will be discussion of what the law should be, but that will

occur in a context of understanding how courts reason, and the principles that they bring to bear in reaching their decisions. The course will look in particular at introductory case law concerning tort law (wrongs by one person against another), personal property, criminal law, and the law as it relates to Aboriginal peoples.

Enrolment is limited to students in their second year of undergraduate studies and beyond.

INSTRUCTOR: Steve Coughlan, D. Darling
FORMAT: Lecture/discussion 3 hours

Jessup Moot: LAWS 2103.02

The Jessup International Law Moot Court Competition gives law students the opportunity to argue a hypothetical case involving international law. The experience affords both training in advocacy and understanding of the international legal system. Competitions are held annually in approximately 55 countries, and winners of those competitions compete in international finals. The Canadian regional round of the competition is a national mooting competition for Canadian law students. Nearly all 21 law schools across the country usually participate. The moot problem always contains issues redolent of a topical international affair. The Jessup Moot is sponsored by the International Law Students Association, based in Washington, D.C. Philip C. Jessup, for whom the competition is named, was one of America's most respected jurists on the International Court of Justice.

Work on the competition begins in October and proceeds up to the Canadian regional round, which is held in February. Each team is judged on its memorials, or written arguments, and on its oral presentation. Each team must prepare a memorial for each side and must argue the case four (4) times, twice for each side. A panel of experienced judges, commonly including justices from across Canada, scores the oral presentations.

Jessup Moot team members will be expected to complete the requirements of the Canadian national competition to earn academic credit.

INSTRUCTOR: H. Kindred, P. Saunders
FORMAT: Major paper class
PREREQUISITE: International Advocacy in second year, through which the team members are selected for the following year
EVALUATION: Performance on the Jessup team

Judges' Clerks Programme

Each week, a law student will serve as law clerk to the presiding Chambers Judge in Halifax. The student will be required to be available each day for the one week period unless some other arrangement is made between the judge and the student concerned.

Interested students should indicate their intent to participate in the programme at Class Selection time.

This programme has the potential to provide a tremendous learning experience of a sort not likely to be obtained in articling or in practice. The programme is voluntary and not for credit. Making up missed work will be the responsibility of the student concerned. Participation in this programme will not be accepted as an excuse for failing to meet other law school requirements.

For further information please speak to Professor P. Thomas.
Restriction: Third year students only

Judicial Remedies: LAWS 2013.03

This class deals with the law of damages and the equitable remedies of injunction and specific performance. Roughly two-thirds of the time is devoted to damages in contract and tort. The remainder is spent on an overview of the equitable remedies already mentioned. A detailed outline of the class content is available from the instructor.

INSTRUCTORS: P. Saunders, T. Cromwell
EVALUATION: Three hour examination and optional paper

Labour Law I: LAWS 2014.03

This is a survey of the institutions and legal concepts related to labour-management relations in Canada: union organization and certification, unfair labour practices, collective bargaining, conciliation, the collective agreement and arbitration, industrial

conflict and internal union affairs. An attempt is made to examine the law of labour relations as an example of a response by the legal system to a social problem.

INSTRUCTORS: D. Pothier, I. Christie

FORMAT: 3 hours a week

EVALUATION: Written examination; there may be an option to have 50% of the evaluation based on short weekly memoranda and 50% on a written examination

Labour Law - Administration of the Collective Agreement: LAWS 2052.02

The class objectives are: (1) to enable students to gain an understanding of labour arbitration jurisprudence and its place in the labour relations process; and (2) to instruct and give students some practice in the advocacy skills involved in labour arbitration, which are not substantially different from those involved in other legal contexts. Students must read materials in preparation for a limited number of lectures by faculty and guests, which provide a background to their preparation for and participation in mock labour arbitrations chaired by practicing arbitrators. In preparing for and participating in one arbitration as counsel, participating in another as a member of the arbitration board and writing a board award, each student has occasion to learn a good deal of labour arbitration law. Each student counsel examines one witness, cross-examines another and presents legal argument. The proceedings are video-taped and each student has the benefit of a semi-private critical assessment while viewing the performance.

INSTRUCTORS: I. Christie, E. Stone

FORMAT: 2 hours per week

PREREQUISITE: Labour Law I

EVALUATION: As counsel 35%: preparation, list of cases, preparation of witnesses, etc. 5%, examination of witnesses 10%, presentation of legal argument 10%, substance of legal argument 10%, brief of law (submitted one week after hearing as counsel) 25%, award submitted by the end of examination 30%, attendance and participation 10%

Land Use Planning: LAWS 2015.03

The class aims to introduce students to the planning process through study of the legal tools used to regulate the use of land in urban and rural areas. While the legal aspects of the planning process will be accentuated, students will also be expected to appreciate the perspective which planners bring to the subject. The class is usually composed of both law and planning students and all students are encouraged to view the class as an interdisciplinary enterprise, which of course the modern planning process is. As virtually all human activity takes place on land, there is little which is excluded from the purview of the planning process. Economic, social, and cultural policy, as much as patterns of urban and rural land use, form part of the enterprise. And increasingly, environmental protection will be seen as a primary goal of land use planning.

After a consideration of the basic legal regime governing planning (including private law remedies, official plans, zoning by-laws, non-conforming uses, subdivision controls, development permits and judicial review of planning decisions), some or all of the following topics will be studied: preservation of agricultural land; heritage property legislation; preservation of special areas (e.g., Niagara Escarpment, Peggy's Cove); the relationship of municipal government to the planning process; tendencies to centralization/decentralization in planning legislation; the impact of environmental concerns upon the planning process. Administrative law is a desirable but not necessary pre-requisite or co-requisite.

INSTRUCTORS: H. Epstein, A. Ruffman

FORMAT: 3 hours a week

EVALUATION: Class presentation, assignment and final examination

Laskin Moot: LAWS 2039.02

This class is a national moot court competition to which every law faculty in Canada is invited to send a team. The actual event takes place in late February or in March at a host Faculty somewhere in Canada. This class requires collaborative work on a hypothetical moot problem in the area of federal administrative and constitutional law. It will include extensive research culminating in

the preparation of a factum. It will also include preparatory oral advocacy sessions and the eventual pleading of the problem before a bench consisting of sitting judges, administrative law practitioners, and law professors. The class will include seminars on appellate advocacy and the use of audio-visual aids in training sessions. This class is open to both second and third year students. Participants will be selected on the basis of a "moot-off" competition. It will be necessary to have at least one team member capable of mooting in French. The selection will be conducted by a committee of three professors.

INSTRUCTOR: T. Scassa

Co-requisites: Administrative Law; Constitutional Law

EVALUATION: Research and factum, as well as oral advocacy.

Participation in the class satisfies the major paper writing requirement

Law and Technology: LAWS 2019.03.

This is a paper class in which students will have the opportunity to explore issues relating to law and technology in a seminar format. The class time will be divided into two parts. Classes during the first part of the semester will focus on a range of topics drawn from the following areas: regulating the Internet, doing business on the Internet, developments in telecommunications and the law, privacy and access to information, law, ethics and technology, and technology and the practice of law. The second part of the class will comprise presentations by students based on their research for their major research papers.

While no technical background or expertise is required as a prerequisite to the class, students will be expected to use electronic mail as a supplement to in-class discussions. In addition, students should expect to use the World Wide Web to access class-related materials and research resources.

INSTRUCTOR: T. Scassa

FORMAT: 3 credits, 2 hours per week

EVALUATION: Major paper

Law of the Sea: LAWS 2022.03 and 2021.02

The conclusion of the Third U.N. Conference on the Law of the Sea was the result of the world's most ambitious law reform movement in the form of the Third United Nations Conference on the Law of the Sea (UNCLOS III), which was in preparation and in session from 1969 to 1982. The result is a new treaty which governs almost every conceivable aspect of ocean use, establishes a new regime for ocean jurisdictional zones and provides a global administrative and regulatory structure for the oceans. This seminar will undertake a detailed analysis of the "new law of the sea" by examining the Convention and other materials. Included in the analysis will be an examination of navigational issues (territorial sea, international straits, archipelagoes), resource issues (exclusive economic zone, fisheries, non-living resources; maritime boundary delimitation); protection of the marine environment; transfer of marine technology; marine scientific research; dispute settlement; international ocean development. The Canadian interest in the new law of the sea will also be examined. The class will be conducted as a seminar and students are expected to make contributions based on substantial reading. A major term paper on an approved topic will be written by all students and students may be required to make a special oral presentation in class. It is expected that several expert visitors will address the class.

INSTRUCTOR: P. Saunders

FORMAT: 2 hours a week

EVALUATION: Major paper, presentation and class participation for 3 credits; examination for 2 credits

Law of Succession: LAWS 2121.03

The first part of the class deals with legislation limitations on freedom of testation such as the *Testators' Family Maintenance Act* and the *Matrimonial Property Act* and certain significant common law rules. Alternatives to the disposition of property by will are also explored.

The second part of this class focuses on the law of wills. Topics will include the formalities required to execute a will, the rules of construction, and problems relating to lapse (the beneficiary dies) and ademption (the property bequeathed disappears) and capacity

to make a will. The special will drafting problems of certain clients, such as parents with a handicapped child or a couple where one of the spouses is confined to a nursing home, will be addressed.

There will be a brief section on estate administration.

INSTRUCTOR: F. Woodman

EVALUATION: Examination

Legal Accounting: LAWS 2023.02

This is a basic class in the business law area and is recommended background for work in the corporate, taxation, and estate planning fields. It is not designed to produce accountants but rather to equip the lawyer to act effectively as a professional adviser to business and to be able to use principles of accounting and the services of accountants to enhance his/her effectiveness. The class is also an example of interdisciplinary study, considering areas where the law and accounting overlap. Even students who have been exposed to accounting in their college work should benefit from the class, the latter two-thirds of which is taught as a law class with an approach not duplicated elsewhere in either business school or law school. No mathematical knowledge beyond simple arithmetic is required. The class begins with a study of elementary principles of double-entry bookkeeping and financial statement presentation, concentrating more on the underlying principles than on detailed drill in procedure. Next comes an examination of the structure and functions of the accounting profession. The remainder of the class concentrates on a consideration of generally accepted accounting principles, their interrelationship with the law, and their relevance to the resolution of certain legal problems. This includes discussion of the attitudes of the courts to accounting concepts; financial statements, their uses and limitations; inventory valuation; valuation of tangible fixed assets; public utility rate regulations; treatment and valuation of goodwill; allocation of income taxes; and measurement of revenues and expenses.

INSTRUCTOR: K. Harris

FORMAT: 2 hours a week

EVALUATION: Final examination

Legal History: LAWS 2122.02/2123.03

This class aims to introduce students to the various types of scholarly endeavour which are subsumed under the rubric "legal history", and to the major schools of thought in the American, English and Canadian literatures on the subject. After introductory classes on the roots of the Western legal tradition, the temporal focus will be on the period 1750-1950. The range of topics considered will fall within some or all of the following areas: Reception of Law, Torts, Criminal Law, Family Law, Dispute Resolution, The Legal Profession, Administrative Law and Commercial Law. Depending on enrolment, the class will proceed through a combination of lectures and seminars.

INSTRUCTOR: P. Girard

EVALUATION: Final examination 100% (2 credit hours), or a major paper 80% and class participation 20%(3 credit hours)

Legislation: LAWS 2075.04

As one of the primary sources of law, legislation is one of the basic working tools of the lawyer. Building on the First-Year Public Law class, the Legislation class attempts to give the student a more detailed view of the role of legislation in the legal process. The class has two major focal points. One is directed towards giving the student a better appreciation of how a statute is created, including the basic underlying policy decisions upon which it is based, the statutory schemes developed to carry out the legislative process, and the problems faced by the drafters in translating general ideas into specific unambiguous language. The second major emphasis is directed towards giving the student an appreciation of the court techniques involved in judicial interpretation of statutes. The rules of interpretation can be stated very easily. To appreciate how they are used by the courts is much more difficult. Understanding gained in this class should be related to other classes and areas of the law where legislation plays an important role, e.g., Constitutional, Administrative, Taxation Law. The class may help to increase appreciation for appropriate use of language in legal work of all types. The class is conducted by discussion of assigned readings and the presentation and discussion of proposed legislation drafted by the students. Each student will prepare a major paper consisting of a draft of proposed legislation and an explanation of the draft,

including such matters as the need for the legislation, the problem(s) to which it is addressed, its constitutionality, the underlying policy supporting the legislative choices and the relation of the proposed draft to the legal context (i.e., the common law and other statutes).

INSTRUCTOR: G. Johnson

EVALUATION: Major research paper

Marine Environmental Protection Law.: LAWS 2124.03

Protection of the marine environment was one of the earliest and most extensive areas of development in international and national environmental law. The transboundary nature of the issues and dramatic public impact of marine pollution incidents have contributed to a dramatic growth in the number and scope of legal instruments aimed at regulating uses and resources of the marine environment. This legal activity has been accompanied by a growing understanding of the critical importance of the oceans to the health of global systems in general, whether as a source of food, a sink for pollutants or a regulator of climate.

The objective of this class is to provide an understanding of the development and current state of law dealing with protection of the marine environment. The examination will proceed initially from the international level, but will focus on the implementation (or non-implementation) of these principles in Canadian law. The specific topics covered in the seminar will vary from year to year depending on current issues and student research interests, but the following list indicates the general subject areas which will be addressed: (1) The Legal Status of the Marine Environment (International and Domestic); (2) Vessel Source Marine Pollution; (3) Land-Based Marine Pollution; (4) Dumping of Wastes at Sea; (5) Regulation of Activities on the Continental Shelf; and (6) Protection of Particular Interests (e.g. protected areas, biodiversity).

INSTRUCTOR: P. Saunders

EVALUATION: Major paper and class presentation

PREREQUISITES: One of Environmental Law I, Maritime Law I, Law of the Sea, or Ocean Law and Policy

Maritime Law and Practice (Maritime Law I): LAWS 2001.03

This is an introduction to Canadian Admiralty Law and practice, including the history of admiralty; the subject matter of admiralty claims (ships, vessels, cargo, etc.); the status of admiralty claims (maritime liens, statutory rights to proceed in rem, etc.); the admiralty jurisdiction of the Federal Court of Canada; collision; carriage of goods by sea; marine towage and pilotage; salvage; etc. The class complements other classes, such as Ocean Law & Policy, Environmental Law, and Law of the Sea.

INSTRUCTOR: A. Chircop

FORMAT: 3 hours a week

EVALUATION: Written examination and class project

Maritime Law and Policy - Carriage of Goods by Sea: LAWS 2164.03 and 2165.02

This is an advanced seminar that deals in depth with different fields of maritime law and policy from year to year. When the seminar focuses on marine transportation, the class will explore the rights and responsibilities of the various parties to the export and import of goods by sea. Thus it will interest students of maritime law, shipping management, foreign trade and international business generally. The class will be conducted by discussion of a variety of shipping documents and legal materials, both Canadian and international, in the context of a number of transactional problems which students will be invited to argue. Student papers directed to overseas trade or shipping policy issues as well as maritime law reform will be encouraged.

INSTRUCTOR: H. Kindred

FORMAT: 2 hours a week

EVALUATION: Oral assignments and a major research paper for 3 credits or written examination for 2 credits

Medical-Legal Problems: LAWS 2158.03

This class is designed to survey a range of medical-legal problems from the perspective of the disciplines of law and medicine. It is intended to provide law students and medical students with an opportunity to collaborate on analyzing and resolving specific

medical-legal problems. One student from each discipline will select a particular problem. Together, the students will identify the medical and legal issues arising out of the problem they selected, research the pertinent legal and scientific literature, and work through the problem.

The medical-legal problems covered may include: the development of a hospital policy on access to reproductive technologies; the drafting of public health legislation in regard to HIV testing; establishing guidelines for offering genetic testing; and the development of treatment guidelines for a local transplant programme.

INSTRUCTOR: Health Law Institute faculty

ENROLMENT: Limited to 16 students (8 law, 8 medicine)

EVALUATION: Paper (60%), oral presentations (20%), and class participation (20%)

FORMAT: 2 class hours, 3 credits

PREREQUISITES: Health Law (applies only to Law students)

Entertainment Law: LAWS 2096.03.

This class will explore all aspects of the law as it relates to the entertainment industry from the point of view of the practitioner. This will involve a cross-discipline study of various areas of law such as contracts, commercial, tax, securities, business associations, copyright, trademarks, and judicial remedies as they converge and apply in a unique and emerging area. Particular attention will be paid to the music industry including record contracts, publishing agreements, music licensing, and merchandising. There will also be some time devoted to the film and television industry and some of the particular problems created by modern technology delivery systems. There will be no formal prerequisites; however, a background in some of the areas mentioned above will be helpful. Students will be expected to analyze the conflicts inherent in the merging of art and business and in particular the legal anomalies created by this merger and the inequities created by oligopolistic ownership of the entertainment industry. Paper topics will be restricted to class topics and suggestions can be provided.

INSTRUCTOR: L. Sutherland

FORMAT: Major paper, Winter term

ENROLMENT: Limited to 16 students

EVALUATION: Major paper (75%) and seminar participation (25%)

McInnes, Cooper & Robertson Seminar in International Trade Law.: LAWS 2056.03

This class examines the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA), and prepares the student to understand generally the role of international and domestic law in modern trading relations. Emphasis is placed on the issues raised by recent trade agreements, such as non-discrimination (e.g. MFN and national treatment), trade rules and unfair trade remedies, services and intellectual property, trade and environmentalism and so forth. Special attention is given to the dispute settlement mechanism, which emphasizes a legal approach to trade relations. The class will be conducted as a seminar, based on regularly scheduled readings.

INSTRUCTOR: G. Winham

FORMAT: 2 hours a week

EVALUATION: Major paper 65%; class participation and minor assignments 35%

Mental Disability Law: LAWS 2127.02/2128.03

The latter half of the twentieth century might eventually be characterized as a time where discrimination in all its forms was recognized and where efforts were made to eradicate it by using the law, among other vehicles. Particularly in western industrialized societies, the need to protect mentally disabled individuals has begun to be seen as having equal importance to protection from other kinds of discrimination.

This seminar concentrates on issues involving those who are described as mentally disordered or who have problems in coping with life. The class surveys many vital issues, including the history and conceptualization of mental disorder, the consumers movement, substantive and constitutional aspects of involuntary civil commitment, the right to treatment and to refuse treatment, discrimination in institutions and in the community, misuses of

psychiatric power, deinstitutionalization, advocacy services and the mentally disordered individual in the criminal justice system.

Although the focus is on issues surrounding mental disorder, there is also ample opportunity for research and discussion of other concerns relating to those who are otherwise mentally disabled or developmentally delayed.

INSTRUCTOR: H.A. Kaiser

EVALUATION: Final examination (or a substituted short research paper) (2 credit hours) or major paper (3 credit hours); class presentations and general class participation are also evaluated for examination and research students

Ocean Law and Policy: LAWS 2068.03

This seminar examines current issues in Ocean Law & Policy. The specific focus will vary each year depending on the instructor. (E.g. Ocean management paradigms; fisheries, etc.) It is recommended that students have a background in international law and/or law of the sea.

EVALUATION: Major paper and class participation

Oil and Gas Law: LAWS 2079.02

This class is designed to provide a basic outline of the legal techniques employed by government in the regulation of the Canadian oil and gas industry and of the legal problems involved in the exploration for, development and production of oil and gas reserves. The class will devote time to both the legal regime in Western Canada and the offshore. Topics studied include: the origin, nature, occurrence, exploration for and production of petroleum and natural gas; the nature of legal interests in petroleum and natural gas; jurisdiction over off-shore areas in international law; the constitutional setting for the regulation of Canada's petroleum and natural gas resources; the existing legislative framework for development in off-shore areas; and development of petroleum and natural gas resources including basic lease provisions, farm-out and joint venture agreements, and jurisdiction over or regulation of interprovincial pipelines; offshore installation; regulatory, and environmental issues.

INSTRUCTOR: F. Van Penick

FORMAT: 2 hours a week

EVALUATION: Written examination

Patents, Trademarks and Unfair Competition: LAWS 2027.02

This class is designed to provide a basic introduction to those aspects of intellectual property law governing patents, trademarks and unfair competition. Other bodies of law relevant to patents and trademarks (e.g. contractual licensing, impact of competition law) may be touched on if deemed appropriate by the professor.

International treaties relevant to the subject will be considered.

FORMAT: 2 hours a week

EVALUATION: Written examination

Poverty Law: LAWS 2076.03.

This class entails an in-depth analysis of poverty and the social welfare system in Canada, with particular emphasis on specific federal and provincial (primarily Nova Scotia) statutes, regulations, policies and programmes. The constitutional implications of certain legislative provisions will be examined *vis-a-vis* the Charter, in particular ss. 7 and 15 and s. 36 of the *Constitutional Act, 1982*.

Discussion will also be had of Canada's international obligations to alleviate poverty and how these commitments are used by poverty lawyers. Leading Supreme Court of Canada decisions such as *Andrews* and *Irwin Toy* will be analyzed for their potential poverty law implications. Participants will discuss how to interpret poverty legislation. Issues such as the right to welfare and/or an adequate annual income will be debated. We will look critically at the lawyer's role in pursuing remedies to the problems of people of low income.

INSTRUCTOR: V. Calderhead

FORMAT: 3 credits, winter term

ENROLMENT: 16 students

EVALUATION: By examination plus a component for class participation. It is possible to do a minor paper for part of the final grade.

Real Estate Transactions: LAWS 2026.04

This class provides a comprehensive and practical introduction to real estate transactions. Legal principles underlying all aspects of the real estate transaction are examined in the context of a real estate conveyancing practice. Topics discussed include: real estate agency law; fixture; conditional contracts; risk of change; defect in the land and buildings; title problems; time is of the essence; merger on closing; deposits and part payment; the Registry Act; possessory title; restrictive covenants; surveys and mortgages. The class is conducted by lecture and class discussion.

INSTRUCTOR: R. Penfound, P. Lederman

EVALUATION: Final examination

Regulated Industries: LAWS 2058.03

The themes of this class are regulation, deregulation, and privatization with a particular emphasis upon the regulatory process itself and the industries subjected to regulation. Industries examined may include telecommunications, broadcasting, cable TV, health and electricity. Sessions will also be devoted to competition law including mergers, collusion, abuse of a dominant position, and restrictive trade practices.

INSTRUCTOR: C. Flood

FORMAT: 2 hours per week

EVALUATION: Major research paper (70%), class presentation (15%) and class participation (15%)

Regulation of Financial Institutions: LAWS 2137.03

There have been recent profound changes in the regulation of Canadian financial institutions and the seminar will focus on the reasons for them and whether the new framework is appropriate in order to maintain capital adequacy, financial reserves and competency of personnel, among other issues. Specific topics which will be covered include: philosophical approaches to regulation; evaluation of different types of financial institutions; the "four pillars" theory; constitutional division of powers and other jurisdictional issues such as provincial regulation of securities activities of banks and other federally regulated financial institutions; use of financial and non-financial holding companies including problems of cross ownership and conflicts of interest; protection of depositors and the role of investor protection plans such as deposit insurance provided by Canadian Deposit Insurance Corporation; and impact of globalization on financial institution regulation.

Each of these specific topics will be the subject of a separate chapter in the seminar materials. There will be some limited discussion of and comparison with the U.S. approach to financial institution regulation.

PREREQUISITE: Business Associations

EVALUATION: Major paper 70%, class participation 15%, and class presentations 15%

Securities Law Moot: LAWS 2144.02

The Canadian Corporate/Securities Law Moot Court Competition is an annual Moot Court competition, sponsored by the Toronto law firm of Davies, Ward & Beck, which focuses upon the fields of corporate and securities law in Canada. The competition is designed to provide students having an interest in these areas of legal practice with an opportunity to meet with judges, corporate and securities regulators, academic lawyers and legal practitioners to debate legal issues of current importance to the Canadian business community. Teams of mooters from a number of Canadian law schools will meet in late February or early March in Toronto to moot a problem. The competition requires collaborative work on a hypothetical problem in the area of corporate and securities law. It will require extensive research culminating in the preparation of a *factum*. It will also include a preparatory oral advocacy session and the eventual pleading of the problem before a board consisting of judges, corporate/securities regulators, academic lawyers and legal practitioners.

This competition is open to both second and third year students. Participants will be selected on the basis of written applications; selection will be based upon a student's stated interest in participation, prior experience, oral advocacy skills and academic record.

PREREQUISITES: Business Associations, Securities Regulation

EVALUATION: Research, factum and oral advocacy. Participation in the competition satisfies the major paper writing requirement

Securities Regulation: LAWS 2138.03

This class will address the theoretical basis for and the role of securities regulation in regulating capital markets and protecting investors. It will provide students with a firm understanding of the basics of securities laws and policies and sufficient guidance to permit them to research certain complex aspects of the subject that cannot be covered in an introductory class. Specific topics which will be covered include: institutional and regulatory framework; theory of securities regulation; licensing of securities market professionals; regulation of primary market offerings; trading in the secondary markets, including an examination of the Toronto Stock Exchange by-laws; continuous market disclosure, including such topics as financial, insider trading and proxy solicitation regulations; regulation of market conduct, including the specifics of take-over bid and issuer bid legislation; and enforcement matters.

PREREQUISITE: Business Associations

EVALUATION: Based primarily on a problem-oriented written examination with the possibility of optional in-term work counting for a certain percentage of the total grade

Taxation I: LAWS 2029.04

This is a basic class in the method and content of Canadian income tax law - including historical background, statutory provisions and cases, and a consideration of the function of the lawyer as an adviser on income tax matters. Discussion covers the interpretation of taxing statutes, residency issues, taxation of individuals, sources of income, capital gains and losses, eligible capital property, capital cost allowance and tax credits. The class emphasizes the analysis of assigned cases, statutory provisions, general readings and problem situations. Throughout the study of these materials, the underlying philosophy and policy considerations are subject to constant examination.

INSTRUCTORS: M. Deturbide, F. Woodman

EVALUATION: Problem-oriented written examination, with the possibility of optional in-term written work counting for a certain percentage of the work

Taxation II: LAWS 2030.02

This class involves an intensive analysis of specialized but important areas of income tax law, especially capital gains and losses, eligible capital property, capital cost allowance, and the income taxation of estates and trusts. The class is taught by lecture and discussion of illustrative problems.

INSTRUCTOR: J. Cruickshank

FORMAT: 2 hours a week

PREREQUISITE: Taxation I

EVALUATION: Written examination and class participation

Taxation III: LAWS 2059.02

This class provides a detailed analysis of the income tax treatment of corporations and partnerships and of family transactions, and consideration of some aspects of tax planning. The class is an intensive one, designed primarily for students who contemplate some degree of specialization in corporate and tax matters. The class is conducted primarily by student presentation of solutions to selected problems.

INSTRUCTOR: E. Harris

FORMAT: 2 hours a week

PREREQUISITES: Taxation I and Legal Accounting (or equivalent accounting background)

CO-REQUISITES: Business Associations and Taxation II

EVALUATION: Class presentation of solutions to assigned problems (one-third) and a paper presenting solutions, as a follow-up to class presentation (two-thirds)

Taxation of Corporations: LAWS 2106.03

(This class replaces Business Taxation.) The class is a survey of the taxation of corporations. The first part of the class will deal with the rules governing the taxation of corporations. Major policy issues in the design of a corporate tax system will be addressed. The second part of the class will look at applications of the basic rules. Topics

will include when to incorporate, the tax-free incorporation of a business, corporate reorganizations, estate freezes, buying and selling a business, and shareholder remuneration.

INSTRUCTOR: P. Festeryga

FORMAT: 3 hours a week

RECOMMENDED: Taxation 1 is highly recommended but not required. Any student considering this class without Taxation 1 is advised to consult with the instructor unless they have had non-law school tax training.

EVALUATION: Three-hour final examination (80%) and class participation (20%)

Torts II: LAWS 2031.03

This class is designed to permit students to explore in a more comprehensive way some of the areas and problems to which they were introduced in the first year Torts class. A significant portion of the judicial process is taken up with determining liability of compensation for damage or injury in Tort claims. This class will study how the courts decide tort cases with a view to achieving a realistic understanding of the process and the factors which dictate the results of individual cases. For that purpose the class will examine, from a jurisprudence perspective, the basis for the imposition of tort liability as well as current issues in modern tort law such as problems of proof of causation, remoteness and economic loss, liability of governmental bodies and interference with economic relations. The final portion of the class will deal with the tort adjudication system itself with a view to identifying its weaknesses and possible alternatives. Students will be expected to approach these problems from the perspective of the courts themselves. The class will be assigned actual factual cases dealing with the issues to be examined and will be expected to deal with these assignments in class discussion.

INSTRUCTOR: J. Merrick

FORMAT: 2 hours a week

EVALUATION: Class participation 30% and a term paper 70%.

The term paper will be in the form of a written decision dealing with a factual problem that will be assigned at the beginning of the class

Women and the Law - Introduction: LAWS 2151.02/2152.03

This class is open to all second and third year law students and all students eligible to take classes from the classes listed as Women' Studies core classes. This class begins with a focus on some of the main themes that have been considered in feminist jurisprudence, such as feminist epistemology and its relationship to legal method, equality, and feminism in legal education. In addition, considerable emphasis is placed upon feminism and its integration with issues of race, class, sexual orientation, and disability. The second major focus is on equality rights in Canada, from the early cases to current concepts of equality under the Charter. This is followed by an examination of the impact of feminist legal theories in particular areas through student class presentations on their major paper topics.

EVALUATION: Final exam (2 credit hours) or major paper (3 credit hours)

E. Graduate Classes

Graduate Directed Research Paper: LAWS 3069.03

Graduate Seminar on Legal Education and Legal Scholarship: LAWS 3000.03

This seminar is a required class for students in the LLM programme. It is also open to JSD students. Its purpose is to explore various issues in legal education and legal research from a comparative perspective. Half of the class is devoted to an examination of the purposes of legal education and the various ways that legal education is structured and carried out in different jurisdictions. The other half of the class is spent examining different methodological and ideological approaches to legal research, with special emphasis on how each of the seminar participants would see his or her development as a legal scholar.

Evaluation is made in relation to a number of components including, but not limited to, a research assignment, class participation and a "methodological prospectus" for the student's thesis research. The class begins in September and is completed by the end of February.

Medicine

Faculty of Medicine

Office of the Dean of Medicine

Location: Rm C-205, Clinical Research Centre
5849 University Avenue
Halifax, NS B3H 4H7
Telephone: (902) 494-6592
Fax: (902) 494-7119

Admissions Office

Location: Room C-132, Lower Level, Clinical Research Centre
Telephone: (902) 494-1874
Fax: (902) 494-8884

Academic and Administrative Staff 1999/2000

Dean

Ruedy, J., MDCM (Queen's), FRCP(C), FACP
MacDonald, N., BSc, MSc, MD, FRCPC (effective July 1, 1999)

Associate Deans

Breckenridge, W.C., BSc, MSc, PhD (Tor), Research
Gray, J.D., BSc, MD (Alta), FRCP(C), Continuing Medical Education
Padmos, A., BA (Tor), MD (McM), FRCP (C), Cancer Care Programs
Ste-Marie, M., MD (McGill), FRCP(C), Undergraduate Medical Education and Student Affairs
Wrixon, W., BSc (Mun), MD (Dal), FRCS(C), Postgraduate Medical Education

Assistant Dean

Grant, S., BA (UNB), MD (Dal), CCFP, FCFPC, Saint John Campus

Academic Directors

Casey, M.S., BA (Tor), MD (Dal), Admissions
Kenny, N.P., BA (MSVU), MD (Dal), FRCP(C), LLD (Hon) (MSVU), Bioethics Education and Research
Mann, K., BSc, MSc, PhD (Dal), Medical Education
Sinhá, G., Director, Student Advisor Programme
Zitner, D., BA (Sir George Williams University), MA (Dal), MD (Dal), CCFPC, FCFPC, Medical Informatics

Administrative Directors/Staff

Connell, G., BPR, (MSVU), Communications
Detienne, B.L., Admissions and Student Affairs Co-ordinator
Edwards, A.C., BSc (Dal), MBA (Dal), Finance
Graham, S.D., BCom (SMU), Curriculum/Evaluation Coordinator
Holmes, B., BSc (Acadia), MEd (Dal), Curriculum and Faculty Development
MacParlane, D., BA (MSVU), Alumni Affairs Co-ordinator
Paterson, G.I., BSc (UBC), MSc (Dal), ISP, Medical Informatics Co-ordinator
Power, L., BSc (Dal), BEd (MSVU), Human Resources
Ross, C., Research Coordinator
Silver Smith, C., Postgraduate Medical Education Coordinator
Stevens, C., Finance Coordinator
Weeden, A., Cert. BA (UNBSJ), Coordinator of Planning and Administrative Services

Dalhousie Medical Research Foundation

Sloan, J., BA (French), BPR (MSVU) Administrator/Executive Director
Teixeira, D., Administrative Assistant

Faculty Council

Casey, Dr. M.S.
Finley, Dr. A.
Issekutz, Dr. T.
Murphy, Dr. P.
Pelzer, Dr. D.
Rowe, Dr. S. (Chair)
Semba, Dr. K.
Smith, Dr. F.
Trillo, Dr. A.A.
West, Dr. K.
Wilson, Dr. K.

Ex officio: President, Dean, Associate and Assistant Deans, Faculty Secretary, President of Medical Students' Society, President of PARI-MP.

I. General Information

Dalhousie Medical School was organized in 1868, but medical teaching was carried out by the independent Halifax Medical College from 1875 to 1911, when the Faculty of Medicine was re-established by the University.

The Faculty provides a complete medical training leading to the degree of Doctor of Medicine (MD). Nationally accredited postgraduate training in family medicine and specialty training is provided in University-affiliated hospitals in Nova Scotia, Prince Edward Island and New Brunswick. Continuing Medical Education is provided to the practitioners of the three Maritime Provinces.

The Faculty is fully accredited by the Liaison Committee on Medical Education and the Committee on Accreditation of Canadian Medical Schools.

The Medical School has strong research programmes in basic biomedical sciences, clinical sciences, population health and medical education.

A. Mission Statement

Dalhousie University is a centre for higher learning that strives to benefit society through the discovery, dissemination and preservation of knowledge. The Faculty of Medicine supports and promotes these purposes, for we believe that it is within this framework that we can remain at the forefront of knowledge and provide the proper milieu from which will emerge excellent physicians and scientists. Thus our mission is an equal commitment to the provision of exemplary patient care, the education of students, the discovery and advancement of knowledge and, through education and community work, to service to society in the Maritime provinces, Canada and worldwide.

The Dalhousie University Faculty of Medicine is a Canadian centre of learning dedicated to the imparting and discovery of knowledge through health education, research and care. We seek to create a learning and research environment that will enable us and our graduates to provide leadership in serving, together and in partnership with others, the broad health needs of individuals and communities in the Maritime Provinces. Committed to excellence in our pursuits, we strive for continued development as a faculty of medicine of national and international stature.

A faculty of medicine's three primary roles are health education, research and care. To function effectively in a continuously changing world of demographics, expectations, politics and resources, an effective administrative organization with adequate resources must be in operation.

B. Faculty

The Faculty of Medicine has approximately 1,400 faculty members, based in Nova Scotia, New Brunswick and Prince Edward Island. Faculty meetings are held regularly throughout the year to determine policy on academic matters.

C. Faculty Council

Faculty Council meets frequently throughout the year, advising Faculty and Deans on academic matters. Faculty Council is responsible for hearing student appeals and for administering the departmental survey process and the selection of candidates for important Faculty administrative positions.

D. Standing Committees of Faculty

There are 12 standing committees of Faculty (Faculty Council, Faculty of Medicine Library Committee, Medical Research Committee, Ethics Review Committee, Scholarships and Awards Committee, Admissions Committee, Student Financial Aid Committee, Preclinical Tenure and Promotions Committee, Clinical Tenure and Promotions Committee, Nominating Committee, T.J. Murray Visiting Scholar in Humanities Committee and the International Health Elective Programme. These committees report annually to Faculty.

E. Degree

The Degree conferred by the University is Doctor of Medicine (MD). The course extends over four years.

F. Academic Year

The academic year for the first two years of the medical course begins late August and extends to the end of May. The final two years of Medicine begin with an "Introduction to Clerkship" class. Students then rotate through a continuum of twenty, four week blocks of clinical experiences as well as attending weekly half-day didactic sessions.

G. Graduate Studies

In association with the Faculty of Graduate Studies, classes are given that lead to degrees of MSc or PhD. Qualified students may register concurrently for the MD and graduate degrees (MSc or PhD) in the Faculty of Medicine. Currently available programmes include: Anatomy, Biochemistry, Microbiology, Pharmacology, Pathology (MSc only), and Physiology and Biophysics (for further information please refer to the Faculty of Graduate Studies Calendar).

H. Research Opportunities

Research in the Faculty of Medicine is supported mainly by research grants and awards to individual faculty members from national granting agencies including the Medical Research Council of Canada, Department of National Health and Welfare, National Cancer Institute of Canada, Nova Scotia and New Brunswick Heart Foundations, Canadian Heart Foundation. Substantial additional assistance is made available through endowments to the University from the estates of the Hon. J.C. Tory and Gladys Marie Oaman and the Dalhousie Medical Research Foundation. Undergraduates registered in the MD Programme are encouraged to participate in ongoing research projects within the Faculty of Medicine. Three major programmes are available to medical students with an interest in biomedical research.

I. BSc (Medicine)

This programme is designed to provide a select group of highly qualified and motivated medical students with an opportunity to gain experience in basic and/or clinical research during the two twelve-week summer periods and elective time over two years. The programme consists of the regular undergraduate medical curriculum in first and second years, a research project, formal weekly seminar and discussion sessions over the summer, a written thesis and oral defense. The emphasis of the programme is on the successful completion of a piece of research from the design stage through implementation, to oral presentation and defence of the written paper.

A limited number of students will be admitted into the two-year programme from each first-year medical class. Successful applicants will receive an annual stipend of approximately \$5000. Interested students are advised to consult with the Research Office in the Faculty of Medicine and the elective programme advisor for first year. Elective lists made available to the first year class in early September provide a starting point for students to select topics of interest for this programme.

It is the student's responsibility to file a formal application for the BSc (Medicine) programme before the deadline in January of each year.

J. MD/PhD Programme

The Faculty of Medicine offers jointly with the Faculty of Graduate Studies a combined MD/PhD programme. This programme is open only to students who are enrolled in both the Faculty of Medicine MD programme and in the Faculty of Graduate Studies in one of the basic science departments of the Faculty of Medicine.

This programme is restricted to a very select group of highly motivated students wishing to carry out graduate work concurrently with their MD studies. Successful candidates are required to have completed at least a Dalhousie four-year honours degree programme or equivalent, and residency requirements for students entering the combined programme with a masters degree would be two years; without a masters degree this would be extended to three years. Students entering the programme would generally initiate their studies as full-time students registered in the MD programme and as part-time students in the Faculty of Graduate Studies. During the first two years, elective time and summers would be devoted to developing a PhD thesis proposal and initiating research. Upon completion of the first two years of medicine students will be given a leave of absence from the study of medicine and would register as full-time graduate students. Upon completion of all of the research for the PhD including thesis defence, applicants would resume full-time studies in the Faculty of Medicine completing years three and four.

It is anticipated that this concurrent programme would effect a significant saving of time for any students contemplating both degrees.

K. Summer Research Programme

Each year applications are received from students interested in pursuing research over one summer in the Faculty of Medicine. Scholarships valued at approximately \$4000 are available to support medical student research projects during the twelve-week period from June until August of each summer.

Individuals interested in participating in any of the above three research programmes in the Faculty of Medicine should contact the Research Office, Faculty of Medicine, Room C-214, CRC Building, 494-1395. Students are encouraged to consult the Atlantic Canada Medical Research Compendium for a list of projects and supervisors.

L. Dalhousie Medical Research Foundation - Studentship Programme

The Dalhousie Medical Research Foundation was formed in 1979 and has as its objective the support of research and related activities in the Faculty of Medicine and its affiliated teaching hospitals. A number of prestigious studentship awards are available to highly qualified medical students with a demonstrated interest in and potential for success in biomedical research. The award is open to any first-year medical student. The Foundation supports supervised research experience from the end of the first to the end of the third year of medical school with the objective to encourage highly qualified and motivated medical students to consider careers in biomedical or behavioural research. The Foundation supports the B.Sc. Med. Programme but participation in this programme is not mandatory. Students interested in applying for either a B.Sc. Med. or General Studentship should contact the office of the Dalhousie Medical Research Foundation, Sir Charles Tupper Medical Building - (902) 494-3502 - www.dmrff.org

M. Dalhousie Medical Alumni Association - Studentship Programme

The Dalhousie Medical Alumni Association offers a number of studentships to qualified medical students. The Dr. F. Murray Fraser Studentship Fund and the Beth Rafuse Medical Research Award provide summer studentships to medical students. The Weld Kernohan Lecture Fund supports a lecture once every three years in the Mid-Week Medicine Lecture Series offered by Continuing Medical Education and the Dalhousie Medical Students' Society.

M. Faculty Regulations

1. Medical students are required to adhere to the general University Regulations. Clinical clerks and residents are subject to the rules and regulations of the hospital department to which they are assigned concerning hours of duty, holidays, etc. Patient care responsibilities override University and statutory holidays.
2. Medical students must observe the regulations of the hospitals relative to undergraduate and post-graduate students, and any violation of such regulations will be dealt with as if a University regulation were violated.
3. All University regulations respecting fees apply to the Faculty of Medicine. In addition, students who have not paid their annual university tuition fees in full by the end of January will be suspended from the Faculty. If the fees are not paid by February 15, the registration of the student for the session will be cancelled. (In this connection it should be noted that the Awards Office and the Office of the Dean of Medicine always give consideration to the provision of bursaries and loans for those in genuine financial need but application for such aid must be anticipated by the student.) A charge is made for handout materials including cases, schedules, lecture outlines, etc.
4. Such instruments and uniforms as students may be required to obtain shall be of a design approved by the Faculty.

N. Dalhousie Medical Alumni Association

Serving the medical school for half a century is a network of more than 6,000 medical alumni - both MD's and Post Graduate Medical specialists - with a long-standing tradition of putting students first. The DMAA Board of Directors, comprised of twenty alumni, faculty and student representatives meets regularly to address issues affecting the quality of education offered and research opportunities available at the medical school.

The financial support allotted each year from the proceeds of the Annual Fund in support of student activities demonstrates the mandate of the DMAA, which is to enhance the excellence and prestige of the medical school's teaching and research activities. A full schedule of on-campus programming is offered throughout the year to encourage positive interaction among students, faculty and alumni.

The DMAA reports to its membership and the university community through the pages of *Vox MedAL*, published twice a year and features regular contributions from and about students. The Medical Alumni Office is located near the entrance to the Kellogg Library and is staffed by Executive Director, Dilly MacFarlane. For further information, please call (902) 494-8800. Please visit our website at www.med.dal.ca/dmaa/ or E-mail Dilly.MacFarlane@dal.ca.

O. Sir Charles Tupper Medical Building

The Sir Charles Tupper Medical Building was completed in the summer of 1967. This 15-storey structure, the chief Centennial Project of the Government of Nova Scotia, is named after Sir Charles Tupper (1821-1915), one of the founders of the Faculty of Medicine, a Father of Confederation, and the only physician to have been Prime Minister of Canada.

The Tupper Building houses the W.K. Kellogg Health Sciences Library which occupies part of the first and all of the second floors of the Tupper Building. The library has a collection of approximately 158,000 volumes and yearly receives 2,400 current serials. The collection also includes over 2,900 audio visual programmes.

The Kellogg Library was made possible by the generous gift, in 1965, of \$420,000 from the W.K. Kellogg Foundation of Battle Creek, Michigan. Other benefactors include the Medical Society of Nova Scotia, which makes an annual contribution to maintain the Cogswell Collection, and the Provincial Medical Board of Nova Scotia which provides an annual grant in honour of the late Dr. John George MacDougall who was, for many years, President of the Board and a member of the staff of the Faculty of Medicine.

The Tupper Building also houses the following: teaching, research and administrative facilities of the Departments of Anatomy and Neurobiology, Biochemistry, Physiology and Biophysics, Pharmacology, Microbiology and Immunology, and Pathology; space for the undergraduate and graduate teaching of science students; study, recreational and dining areas for medical students; the Animal Care Centre; the Clinical Trials Atlantic Corporation (CTAC); the Dalhousie Medical Alumni Association Office; the Dalhousie Medical Research Foundation; and, Medical Computing and Media Services.

P. Clinical Research Centre

The Centre (formerly Dalhousie Public Health Clinic), which was constructed in 1923 following a gift from the Rockefeller Foundation, was originally built to house the outpatient services of the clinical departments. The Centre is now physically connected to the Tupper Building and, together with a block of space connecting the two buildings (the Link), houses the Atlantic Research Centre (ARC), the offices of the Department of Community Health and Epidemiology and the administrative units of the Dean's Office.

Q. Family Medicine Centres

These centres are modern ambulatory clinical facilities housing the administrative, research, clinical and educational resources of the Department of Family Medicine. The first of these opened in 1975 and is situated on the 8th floor of the Abbie Lane Building, QE II Health Science Centre. The Cowie Family Medical Centre is in Spryfield. The third centre established in 1995 is the New Brunswick Region 3 Family Medicine Teaching Unit (Fredericton, NB).

R. Affiliated Hospitals

The majority of clinical departments are located in one of the affiliated teaching hospitals. The major teaching hospitals include the QEII Health Sciences Centre, the Nova Scotia Hospital, the IWK - Grace Health Centre, and the Atlantic Health Sciences Corporation. Other affiliated and associated institutions, which for the most part are involved in the Dalhousie University Resident Training Programmes include the Centracare Hospital, Sydney Community Health Centre, St. Martha's Hospital, The Moncton Hospital, Dr. Everett Chalmers Hospital, Queen Elizabeth Hospital and Prince County Hospital. Other facilities include the Nova Scotia Environmental Health Centre (opened in 1997) located in Fall River and a clinical skills learning centre (opened in 1998) located at 5599 Fenwick Street, Halifax.

S. Nova Scotia Environmental Health Centre

Environmentally triggered sensitivities are plaguing growing numbers of people world wide. To study their causes and treatments, Dalhousie Medical School joined forces with the Nova Scotia Department of Health to create the Nova Scotia Environmental Health Centre (NSEHC). Opened in the spring of 1997, the NSEHC in Fall River, Nova Scotia is an one-of-a-kind, world class facility dedicated to the research and treatment of environmental sensitivities.

Director: Dr. Roy Fox
Telephone: (902) 860-0551
Fax: (902) 860-2046

Location: 3064 Hwy. 2 (P.O. Box 2130)
Fall River, NS

T. Dalhousie Medical Students' Society

All medical students are members of this Society, which exists to promote the welfare and general interests of the medical undergraduates, including social and sports activities, relations with the Faculty and with the Students' Union of the University. The Society presents honours and awards to outstanding medical students.

The president and vice-president of the Medical Students' Society, the presidents of the four undergraduate classes and the president of the Residents Association of Nova Scotia are members of Faculty. The Presidents of the Medical Students' Society and Residents Association of Nova Scotia are ex-officio members of Faculty Council. Medical students are members of the following Faculty

committees: Medical Education, Student Financial Aid, Admissions and Library. Regular monthly meetings are held by the Dean and associates with the class presidents and educational representatives as well as the president of the Medical Students' Society.

U. Clinical Trials Atlantic Corporation

Clinical Trials Atlantic Corporation (CTAC) was formed in 1994 to help bring medical research funding to the Atlantic provinces. In its first two years of operation, this joint venture of Dalhousie Medical School and several other academic institutions and teaching hospitals in the region has attracted more than \$2.5 million in clinical trials. CTAC provides the infrastructure to attract clinical trials to the Atlantic region, promotes Atlantic Canada's network of experienced researchers to the pharmaceutical industry, and provides training, infrastructure, patient recruitment and administrative support.

Chief Executive Officer: Mr. Peter Thompson
Telephone: (902) 494-6567
Fax: (902) 494-2057

V. Medical Undergraduate Student Advisor Programme

Director: Dr. G. Sinha
Department of Anatomy and Neurobiology
Room D-2, 14th Floor
Sir Charles Tupper Medical Building
Telephone: 494-7059

This is a confidential support programme which was devised by the students. It is separate from the Dean's Office and it enables students to get help for individual, personal and academic problems from a person who has no influence on their academic career. All communications are strictly confidential. Referrals are made when necessary.

There are also a number of lunch hour and evening events associated with the programme; and evening discussion on "Medical Marriages", a banker who gives advice on "Managing your Money". There is also a series of Brown Bag lunches on items of general interest.

Students looking for advice should contact one of the Directors. Early contact is recommended before problems become critical.

W. NOVAhealth International

NOVAhealth International (NHI) offers a 'one-stop-shopping' opportunity to tap into the rich health care resources of Nova Scotia while pursuing international opportunities in the field of health education, technology and services through partnerships with private business, NGOs and government institutions.

A for-profit organization, NHI is affiliated with Dalhousie Medical School, providing consummate access to state-of-the-art clinical, research and consultant services. Originated through a proposal by the Government of Nova Scotia's Department of Health, NHI's mandate is to develop and export health care projects, programmes and services by capitalizing on the infrastructure of the current Canadian health care system.

Director General: Dr. Ronald Stewart
Chief Executive Officer: Mr. Neil Ritchie
Telephone: (902) 494-3543
Fax: (902) 494-7119

II. Admissions

A. Admission to First Year

1. Application and Selection

Entrance to the Faculty of Medicine is limited to 82 students annually. Successful candidates are selected by the Admissions Committee of the Faculty of Medicine, whose decision is final. The application for admission is to be made only on the regular application form of the Faculty of Medicine which may be obtained from the Admissions Office, Dalhousie University after October 1st.

The completed form must be returned to the Registrar's Office, Dalhousie University, Halifax, N.S. B3H 4H6 post marked not later than November 15 in order to be considered for entry to the class beginning the following August. All applications must be accompanied by a \$60.00 processing fee, which is not refundable and is not applicable to tuition fees.

A completed application consists of:

- 1) The application form filled out by the applicant as required,
- 2) The \$60.00 fee as noted above,
- 3) Three completed confidential assessments (which are to be sent directly to Admissions Office, Room C-132, Lower Level, Clinical Research Centre, 5849 University Avenue, Nova Scotia, B3H 4H7),
- 4) Evidence that the Medical College Admission Test has been taken,
- 5) Official transcripts from all universities and colleges attended by the applicant (if the applicant is still engaged in university studies, an interim transcript is to be sent when the application is made and a final official transcript forwarded by the institution concerned on the completion of those studies), and
- 6) Supplementary information form.

The Admissions Committee will not consider incomplete applications.

2. Selection Objectives

The Faculty is seeking applicants who have a good record of achievement in both academic and non-academic activities. Applicants with a broad academic background have an enhanced chance of admission as humanities and social sciences cultivate desirable personal qualities for students and physicians. This includes sound basic training in the sciences in order that they can understand the complexities of modern scientific medicine. The greatest possible proficiency in communication and self-expression, both orally and written, is a necessity to the future medical practitioner. In addition, in order to have acquired the required degree of intellectual maturity, the prospective medical student should have more than basic training in at least one field of learning, whether it be in the humanities, social sciences, life sciences or physical sciences.

3. Selection Factors

Sources of information and factors considered by the Admissions Committee include (a) academic requirements, (b) ability as judged on university records and on the Medical College Admission Test, (c) confidential assessments received from referees of the applicant's choice and from any others the Committee may wish to consult, (d) interviews, and (e) place of residence. More detailed comments and explanations on each of these follow in paragraphs 4-10 below.

4. Academic Requirements

The Admissions Committee recognizes that appropriate preparation for the study of medicine can be acquired through many varied educational backgrounds. The major objective is that premedical education encompass broad study in the physical, life and social sciences and the humanities. The minimum requirement for entry, however, is a baccalaureate degree. Courses in the social sciences and humanities will be helpful in understanding human behaviour in health and illness. Ability to communicate effectively, both oral and in writing, is essential. The committee believes that attracting students with a rich variety of educational backgrounds is in the interest of all students. Such preparation supports the training of outstanding physicians.

All applicants must meet the following minimum academic requirements:

- **Maritime Applicants:** A minimum academic average of B+ (77% or higher) or a GPA of 3.30 based on a full course load of 5 full classes each year in the last two undergraduate years, or three out of four good years plus MCAT scores of 8 and above (but may contain a score of 7 in ONE of the numerical sections) with a minimum score of 24. While we would ordinarily expect a candidate to have 2 consecutive years in which 5 full courses were carried while achieving a GPA of 3.3, the Admissions Committee would accept applications from candidates who have demonstrated compelling reasons for not having met the requirements or who have unusual qualifications. These decisions would be made at the discretion of the Committee.

- **Non-Maritime Applicants:** A minimum academic average of A- (80% or higher) or a GPA of 3.70 based on a full course load of 5 full classes each year in the last two undergraduate years, or three out of four good years plus MCAT scores of 10 and above (but may contain a score of 9 in ONE of the numerical sections) with a minimum score of 30.

Due to differing requirements for degrees at various universities in the Maritime provinces, the Faculty has adopted a policy to ensure fair and equal opportunity for all students. The Admissions Committee has the discretion to receive an application from any student at a Maritime university that does not have a three year general science baccalaureate degree if that student will have completed all of the requirements that would have made him/her eligible for that degree at Dalhousie by June 30 preceding registration in the Faculty of Medicine. However, the Committee strongly favours candidates who have a four-year undergraduate degree and only in unusual circumstances accepted those from three year degrees (or equivalent programs).

The medical undergraduate has to deal with a great more information per unit of time than is usually the case in university undergraduate programmes in arts or science. Therefore, the Admissions Committee will consider not only the academic grades of applicants but the type and degree of difficulty of university classes completed.

5. Academic Ability

Although there are no absolute prerequisite courses, candidates are encouraged to have taken two or three science courses at a challenging level. This will not only prepare the applicant to successfully write the Medical College Admission Test, but will provide a good foundation for studies in the medical program. Accordingly, a demonstrated capacity to carry a full programme of demanding advanced level classes is a necessary asset for a medical student. The ability to obtain consistently better than average grades in such a programme is the best indication of that capacity. An academic record which shows failed or repeated classes, classes passed with low grades or supplementary examinations, particularly in the two years prior to anticipated entry into medical school, makes the prospect of admission unlikely. With a limited enrolment and many more applicants than the class requires, those with the best academic record will have the greatest chance of admission. Nonetheless, the Admissions Committee can, and does, make significant use of non-academic factors (see para. 7) in deciding which applicants will be admitted.

6. Medical College Admission Test

The Medical College Admission Test (MCAT) is an absolute requirement for admission to the Faculty of Medicine. It is a useful predictor of academic performance in the preclinical years of medical school and considerable weight is placed on MCAT results by the Admissions Committee. It is the responsibility of the applicant to arrange to take the Test.

All applicants are required to write the Medical College Admission Test prior to the deadline date for submission of application. This test cannot be any more than five years old. We do not accept the April writing of the MCAT for entry in September of the same year. The MCAT is less science-based and more balanced. It has been designed "to encourage students interested in medicine to pursue broad undergraduate study in the natural and social sciences and in the humanities. The MCAT will assess mastery of basic biology, chemistry, and physics concepts; facility with scientific problem solving and critical thinking; and writing skills." Students should note that the scientific information to answer questions on the MCAT should be obtainable in first or second year undergraduate classes. Performance in the verbal reasoning test and writing sample test will be enhanced by a broad undergraduate education including the humanities. These tests will now make up half the total MCAT examination.

Information about the MCAT, including an application form, can usually be obtained from the Registrar of the university the student is attending or by writing to MCAT Registration, The American College Testing Programme, P. O. Box 4056, Iowa City, Iowa, 52243. The latest date for submitting an application is about four weeks before the testing date.

7. Non-Academic Factors

These play a very important part in the evaluations of the Admissions Committee. The attributes of emotional stability, intellectual curiosity, social values, initiative, leadership, reliability, personal maturity, motivation and communicative skills, as determined by referee's confidential assessments, interviews, etc., are considered for each candidate. Any outstanding achievement or breadth in terms of life experience is given consideration. Such achievement would be drawn to the attention of the Committee by the referees or in the Supplementary Information Form provided.

8. Interviews

Applicants with a reasonable chance of admission are invited for an interview. A fee of \$50 will be charged to all applicants receiving an interview. Occasionally a second interview (at no charge to the student) is arranged if additional information is needed to reach a decision.

9. Place of Residence

Admission preference is given to Canadian citizens (or landed immigrants) whose place of residence is in Nova Scotia, New Brunswick or Prince Edward Island (the Maritime Provinces of Canada). The place of residence for university students is normally presumed to be the country or province in which the home of the applicant's parents is located. Attendance at a university in the Maritime Provinces does not, by itself, necessarily constitute having residence in the Maritime Provinces.

Applicants who have been, or will be, in the work force for more than three years at the time of commencement of studies in the Faculty of Medicine will normally be presumed to be resident of the place where such employment occurred. Undergraduate students who have been enrolled full-time at a Maritime university for at least three consecutive academic years will be considered to be Maritime residents for the purposes of admission. The applicant must then relinquish residency status in his/her home province. Students in graduate programmes in good standing who have resided in Nova Scotia for two (2) years will be considered a maritime resident. Other relevant factors will be taken into account by the Admissions Committee in their determination of the residency status of each applicant. Each applicant is encouraged to give detailed and complete information on their resident status at the time of application.

All applicants are expected to claim the same place of residency on all applications to medical schools. Failure to do so may lead to rejection of the application. The decision of the Admissions Committee regarding the residency status of each applicant will be final and is not subject to appeal.

10. Immunization Requirements

The Faculty of Medicine's immunization policy requires that all students show documented appropriate immunization for tetanus, diphtheria, polio, measles, mumps, rubella and chicken pox. Proof of immunization must be written documentation obtained from a physician and/or public health facility, including the date of the immunization. All students must be immunized against Hepatitis B, which will be made available in a three injection series in the autumn of the Med I year, at a cost of approximately \$83.00 (responsibility of the student). It is strongly recommended that all students be immunized against influenza. On registration day, all Med I students are skin tested to establish their tuberculin status. At that time, all students are provided with a copy of the Faculty of Medicine Policy for Students Regarding Infectious Diseases.

11. Notification

Candidates will be informed of the status of their application (e.g. accept, reject or wait list) between early February and late June. Those candidates who are wait listed can expect to hear anytime between the end of June to Registration day.

12. Deferrals

Applicants who are offered a place in the incoming class may request a deferral of admission for one year. The Admissions Committee may rarely, at its discretion, grant a limited number of these requests in any one year to outstanding students.

Students who are enrolled in a graduate studies programme will be required to complete the programme before entering medicine. It is anticipated that such students will apply during their last year.

13. Acceptance Fee

On notice of acceptance into the Faculty of Medicine, applicants must be prepared to sign a formal agreement of acceptance and to deposit with the Registrar the sum of \$200 before a specified date. This sum is credited toward tuition fees if the student registers but is not refunded if the student withdraws.

14. Eligibility

An application is not considered if the applicant has been required to withdraw from another medical school at the request of the Faculty of that school.

15. Re-application

A new application form must be completed in each year in which application is made.

16. Amendment of Admission Regulations

These regulations may be amended or added to without notice by the Faculty of Medicine. In ordinary circumstances adequate notice of change is given.

B. Students with Learning Disabilities

Dalhousie University is committed to providing equal educational opportunity and full participation for students with learning disabilities. Please see the Policy on Accessibility for Students with Learning Disabilities (pg. 11)

III. Curriculum Leading to MD Degree

The curriculum of the Faculty of Medicine is under continuous review, to respond to changes in patterns of health and disease treatment, the health care system, and in methods of effective teaching and learning. The description of the four-year programme which follows reflects the outcome of a curriculum review in 1991 which has resulted in a completely revised curriculum. The curriculum has been implemented over four years, which began with the first-year class entering in September 1992. In 1995 the Committee on Accreditation of Canadian Medical Schools and the Liaison Committee on Medical Education reviewed the curriculum and granted the maximum seven year accreditation. For the most current information, visit our Website: <http://www.mcms.dal.ca>.

A. Objectives of the Undergraduate Programme

1. Basic Assumptions

1. All physicians require a common foundation of knowledge, skills, and attitudes, the basis for which should be developed in the course of undergraduate medical education.
2. The function of the undergraduate medical education programme is to prepare the physician to undertake a post MD educational programme leading to independent practice in one of the fields of medicine (e.g. family medicine, specialty practice). The graduating student cannot be expected to possess all the knowledge, skills and competencies that are essential for the practicing physician. Rather, the emphasis is on concepts, skills, and attitudes, and the integration of basic and clinical sciences.
3. Essential components of an undergraduate medical education programme include the presence of formal mechanisms to evaluate its performance, adequate administrative support and participation in medical education research.

2. Educational Goals for the Medical Student

At the end of the undergraduate programme, the aspiring physician should:

1. Be an active, independent learner, able to seek out information; to analyze it critically, and to apply it by scientific reasoning to the solution of clinical problems; and to use the changing technology of information processing.
2. Possess the strong foundation of knowledge, skills, values and attitudes required for the pursuit of a postgraduate medical education programme and for life-long learning. This will include the ability:

- a) To identify, evaluate, and help resolve health problems in individual patients; to help patients adjust to their condition and to make efficient use of available resources for these purposes. In so doing the student will utilize appropriate aspects of the basic, clinical, behavioural and social sciences.
- b) To demonstrate skills in information seeking, information analysis, scientific reasoning and the application of results.
- c) To educate patients and others in the promotion of health and the prevention of disease. Demonstrate a strong commitment to the promotion of health.
- d) To take into consideration the personal needs of each patient, as well as the family and social environment, when managing clinical problems. Demonstrate a caring, compassionate and dedicated attitude towards patients.
- e) To work effectively as a member of a team that includes physicians, other health professionals and community agencies.
- f) To participate in peer review activities and respond positively to constructive criticism.
- g) To contribute to the development and success of health care programmes and institutions. Demonstrate an understanding of the organizational aspects of the Canadian and Maritime health care systems, with their various programmes and institutions; knowledge of the impact of demographic, socioeconomic, political and technological factors on health care delivery and of strategies and measures for cost containment.
- h) To appreciate the fundamental contribution of research to the evolution of medicine.

B. The Four Year Programme

1. First Year

Begins in late August with a duration of 40 weeks.

The first-year programme is designed around clinical cases or problems. Students work in groups of 7-8 with a faculty tutor, meeting for approximately six hours weekly. Laboratory experience and a small number of lectures (3-5 weekly) are included. An important component of learning is participation in the small group tutorials. Students are expected to participate, and evaluation will reflect this expectation. Self-directed study is an integral part of the curriculum. The units run consecutively as follows: Introduction to patients and clinical medicine occurs early in the year. Attendance at all clinical experiences is required.

Introduction: 1 week

Unit 1: Human Body - 8 weeks

Unit 2: Metabolism & Function - 10 weeks

Unit 3: Pathology, Immunology & Microbiology - 8 weeks

Unit 4: Pharmacology - 5 weeks

Unit 5: Genetics, Embryology, and Reproduction - 5 weeks

Unit 6: Population Health

Unit 7: Patient-Doctor

Unit 8: Electives

Units 1-5 run consecutively throughout the year

Units 6-8 run longitudinally, involving one weekly session

2. Second Year

Begins in late August with duration of 40 weeks.

In their second year of study, students continue to learn in small groups of 7-8 students with a faculty tutor. Six hours weekly are devoted to tutorial experience. Attendance at tutorials is required. Students continue to have lectures (approximately three weekly) and laboratory experiences. Self-directed study is an integral component of the curriculum, and time is scheduled for this activity. Clinical experience continues, and attendance is required.

The curriculum units are as follows:

Unit 1: Brain and Behaviour - 10 weeks

Unit 2: Skin, Glands and Blood - 9 weeks

Unit 3: Cardiovascular and Respiratory - 8 weeks

Unit 4: Genitourinary, Gastrointestinal and Musculoskeletal - 10 weeks

Unit 5: Clinical Epidemiology and Biostatistics

Unit 6: Patient - Doctor

Unit 7: Elective

Units 1 - 4 run consecutively throughout the year.

Units 5 - 7 run longitudinally, involving one weekly session

3. Clinical Years (Years III and IV)

The description below describes the current curriculum in the clinical years. It is under review and changes will be implemented in September 1999.

The clinical years are a continuum of 88 weeks' clinical experience, as well as centrally-organized educational sessions. Rotations in the clerkship years are as follows:

Introduction to the Clerkship - 1 week

Electives: 12 weeks

Family Medicine: 4 weeks

Medicine: 8 weeks

Obstetrics/Gynecology: 8 weeks

Ophthalmology/Otolaryngology: 4 weeks

Pediatrics: 8 weeks

Psychiatry: 8 weeks

Surgery: 4 weeks

Urology: 4 weeks

In addition, students must complete a 4-week selective experience offered in each of Family Medicine, Medicine, and two 4-week selectives in Surgery. In addition to Family Medicine, other clerkships may also require that students complete the rotation at designated sites away from the Halifax teaching hospital base.

Concurrent with the clerkship experience, students return to the medical school for one half-day weekly. These centrally-organized sessions are based on objectives related to Pharmacology and Therapeutics, Neurosciences, Radiology, Anaesthesia, Physical Medicine and Rehabilitation and other identified areas of importance. In addition, theme issues such as family violence are included as are discussions of ethics. These sessions involve lectures, small group tutorials, and a variety of other learning experiences.

C. Courses Offered

The units in the 1999-2000 curriculum, as well as the clerkship chairperson, or unit head, are listed alphabetically. Each class is described briefly. Unit heads are subject to change.

The Introduction to the Clerkship is a preparatory class for the clerkship which includes hands-on skills and procedures modules. This must be successfully completed to enter the clerkship rotations.

Brain and Behaviour

Unit Head - Dr. T. Benstead, 473-5565

This interdisciplinary unit incorporates objectives of the Neurosciences, Neuroanatomy, Neurophysiology and Psychiatry. This unit extends for 10 weeks in Year II.

Cardiovascular and Respiratory

Unit Head - Dr. N. Morrison, 473-4024

This 8-week unit in Year II introduces the concepts, knowledge and skills which are necessary to understand disorders of these two systems.

Clinical Epidemiology and Biostatistics

Unit Head - Dr. M. Joffres, 494-1932

In this Year II unit, students learn to apply the principles of clinical epidemiology and biostatistics to the medical problems which are encountered by practicing physicians. The major themes include: abnormality, diagnosis, risk and causation, natural history of disease, etc.

Electives

Unit Head Year I - Dr. M. Wilkinson, 420-3198

Unit Head Year II - Dr. M. Ludman, 428-8592

In Years I and II, students spend a half-day weekly in elective study. Twelve weeks of elective study are available in the clerkship period.

Family Medicine

Chair - Dr. C. Maclean, 473-4715

The Family Medicine core clerkship is 4 weeks in length. After a 2-day orientation, students spend a 10-day period with each of two preceptors. Students are introduced to the principles of Family Medicine in both an urban and non-urban setting. In a second 4-week selective experience, students have an opportunity to explore areas of special interest.

Genetics, Embryology and Reproduction

Unit Head, Dr. M. Ludman, 428-8754

In this Year I unit, students are introduced to molecular and human genetics and to early human development and reproduction.

Genitourinary, Gastrointestinal and Musculoskeletal

Unit Head - Dr. M. West, 473-4023

This Year II unit of 10 weeks in length emphasizes the basic mechanisms underlying musculoskeletal, gastroenterological and renal disorders.

Human Body

Unit Head - Dr. I. Mobbs, 494-2497

This Year I unit consists of an introduction to the structure of the normal human body. The problem-based course includes significant laboratory experience to enhance tutorial learning.

Medicine

Chair - Dr. C.E. Maxner, 473-3731

This eight week core clerkship rotation provides students with an opportunity to integrate previous knowledge with new skills in caring for patients with a broad spectrum of illness (and often multiple illnesses) in a hospital setting. The skills of information gathering, physical examination and hypothesis testing are developed under the expert tutelage of residents and experienced clinicians.

Metabolism and Function

Unit Head - Dr. F.B. Palmer, 494-2570

This unit introduces students to concepts and principles in biochemistry, physiology and molecular biology.

Obstetrics and Gynecology

Chair - Dr. B. Parish, 420-3491

This clerkship is divided into four weeks on the Obstetrics service and four weeks on the Gynecology service. The Obstetrics rotation is divided into three blocks of time as follows: 1) Caseroom - two weeks; 2) high risk ante-partum care one-week; and 3) post-partum - one week. Students also will participate in a series of seminars covering a variety of topics in Obstetrics and Gynecology.

Ophthalmology and Otolaryngology

Chair - Dr. P.E. Rafuse, 422-8353

This rotation provides students opportunities to learn about the common problems which are likely to be seen in practice. Two weeks are spent in each rotation, and experience in both adult and pediatric clinics is included.

Pathology, Immunology and Microbiology

Unit Head - Dr. D. Mahony, 494-2179

This Year I unit includes the study of problems which introduce relevant concepts and principles of immunology, microbiology and pathology.

Patient Doctor

Unit Head Year I - Dr. S. Robinson, 473-2394

The Patient-Doctor unit in Year I is a multidisciplinary unit which introduces the students to the "art of medicine." Introductory sessions in communication skills, human development, behavioural science, human sexuality, and medical ethics help students build a larger framework in which to place the patient-doctor experience.

Unit Head Year II - Dr. B. Joyce, 473-1238

In Year II, this unit provides the ongoing development of the clinical skills introduced in Year I, including interviewing and physical examination skills. The clinical skills are expanded to include the areas of psychiatry, paediatrics and adult internal medicine.

Pediatrics

Chair - Dr. K. Blake, 420-6499

The eight weeks Pediatric core clerkship includes two weeks of neonatology, at least two weeks of ambulatory care/emergency room experience, and a one-month inpatient rotation. During the last four weeks, several problem-based learning small group discussions, seminars and other learning experiences are provided.

Pharmacology

Unit Head - Dr. S. Howlett, 494-3552

This 5-week unit in Year I emphasizes basic pharmacological principles, such as factors affecting absorption, metabolism and excretion of drugs.

Population Health

Unit Head - Dr. D. Langille, 494-1312

This Year I unit provides an introduction to understanding health in a community context and the principles of epidemiology. The main themes of the unit include: infectious diseases outbreak and the public health system; health of minorities; the problems of aging; substance abuse and its impact; occupational and environmental health; family violence; nutrition and coronary heart disease; mental health; screening in population health.

Psychiatry

Chair - Dr. A. Stokes, 473-8375

In this core clerkship, students will be expected to make a comprehensive psychiatric assessment of a variety of clinical problems, and to plan and execute the investigation and management of these problems under supervision. The goal of the programme is to prepare the clinical clerk for the independent practice of general clinical medicine. All of the general skills of a physician in the assessment and management of psychiatric problems should be mastered, as well as the recognition of the need for appropriate assistance.

Skin, Glands and Blood

Unit Head - Dr. S. York, 473-3728

This 9-week, Year II unit has been developed to facilitate students' understanding of disorders affecting the skin, endocrine glands and blood.

Surgery

Chair - Dr. C.G. Jamieson, 473-5144

The four-week core surgery clerkship is devoted to the Principles of Surgery. A programme of seminars and tutorials has been developed to address these objectives. During the four weeks, students will be assigned to a surgical service and to a preceptor. When not actively involved in the core curriculum, the student will participate in some of the usual activities of the service, i.e. grand rounds, service rounds, OR, etc., to familiarize the students with all aspects of Surgery.

Urology

Chair - Dr. J. Grantmyre, 425-3940

This four week clerkship is intended to provide students with a broad experience in clinical problem solving of urologic disease. Students will have both inpatient and ambulatory care experience. The clinic exposure is especially broad in this rotation and is structured to provide an understanding of general adult and pediatric urology, stone disease, sexual dysfunction, male infertility, urologic oncology and voiding dysfunction. An intensive seminar programme will solidify those issues generated by patient exposure.

D. The Flexible Scheduling Option

A student may take 3 years to complete Years I/II or Years III/IV. This means that the workload of students in this programme may vary depending on the year, but, on average, it will be reduced by one-third. Evaluations are held in concert with students in the regular programme. Students must understand that the sequence of the curriculum might not be ideal. Students must apply to the Associate Dean for Undergraduate Medical Education and Student Affairs by the last day of the first unit (Year I) and before the clinical years begin (Year III). Students must pay full tuition for each of the three years.

IV. Undergraduate Medical Education and Student Affairs (UMESA)

The purpose of the UMESA Office is to assist students and faculty functioning in the Faculty of Medicine by:

- 1) Helping to coordinate and administer all undergraduate medical classes and educational experiences;
- 2) Assisting students who require assistance or information with regard to curriculum, evaluation, elective experiences, scholarships, financial assistance, or other matters which arise; and
- 3) Helping to organize, administer, analyze and evaluate all external and internal examinations and evaluations of undergraduate medical students.

A. Unit and Year Outlines

Students will be provided with an overall outline of the academic year at the beginning of the year. Class outlines will be placed on file in the Undergraduate Medical Education and Student Affairs office.

B. Evaluation

Evaluation is conducted in the Faculty of Medicine for two purposes:

- (1) To enable both student and Faculty to evaluate progress, which determines where satisfactory progress has been achieved, and also to discover where difficulties lie so that remedial action can be taken;
- (2) To certify to the public and its licensing authorities that a graduate of this Faculty of Medicine is a dependable and competent physician.

To meet the above objectives, several types of evaluations are held throughout the four undergraduate years. Learning examinations are held occasionally throughout the year to enable each student to evaluate areas already learned in order to use time more efficiently in preparation for final exams. Grading examinations ordinarily take place at regular intervals, usually at the end of a unit. Evaluation of clinical skills is also conducted at regular intervals.

At the beginning of each year, Promotion and Evaluation Regulations are distributed to all medical students. These regulations are approved by Faculty Council on an annual basis. The regulations address all aspects of professional education and deal with fitness to study medicine.

Academic Accommodation for Students with Learning Disabilities

Please refer to the section on Procedures Regarding Students with Learning Disabilities under University Regulations.

C. Grading

All student performance will be recorded as "Pass" or "Fail" on the official transcript. In the clinical years, "Distinction" is also awarded. Numerical or letter grades do not appear on the transcript.

D. Ongoing Evaluation

In addition to examinations, students may be evaluated on both attitudinal attributes and skills. This evaluation is ongoing, and contributes to performance assessment in all classes, particularly in the clinical experiences.

E. Graduation

A student must have completed and passed all components of the curriculum before convocation. For students in their final year who have been unable to do so due to outstanding remedial work or the need to complete work missed due to illness, graduation at the Fall convocation will be possible.

F. Application Procedure for the Qualifying Examination

Apply directly to the Medical Council of Canada. The Registrar's office of MCC will process the applicant's credentials and issue an admission letter and an ID card. Application kits will be available at the offices of Faculties of Medicine, Provincial College of Physicians and Surgeons and the Medical Council of Canada.

G. Licensing

Students are reminded that they must conform to the regulations prescribed by the Medical Board or College of Physicians and Surgeons of the province in which they wish to practice. Contact the licensing authority in each Province for specific regulations. The names and addresses of the Registrars of the Medical Licensing Authorities of the Atlantic provinces and the Medical Council of Canada are as follows:

Nova Scotia: Dr. C.D. Little, Registrar, College of Physicians and Surgeons of Nova Scotia, 5248 Morris Street, Halifax, N.S. B3J 1B4.

New Brunswick: Dr. E. Schollenberg, Registrar, College of Physicians and Surgeons of New Brunswick, 1 Hampton Road, PO Box 628, Rothesay, N.B. E0G 2W0.

Prince Edward Island: Dr. H.E. Ross, Registrar, College of Physicians and Surgeons of Prince Edward Island, Polyclinic Professional Centre, 199 Grafton Street, Charlottetown, P.E.I. C1A 1L2.

Newfoundland: Dr. R.W. Young, Registrar, Newfoundland Medical Board, Churchill Park Chambers, 15 Rowan Street, St. John's, Nfld. A1B 2X2.

Medical Council of Canada: The Registrar, 2283 St. Laurent Blvd., P.O. Box 8234, Ottawa, ON K1G 3H7

V. Postgraduate Medical Education

A separate calendar is produced for Postgraduate Medical Education. One is available by phoning that office at 494-2362 or writing to Room C-126, Lower Level, Clinical Research Centre, 5849 University Avenue, Halifax, N.S., B3H 4H7.

VI. Division of Medical Education

Director
Mann, K.V.

Professors
Gray, J.
Kaufman, D.
Kenny, N.
Laidlaw, T.
Mann, K.V.
Murray, T.I.
Wrixon, W.

Associate Professors
Baylis, F.
Hansell, M.
Ste-Marie, M.

Assistant Professors
Allen, M.
Blake, K.
Bullock, G.
Langille, D.
Kovacs, G.
Ross, J.A.
Weijer, C.
Zitner, D.

Lecturer
Fleming, M.
Holmes, D.B.
Paterson, G.
Sargent, J.

In July 1994, the Faculty of Medicine established the Division of Medical Education. This restructuring followed the Long Range Planning Committee Report (1992) which recommended that the medical school develop a plan for a continuum of medical education curricula from undergraduate through continuing medical education.

The Division of Medical Education conducts and fosters educational development and research at the Medical School. Education initiatives that are relevant to the entire continuum of medical education are part of the Division's mandate. It also serves as a means of communication and a resource for individuals who are involved in educational research and development throughout the Faculty.

The Division combines academic functions of undergraduate, postgraduate and continuing medical education. The operational aspects of these three programmes remain separate, each under the direction of an associate dean, and the Division facilitates sharing of resources and expertise to maximize their effectiveness.

Several educational programmes which cross the continuum are located in the Division. These are communication skills, faculty and programme development, simulated patient and procedural skills. In addition, the specialty areas of medical informatics, bioethics education and research and medical humanities are connected to and play an active role in the Division.

For further information, please visit the Division's homepage on the Internet at www.medicine.dal.ca/dme.

VI. Continuing Medical Education

Associate Dean
Gray, J.D.

Location: Clinical Research Centre, C-106
5849 University Avenue
Halifax, NS B3H 4H7
Telephone: (902) 494-2061
Fax: (902) 494-1479
Web Page: <http://www.mcms.dal.ca/cme/index.html>

Continuing Medical Education programs have been presented by the Faculty since 1922 with the introduction of the annual Dalhousie Refresher Course. This Refresher is still offered, along with another annual three-day Refresher held in February since 1974. A variety of other types of programs are now offered by the Office of Continuing Medical Education, with contributions from many Faculty members. Subject matter is predominantly clinically oriented, and ranges from research to applied therapeutics. Teachers and learners participate in the planning, performance and evaluation of each program. In addition to the Refreshers and other Halifax-based short courses, a regular series of visiting teacher programs is offered in community hospitals throughout Nova Scotia. Community physicians are also served by two distance education initiatives: the provision of programs via interactive videoconference and the development of on-line interactive learning modules for the Internet. The Management Program for Clinical Leaders is designed for physician managers in health care organizations who wish to increase their effectiveness as partners in the management of health care resources. A variety of other programs are provided, with an increasing emphasis on small-group, problem-based learning activities. A quarterly lecture series, "Distinguished Leaders in Medicine" is organized by Continuing Medical Education on behalf of the Faculty of Medicine to provide joint faculty and student learning opportunities.

Consultative services in Continuing Medical Education are available to medical organizations. Research on effective teaching and learning methods, program planning and evaluation is actively pursued. Particular emphasis is placed on developing methods that encourage physicians to take an active part in designing, conducting and evaluating their own continuing education.

VII. Departmental Programmes

A. Anaesthesia

Location: QEII - Health Sciences Centre
Victoria General Site, Tenth Floor
Halifax, Nova Scotia
(902) 473-2331

Telephone:

Professor and Chair of Department
Coonan, T.J.

Professor Emeritus
Moffitt, E.A.

Professors
Clark, A.J.M.
Hall, R.I.
Hope, C.E.
Stewart, R.D.
Writer, W.D.R.

Associate Professors
Finley, G.A.
Hamilton, K.R.
Hung, O.R.
Imrie, D.D.
Knox, J.W.D.
Persaud, S.S.
Shukla, R.C.
Smith, J.B.
Soder, C.M.

Assistant Professors

Allen, C.T.B.
Barker, R.A.
Buss, M.I.
Chisholm, K.C.
Clark, A.G.
Davies, E.C.
Gallacher, W.N.M.
Glenn, J.J.
Godkin, T.A.
Hackmann, T.
Hughes, D.R.
Joules, C.P.
Keith, I.C.
Launcelott, G.O.
Law, J.A.
Livingston, P.
MacIntyre, A.
MacManus, B.J.
McIntyre, A.J.
McLaren, R.G.
Morris, I.R.
Morrison, D.L.
Morrison, J.D.
Muir, H.A.
Muir, J.G.
Murchland, C.A.
Murphy, M.F.
Ngan, J.E.S.
Nunn, R.
Papworth, D.P.
Roper, F.
Scovill, J.E.
Smith, J.A.
Whatley, G.
Yazer, H.

Lecturers

Beauprie, I.
Dobson, G.R.
Friesen, M.
Lee, S.
Litz, D.S.
Redmond, M.
Seldmann, T.

Stevens, S.C.
Stubbs, S.S.
Wawrzyszyn, B.
Wills, D.G.
Wybenga, M.

The Department of Anaesthesia provides general, regional and local anaesthesia for all types of general surgery, neurosurgery, cardiovascular surgery, urology, gynecology, plastic and orthopedic surgery, and obstetric and pediatric anaesthesia in the operating and case rooms of the hospitals affiliated with Dalhousie University. It has intensive care responsibilities and consultation services in most hospitals. The Department at the Victoria General Hospital is jointly responsible with the Department of Surgery for the Surgical Intensive Care Unit activities. Additionally the Department also operates a Pain Clinic at the Victoria General Hospital.

Its faculty is well equipped to teach all aspects of medicine related to anaesthesia and acute care medicine, and illustrate the application of the basic sciences of physiology, pharmacology and anatomy to anaesthesia. They participate in undergraduate instruction in basic science subjects, and in system block committees. Some are responsible for Basic and Advanced Cardiac Life Support Certification.

1. Fourth-Year Medicine

A two-day class is given at the beginning of fourth year dealing with cardiopulmonary resuscitation, with an introduction to training in the skills of intravenous therapy, endotracheal intubation, artificial ventilation, closed chest-compression, arrhythmia detection and electrical and pharmacological treatment.

2. Electives

First Year

Departmental faculty act as preceptors in guiding students in a literature survey.

Second and Third Year

One afternoon per week may be taken as an elective in Anaesthesia, acquiring specific skills or investigating a particular topic.

Fourth Year

Clinical clerks may choose one month of Anaesthesia as an elective, to further practice the basic skills associated with airway control and ventilation.

Internship

Four weeks may be taken in Anaesthesia to further upgrade skills and knowledge related to acute care medicine.

Residency Training

An integrated University residency training programme is available in the Department, consisting of a four-year programme meeting the requirements of the Royal College of Physicians and Surgeons of Canada. Participating hospitals are the Victoria General, Camp Hill Hospital, Grace Maternity Hospital, Izaak Walton Killam Children's Hospital, Halifax Infirmary and Saint John Regional Hospital. A two-year diploma course is also available. These two years will count toward Certification or Fellowship of the Royal College of Physicians and Surgeons of Canada.

B. Anatomy and Neurobiology

Location: 13th Floor, Tupper Building
Telephone: (902) 494-6850
Fax: (902) 494-1212

Dr. D.G.J. Campbell Professor and Head of Department
Hopkins, D.A.

Professors

Currie, R.W.
Dickson, D.H.
Neumann, P.E.
Rutherford, J.G.
Semba, K.
Wassersug, R.J.

Associate Professors

Ellenberger, H.H.

Hagg, T.
Hansell, M.M.
Mobbs, I.G.

Assistant Professors

Allen, G.V.
Baldrige, W.H.
Clarke, D. (major appointment, Division of Neurosurgery)
Darvesh, S. (major appointment, Medicine)
Mathieson, W.B.
Mendez, I. (major appointment, Division of Neurosurgery)
Morris, S. (major appointment, Division of Neurosurgery)
Smith, F.

Lecturer

Sinha, G.

Demonstrators

Brodie, J.
De Saint-Sardos, J.
Ferris, D.
Whitefield, S.

1. Course of Study

First Year Medicine

The Anatomy Department is involved in 2 units in the first year of Medicine. Students are introduced to Gross Anatomy and Histology in the Human Body Unit and Embryology in the Genetics, Embryology and Reproduction Unit. Students learn basic concepts and patterns through a case-oriented problem-situated (COPS) approach. Students attend small group tutorial sessions where a case is discussed and learning issues from a particular anatomical region or organ system are raised. These issues are resolved in the tutorials, laboratory sessions and with the aid of a minimum number of lectures.

Second-Year Medicine

Neuroanatomy is taught as an integral part of the Brain and Behaviour Unit, which is presented at the beginning of the second year. Neuroanatomical principles of organization and integration in the central nervous system are employed to analyze and explain the pathological processes described in the cases around which the unit is built. The basic neuroanatomy from which these principles are derived is presented in a series of lectures and laboratory sessions that are arranged to complement the cases. Neuroanatomical topics are included in the written examination at the end of the unit; as well, there is a practical examination on the material presented in the laboratory sessions.

In order to obtain an integrated understanding of the operation of the central nervous system, neurophysiological, neuropharmacological and psychiatric topics are also taught in conjunction with the neuroanatomy considered in this Unit.

2. Electives for Medical Students

The department participates in the elective programme.

First Year Students: The Department offers a variety of essay topics covering areas of recent research interest, which enable students to become familiar with topical research in medicine and with the facilities of the Kellogg Health Sciences Library.

The Department also offers short research projects under the direction of staff members for medical students wishing to undertake basic or pre-clinical research or integrate basic anatomy with clinical projects.

Second and Third Year Students: The Department offers research projects under the direction of staff members. The Department also offers electives in Head & Neck Anatomy and Neuroanatomy. An elective in Musculoskeletal Anatomy can be offered in conjunction with the staff of the Division of Orthopedic Surgery.

3. Residency Training

Programmes can be arranged for residents to help fulfil basic science requirements in specialty training.

4. Graduate Studies

Students wishing to take classes leading to a MSc or PhD degree in Anatomy should consult the calendar of the Faculty of Graduate Studies. Interdisciplinary Anatomy/Neuroscience degrees are also offered through the Neuroscience Graduate Programme. Medical graduates wishing to take advanced training in neuroanatomy, gross anatomy, developmental anatomy or histology should consult the Head of the Department. (For details of classes see Faculty of Graduate Studies Calendar.) It is also possible to take a combined MD/PhD programme.

5. Classes

Dentistry Students

Gross Anatomy/Neuroanatomy: This class is offered to first-year students. It presents an integrated description of the anatomical organization of the central and peripheral nervous systems, and the gross anatomy of the head and neck, thorax and abdomen. Lectures, laboratories and dissections are used with special attention given to oral and dental structures.

Histology: This class is offered to first-year Dental students. The class covers the structure of tissues and organs of the body with emphasis on oral structures.

The Anatomy & Neurobiology Department is also involved in the first year Growth and Development course, teaching the embryology component.

Health Professions Students

General basic lecture classes in gross anatomy, microanatomy and neuroanatomy are offered to meet the needs of students in nursing and special health education (1010.03), and recreation, physical and health education, kinesiology and dental hygiene (1020.03). A problem-based learning course in Human Anatomy is offered to Pharmacy students (1040.03). A lecture and laboratory class in head and neck anatomy (1030.03) is also offered to Dental Hygiene students. In addition, special lecture and laboratory classes in gross anatomy (2170X/Y.06), microanatomy (2160.03) and neuroanatomy (2100.03) are offered to Physiotherapy and Occupational Therapy students.

The following classes are open with a limited enrolment to Arts and Science students:

- Neuroanatomy/Biology 3440.03/Neuroscience 3440.03
- Human Histology/Biology 3430.03
- Comparative Vertebrate Histology/Biology 3421.03
- Human Gross Anatomy/Biology 3435.06
- Basic Human Anatomy 1010.03/1020.03

C. Biochemistry

Location: 9th Floor, Tupper Building
Telephone: (902) 494-2480

The Carnegie and Rockefeller Professor and Head of Department

Palmer, F.B., Acting Head

Professors

Breckenridge, W.C.
Dolphin, P.J.
Doolittle, W.F.
Gray, M.W.
Helleiner, C.W. (post-retirement)
Lazier, C.B.
Palmer, F.B.
Russell, D.W. (post-retirement)
Singer, R.A.
Wallace, C.J.A.

Associate Professors

Byers, D.M. (major appointment in Pediatrics)
Cook, H.W. (major appointment in Pediatrics)
Dobson, M.
Liu, P.X.-Q.
Ridgway, N.
Ro, H.-S.

Assistant Professors

Bearne, S.
McLeod, R.
McMaster, C.
Too, C.

Lecturers

Riddell, D.C. (major appointment in Pathology)

1. Course of Study

First-Year Medicine

The practice of medicine requires an understanding of the chemistry underlying the maintenance and reproduction of human beings and their disease-causing parasites. Biochemistry provides the foundation on which physiology, pharmacology and much of pathology rest. The study of Biochemistry introduces students to the basic principles important to a practicing doctor and shows where we are in the continuing effort to understand in detail the chemical basis of life. The principles of Biochemistry will be introduced through the study of selected cases, in small group tutorials and independent learning.

2. Electives

The Department offers two types of elective programmes to limited numbers of medical students. (1) small research projects under the direction of staff members and (2) investigations in some depth of student's choice, utilizing the resources of the Kellogg Health Sciences Library. Students wishing to take an elective in Biochemistry should consult Dr. Palmer so that a suitable programme may be selected.

3. Classes

Classes for Dentistry Students

Biochemistry for first-year Dental students DENT 1112.01R.

Nutrition and Biochemistry DEHY 2809.03: (taught in collaboration with the School of Nursing for Dental Hygiene students).

Classes for Science Students

Details of the following classes will be found in the Calendar of the College of Arts and Science.

- BIOC 2020.03A: Cell Biology
- BIOC 2030.03A or B: Genetics and Molecular Biology
- BIOC 2200.03B: Introductory Biochemistry
- BIOC 3200.03A: Biological Chemistry
- BIOC 3300.03B: Intermediary Metabolism
- BIOC 3400.03B: Nucleic Acid Biochemistry and Molecular Biology
- BIOC 4301.03B: Biochemical Communication
- BIOC 4302.03A: Biochemistry of Lipids
- BIOC 4304.03B: Integration and Control of Metabolism
- BIOC 4403.03B: Genes and Genomes
- BIOC 4404.03A: Gene Expression
- BIOC 4501.03A: Medical Biotechnology I
- BIOC 4603.03A: Advanced Laboratory in Biochemical Techniques
- BIOC 4604.03A: Research Project I
- BIOC 4605.03B: Research Project II
- BIOC 4700.03A: Proteins
- BIOC 4701.03B: Enzymes
- BIOC 4804.03A: Introduction to Pharmacology I
- BIOC 4805.03B: Introduction to Pharmacology II
- BIOC 4811.03A: Biochemistry of Clinical Disorders I
- BIOC 4812.03B: Biochemistry of Clinical Disorders II

Classes for Health Professions Students

- BIOC 1420.03B: Introduction to Biochemistry for Bachelor of Nursing Students.

4. Graduate Studies

The Department offers suitably qualified students an opportunity to study for the degree of Master of Science and Doctor of Philosophy. A complete description of these programmes, as well as of graduate classes, is in the Calendar of the Faculty of Graduate Studies.

D. Community Health and Epidemiology

Location: Clinical Research Centre
5849 University Avenue
Halifax, Nova Scotia
Telephone: (902) 494-1547
Fax: (902) 494-1590

Professors Emeriti

Stewart, C.B.
Irwin, A.C.

The Eddy Professor and Head of Department

MacLean, D.R.

Professors

Brown, M.G.
Cohen, F.G. (cross appointment in School for Resource and Environmental Studies)
Cohen, M. (cross appointment in Oral Biology, Faculty of Dentistry)
Leighton, A.H. (cross appointment in Psychiatry)
MacLean, L. (cross appointment in School of Business Administration)
Murray, T.J. (cross appointment in Medicine)
Pádmós, A.
Stewart, M.J.
Stewart, R. (major appointment in Division of Emergency Medicine)
White, F. (major appointment with PAN American Health Organization)

Associate Professors

Flowerdew, G.
Joffres, M.
Kephart, G.
Langille, D.B.
Makrides, L. (cross appointment in Physiology & Biophysics and Director of School of Physiotherapy)
Murphy, J. (cross appointment in Psychiatry)
Poulin, C.
Scott, K.E.
Sketris, I. (cross appointment in College of Pharmacy and School of Health Services Administration)
Tan, M.

Assistant Professors

Baikie, M. (major appointment with NS Department of Health)
Burge, F.
Cox, J. (joint appointment in Medicine)
Curtis, L.
Davidson, K. (major appointment with Psychology Department, University of Alabama)
Dodds, L. (cross appointment in Obstetrics and Gynecology)
Farquharson, J. (major appointment with Heart Health Nova Scotia)
Gross, M. (cross appointment in Surgery)
Guernsey, J.R. (cross appointment in School of Resource and Environmental Studies)
Hicks, V. (Health Economics Consultant)
Hood, R. (major appointment with School of Health and Human Performance)
Johnston, G. (cross appointment in Health Services Administration)
King, D. (major appointment with Worker's Compensation Board of North West Territories)
Kirkland, S.
Kozousek, V. (cross appointment in Ophthalmology)
Langley, J.M. (cross appointment in Paediatrics)
LeBlanc, J.C. (cross appointment in Paediatrics)
MacPherson, K.
McIntyre, L.L. (cross appointment in Faculty of Health Professions)
Mitchell, T.
Rockwood, K. (cross appointment in Medicine)
Schlech, W.F. (cross appointment in Medicine)
Scott, J.W. (major appointment in Pediatrics; major appointment with N.S. Department of Health and Fitness)
Sweet, L. (major appointment with PEI Dept. of Health and Social Services)
Townsend, E.
VanZanten, S. (cross appointment in Medicine)
Veugelers, P.
Weerasinghe, S.

Zahner, G. (major appointment with Yale University Medical School)

Lecturers

Anderson, D.R. (cross appointment in Pathology)
Braunstein, J. (major appointment with Priorities and Planning Secretariat)
Prentice, J. (major appointment with Maritime Tel & Tel)

1. Departmental Teaching Objectives

The teaching programme of this department is designed to meet the following objectives:

1. To help the student develop a knowledge and understanding of the methods required for the primary, secondary, and tertiary prevention of disease.
2. To help the student learn about health resources in the community and how these may be most effectively utilized by physicians.
3. To assist the student in acquiring a basic understanding and knowledge of health data acquisition and its analysis and interpretation.
4. To assist the students in acquiring a basic knowledge of epidemiological approaches to problems of maintaining health and preventing disease, to assist students to recognize that health or disease results from interaction between the host, the agents of disease, and the environment.

2. First and Second Year Medicine

The Department participates in the undergraduate education programme by active involvement of Faculty members and in managing the Population Health Unit, the Clinical Epidemiology Unit, by providing student electives, positions in the BSc Medicine programme, and by individual consultations with students.

3. Fourth Year Medicine

This course features a series of lectures, case studies and discussions dealing with the Health Care System in Canada, current issues and future directions.

4. MSc Programme in Community Health and Epidemiology

This MSc programme focuses on knowledge, analytical skills and formal evaluative methods used in assessing community health service needs and in designing, implementing and evaluating disease prevention and health promotion programmes. The typical MSc CH&E student has had undergraduate training in a health profession or related discipline and has worked in the health sector. Admission standards are those of Dalhousie University's Faculty of Graduate Studies.

An honours baccalaureate degree or an M.D. degree from a recognized university is ordinarily required. Enrolment is limited. Some part-time students are accepted. Applicants must meet English Language Competency and Quantitative Skills requirements. Details of this programme are found in "Dalhousie University, Graduate Studies Calendar".

5. Community Medicine

Dalhousie University has an Affiliate Agreement in Community Medicine with the University of Toronto. A resident in Community Medicine must be accepted both in the University of Toronto and Dalhousie University programmes to benefit from this inter-university programme. A senior resident may undertake one year of training at Dalhousie, consisting of field assignments in Public Health, Health Planning, Occupational Health, Geriatric Health, Cancer Epidemiology, Environmental Health and Alcohol and Drug Dependency.

E. Emergency Medicine

Location: 351 Bethune, VG Site
QEII Health Sciences Centre
1278 Tower Road
Halifax NS B3H 2Y9
Telephone: (902) 494-6596
Fax: (902) 494-1625
E-mail: emergency.medicine@dal.ca

Director

Sinclair, D.E., MD, FRCP, CCFP(EM)

Professor

Stewart, R., cross appointment in CHE, Anaesthesia, Physiotherapy

Associate Professors

Beveridge, R., cross appointment in Internal Medicine

Ducharme, J., Residency Director, RCPS

Grover, D., cross appointment in Pediatrics

Murphy, M., cross appointment in Anaesthesia

Sinclair, D.

Thompson, J.

Assistant Professors

Bullock, G. - Undergraduate Coordinator, cross appointment in Medical Education

Carr, B., cross appointment in Family Medicine

Kovacs, G., cross appointment in Medical Education

LeBlanc, C., Residency Director, CCFP(EM)

McLeod, B.

Ross, J., cross appointment in Medical Education

Taylor, B., cross appointment in Pediatrics

Wren, P., cross appointment in Pediatrics

Lecturers

Ackroyd, S.

Allen, D.

Blake, K., cross appointment in Pediatrics

Bolton, S.

Cain, E.

Cajee, I.

Campbell, S.

Clark, G.

Cote, R.

Croskerry, P.

Currie, T.

Davidson, R. B.

Dingle, M.

Inkpen, T.

Keith, K.

Kerr, S.

McCulloch, D., cross appointment in Pediatrics

Merchant, N.

Petrie, D.

Postuma, P.

Rombaut, A.

Smith, W.

Taian, J.

Tallon, J.

Vaillancourt, C.

Watson, M.L.

Weatherhead, D.

Webster, S., cross appointment in Pediatrics

Wu, K.

Young, N.

Clinical Instructors

Blandford, A.

Huntaman, J.

Leger, R.

Levesque, C.

Meagher, J.M.

O'Hanley, P.

Sigsworth, W.

Smith, L.

Findlater, J.

Walsh, P.

1. Emergency Medicine

The primary objective of Emergency Medicine is to ensure medical students are introduced to the many facets of Emergency Medicine and its role in the delivery of health care. The field of Emergency Medicine is an exciting one. Physicians practicing in this area are continually exposed to a wide variety of clinical disease and injury. Severity of presentation is also tremendously variable, requiring prioritization and the ability to rapidly judge how ill or injured patients are: a physician may be seeing a small child with a fever one minutes, then be intubating a patient with acute respiratory distress the next.

2. First- and Second-Year Medicine

Faculty members participate each year in the COPS programme. Number of second year selective positions at the QEII HSC is approximately 15.

3. COPS Clerkship

During orientation a three day Skills and Procedures Course is coordinated along with a two-day ACLS course for all students. Four positions per month/rotation are available at the QEII HSC site, and two or three positions per month at SJRH.

4. Electives

Electives can be arranged in Emergency Medicine. Special requests are considered for all levels of medical training.

5. Residency Training

Emergency Medicine offers two residency training programs; the five year Royal College of Physicians and Surgeons of Canada and one year College of Family Physicians of Canada which are based in Halifax and Saint John. Both of these programs provide residents with solid technical skills. Integrated core teaching sessions are held weekly.

The College of Family Physicians of Canada offers one year of specialty training in Emergency Medicine through its CCFP(EM) Residency. Any physician earning Certification in Family Medicine (CCFP) is eligible to apply. Upon successful completion of the residency program and satisfactory results on oral and written examinations, candidates are conferred with a Certificate of Special Competency in Emergency Medicine [CCFP(EM)].
PGY3 Year: Five Adult Emergency rotations, Pediatric Emergency, Anaesthesia, two ICU (Med/Surg) rotations, CCU, Plastics, Orthopaedics, elective.

The Royal College program is able to provide protected time throughout for original research as well as more in-depth exposure to topics such as prehospital care and administrative management.

Year 1

Two Medicine rotations, Psychiatry, Emergency Medicine, two Surgery rotations, Orthopaedics, Plastics and while taking four months of Community Health & Epidemiology and Biostatistics courses, work 50% during first month in Emergency Medicine followed by Anesthesia, Pediatric Emergency/Pediatric Anesthesia.

Year 2

Three Combined ICU rotations, Obstetrics and Gynecology, two Pediatric Emergency rotations, two Emergency Medicine rotations, two CCU rotations, two Neurosciences rotations (Neuro ICU, Neurology Consults, Neurosurgery).

Year 3

Prehospital Core Rotation (with follow-up of ongoing project over next 5 periods), Research Project Month, four Emergency Medicine rotations, two Pediatric ICU rotations, Elective, Medical Education Core (ongoing over next five periods), Plastics, Internal Medicine Consults

Year 4

5th year subspecialty or Masters Course Administration (with project to follow for 5-6 periods), Research Month, Toxicology, four Emergency Medicine / Research rotations, two Trauma rotations, Elective, Pediatric Emergency Medicine

Year 5

Two Emergency Medicine / Research rotations, eight rotations of Dalhousie Courses while doing 1-2 emergency shifts/week, Emergency Medicine, Pediatric Emergency Medicine.

Year 4

If not doing subspecialty or Masters Program Administration core rotation (with follow-up of ongoing project over next 4 periods), Research Month, Toxicology, four Emergency Medicine rotations, two Trauma rotations, Surgery Consults, Pediatric Emergency Medicine.

Year 5

If not doing subspecialty or Masters program

Research, two Emergency Medicine / Research rotations, three Elective rotations (grouped block to allow theme for electives, needs pre-approval from director), Emergency Medicine, Pediatric Emergency Medicine, two Elective rotations (again to be in association with next period), Emergency Medicine, Research.

Suggested Textbooks:

Emergency Medicine A Comprehensive Study Guide, JE Tintinalli, E Ruiz, RL Krome
Emergency Medicine Concepts and Clinical Practice, Rosen, Barkin et al

6. Continuing Medical Education

A number of the Faculty participate in the planning of CME for Dalhousie CME short courses as well as presenting lectures/courses internationally and nationally which are offered by the Canadian Association of Emergency Physicians.

F. Department of Family Medicine

Location: Abbie J. Lane Building, Eighth Floor
QE II HSC
Telephone: (902) 473-4747
Fax: (902) 473-4760

Professor Emeritus
Still, H.C.

Head of Department
MacLachlan, R.

Professors
Gass, D.A.
Cameron, I.A.
MacLachlan, R.

Associate Professors
Abbott, C. (major appointment in Medicine)
Brown, D.C.
Burge, F.
Cameron, S.
Cervin, C.
Cummings, I.
Hayes, V.
MacLean, C.
Maxwell, D.M.
Murray, T.J. (major appointment in Medicine)
Nixon, M.D.
Phillips, W.G.C.
Putnam, W.

Assistant Professors
Bell, M.L.
Boucher, F.G.
Brosky, G.
Cameron, S.
Johnson, W.
Keating, M.
Lea, R. (major appointment in Obstetrics/Gynecology)
Prime-Walker, B.
Sinclair, D.
Tatenichi, S.
Tingley, B.
Whelan, A.M. (major appointment in Pharmacy)
Wrixon, W. (major appointment in Obstetrics/Gynecology)

Lecturers
Armitage, M.
Banks, M.R.
Barry, T.
Bradley, W.
Brien, D.V.
Carr, B. (major appointment in Emergency Medicine)
Collins, A.
Curry, J. (major appointment in Surgery)
Davidson, B.
Duncan, M.
Fay, D.
Hart, S.
Johnson, W.L.

Keddy, J.
Kerr, P.
MacDonald, I.
Morgan, L.L.
Phillips, E.V.
Reid, D.
Ruparella, H.
Smith, J.A.
Smith, S.
Sommers, J.G.

Clinical Instructors

Archibald, G.	Atkinson, S.
Aucoin, M.	Barry, C.
Barry, T.	Beatty, G.L.
Braun, R.	Brewer, J.
Buhariwalla, F.	Burditt, A.M.
Carlos, M.	Chesser, G.
Chow, C.	Clarke, B.
Conrod, M.	Cooper-Rosen, E.
Craswell, D.	Critchley, C.
Cudmore, D.	Davey, C.
D'Arcy, D.	Donald, G.
Douglas, S.	Duffy, C.
Elliott, C.	Ernest, G.
Fitch, W.	Fitzgerald, J.
Forbes, R.	Foley, A.
Fraser, J.	Fraser, P.K.
Fraser, Z.	Gagnon, L.
Genge, R.	Gold, E.
Gracie, G.	Hall-Losier, S.
Hansen, P.	Harding, R.
Harper, W.	Holmes, E.B.
Jayabarathan, A.	Johnson, B.
Johnson, M.	Kazimirski, J.C.
Kazimirski, M.	Kerr, P.
Keyes, E.	Kirkpatrick, J.
Klynstra, S.	Landry, D.
Langley, S.	Laughlin, T.
Leahey, S.	Lewis, V.
Lister, N.	MacDonald, D.
MacDonald, I.	MacDonald, J.W.
MacDougall, S.	MacKean, P.
MacKillop, J.	Mackin, M.
Marshall, C.	Martin, B.
Massarelli, E.	Matheson, G.
McIntosh, M.	McLaughlin, W.
McNab, J.	Moise, E.
Moyse, C.	Murphy, P.
Murray, K.	Murray, M.
Murray, R.	Northrop, S.
O'Neil, L.	Otiver, R.
Perley, M.	Quigley, M.P.
Ross, D.	Ross, V.
Slipp, F.E.	Smith, M.
Smith, P.	Smith, V.
Sommers, J.	Spencer, P.
Steeves, A.	Telfer, C.
Thomas, G.R.	Veinot-Nash, J.
Verma, B.	Vlahos-Harvey, S.
Watson, M.L.	Whynott, L.
Woodford, T.	Zigante, N.

Preceptors

Boulay, R.	Carruthers, G.
Collins, A.	Davidson, B.
Eros, E.	Gunn, R.
Johnston, M.	MacNeil, D.
McCann, B.	Mishra, H.
Quintal, B.	Ross, P.

1. Family Medicine

The primary objective of this Department is to ensure that medical students have exposure to Family Medicine including experience in office practice, home visits, community-based care and in the long term follow-up of patients. The main objective of the residency training programme is to assist physicians planning a career in Family Medicine attain the necessary skills and knowledge and

foster the growth of a helping attitude. A number of members of Faculty from different departments participate in the activities of the Department.

2. First- and Second-Year Medicine

The Department participates in the COPS programme and in the Interviewing Skills, Clinical Methods and Life Cycle components of the Patient-Doctor unit.

3. COPS Clerkship

All students have a one month core clinical clerkship in Family Medicine. They spend the first two days of the four week rotation in the Family Medicine Centre, attending seminars and preparing for their clinical experience in two Maritime practices. Each student is assigned two preceptors who are responsible for the schedules of the clerks while with them in their practices. After the community practice experience, the clerks return to the Family Medicine Centre for a one day follow-up and evaluation of the rotation. During this time each clerk is also expected to report on a clinical project topic, a geriatric project topic; as well as varied other assignments. Students participate in four weeks Family Medicine selective; as part of the selective they are encouraged to pursue an area of special interest related to family medicine.

Evaluation is by preceptors assessment, a practice management project and other assignments.

4. Electives

Individual electives in Family Medicine are offered with respect to the students' interests and abilities in all four years.

5. Continuing Medical Education

The faculty contribute toward several Continuing Medical Education short classes either in planning or presentation, as well as travelling to community hospitals in the Maritime Provinces and presenting specific topics relating to Family Medicine.

6. Residency Training

The Department of Family Medicine offers a two-year integrated programme. The aim is to graduate family physicians who are prepared to meet the changing health needs of the community in both ambulatory and hospital settings. The programme is accredited by the College of Family Physicians of Canada and candidates who complete this programme are eligible to sit the certification examinations of the College of Family Physicians of Canada. The residency programme in Emergency Medicine is also available as an extension of the two-year Family Medicine programme and is also an accredited programme of the College of Family Physicians of Canada.

The Family Medicine programme is designed to be as family practice oriented as possible by addressing the needs of physicians who intend to practice in rural and urban communities which have reasonable access to specialty services. The residents are assigned to services in the smaller Maritime teaching hospitals where responsibility and one-on-one teaching is readily available. The residents take part in both in-hospital and office based family medicine rotations and will be responsible for the care of their patients from office to hospital, to home, and back to office visits.

The emphasis of the programme is on primary and secondary care appropriate to family practice trainees. The first year emphasizes hospital based learning experience while the second year focuses on continuing comprehensive ambulatory care through family medicine teaching practices.

Suggested Textbooks:

- *Family Medicine: A Guide for Practitioners of the Art, 2nd edition, Rice, Shires, Hennen, Rakel and Conn*
- *Family Practice, Medalie*
- *Family Medicine - Principles and Applications, Hodgkin*
- *Towards Earlier Diagnosis, McWhinney*
- *Introduction to Family Medicine; The Business of Medical Practice, A Canadian Handbook, duBois*

Suggested Journals:

- *Canadian Family Physician*
- *The Journal of Family Practice*

G. Medicine

Location: Bethune Building, Fourth Floor
QEII Health Sciences Centre
Halifax, NS
Telephone: (902) 473-2379

The Carnegie and Rockefeller Professor and Head of Department
Cowden, E.A.

Professor Emeritus
Woodbury, J.F.L.

Professors

Badley, B.W.D.
Carr, R.A.
Chandler, B.M.
Fernandez, L.A.V.
Fox, R.A.
Gardner, M.J.
Gray, J.D.
Handa, S.P. (Saint John)
Hanly, J.G.
Hirsch, D.
Jindal, K.K.
Johnstone, D.E.
Kirby, R.L.
Khanna, V.N. (Saint John)
Klassen, G.A.
Langley, G.R.
MacDonald, N. (Dean, Faculty of Medicine) (effective July 1, 1999)
MacLeod, A.J.
MacSween, J.M.
Marrie, T.J.
Murray, T.J.
Padmos, A.
Powell, C.
Purdy, R.A.
Rittmaster, R.S.
Robertson, H.A. (major appointment in Pharmacology)
Rockwood, K.
Ruedy, J. (Dean, Faculty of Medicine)
Sallsbury, S. (major appointment in Pediatrics)
Schlech, W.
Tonks, R.S.
Wall, J.
Williams, C.N.
York, S.B.

Associate Professors

Abbott, E.C.
Anderson, D.R.
Benstead, T.
Bowie, D.M.
Corbett, B.N.
Forward, K.R. (major appointment in Microbiology and Immunology)
Foster, C.J.
Givner, M. (major appointment in Pathology)
Gray, J.M.
Gregor, R.D.
Harrison, E.R.
Haase, D.A.
Hayne, O.A.
Higgins, L. (Saint John)
Hoffman, P.S. (major appointment in Microbiology)
Holland, J.G. (major appointment in Physiology and Biophysics)
Horacek, B.M. (major appointment in Physiology and Biophysics)
Johnston, B.L.
Josephson, B.
Kella, C.M.
Kiberd, B.A.
Kollpollai, C.J.
Klotz, J.
Leddin, D.J.
MacCormick, R.
Mann, O.E.
Maxner, C.E.

McCormick, C.W.
Miller, R.A.W.
Moorsom, D.
Murray, A.H.
O'Brien, B.D.
O'Neill, B.J.
Patil, J.
Peterson, T.
Phillips, S.
Poliak, P.T.
Rae, J.R.
Reid, E.L.
Robinson, K.S.
Rocker, G.
Rowden, G. (major appointment in Pathology)
Rowe, R.C.
Sadler, R.M.
Sapp, J.L.
Shlossberg, A.H.
Singer, R.A. (major appointment in Biochemistry)
Skillings, J.R.
Slyter, K. (Adjunct)
Staples, E.
Szuler, I.
Tanton, R.T.
Turnbull, G.K.
VanZanten, S.J.
West, K.A.
West, M.L.

Assistant Professors

Ahmad, S.
Bailey, P. (Saint John)
Basta, M.
Bata, I.
Beaudin, D.J. (Saint John)
Bedwell, S.F.
Beveridge, R.C. (Saint John)
Bewick, D. (Saint John)
Borzecki, A.
Carver, D.
Clase, C.
Cockeram, A.W. (Saint John)
Cookey, B.J.
Couban, S.
Cox, J.L.
Crofts, P.A.
Crowell, R.
Darvesh, S.
Davidson, R. (Major appt. Microbiology & Immunology)
Dhawan, P.
Dipchand, C.
Dornan, J.M. (Saint John)
Emenau, P.L. (Saint John)
Ethars, K.
Fine, A. (Major in Physiology/Biophysics)
Finlayson, L.A.
Forrest, D.
Gallant, G.J.
Ginther, D.G.
Gordon, J.
Grant, E. (Saint John)
Grant, I.
Guy, F.C.
Hernandez, P.
Howlett, J.
Ing, V.
Jarrett, P.G. (Saint John)
Joshi, P.C. (Saint John)
Joyce, B.M.
Keeling, D.R. (Saint John)
King, D.
Kirby, S.
Lodge, R. (Saint John)
Love, J.
MacDonald, N.
MacDonald, R.G. (Saint John)

MacKnight, C.
Macneil, A.R.
Malatjalian, D.A. (major appointment in Pathology)
Mallery, L.
McClone, J.M. (major appointment in Psychology)
McParland, C.P.
Michael, R.T.
Morgunov, N. (major appointment in Physiology and Biophysics)
Morrison, D.L.
Morrison, N.
Mosher, D.
Murray, S.J.
Patrick, W.D.
Pyesmany, A. (major appointment in Paediatrics)
Rajaraman, R.
Reardon, M.
Sangalang, V.
Sheridan, W.
Simpson, D.
Sohi, P. (Saint John)
Sutton, E.
Teskey, R.J.
Title, L.M.
Touchie, C.
Ur, E.
White, D.
Workman, S.
Yeung, P.K. (major appointment in Pharmacy)

Lecturers

Acott, P. (major appointment in Pediatrics)
Barnard, D.R. (major appointment in Paediatrics)
Bessoudo, R. (Saint John)
Bhan, V.
Bishop, G.W. (Saint John)
Burnell, M.J. (Saint John)
Dolan, S.
Douglas, J. (Saint John)
Foyle, A. (major appointment in Pathology)
Haldane, D.J.
Khaliq-Kareem, M.
Lang, B.A. (major appointment in Paediatrics)
Loane, T.D. (Saint John)
Lodge, R. (Saint John)
MacDonald, N.
MacDougall, A.D. (Saint John)
MacLean, G.L. (Saint John)
MacPherson, K.M.
Mahar, R.K.
Majaess, G.G.
Manning, D.J.
Marr, D. (Saint John)
Morgunov, N. (major appointment in Physiology & Biophysics)
Paddock, V.
Raju, M.K. (Saint John)
Reid, P.H. (Saint John)
Sadowska, E. (Saint John)
Sawhney, R.P.S.
Tremaine, R.D.L.
Walsh, N.G.
Wilson, D.
Zayed, E. (major appointment in Pathology)

Instructor

Smith, J.

1. Academic Programmes

The Department of Medicine is located at the Queen Elizabeth II Health Sciences Centre, Halifax, N.S. And the Saint John Regional Hospital, Saint John, N.B.

Clinical rotations including ambulatory care in the Queen Elizabeth II Health Sciences Centre are undertaken at all sites including the Victoria General, Nova Scotia Cancer Centre, Nova Scotia Rehabilitation Centre, New Halifax Infirmary and Abbie J. Lane Memorial.

2. Academic Courses

First Year Medicine

1. **Introduction to interviewing, pathophysiology and clinical skills:** The Department provides a bedside teaching class to first-year students, one morning (3 hours) per week for most of the academic year. Several introductory sessions are concerned with the approach to and interviewing of patients. Members of the Departments of Internal Medicine and Family Medicine and Psychiatry participate in this component. The class is concerned with the application of physiological principles to patient problems and general clinical skills. Students work in small groups.
2. **System class teaching:** Through its divisions of Dermatology, Geriatrics, Neurology, Respiriology, Endocrinology, Cardiology, Gastroenterology, Hematology-Oncology, Infectious Disease, Nephrology, Rheumatology, General Medicine, Physical Medicine and Rehabilitation, the Department participates in the corresponding interdisciplinary class teaching programme and basic science-clinical correlative teaching sessions.
3. **Electives:** The Department offers student electives in several areas.

Second-Year Medicine

1. **Clinical skills medicine:** The Department provides this bedside teaching tutorial one morning a week (3 hours) throughout the academic year. Students learn clinical skills and the pathophysiology of symptoms and signs working in groups of four, by examining patients in the clinical teaching units of QEII Health Sciences Centre. This tutorial is ordinarily taught through a systems approach, the last block being general medicine to consolidate the student's examination techniques. Recommended texts: Harvey, *The Principles and Practice of Medicine*; Bates, *A Guide to Physical Examination*.
2. **Electives:** The Department offers elective opportunities in several areas.

Third and Fourth-Year Medicine

a) Core Clerkship:

The clinical clerkship is an 88-week continuum of which Internal Medicine is but one component. The core internal medicine programs will consist of eight sequential weeks of full time Internal Medicine Clinical care experience. The sites for this teaching will be the New Halifax Infirmiry or Victoria General sites of the Queen Elizabeth II Health Sciences Centre. This portion of the program will consist of two distinct four-week blocks with separate preceptors. The student will function as a junior member of house staff with responsibilities for inpatients (and occasionally a small component of outpatients) care. This experience will generally consist of two four-week blocks on General Medicine Services although periodically some students will have one four-week block assigned to an appropriate medicine sub-specialty service. Students will assess patients in Inpatient environments to learn history and physical examination skills. This performance will be reviewed by more senior members of the clinical care team. This involves a mature commitment to continuous patient care including on-call responsibilities involving staying within the health care facility for a 24-hour continuous time block.

Students are expected to attend and participate in ward rounds to improve skills in clinical assessment, usage of diagnostics and application of therapeutics. Aside from ward rounds and associated activities, students are expected to attend other educational venues such as Medical Grand Rounds. Due to the lack of Dermatology and Geriatric exposure on the inpatient services, independent learning events are held weekly (on Tuesdays) hosted by these clinical care units.

A component of the evaluation process for the student includes an "In Training Evaluation Report" (ITER) which is to be filled out at the end of each four-week block by the student's preceptor. It is expected that in formulating this evaluation the preceptor will obtain input from the more senior house staff working with the student as well as the relevant nursing staff. The preceptor will provide the completed ITER and review this with the student at the end of their four-week block. It is also expected that each student will have a witnessed history and physical exam during each block

to assess their proficiency in clinical skills. Students are also expected to attend all mandatory educational events (tutorials, Dermatology and Geriatric half days) and therefore students' presence is monitored. Failure to attend will place the student in academic jeopardy.

Recommended core texts for the Internal Medicine component of the clerkship are "The Principles and Practice of Medicine" by Harvey et al supplemented by some more detailed texts such as Harrison's "Principles of Internal Medicine" or Cecil's "Textbook of Medicine" and/or assigned literature articles by the preceptor.

b) Clerkship Selectives in Internal Medicine:

Each student must complete a four-week selective experience in a rotation based in Internal Medicine or one of its subspecialties. The menu of available selectives can be found in the COPS Clerkship Manual provided to the student by the Faculty of Medicine. Selectives are provided at all teaching sites within the Queen Elizabeth II Health Sciences Centre as well as the affiliated teaching hospital the Saint John Regional Hospital. The student should expect in-house call duty to represent a component of the selective experience.

Evaluation consists of the completion of an In-Training Evaluation Report by the preceptor at the end of the four weeks. This evaluation should be reviewed with the student prior to their leaving the service. Recommended reading will be provided by the preceptor of the selective.

c) Clerkship Electives in Internal Medicine:

Students may choose to do electives within the Department of Medicine. Guidelines are provided in the COPS Clerkship Manual regarding arranging an elective experience. It may be that the educational experience defined by the Elective preceptor could involve an on-call experience.

Evaluation consists of completion of an In Training Evaluation Report by the preceptor which will be reviewed with the student at the completion of the elective. Recommended reading guidance will be provided by the preceptor of the elective.

3. Residency Training

The Department provides a fully approved Internal Medicine training programme and fully approved specialty training in Cardiology, Dermatology, Endocrinology, Gastroenterology, Hematology, Infectious Diseases, Microbiology, Nephrology, Neurology, Physical Medicine and Rehabilitation, and Rheumatology. These programmes are based at the various sites of the QEII Health Sciences Centre.

1. **Internal Medicine:** The core programme in internal medicine is a three-year programme in which the resident gains experience in general internal medicine, critical care and most of the sub-specialties of internal medicine. The general internal medicine experience includes two large Clinical Teaching Units with pyramidal tiers of housestaff. There are significant ambulatory care rotations from the second year onwards. The third year of training includes more consultation experiences as well as a community-based experience. Successful completion of the core programme in internal medicine is a prerequisite to sub-specialty programmes.
2. **Cardiology:** This programme is based at the New Halifax Infirmiry with rotations to the Izaak Walton Killam - Grace Health Centre.
3. **Dermatology:** This programme is based at the Victoria General Site with rotations at the Halifax Infirmiry Site and the Izaak Walton Killam - Grace Health Centre.
4. **Endocrinology:** This programme is based at the Victoria General Site.
5. **Gastroenterology:** This programme is based at the Victoria General Site and the Halifax Infirmiry Site with elective rotations in Pathology and Radiology or to the Izaak Walton Killam - Grace Health Sciences Centre.
6. **General Internal Medicine:** This includes a fourth year of training which is specifically tailored to career needs.
7. **Geriatric Medicine:** This programme is based in the Veteran's Memorial Building.
8. **Hematology:** This programme is based at the Victoria General Site with rotations to the Izaak Walton Killam - Grace Health Sciences Centre and the Hematology Laboratories.

9. **Infectious Diseases:** This programme is based at the Victoria General Site.
10. **Microbiology:** This programme is based at the Victoria General site.
11. **Infectious Diseases/Microbiology:** This is a combined programme based at the Victoria General Site.
12. **Neurology:** This programme is based at the Victoria General Site.
13. **Physical Medicine and Rehabilitation:** This programme is based at the Nova Scotia Rehabilitation Centre, with rotations available in appropriate medical and surgical disciplines.
14. **Rheumatology:** This programme is based in the Victoria General Site.

H. Microbiology and Immunology

Location: Sir Charles Tupper Medical Building
Telephone: (902) 494-3587
Fac: (902) 494-5125

Professor and Head of Department

Johnston, G.C.

Professors

Anderson, R.
 Hoffman, P.S. (joint appointment in Medicine)
 Issekutz, T. (joint appointment in Pediatrics)
 Johnston, G.C.
 Lee, S.H.S.
 Lee, T. (joint appointment in Surgery)
 Mahony, D.E.
 Stoltz, D.B.
 Stuttard, C.

Associate Professors

Bortolussi, R.A. (major appointment in Pediatrics)
 Carr, R.I. (joint appointment in Medicine)
 Duncan, R.
 Forward, K.R. (joint appointment in Pathology)
 Halperin, S.A. (major appointment in Pediatrics)
 Hoakin, D.W.
 Issekutz, A.C. (major appointment in Pediatrics)
 Lee, S.F. (joint appointment with Oral Biology)
 Marrie, T.J. (major appointment in Medicine)
 Marshall, J.S. (joint appointment in Pathology)
 Rajaraman, R. (joint appointment in Medicine)

Assistant Professors

Abdelhaleem, M. (major appointment in Pathology)
 Barnes, C.
 Bezanson, G.S.
 Carpenter, M.
 Davidson, R.
 Faulkner, G.T.
 Garduno, R. (joint appointment in Medicine)
 Haldane, D.J.M.
 Kennedy, W.A.
 Stednyk, A.W. (major appointment in Pediatrics)
 Touchie, C. (major appointment in Medicine)

Instructor

Murray, L.E.

1. Course of Study

First-Year Medicine

The Department of Pathology and the Department of Microbiology and Immunology participate in an eight-week unit (PIM Unit) in the COPS curriculum. The Unit is comprised of a series of lectures, case studies and laboratory sessions which address basic science issues underlying clinical situations encountered in these disciplines. An array of computer material is available to assist students in their progress through the unit.

Second-Year Medicine

Infectious disease problems form part of a systems-oriented curriculum throughout the year.

Third-Year Medicine

A series of lectures on clinical immunology issues is presented by the Department.

Residency Training

An integrated University residency training programme is given by the Department. It comprises four years in Medical Microbiology and meets the requirements of the Royal College of Physicians and Surgeons of Canada. Participating hospitals are the QEII Health Sciences Centre and the Izaak Walton Killam - Grace Health Centre for Children, Women and Families.

2. Graduate Studies

The MSc programme generally requires a minimum of two years to complete and comprises classes in microbiology and immunology and allied disciplines, and research work resulting in a written thesis.

The PhD programme is approximately three to five years duration and involves class work as for the MSc plus research of a high calibre culminating in a thesis.

Graduate programme streams in Immunology, Virology, Molecular Genetics and Microbial Pathogenesis are available to allow well-qualified students to concentrate their studies while acquiring general knowledge and understanding of major concepts in Microbiology and Immunology. Please consult the Graduate Studies calendar for list of classes offered.

An MD/PhD programme is also available.

Students should consult the Graduate Studies Section of this Calendar or the Graduate Studies Coordinator for a full description of these programmes.

3. Research Facilities

Members of the Department are housed in the Sir Charles Tupper Medical Building, the QEII Health Sciences Centre, the IWK-Grace Health Centre and the Dentistry Building. Research in both basic and clinical microbiology, immunology and related disciplines is carried out in laboratories at these locations.

4. Classes

Classes for Dental Students

First Year Microbiology: This class covers the general principles of medical bacteriology, virology, mycology, parasitology and immunology. Specific topics related to oral infectious diseases complete the class.

Classes for Science Students

The Department of Microbiology and Immunology offers a BSc Honours programme, a Combined Honours programme with the departments of Biochemistry and Biology, an Advanced Major, and provides a wide range of classes, listed below, dealing with various aspects of microbiology and immunology.

Students should consult the Undergraduate Calendar for a full description of these programmes and classes.

- MICR 2100.03: Introductory Microbiology and Immunology
- MICR 3033.03: Microbial Genetics
- MICR 3114.03: Virology
- MICR 3115.03: Immunology
- MICR 3118.03: Medical Bacteriology
- MICR 3024.03: Microscopy
- MICR 4026.03: The Mammalian Cell as a Microorganism
- MICR 4027.03: Molecular Mechanisms of Cancer
- MICR 4103.03: Infectious Diseases of Aquatic Organisms
- MICR 4114.03: Advanced Topics in Molecular and Medical Virology
- MICR 4115.03: Immunology of Host Resistance
- MICR 4118.03: Molecular Pathogenesis
- MICR 4301.03: Immunobiology
- MICR 4302.03: Molecular Immunology
- MICR 4303.03: Granulocytes and the Immune System
- MICR 4403.03: Genes and Genomes
- MICR 4404.03: Gene Expression
- MICR 4601.03: Laboratory Techniques in Molecular Biology I

- MICR 4602.03: Laboratory Techniques in Molecular Biology II
- MICR 4700.06: Directed Research Project
- MICR 4701.03/4702.03: Advanced Topics in Microbiology and Immunology
- MICR 4900.06: Honours Research and Thesis

Classes for Health Professions Students

MICR 1050.03: This class is designed for students in Pharmacy. It addresses some basic principles of microbial structure, physiology, and genetics in relation to microbial pathogenesis.

MICR 1100.03: This class is designed for nurses and other health professionals and deals with the major groups of microbial pathogens as well as theories of immunity, infectious disease prevention and community health.

MICR 1200.03: This class is designed for dental hygiene students and provides a survey of general microbiology as well as specific topics in oral microbiology and infectious diseases related to the oral cavity.

MICR 2020.03: This class in General Microbiology is designed for students in the School of Physiotherapy.

i. Obstetrics and Gynecology

Location: IWK-Grace Health Centre
University Avenue
Halifax, NS

Telephone: (902) 494-2455

Professor Emeritus
Tupper, W.R.C.

Professor and Head of Department
Young, D.C.

Professors
Allen, A.C. (major appointment in Pediatrics)
Baskett, T.F.
Graves, G.R.
Wilkinson, M.
Writer, M.D.R. (major appointment in Anesthesia)
Wrixon, W.

Associate Professors
Armson, A.
Farrell, S.A.
Grimshaw, R.
Higgins, L.M.
Ira, N.N.
Lea, R.H.
Moger, W. (major appointment in Physiology and Biophysics)
Parish, B.
Rees, E. (major appointment in Pediatrics)
Shlossberg, A. (major appointment in Medicine)
Shukla, R. (major appointment in Anaesthesia)
Stinson, D.L. (major appointment in Pediatrics)
Webster, R.D.
Wenning, J.
Whyte, R. (major appointment in Pediatrics)
Welch, P. (major appointment in Pediatrics)
Van den hof, M.
Zayid, I. (major appointment in Pathology)

Assistant Professors
Brand, A.
Corkum, T.P.
Craig, C.
Dodds, L.
Gill, G.
Landymore, K.
Loebenberg, R.
Lord, H.L.
Ludman, M. (major appointment in Pediatrics)
Maley, C.A.
Murphy, P. (major appointment in Physiology/Biophysics)
Pearce, P. (major appointment in Psychiatry)
Pehusa, E. (major appointment in Pediatrics)

Reardon, E.
Robinson, S. (major appointment in Medicine)
Sanderson, F.
Vincer, M. (major appointment in Pediatrics)

Lecturers
Andrade, E.M.
Delisle, I.
Zilbert, A.

Clinical Instructors

Brodie, G.
Caddick, R.
Christie, G.B.
Colford, D.
Connors, S.
Crumley, J.
Cudmore, D.W.
Gardner, A.
Good, H.G.
Henry, J.S.
King, L.
Kingston, M.B.
Knickle, D.A.
Landau, P.
MacKay, J.
Moore, T.
Morgan, D.S.
Saxon, R.

The objectives of the Department are to make available a basic core of knowledge in Obstetrics and Gynecology, and, at the same time, provide sufficient opportunity for self-education. The objectives are those laid out in the "core curriculum" developed by the association of Professors of Obstetrics and Gynecology.

The objectives indicate the minimum of knowledge, skills and behaviour patterns the student must attain prior to entering an internship/practice. These objectives are not meant to be all embracing. It is the responsibility of the students to identify their own priorities and to be sure they acquire the knowledge and skills defined in the objectives. The Department provides lectures, audio-visual aids, discussion groups and suggested reading material. In addition, students have an opportunity to be actively involved in patient assessment and care.

1. COPS Clerkship

At the beginning of their 3rd year the students enter an 88 week rotating clerkship schedule; 8 weeks spent doing obstetrics & gynecology (4 weeks in obstetrics, 4 weeks in gynecology). The students attend regularly scheduled seminar sessions during which the major problems encountered in obstetrics and gynecology are discussed. In addition they are required to complete a log of practical clinical skills in both obstetrics and gynecology. Students are part of the clinical health care team and receive first hand clinical experience in a variety of skills including pelvic examination and the conduct of normal labour and delivery. The location of both the obstetrics and gynecology rotation is the IWK-Grace Health Centre. Emergency coverage includes the new Halifax Infirmary at the Camp Hill Medical Centre, QEII Health Sciences Centre.

2. Electives

Most members of the Department are prepared to function as elective preceptors. The faculty may suggest elective topics, but it is preferable that the students develop their own electives.

3. Postgraduate Training in Obstetrics and Gynecology

Further training required to be a specialist in Obstetrics and Gynecology now involves five years of post-MD specialty training. This includes a PGYI year, which previously was known as the Rotating Internship. We have modified this year to suit our specialty requirements, however it basically involves rotations through the various major areas of Surgery and Medicine. This includes Obstetrics and Gynecology, Neonatology, Psychiatry, Pediatrics, Internal Medicine, General Surgery, Surgical Intensive Care, Emergency Medicine, and elective rotations. During the PGYI year trainees may receive part of their education at the IWK-Grace Health Centre and the QEII Health Sciences Centre in Halifax, Nova Scotia; The Nova Scotia Hospital in Dartmouth, Nova

Scotia; Saint John Regional Hospital, Saint John, New Brunswick; Moncton Hospital, Moncton, New Brunswick; The Everett Chalmers Hospital, Fredericton, New Brunswick

The remaining four years, PGYII through PGYV, involves two years of core Obstetrics and Gynecology, a year and a half of sub-specialty and electives, and the final six months as senior resident in Obstetrics and Gynecology. This programme is designed to meet the requirements of the Royal College of Physicians and Surgeons of Canada. Hospitals participating are the IWK-Grace Health Centre and the QEII Health Sciences Centre in Halifax, Nova Scotia, and the Saint John Regional Hospital, Saint John, New Brunswick.

A formal academic programme with pathology seminars, Grand Rounds, basic science seminars, Journal Clubs, and resident education seminars function throughout the academic year.

J. Ophthalmology

Location: Queen Elizabeth II Health Sciences Centre
1278 Tower Road
Halifax, NS B3H 2Y9
Telephone: (902) 473-4343

Professor Emeritus
MacRae, D.M.

Professor and Head of Department
LeBlanc, R.P.

Professors
Barnes, S.
Guernsey, D.
Newmann, P.
Ramsey, M.S.

Associate Professors
Chauhan, B.C.
Kozousek, V.
LaRoche, G.R.
O'Brien, D.B.
Rafuse, E.V.

Assistant Professors
Andrews, D.M.
Baldrige, W.B.
Dickinson, J.D.
Hoskin-Mott, A.E.
Humayan, M.
MacNeill, J.R.
Nicolela, M.
Orr, A.
Rafuse, P.E.
Read, R.M.
Robitaille, J.
Samad, A.
Seamone, C.
Tremblay, F.

Lecturers
Audain, V.P.
Beaton, J.W.
Dayal-Gosine, L.
De Becker, I.
Keating, D.M.
Kelly, M.
Maxner, C.E.
O'Brien, D.M.
Pretty, B.R.
Sapp, G.A.

1. Undergraduate Medical Training

Clinical clerks will spend a 2-week core rotation in ophthalmology. They will rotate through both adult and pediatric ophthalmology clinics, exposing them to the diagnosis and management of both emergency and chronic ophthalmic conditions. There are several didactic lectures, a computer-based learning module and an extensive audio-visual library.

Text: *Basic Ophthalmology for Medical Students and Primary Care Residents*

Electives are also available for second and fourth year students upon permission of the department.

2. Residency Training

An integrated University residency training programme is available in the Department, consisting of a PGY1 year followed by a four clinical year programme meeting the requirements of the Royal College of Physicians and Surgeons of Canada. During the PGY1 year, 2 months will be spent in the Department of Ophthalmology working with the clinical residents. All clinical activities will be carried out in the facilities of the QEII Health Sciences Centre and the IWK-Grace Hospitals.

K. Otolaryngology - Head and Neck Surgery

Location: 3rd Floor Dickson Centre, VG Site
QEII Health Science Centre
HALIFAX, NS
473-3483

IWK-Grace Health Sciences Centre
IWK Site, 1st Floor

Professor and Head of Department
Attia, E.L.

Associate Professor
Stach, B. (Audiology)

Assistant Professors
Clarke, K.D.
Cron, C.C.
Massoud, E.
Morris, S.
Nasser, J.
Prince, M. (Program Director)
Wali, M.N.
Walling, K.E.

Lecturers
Kirkpatrick, D. (Clinical Chief)

1. Course of Study

First Year Medicine

An introductory lecture addresses the wide scope of Otolaryngology. A three hour practical session in conjunction with the Department of Ophthalmology to review the equipment and techniques involved in the head and neck exam. Core material is presented through two cases in the Human Body Unit cases block where relevant anatomy, physiology and disease processes are reviewed. Complementary lectures and labs in relevant Gross and Micro Anatomy are provided.

Second Year Medicine

Continuation of core material is provided through 2 cases involved in the Brain and Behaviour Unit cases. Introduction in the basics and clinical use of Audiology is provided in a lab setting. Evaluation of ENT examination involving the head and neck will be included in the 2nd year of OSCE examination.

Third Year Medicine

The two weeks core rotation will provide an overview of the Otolaryngology Head and Neck field. The student will be re-introduced to the Otolaryngology physical examination, audiology, its applications and interpretation, operative procedures in Otolaryngology and various specialized clinics in Otolaryngology including the multidisciplinary Oncology Clinic and Pediatric Cleft Palate Clinic.

This arrangement will involve rotations between the QEII Health Sciences Centre adult care facility and the IWK Childrens' Hospital. Rotations within both the adult and pediatric settings will include primarily general otolaryngology problems. The rotation will also include operating room exposure.

In addition, three 3-hour blocks are presented throughout the year to discuss cases in Head and Neck Oncology, General and Pediatric Otolaryngology and Otolitic Vestibular problems.

Texts

- Deweese and Saudners, *Textbook of Otolaryngology*
- Adams, Boise and Paparella, *Boies' Fundamentals of Otolaryngology*
- F.E. Lucenta, *Essentials of Otolaryngology*
- Attia & Marshall, *Disorders of the Ear: Diagnosis and Management*

A selected reading list of current journal articles is distributed, computerized learning modules simulating real life situations involving common Otolaryngology problems are also available.

The main objective of this rotation is to provide the student the opportunity to become more familiar with the basic Otolaryngology examination and the recognition of normal from abnormal in the area of Otolaryngology, Head and Neck. An emphasis is also placed on the management of common Otolaryngology-HNS emergencies.

Electives

Electives for 2nd and 3rd year medicine can be arranged with the Department of Otolaryngology - HNS.

Fourth-Year Medicine

Various elective experiences can be arranged with the Department of Otolaryngology. Electives can be planned to emphasize the particular area of interest of the elective student. Evaluation of the examination techniques of Otolaryngology, Head and Neck at the OSCE.

2. Postgraduate Residency Training

An integrated University resident training programme is available in the Department, consisting of a five-year rotation meeting the requirements of the Royal College of Physicians and Surgeons of Canada. Residents are accepted into the programme at the PGY1 level. Arrangements are made through the Department of Surgery to have two years of basic surgical training. From PGY3 - PGY5, the residents are based at the QEII Health Sciences Centre and IWK-Grace Health Sciences Centre.

3. Continuing Medical Education

Clinical traineeships are arranged for practicing physicians through the Division of Continuing Medical Education. The staff also participates in the Community Hospital CME Programmes and the Annual Dalhousie Refresher Course.

L. Pathology

Location: Tupper Building
Eleventh Floor
Telephone: (902) 494-2091
Fax: (902) 494-2519

Professor Emeritus

Cooper, J.H.
Ghose, T.
Janigan, D.T.

Head of Department

Moss, M.A.

Professors

Butt, J.C.
Casson, A.G. (Major appointment in Surgery)
Fraser, A.D.
Guernsey, D. (cross appointment in Physiology and Biophysics)
Issekutz, A. (major appointment in Pediatrics)
Issekutz, T. (major appointment in Pediatrics)
Lee, T. (major appointment in Microbiology & Immunology)
Malatjalian, D.A. (cross appointment in Medicine)
Moss, M.A.
Rowden, G. (cross appointment in Medicine)
Sangalang, V.E.
Wright, J.R. (cross appointment in Surgery)

Associate Professors

Dooley, K.C.
Greer, W.L.

Forward, K.
Fraser, R.B.
Gupta, R. (cross appointment in Urology)
Khalig, S.U. (Saint John)
Lee, S.H.S. (major appointment in Microbiology and Immunology)
Mackay, J.S. (Saint John)
Marshall, J.S. (joint appointment in Microbiology and Immunology)
Nassar, B.A.
Neumann, P.E. (major appointment in Anatomy and Neurobiology)
Raza, A.
Riddell, C. (cross appointment in Biochemistry)
Scott, R.E. (Saint John)
Trillo, A.
Walsh, N.
Zayed, E. (cross appointment in Medicine)

Assistant Professors

Abdelhaleem, M.
Alexander, C. (Colchester)
Alexander, K.N. (Saint John)
Anderson, D.R. (major appointment in Medicine)
Ball, L.M.
Barnard, D.R. (major appointment in Pediatrics)
Barnes, P.J.
Bernardo, A.I.
Bojarski, A.B. (Saint John)
Cadeau, B.J. (Saint John)
Covert, A.A.
Craig, S.
Davidson, R.J. (major appointment in Microbiology & Immunology)
Dymond, L.C.
Foyle, A. (cross appointment in Medicine)
Guha, A.K.
Haldane, D. (major appointment in Microbiology and Immunology)
Hardy, G.J. (Saint John)
Hirsch, G.M. (major appointment in Surgery)
Lee, C.
McAlister, V. (major appointment in Surgery)
Muthu, S. (Saint John)
Norman, C. (Saint John)
O'Brien, A.M.E. (Saint John)
Powell, C.V.L. (Saint John)
Protzner, F.K. (Saint John)
Ramsey, M. (major appointment in Ophthalmology)
Resch, L.
Tran, H.T. (Saint John)
Wright, B.A. (cross appointment in Dentistry)
Yang, H.

Lecturers

Bowes, V.F. (Dartmouth)
Desormeau, L. (Antigonish)
Hayne, O.A. (major appointment in Medicine)
Murphy, J.S. (Dartmouth)
Murphy, D.M.

Honorary Adjunct

Cole, D.
Douglas, D.J.
Xu, Z. (Sydney)

1. Course of Study

First Year Medicine

General Pathology: Pathology in the first year of medicine is combined with immunology and microbiology to form an eight week unit (FIM Unit) in the COPS curriculum. The four weeks of pathology teaching deals with understanding of basic responses of cells, tissues and organs to various injurious stimuli with particular emphasis on the role of such responses in the pathogenesis of disease. The subjects covered by the programme are: cell injury, inflammatory responses, neoplasia, fluid and hemodynamic derangements. These are presented to the students through: (1) lectures, (2) case discussion in small group tutorial sessions, (3) laboratory sessions.

The class provides students with the basic pathology knowledge necessary to understand pathological changes in diseased organs in the subsequent years.

Text: Cotran, Kumar, Robbins. *Pathologic Basis of Disease*. 5th Edition. Recommended as a general text which can be used for the general pathology class in first year and the system pathology in the second and subsequent years.

Second Year Medicine

System Pathology: System Pathology forms a part of the organ oriented units established for the second year. Several members of this Department are actively involved in incorporating laboratory sessions and lectures in various system units.

Electives

A programme is available, by arrangement, for a limited number of students who wish to have electives and extend their learning in pathology beyond what is presented in the core programme of lectures and laboratories, specifically those considering pathology as a future career.

2. Open Conferences

A number of departmental conferences in the Dr. D.J. Mackenzie Laboratories are available to students. These are scheduled weekly throughout the year and are: surgical pathology, gross autopsy pathology, neuropathology, GI pathology, nephropathology, pulmonary, dermatopathology uropathology, transplant pathology, ear-nose-throat, cytological nervous system, eye, gynaecologic pathology rounds, lecture classes in pathobiology, clinical medical biochemistry.

3. Residency Training

An integrated University residency training programme is available in the Department, meeting the requirements of the Royal College of Physicians and Surgeons of Canada in Anatomical Pathology, General Pathology, Hematologic Pathology and Medical Biochemistry. Participating hospitals are the QEII Health Sciences Centre (Camp Hill and VG sites), the IWK-Grace Health Centre for Children, Women and Families, and the Saint John Regional Hospital in Saint John, New Brunswick.

4. Classes

Classes for Dentistry Students

Second Year: A systematic survey of human disease is given with special emphasis on material directly relevant to the practice of Dentistry. The class is described in detail in this calendar in the Faculty of Dentistry section.

Classes for Graduate Students

The Department currently offers a MSc graduate studies programme. Please consult the Graduate Studies section of this calendar for course information.

M. Pediatrics

Location: IWK Grace Health Centre
Halifax, Nova Scotia

Telephone: (902) 428-8229

Fax: (902) 428-2975

1. Course of Study

First Year Medicine

First-year core pediatric material on growth and development is studied within the context of the life cycle sessions, which are a part of the first-year patient doctor unit. Within the life cycle sessions, students acquire an overview of human growth and development from infancy through old age. A series of lectures/large group sessions cover psychological, emotional, and behavioural aspects of child development. Additional large group sessions look at adulthood and old age within a developmental framework. Adolescence is studied in a case based tutorial.

First-year students, working in pairs, are assigned to follow a newborn infant and his/her family during the first year of life. The students visit the family at home on four occasions. They observe the physical and behavioural development of the infant and conduct standardized screens of development. In addition, they observe the

parent/child interactions, infant temperament, and learn about common medical problems and preventive health care in the first year of life including nutrition and immunization.

Additional learning opportunities in paediatrics occur within the genetics, embryology and reproductive class, where the cases have many pediatrics-related aspects.

Second-Year Medicine

The programme is devoted principally to the acquisition of the basic skills of pediatric history-taking, family interviewing and the physical examination of infants and children. This programme is carried out in wards of the IWK Grace Health Centre. Students also attend the neonatal nurseries of the IWK Grace to develop experience and understanding of medical problems of the newborn infant. Regular home visits to the infants whose early growth and development they observed during the first year are optional in the second year schedule.

Recommended Textbook: Goldbloom, R.B., (Ed), *Pediatric Clinical Skills*, New York, Churchill - Livingstone, 1992.

2. Clinical Clerkship

Core Pediatrics in an eight-week rotation. The students spend 8 weeks at the IWK Grace Health Centre for Children, Women and Families (70% of class) or 8 weeks at off-site hospitals (i.e. Saint John Regional, Moncton Hospital). At the IWK Grace the students spend one month on the general pediatric in-patient teams under the direct supervision of the residents and the attending physicians. The students are active members of the team and gain considerable experience in history taking, physical examination, diagnosis and treatment of childhood diseases. The students spend a month in an ambulatory care setting and attend our patient clinics, the emergency room and subspecialty clinics. The off-site rotations cover general pediatrics on the inpatient ward with integration of ambulatory and ER. Many sites offer extensive neonatal training with certification in resuscitation. Formal and informal teaching sessions are conducted by more senior members of the team and the clerks are also encouraged to attend the various weekly clinical case conferences held in the hospital. Two to four COPS tutorials are held each week throughout the rotation and a wide range of common pediatric problems are encountered. (These tutorials are videoconferenced to the off-sites (since May '97) and evaluation of this process of teaching is underway.) The students are evaluated for each month of their rotation and there is an end of rotation triple jump exam.

Recommended Texts: *Nelson's Textbook of Pediatrics*, R.R. Behrman and V.C. Vaughn III, Editors, latest edition, W.B. Saunders Company or *Pediatrics*, A.M. Rudolph and J.J.E. Hoffman, Editors, latest edition, Appleton and Lange.

3. Electives

The Department of Pediatrics offers elective programmes for interested students in all four years. Arrangements for these electives may be made through the Department early in each academic year. The department elective representative for the first two years is Dr. M. Ludman, 428-8754, and for the clerkship years is Dr. P. Yhap, 428-8778. Inquiries regarding elective programmes at other medical schools or from students at other schools should be directed to the Undergraduate Medical Education and Student Affairs Office.

4. Residency Training

The Department of Pediatrics at Dalhousie University offers a four-year postgraduate training programme in paediatrics. Successful completion of this residency renders the trainee eligible for the specialty examinations in paediatrics offered by the Royal College of Physicians and Surgeons of Canada, and by the American Board of Pediatrics. The programme is based primarily at the IWK - Grace Health Centre. This institution with pediatric beds, serves as the tertiary care pediatric referral centre for the three Maritime provinces of Canada, Nova Scotia, New Brunswick, and Prince Edward Island. In addition, it serves as a community pediatric hospital for the Halifax Regional Municipality. The population of the metropolitan area is approximately 339,000. The referral base in the Maritime provinces is approximately 1.8 million.

Residents also rotate to Neonatology and Perinatology at the IWK Grace Health Centre (6000 deliveries per year). An active Regional Reproductive Care Programme encourages antenatal referrals of all high-risk pregnancies from Nova Scotia and PEI. Exposure to normal newborns and an extremely busy neonatal intensive care unit provide a broad range of neonatal exposure for residents. Pediatric residents also attend all high-risk deliveries.

The Saint John Regional Hospital is a facility which has a pediatric unit affiliated with Dalhousie University. Residents rotate through general inpatients pediatrics and ambulatory pediatrics at the Saint John Regional which provides secondary and some tertiary care for children from a large area of New Brunswick. Saint John is a city of 130,000. Accommodation is provided for residents who are on rotation in Saint John.

The programme in paediatrics is designed to provide a well-rounded experience, covering all "core" areas, but also providing time for specialization in areas of individual interest. The first three years of training cover the core requirements established by the Royal College of Physicians and Surgeons of Canada. Specific rotations will include the Emergency Department, Ambulatory Clinics, In-patient general Pediatric wards, Newborn Intensive Care Units, Pediatric Intensive Care Unit, Pediatric Surgery, Child Psychiatry, Behavioural and Developmental Pediatrics, and many of the Pediatric subspecialty services. In addition to time set aside for research, the fourth year of the programme can usually be individually designed to meet the specific training needs and interests of the resident.

There is ample time for electives, which may be spent pursuing a clinical specialty, or engaging in a research project. Many of the faculty members are actively involved in research, and resident participation is mandatory.

The training programme provides "graded responsibility" to house staff according to the level of seniority and expertise. House staff will be on call no more than one night in four. Senior trainees do less on call. Each resident is permitted four weeks paid vacation per year, and is permitted to attend one educational conference per year.

In Halifax there are 37 full-time members of the Department, (with expertise in general pediatrics and most pediatric sub-specialties) and 8 part-time faculty members. Most of the latter group are general pediatricians practicing in the community. In addition, a further 10 individuals from the Departments of Dentistry, Dermatology, Surgery, Psychiatry, Physical Medicine and Rehabilitation, Gynecology and Psychology have cross appointments with the Department of Pediatrics. In Saint John, New Brunswick, the faculty is made up of 2 full-time and 7 part-time members.

4. Resident Evaluation

All pediatric postgraduate trainees must take the annual in-training examination of the American Board of Pediatrics. This examination, the cost of which is partially subsidized by the Department, provides valuable feedback concerning areas of strength or weakness in clinical knowledge. It also helps the Department to assess its own deficiencies or weaknesses. After each clinical rotation, an in-training evaluation report is completed and is reviewed with the trainee. The trainees are interviewed twice annually to review evaluations and general progress. The clinical skills of the resident staff are assessed regularly by means of oral and clinical examinations.

5. Rounds and Conferences

At the IWK Grace Health Centre, regularly scheduled conferences include weekly Grand Rounds, Admission Rounds, Radiology Rounds and many subspecialty conferences. In addition, there is a dedicated educational time set aside for pediatric trainees. A weekly schedule of pediatric conferences and teaching sessions also exists at the Saint John Regional Hospital. All residents are subsidized to attend one approved national or international scientific meeting per year.

7. Continuing Medical Education

Members of the Department of Pediatrics participate in the activities of the Division of Continuing Medical Education, offering annual short classes in selected topics of pediatric interests, preceptorships

for periods of two to four weeks, and special training programmes tailored to individual needs of physicians interested in their own continuing education. In addition, Departmental teachers attend clinical teaching conferences at various hospitals throughout the Maritime Provinces.

N. Pharmacology

Location: Tupper Building, Sixth Floor
Telephone: (902) 494-3435

Professor Emeritus
Aldous, J.G.

The Carnegie and Rockefeller Professor and Head of Department
Robertson, H.A.

Professors
Downie, J.W.
Ferrier, G.R.
Gray, J. (major appointment in Medicine)
Howlett, S.
Renton, K.W.
Robertson, H.A.
Ruedy, J. (major appointment in Medicine)
Rusak, B. (major appointment in Psychiatry)
Sawynok, J.
Vohra, M.M.
White, T.D.

Associate Professors

Blay, J.
Hall, R.I. (major appointment in Anaesthesia)
Kelly, M.
McKenzie, G.M.
Peterson, T. (major appointment in Medicine)

Assistant Professors

Anderson, G. (major appointment in Applied Oral Science)
Durson, S. (major appointment in Psychiatry)
Hong, M. (major appointment in Surgery)
Hung, O. (major appointment in Anaesthesia)
Kopala, L.C. (major appointment in Psychiatry)
Nachtigal, M.W.

Adjunct Professors

Cribb, A. (major appointment in Anatomy and Physiology, Vet College, and UPEI)
Jackson, D. (Astra, Sweden)
Marshall, W. (major appointment in Biology at StFX)

Pharmacology in the first year of Medicine introduces students to the principles of pharmacology and some specific drug groups primarily through a case-oriented problem-stimulated (COPS) approach. Students attend small group tutorial sessions where a case is discussed and learning issues-raised. These sessions are supplemented with several lectures, computer simulation labs, and a Drug-Literature Evaluation (DLE) project.

Therapeutics in the third year of Medicine has been reorganized to integrate into the COPS curriculum. Special emphasis is placed on the principles of pharmacokinetics and drug interactions, particularly as these relate to appropriate dosing. Drug treatment in special populations (e.g., young, elderly, during pregnancy, for patients with renal or hepatic insufficiency, etc.) is emphasized.

1. MD/PhD Programme

The Department of Pharmacology offers a combined MD/PhD Programme in Pharmacology.

2. BSc (Med) Programme

The Department of Pharmacology offers a BSc (Med) programme in Pharmacology. Please consult the Department for details.

3. Electives

Opportunities for elective work in pharmacology are open to students. Laboratory (research) experience should include work during the summer months as paid summer research assistants.

4. Continuing Medical Education

The Department participates in this programme either in planning or through presentation of lectures given at various centres in the Maritime Provinces.

5. Residency Training

The Department provides formal and informal sessions for residents. With approval, training in various research laboratories of the department can be arranged for residents to enhance their research skills.

6. Classes

Classes for Dental Students

Separate Pharmacology classes for dental students are given throughout the Dental programme. These are designed to emphasize those drugs most commonly employed by dentists. However, other drugs are also discussed, especially in connection with medical problems their patients may have which are not necessarily associated with their dental problems. Drug interactions and allergic reactions are stressed.

Students in the dental hygiene programme receive a separate course of lectures (DH 3007) directed at their requirements.

Classes for Arts and Science Students

Introductory classes are offered as a credit in the Honours BSc (Biology and Biochemistry) programmes under the designation Biology 4404A, 4405B, Biochemistry 4804A, 4805B, Neuroscience 4374A, 4375B.

Graduate Studies

Advanced work leading to the MSc, PhD and MD/PhD degrees is offered to both science and medical graduates. The Calendar of the Faculty of Graduate Studies should be consulted.

Classes for Health Professions Students

Students registered in First Year of the College of Pharmacy receive instruction in systematic pharmacology designated as PHAC 1470.03. Students in the Occupational Therapy programme receive a course of lectures designated OCCU 4400.03. Students in Nursing receive instruction in systematic pharmacology designated as NURS 2050.03.

O. Physiology and Biophysics

Location: Tupper Building, Third Floor
Telephone: (902) 494-3517
Fax: (902) 494-1685

Professors Emeriti

Issekutz, B.
MacLeod, E.
Szerb, J.C.

The Carnegie and Rockefeller Professor and Head of Department
French, A.S.

Professors

Armour, J.A.
Barnes, S.A.
Croll, R.P.
Fine, A.M.
French, A.S.
Guernsey, D.L. (major appointment in Pathology)
Horacek, B.M.
Horackova, M.
McDonald, T.F.
Melnertzhagen, I.A. (major appointment in Psychology)
Moger, W.H.
Pelzer, D.J.
Rasmussen, D.D.
Wilkinson, M. (major appointment in Obstetrics & Gynaecology)
Wolf, H.K.

Associate Professors

Brown, R.E. (major appointment in Psychology)
Handa, S.P. (major appointment in Saint John Regional Hospital)
Holland, J.G.
Kozey, C.L. (major appointment with School of Physiotherapy)

Morgunov, N.
Murphy, M.G.
Murphy, P.R.
Pelzer, S.
Rittmaster, R. (major appointment in Medicine)
Stroink, G. (major appointment in Physics)

Assistant Professors

Chauhan, B. (major appointment in Ophthalmology)
Gardner, M.J. (major appointment in Medicine)
Landymore, K.M. (major appointment in Obstetrics & Gynaecology)
Linsdell, P.
Villarreal, A.

Adjunct Professor

Hicks, T.P. (major appointment, Head, Division of Tissue Regeneration Group, NRC, Ottawa)
Martin, S. (major appointment in Biology, Mount Saint Vincent University)
Seyfarth, E.-A. (major appointment, Privaldozent Zoological Institute, J.W. Goethe University, Frankfurt am main, Germany)

Senior Instructor

Couture, C.

1. Course of Study

First Year Medicine

First-year students follow the Case-Oriented Problem-Simulated (COPS) curriculum. The department has members serving as tutors in the various units of Med I, and provides cases, lectures and laboratory/conference sessions in the Metabolism and Function Unit.

Second Year Medicine

The department has a major role in the Brain and Behaviour unit, and a minor one in Respiratory and Cardiovascular.

Fourth Year Medicine

The department contributes tutors to the clinical Pharmacology Unit.

2. Clinical Clerkship

Electives

The Department offers two types of elective programmes to limited numbers of medical students:

1. small research projects under the direction of staff members, and
2. investigations in some depth of published work on a topic of the student's choice, utilizing the resources of the staff member and the Kellogg Health Sciences Library.
3. The Department offers students Selective and Elective experiences. The Department or Office of the Dean of Medicine may be contacted for details. Faculty from the Department also participate in the Teaching Rounds of the Core Medicine Rotation.

3. Graduate-Level Classes

The Department offers suitably qualified students an opportunity to study for the degrees of Master of Science and Doctor of Philosophy. Advanced graduate seminars and lecture classes are given in cell and molecular physiology, cardiovascular physiology, membrane physiology, endocrinology, neurophysiology etc. A complete description of these programmes is in the calendar of the Faculty of Graduate Studies.

4. Classes

Classes for Students in the Health Professions, Dentistry, and Other Faculties

- Physiology C1010X/Y.06: Distance Education class equivalent to Physiology 1010X/Y.06
- Physiology 1010X/Y.06: For students in Nursing, Dental Hygiene, Physical Education, and Kinesiology
- Physiology 2030X/Y.06: For students in Physiotherapy, Occupational Therapy, Health Education, and Kinesiology
- Neurophysiology 3110.03A: For students in Physiotherapy and Occupational Therapy

- Exercise Physiology 3120.03A: For students in Physiotherapy
- Physiology 4321X/Y.06: For senior undergraduates, fourth year honours Science students, and graduate students.

P. Psychiatry

Location: 4th Floor, Abbie Lane Building
QEII Health Sciences Centre
Halifax, NS

Administration Office - Room 4082, 473-6214/4887 (fax)

Education Office - Room 4031, 473-4883/4545 (fax)

Research Office - Room 4083, 473-4255/4596 (fax)

Professor Emeritus

McCormick, W.O.

Munro, A.

Professor and Head of Department

Kutcher, S.

Professors

Doane, B.K.

Flynn, P.

Hirsch, D.

Hirsch, S.

Kopala, L.

Leighton, A.H.

McGrath, P.

Munro, A.

Murphy, J. (Adjunct)

Rusak, B. (Killam Professor)

Associate Professors

Alda, M.

Carrey, N.

Connolly, J.

Dursun, S.

Kusumakar, V.

Michalon, M.

Milliken, H.

Mirza, K.A.H.

Morehouse, R.

Oriik, H.

Reynolds, P.

Rosenberg, E.M.

Schwartz, M.

Stokes, A.

Teahan, M.

Assistant Professors

Abbass, A.

Bassett, A. (Visiting)

Birnie, W.

Brooks, K.

Brooks, S.

Burley, J.

Bush, H.

Buffett, L.M.

Chengapa, V.

Chisholm, T.

Cook, A.

Covert, K.

de Coutere, I.A.A.

Devarajan, S.

Eastwood, D.

Fisk, J.D.

Gardner, D.

Gaudet, A.

Hipwell, A.

Howard, R.J.

Howes, J.L.

Lavallee, C.

Leblanc, J.

Lynch, M.

MacDonald, D.D.

MacDonald, G.W.

MacDonald, J.

Maynes, D.F.

Morrison, D.

O'Donovan, C.

Rubens, M.

Vallis, M.

Whitby, D.

Lecturers

Abbott, C.M.

Akoto, A.

Bergin, S.

Bhaskara, S.

Brooks, A.

Butler, G.

Cane, D.

Crist, W.B.

Curtis, J.

D'Costa, J.

Diaz, P.

Eakes, G.

Evans, R.

Feltham, I.

Flynn, M.

Forsythe, P.

Gabriel, J.

Garvey, B.

George, P.

Good, K.

Gray, G.

Gusella, J.

Guzman, R.

Johl, A.K.

Junek, W.

MacKay, T.J.

McIntosh, D.

Mulhall, D.

Muthu, M.S.

Neilson, G.

O'Neill, M.T.

Onuora, A.

Pearce, P.

Pilon, D.

Rajda, M.

Roberts, D.

Ross, M.

Santor, D.

Smith, W.E.

Steele, C.

Sullivan, M.

Theriault, P.S.

Tomlinson, M.

Wadhwa, U.

Walentynowicz, M.

Walker, J.

Whitehorn, D.

Wilson, A.

Woulff, N.

Clinical Instructors

Addleman, D.

Ahmad, K.

Aquino, E.

Casson, S.

Mills, P.

Perry, P.E.

Robertson, H.

Spears, B.

Todd, F.R.

Watt, G.

The objectives of undergraduate teaching in the Department of Psychiatry are: to underline the significance of biopsychosocial factors in normal human development and in illness, to enable students to recognize psychiatric disorders, and to treat these disorders within their competence, or refer the patient for psychiatric investigation and management.

1. Course of Study

First Year Medicine - Human Behaviour

1. Within the Patient/Doctor Unit, students will receive several sessions of didactic teaching on topics including normal cognitive, social and emotional development stages, learning theory and defense mechanisms.
2. Two multidisciplinary seminars focus on infant temperament and family functioning.
3. A multidisciplinary approach to the assessment and management of psychiatric illness in adolescents follows.
4. The patient contact programme consists of three sessions, each of three hours, with seven to eight students supervised by senior psychiatrists. These are designed to introduce students to psychiatric disorders by exposing them to actual patient interviews. Students will also observe diagnostic and treatment sessions.

Second Year Medicine - Clinical Psychiatry

Psychiatry, neurology and physiology produce an integrated unit in second-year called the Brain and Behaviour Unit. Three major psychiatric cases are studied over a period of three weeks. A series of 8 lectures and two laboratory sessions (3 hours each) complement the case studies. This Unit runs in parallel with a patient contact programme consisting of five sessions of three hours each. Groups of three to four students are supervised by junior and senior faculty. Using pre-circulated guidelines, the students learn to complete a psychiatric history and to assess the patient's mental status. They then discuss diagnosis and management with their facilitator.

Third and Fourth Year Medicine

The clinical clerkship consists of an eight-week core programme spread over 18 months during year III and IV. The overall clerkship offers the student an opportunity to examine and participate in the treatment of in- and out-patients at Queen Elizabeth II Health Sciences Centre, Abbie Lane Building, the Izaak Walton Killam - Grace Health Centre, the IWK-Grace Community Health Services Centre and The Nova Scotia Hospital. Some students may also have the opportunity to complete their clinical clerkship rotation at Valley Regional Hospital in the Annapolis Valley or Saint John Regional Hospital, Saint John, New Brunswick. Students are supervised in the treatment of suitable patients. As a part of the didactic programme offered, an intensive seminar series on related psychiatric conditions is completed during these eight weeks. Also a series of sessions on ambulatory care experience is planned during the core programme.

2. Electives

Electives are offered in all four years. These vary from supervised individual patient psychotherapy to involvement in research projects.

3. Residency Training

This covers Postgraduate Years (PGY) 1 to 5.

PGY-1: This year provides broad clinical training in the following areas: psychiatry, internal medicine, emergency medicine, paediatrics, obstetrics and gynaecology, choice of selective for one month and one month of elective time.

PGY-2 to -5: These years of integrated university residency training are planned to meet the requirements of the Royal College of Physicians and Surgeons of Canada. Participating units and hospitals are the Queen Elizabeth II Health Sciences Centre Abbie Lane Building, IWK-Grace Community Health Services, Valley Regional Hospital, Izaak Walton Killam-Grace Health Centre, The Nova Scotia Hospital and Saint John Regional Hospital.

Each postgraduate student spends at least 2 ½ years in the central university programme to complete the mandatory rotations required by the Royal College. The remaining months are spent in a variety of psychiatric or related clinical or research settings in the Maritime Provinces or elsewhere.

Electives available in the senior years include additional training beyond the minimum time in geriatric or consultation/liaison psychiatry or experience in eating disorders, sleep/wake disorders, neuropsychiatry, forensic psychiatry, semi-rural community psychiatry, pain management, research projects or secondment to relevant non-psychiatric experience, such as neurology.

On the successful completion of the Residency Programme and the Royal College written and oral examinations, an individual can seek further sub-specialty training in the Fellowship Programme. This programme has been developed to enhance training in psychiatric medicine which will meet the clinical service needs of the Province of Nova Scotia and the academic initiatives of the Department.

4. Continuing Medical Education

The Department offers refresher classes (in collaboration with the Division of Continuing Medical Education) for general practitioners and specialists. General practitioners may come for a clinical traineeship in the Department of Psychiatry, and the Department takes part in the general classes offered by the Division of Continuing Medical Education. On a regular basis throughout the academic year, clinical case conferences and university rounds presentations are given at the Metro teaching hospitals.

Q. Diagnostic Radiology

Location: QHII Health Sciences Centre
Victoria General Site, Third Floor
Halifax, Nova Scotia
Telephone: (902) 473-5452

Professor Emeritus
Fraser, D.B.

Professor and Head of Department
LeBrun, G.P.

Professors
Grantmyre, E.B.

Associate Professors

Andrew, J.
Campbell, D.R.
Daniels, C.
Fried, L.A.
Jackson, J.R.
Johnson, A.J.
Jones, G.R.M.
Lo, C.D.
Mason, W.F.
Miller, R.M.
Mitchell, M.J.
Riding, M.D.

Assistant Professors

Anderson, I.
Barnes, D.
Barry, M.
Caines, J.S.
Cooper, M.
Covert, W.N.
Dobson, R.
Flemming, B.K.
Gates, L.
Gordon, D.
Iles, S.E.
Llewellyn, G.
Macken, M.B.
Maloney, W.J.
Martin, R.H.
Mawko, G.
Murphy, G.F.
O'Brien, K.
Schaller, G.
Thompson, D.
Vandorpe, R.
Whelan, J.F.
Yeadon, D.E.

Lecturers

Abraham, R.
Acton, D.
Allen, J.
Archer, B.
Barton, W.F.
Baxter, B.

Butler, G.
Cartier, Y.
Cheverle, D.
Clark, T.
Ellis, R.
Englund, M.
Ferguson, D.
Finnegan, M.
Fraser, J.D.
Heelan, J.
Hes, D.
Leger, J.
McPhee, D.
Oxner, J.H.
Pass, B.
Ross, A.
Thompson, S.

L. Course of Study

First and Second Year Medicine

Through the cases in the COPS curriculum, the student becomes familiar with the many diagnostic imaging modalities (x-ray, ultrasound, computerized tomography, magnetic resonance, and nuclear medicine) and with interventional radiology such as needle biopsy, angioplasty, percutaneous tubal drainage, and vascular embolization. Electives are available for first and second COPS clerkship.

There are four three hour compulsory Wednesday afternoon educational sessions. The emphasis is placed on the investigation of patient problems, using various imaging modalities, interventional diagnostic and therapeutic radiology. One month electives are also available in clerkship.

Texts:

- Appleton, Hamilton, Simon, *Surface and Radiological Anatomy*

The following books are suggested reading:

- Squire - *Fundamentals of Roentgenology*
- Meschan - *Synopsis of Roentgen Signs*, and Armstrong - *X-Ray Diagnosis*.

2. PGY1

One month electives available from September to June inclusive.

3. Residency Training

An integrated University residency training programme is available in the Department consisting of a five year programme meeting the requirements of the Royal College of Physicians and Surgeons of Canada in Diagnostic Radiology. Participating hospitals include QE II Health Sciences Centre, IWK-Grace Health Centre, the Victoria General Hospital, and Saint John Regional Hospital.

4. Fellowship Training

Clinical fellowships are available in Cardiovascular, Gastrointestinal, Musculoskeletal, Neuroradiology, and General Imaging.

5. CME Programs

The department offers two week clinical traineeships in General Imaging (CT, Nuclear Medicine, Ultrasound, Cardiovascular, Interventional, Mammography, General Pediatric Radiology and Neuroradiology) between October and May.

R. Radiation Oncology

Location: Nova Scotia Cancer Centre
5820 University Avenue
Halifax, NS B3H 1V7
Telephone: (902) 473-6000
Fax: (902) 473-7205

Head
Joseph, P.

Associate Professors
Andrew, J.W.

Assistant Professors
Hale, M.E.

Meng, J.S.

Lecturers

Bahoric, B.
Mulroy, L.
Nolan, M.
Rajaraman, M.
Rutledge, R.
Sun, A.

1. Course of Study

First and Second-Year Medicine

Members of the department participate in teaching in the various body system programmes. A large volume of clinical material is available for teaching purposes through the Cancer Treatment and Research Foundation (CTRF) Nova Scotia Cancer Centre in the Dickson Building of the Victoria General Hospital. Students attend many of the multidisciplinary clinics in conjunction with consultants from other medical and surgical departments in the Halifax teaching hospitals.

Third and Fourth Year Medicine

Members of the Department continue to participate in the various system blocks. A large volume of clinical material is available for teaching purposes through the Cancer Treatment and Research Foundation (CTRF), Halifax Clinic in the Dickson Building of the Victoria General Hospital. Students attend many of the multidisciplinary clinics in conjunction with other departments. Everyone is encouraged to attend both the oncology and research rounds which are held on a weekly basis.

2. Electives

In all four years a one month elective study period is available on the request of a student. The time is spent in the CTRF Nova Scotia Cancer Centre which houses the Department of Radiation Oncology and the radiotherapy treatment facilities that service the whole province. The rotation provides an overview on the management of all forms of cancer and in particular its treatment by radiotherapy. Altogether about one-half of all cancer patients receive treatment by radiotherapy.

A second ongoing programme throughout the academic year is for up to five students to spend one half day in the Cancer Centre each week. This provides both the opportunity to interact with cancer patients and to undertake a small clinical research project under the guidance of a staff radiation oncologist.

3. Residency Training

This is an accredited integrated four year training programme leading to the fellowship in Radiation Oncology of the Royal College of Physicians and Surgeons of Canada (FRCPC). Residents rotate between the CTRF Nova Scotia Cancer Centre, the Halifax teaching hospitals, the Saint John Regional Hospital. These rotations provide a broad all round experience in clinical oncology, an understanding of the biology of cancer and research methods.

Specific lectures on radiation medicine and oncology are given in other university departments on a regular basis.

4. Continuing Medical Education

As part of the outreach programme of the CTRF and the Faculty of Medicine, lectures and seminars are given on an ad hoc basis at hospitals throughout the province and at scientific meetings throughout the Maritime.

S. Surgery

Location: Department of Surgery
V.G. Hospital
1278 Tower Road
Halifax, NS
Telephone: (902) 473-2246
Fax: (902) 473-4442

Professors Emeriti

Gillis, D.A.
Norvell, S.T.
Ross, E.F.
Stevenson, W.D.

Professor and Head of Department

Stone, R.M.

Professors

Bitter-Suermann, H.

Holness, R.O.

Hyndman, J.C.

Jamieson, C.G.

Janigan, D.T. (cross appointment in Pathology)

MacDonald, A.S.

Murphy, D.A.

Parkhill, W.S.

Stanish, W.D.

Yabsley, R.H.

Associate Professors

Alexander, D.I.

Amirault, J.D.

Bugden, C.

Giacomantonio, J.M.

Gross, M.

Howes, W.J.

Iype, M.O.

Kinley, C.E.

Leahy, J.L.

Lee, T.D.G. (cross appointment in Microbiology and Immunology)

Leighton, R.K.

McAlister, V.

Parrott, J.C.

Petrie, D.P.

Reardon, G.

Sullivan, J.A.

You, C.K.

Assistant Professors

All, I.M.

Anderson, G.

Bethune, D.C.G.

Boulos, A.N.

Buatt, K.

Clarke, D.B.

Hall, R.I. (cross appointment in Anaesthesia)

Henderson, W.

Higgins, H.G.

Hirsch, G.M.

Howes, W.J.

Laonde, D.

Lau, H.

MacKean, G.

McIntyre, P.M.

Mendez, I.

Morris, S.F.

O'Brien, J.

Paletz, J.

Ross, D.

Scarth, H.

Sparkes, G.

Stephen, W.J.

Stiles, G.E.

Vair, B.

Wilson, K.L.

Wood, J.

Wright, J. (cross appointment in Pathology)

Lecturers

Abraham, E.P.

Acker, J.

Anderson, I.B.

Barnhill, T.

Burns, G.R.

Coady, C.M.

Curry, J.P.

Englund, R.E.

Forgie, W.R.

Fienieleff, H.

Johnston, D. G.

MacMichael, D.

Topp, T.

Instructors

Arditti, J.

Calverley, V.

LeGay, D.

Mitton, H.

Rae, R.E.

Tees, D.A.

Wheelock, W.B.

The Department provides basic instruction in those diseases which fall within the field of surgery. Opportunities are provided to students so that they may become familiar with patients having surgical diseases, their diagnosis, investigation, and treatment. Students may pursue elective or research studies if they so desire.

1. Course of Study

First and Second Year Medicine

Members of the Department of Surgery participate in the pre-clerkship curriculum in the following areas:

1. As tutors in various problem-based-learning units that make up the COPS curriculum.
2. As preceptors for elective students in surgery.
3. As clinical teachers in the Med II Patient-Doctor component of the curriculum where students learn basic skills, history taking and physical examination.

2. The Clerkship

At the completion of the second year, the student enters an 88-week clerkship, of which 12 weeks are spent in the Department of Surgery doing three rotations, each of four weeks.

The first four weeks are described as a "Core" rotation. The learning objectives for this Core rotation are the skills and knowledge related to the Principles of Surgery. The core clerk may be on any of the surgical units, but attends daily seminars and subsequently writes an examination on the Principles of Surgery.

The two selective clerkship rotations may be taken on any of the surgical services. During this time, in addition to participating on the clinical team, the clerk will attend a series of seminars provided by the different specialties in surgery.

During the Core rotation and also the selective rotations in the clerkship, the students will take emergency call in the hospitals.

One of the rotations must be on a General Surgical service.

Additional opportunities for the students exist in the form of electives in surgery. These are four week rotations on surgical services under the supervision of an identified surgeon, either in Halifax or elsewhere.

3. Residency Training

Integrated University Residency Training Programmes in the disciplines of General Surgery, Orthopedic Surgery, Cardiac Surgery, Pediatric General Surgery, Neurosurgery and Plastic Surgery are available in the department. The training programmes in these disciplines are accredited by the Royal College of Physicians and Surgeons of Canada. Participating hospitals include the QEII Health Sciences Centre, IWK-Grace Health Centre, Archie MacCallum Hospital and Saint John Regional Hospital, Saint John, New Brunswick.

The General Surgery programme is a five-year programme. The programme is designed so that its graduates are prepared to pursue community practice, or to compete for clinical and/or research fellowships. There is considerable flexibility in the General Surgery training programme. The mandatory rotations include Intensive Care and Pediatric General Surgery (three months each), and a minimum of 30 months in General Surgery. Many elective rotations are available, including Orthopedics, Plastics, Trauma, Research, Community Surgery, and others. The final year is spent as the senior resident on a General Surgery service.

The Division of Neurosurgery provides for a year of basic training in the neurological sciences, and at least thirty-six months of clinical neurosurgery (including pediatric Neurosurgery) with progressive responsibility. A full education programme in allied neurological science fields is a part of this programme.

The cardiac surgery residency program is an integrated six year process which incorporates two years of core surgery, six months of general surgery, six months of adult cardiac surgery, six months of thoracic surgery, six months of pediatric cardiac surgery and twelve months of senior cardiac surgery resident. In addition, there is one year for academic enrichment. For those considering an academic career, this can consist of a research year, which may lead to a MSc or PhD, while others may choose to develop an area of special clinical interest or expertise.

The Division of Orthopedic Surgery conducts a four-year programme. During the first year, residents rotate through such specialties as Plastic Surgery, Neurosurgery, ICU, and Cardiovascular Surgery. Elective rotations are available during this period of time. The three core years of Orthopedic Surgery are designed for the resident to gain experience in Adult, Pediatric and Traumatic Orthopedic Surgery. Residents are encouraged to carry out a post training year as a Fellow at this or another centre.

The Division of Plastic Surgery is similar in that the first two years are spent in general surgical rotations with particular reference to those subspecialties that are appropriate to plastic surgery. The two core years of Plastic Surgery are designed for the resident to gain experience in adult and pediatric traumatic and reconstructive surgery.

The Division of Pediatric General Surgery offers a two year fellowship programme, one of six Royal College approved programmes in Canada, to trainees who have completed training in General Surgery.

A formal academic programme, in each specialty, with pathology seminars, grand rounds, basic science seminars, journal clubs, etc., functions throughout the year. The surgical divisions provide the funds for residents to travel to meetings to present their work. Funding is also provided for residents to attend two additional meetings during their period of training.

4. Continuing Medical Education

The Department sends its members to various centres throughout the Maritime provinces at the request of the Division, for meetings, conferences, etc. This is an important function in that it is now realized that continuing medical education is essential for the continuing competence of the graduate doctor.

T. Urology

Location: 5th Floor, Victoria General Hospital
Halifax, Nova Scotia
Telephone: (902)473-5853

Professors Emeriti
Mack, F.G.

Professor and Head of Department
Norman, R.W.

Professors
Awad, S.A.
Belitsky, P.
Chesley, A.E.

Associate Professors

Anderson, P.A.
Auld, R.B.
Downie, J.W. (major appointment in Pharmacology)
Gajewski, J.B.
Grantyre, J.E.
Lawen L.G.
Millard, O.H.
Schwarz, R.D.

Assistant Professors

Bell, D.G.
Gupta, R. (major appointment in Pathology)
Morse, M.J.
Sullivan, H.A.
Tewari, H.D.
Wentzell, P.G.

Undergraduate Training

1. The Pre-clinical Years (Med I and II)

The renal/urology component in Med II occupies two weeks of integrated introduction to a few of the pathologic processes in urology. In addition, every effort is made to co-ordinate with other units in the COPS programme. Individual faculty from the Department serve as tutors.

2. The Clinical Years (Med III and IV)

Urology is a core rotation for the clinical clerks. During this four week experience, the students work with an individual staff preceptor at one of the main Dalhousie teaching hospitals. The clerks are responsible under the supervision of staffmen and residents for patient care on the wards and in the out-patient settings. They are also exposed to common operative urological procedures. The ambulatory experience includes many of the specialty clinics in Urology. During the rotation, the students are expected to meet clinical challenges with an open, enquiring mind and to internalize an understanding of basic principles of urological physiology and pathology. There is a regular topic based seminar programme with the Faculty to facilitate this process. The objectives of the rotation include clinical hypothesis formation and supervised decision making. These objectives are practised in all clinical settings but particularly in the out-patient clinics.

For those students wishing to carry on greater study of urologic principles, an elective experience is offered. This experience can be tailored to an individual student's needs and interests.

3. Family Medicine Residency

Urology is offered as an elective. The four-week period can be spent at the Victoria General Hospital, the new Halifax Infirmary or the Saint John Regional Hospital. The duties and assignments have been designed specifically to prepare the candidate for family practice.

4. Residency Training

Specialty training in Urology is available in the Department. The five year training programme includes two years of core Surgery (specially designed) and three years training in Urology. Successful completion fulfils the requirements for the Royal College of Physicians and Surgeons of Canada specialty examinations. During their training the residents are expected to meet clinical problems with an open, enquiring mind and are given increasing responsibilities, commensurate with their experience. A wide exposure to a variety of urological conditions and procedures is provided. The rich clinical and surgical experience is supplemented by departmental grand rounds, seminars and journal clubs. At the end of the training the resident is proficient in the specialty of Urology.

Participating hospitals include the QEII Health Sciences Centre, IWK-Grace Health Centre, and Saint John Regional Hospital.

U. Medical Computing and Media Services (MCMS)

Location: Sir Charles Tupper Building, Basement Level
Telephone: Finance & Administrative Manager (902) 494-1933
Media Services Manager (902) 494-1263
Computing Services Manager (902) 494-1266

Fax: (902) 494-2046
E-mail: MCMS@DAL.CA
WWW: MCMS.med.dal.ca/MCMS

Below you will find a small sampling of the services we provide. Please call for further information, advice and/or a copy of our brochure outlining our many services.

1. Computing Services

Phone: (902)494-1266

E-mail: MCMS@DAL.CA

In the areas of research, instruction and administration, providing services to help meet your computing needs for hardware and software support. Phone: 494-1266.

Networking: Includes:

- Local Area Networks (word processing, spreadsheets, graphics, databases);
- Internet (E-mail, ftp);
- Intranet (web page); and
- FTP access from home.

We also support web pages for your department. Staff are available for service and repair work, and purchases advice.

2. Photography

Phone: (902) 494-1263

E-mail: PHOTO@DAL.CA

Covering all your photographic needs from passports to clinical slides. Check out our stock slides, maps, charts and aerial views of Halifax and Dalhousie University.

- film processing
- slide duplicates, custom colour slides, and copy slides
- custom black & white printing
- video production, audio recording and slide tape production
- digital photography/scanning

3. Graphics/Imaging

Phone: (902) 494-1267

E-mail: TUPAV1@IS.DAL.CA

FTP: IMAGE.MED.DAL.CA

Expert technical assistance from concept to creation. Transform your media images to computer or your computer images to media.

- computer slides
- multi-media presentations
- diagrams/illustrations, etc.
- scientific posters

4. Classroom Services

Phone: (902) 494-1290

Cellular: (902) 471-9372

E-mail: CLASS@DAL.CA

On-line booking form:

http://www.mcms.dal.ca/mcms/class_form.html

Providing and maintaining audio-visual support for more than 100 classrooms, seminar rooms, and labs, in the Tupper, Forrest, Burbidge, Fenwick, and Dental buildings.

- Teleconferencing
- Equipment pool
- Conference Support
- General equipment consultation

5. Dalhousie University Video Conferencing Services

Phone: (902) 494-2867

E-mail: VIDEOCON@DAL.CA

On-line booking Form:

HTTP://WWW.MCMS.DAL.CA/MMS/VC_FORM.HTML

Videoconference to anywhere in the world. One of the best videoconferencing facilities of its kind. Excellent for meetings, distance education, interviews, etc.

Faculty of Graduate Studies

Office of the Dean

Location: Arts & Administration Building
Room 314
Studley Campus
Halifax, NS B3H 4H6

Telephone: (902) 494-2485
Fax: (902) 494-8797
E-mail: graduate.studies@dal.ca
WWW: <http://www.dalgrad.dal.ca/homepage.htm>

Administrative Officers

Dean
Ricketts, P.J., BA Hons (Nottingham), DPhil (Southampton)

Associate Dean
Woolf, D.R., BA Hons (Queen's), PhD (Oxford)

Secretary
Folkins, L., BSc (Dal), MSc, PhD (UofT)

Faculty Administrator
Nielsen, S., BBA (MSVU), MBA (Dal)

Admissions and Programme Officer
Maynard, B.A.

Executive Assistant to the Dean
O'Grady, J.

DalTech Graduate Studies Office

Location: MacNab Building
Room A217
Sexton Campus (DalTech)
Halifax, B3J 2X4

Telephone: (902) 494-1288
Fax: (902) 494-3149
E-mail: gar@dal.ca
Website: <http://www.dal.ca/daltech>

Associate Principal for Graduate Studies and Research
Hamdullahpur, F., BSc, MSc (Technical University of Istanbul), PhD (TUNS), PEng

Director of the Internetworking Programme
Robertson, W., BSc (Hons), MSc (Aberdeen), PhD (TUNS)

Administrative Assistant
Griffin-Hody, P., BA (Dal)

Admissions and Programme Coordinator
Parker, S.

Faculty Council

Banlascad, E., 2000 Architecture
Bearne, S., 2001 Biochemistry
Bishop, M., 2001 French
Blay, J., 2000 Pharmacology
Cadigan, S., 2001 History
Clark, S., 2001 Agriculture
Dasgupta, S., 2001 Economics
Earl, M., 2001 Physiotherapy
Pinbow, R., 2001 Political Science
Folkins, L., Secretary '99 Oceanography
Gill, T., 2000 Engineering
Gregor, P., '99 Nursing

Hamdullahpur, F., Associate Principal, DalTech
Horackova, M., '99 Physiology & Biophysics
Jost, A., 2000 Computer Science
Putnam, C., '99 Health & Human Performance
Rathwell, T., 2000 Health Services Admin.
Ricketts, F., Dean (Chair)
Ross, T., 1999 English
Sketris, L., 2000 Pharmacy
Stewart, S., 2000 Psychology
Stroink, G., 2001 Physics
Sutherland, B., Associate University Librarian
Willison, M., '99 Biology
Wood, S., 2001 Resource & Environmental Studies
Woolf, D., Associate Dean

(Each discipline shall have only one elected member on Faculty Council at any given time.)

Faculty Regulations

The complete details of the Faculty of Graduate Studies regulations are included in the Manual for Governance, Policies and Procedures, which is available in the faculty and departmental offices. Detailed information about particular programmes will be found in the Departmental entries in the subsequent sections of this calendar or may be obtained from Departmental publications. It is the responsibility of all graduate students to familiarize themselves with the regulations which govern the conditions of their programmes of study at the University. Except where noted, Faculty of Graduate Studies regulations take precedence over Departmental regulations.

I. Graduate Programmes

Graduate programmes are offered at Dalhousie University (including DalTech) in a variety of research and professional fields at the diploma, master's and doctoral level.

1.1 Degree Programmes

Departments in the Faculty of Graduate Studies offer programmes leading to the following degrees and diplomas:

- Doctor of Philosophy (PhD)
- Doctor of Philosophy/Doctor of Medicine (MD/PhD)
- Doctor in the Science of Law (JSD)
- Master of Applied Science (MASC)
- Master of Applied Science/Master of Urban and Rural Planning (MASC/MURP)
- Master of Architecture (First Professional) [MArch (First Prof)]
- Master of Architecture (Post-Professional) [March (Post-Prof)]
- Master of Arts (MA)
- Master of Business Administration (MBA)
- Master of Business Administration (Financial Services)
- Master of Business Administration (Information Technology)
- Master of Business Administration/Bachelor of Laws (LLB/MBA)
- Master of Computer Science (MCS)
- Master of Development Economics (MDE)
- Master of Engineering (MEng)
- Master of Engineering/Master of Urban and Rural Planning (MEng/MURP)
- Master of Environmental Design Studies (MEDS)
- Master of Environmental Studies (MES)
- Master of Health Services Administration (MHSA)
- Master of Health Services Administration/Bachelor of Laws (LLB/MHSA)
- Master of Health Services Administration/Master of Nursing (MN/MHSA)
- Master of Information Technology Education (MITE)
- Master of Laws (LLM)
- Master of Library and Information Studies (MLIS)
- Master of Library and Information Studies/Bachelor of Laws (LLB/MLIS)
- Master of Marine Management (MMM)
- Master of Nursing (MN)
- Master of Nursing/Master of Health Services Administration (MN/MHSA)

- Master of Public Administration (MPA)
- Master of Public Administration/Bachelor of Laws (LLB/MPA)
- Master of Science (MSc)
- Master of Science (Oral and Maxillofacial Surgery)/Doctor of Medicine (MSc/MD)
- Master of Social Work (MSW)
- Master of Urban and Rural Planning (MURP)
- Graduate Diploma in Public Administration (GDPA)

1.2 Programme Administration

Graduate programmes at Dalhousie are administered at the Faculty level and at the Department/Programme level.

1.2.1 Department/Programme Level

At the department level all graduate programmes are administered through a Graduate Coordinator.

1.2.2 Faculty Level

At the Faculty level students in programmes at DalTech (i.e. Architecture, Computer Science, Engineering, and Planning) are served primarily through the DalTech Office of Graduate Studies located on the Sexton Campus; while students in all other programmes are served directly through the Office of the Dean on the Studley Campus. Throughout the Regulations, where reference is made to the Faculty Office or Faculty, DalTech students should contact the DalTech Office of Graduate Studies; all other students contact the Office of the Dean directly.

1.3 Programme Definition

All graduate programmes at Dalhousie University have a minimum period for programme fee payment and residency requirements. For example, a one year programme involves a programme fee requirement of one year, during which a full-time student is expected to be on campus unless otherwise given permission to take courses or undertake research somewhere else. At the master's level, students can be admitted into either a one year or two year programme (there is also one three-year programme). Doctoral programmes at Dalhousie are normally at least two year programmes (i.e. they have at least a two year programme fee and residency requirement). If students have to continue beyond the programme fee requirement period to complete their degree, additional continuing fees are required. Students in master's thesis programmes should normally expect to take 6 to 12 months beyond the programme fee requirement period to complete their studies. Students in doctoral programmes should expect to take 12 to 24 months beyond the programme fee requirement period to complete their studies. Students must pay continuing fees until all of the requirements of their programme have been successfully completed.

1.3.1 General Programme Definitions - Master's Level

Master's programmes are usually structured in one of three ways: 1. classwork plus a thesis; 2. classwork plus a graduate project; or 3. classwork only. Some programmes also have a work or internship component in addition to classwork and project/thesis requirements, and this usually adds to the time necessary for completion.

Programme Length (Fee Requirement)	Classwork plus Thesis	Classwork plus Project	Classwork Only
One Year Programme Fee: one year programme fee, followed by continuing fees as required	4.5 full credits plus a thesis	5.5 full credits plus a graduate project	6.5 full credits
Two Year Programme: Fee: two years of programme fees, followed by continuing fees as required	5-9 full credits plus a thesis	6-11 full credits plus a graduate project	7-13 full credits

NOTE: Term classes are normally equal to one-half credit.

Master's programmes exceeding the maximum number of credits for a two year programme are considered as three year programmes and fees are applied accordingly.

1.3.2 General Programme Definition - Doctoral Level

All doctoral programmes at Dalhousie require a full-time residency period as defined below.

Two Year Residency: For students who enter with a first-class research Master's degree. Fee: two years of programme fees followed by continuing fees as required.

Three Year Residency: For students who enter directly from first-class undergraduate degree with honours standing as granted by Dalhousie. Fee: three years of programme fees followed by continuing fees as required.

II. Admission Requirements for Graduate Programmes

Please note that entry into Dalhousie's graduate programmes is very competitive, and applicants who meet the minimum requirements are not guaranteed admission. Normally, successful applicants have academic records and qualifications which are well above the minimum required.

2.1 Admission Requirements

The Faculty of Graduate Studies sets the minimum admission standards that are required for entry into graduate programmes. Individual Departments may require additional qualifications of their candidates, and enrollment limitations usually mean that successful applicants possess qualifications that considerably exceed the minimum requirements. Final decisions on all admissions are made by the Faculty of Graduate Studies, and there are no appeals on admission decisions. The Faculty of Graduate Studies reserves the sole right to reject applications from candidates who meet or exceed the minimum admission requirements.

In all cases, candidates for admission must possess degrees which are deemed by the Faculty of Graduate Studies to be equivalent to those granted by Dalhousie University, and which have been granted by institutions which are fully recognized by Dalhousie.

2.2 Master's Degree Programme

Candidates for admission must hold at least a Bachelor's Degree with a minimum B average from a university of recognized standing, with the following conditions:

- For entry into a Master's programme with a thesis requirement (these are normally one year programmes, as described above), candidates must hold a Bachelor's Degree with an honours or the equivalent of honours standing as granted by Dalhousie University in the area in which graduate work is to be done or an area which is relevant to the graduate work. A four (4) year Baccalaureate degree may be considered as equivalent of honours if there is evidence of independent research capacity (such as a research project as part of a course) or if the degree is officially approved as an honours equivalent. In those cases where a candidate has a three (3) year degree and an honours programme was not available to them, first-class candidates will be considered for admission to a two year programme.
- For entry into all other programmes (normally involving a programme fee requirement and residency period of more than one year), candidates must hold a Bachelor's Degree with at least four (4) classes, or their equivalent, taken at a senior undergraduate level in the area in which graduate work is to be done or an area which is relevant to the graduate work. Candidates must achieve an average of at least a B in those four classes, as well as the overall B average for their degree.
- Some professional programmes offer a one year master's programme for which an honours degree or equivalent is not required for admission. See Departmental Listings for details of individual programme admissions.

A small number of mid-career Master's degrees (see 6.2.3 below) allow entry either with or without a Bachelor's degree, depending on the qualifications of the applicant. Currently, such programmes include the MBA (Financial Services) programme and the MPA (Management) programme. Admission to such programmes, as with all graduate programmes, is at the discretion of the Faculty of Graduate Studies.

2.3 Doctoral Degree Programmes

The criteria for admission to doctoral programmes are more rigorous than that for master's programmes. The successful completion of a Master's degree does not guarantee admission to a Ph.D. programme. Typically a Ph.D. thesis must represent an original contribution which advances the field of learning in the subject. It must be a significant piece of research and only those with a demonstrated ability to perform research at an advanced level will be considered for admission.

Candidates must hold:

- a) a first-class* research Master's Degree, or its equivalent, from a recognized university, for entry into a Doctoral programme with a two (2) year programme fee and residency requirement, (*the identification of a first class Master's degree is based on grades in class work; evidence of a well-written, high quality thesis, and other indicators, such as publications in refereed journals, presentations at scholarly conferences, etc.); or
- b) a Bachelor's Degree from a recognized university with a first class (i.e. a minimum of an A- average) honours standing (including a research dissertation) as granted by Dalhousie University, for entry into a Doctoral programme with a three (3) year programme fee and residency requirement.
- c) a first-class non-thesis Master's Degree may be considered for admission to the PhD where evidence of independent research can be clearly demonstrated, such as a major research paper, presentation at scholarly conferences, publications in journals, etc. Such candidates may also be admitted into a master's programme with the possibility of transferring into the doctoral programme, as described below.

A few departments will admit a Bachelor's graduate with a first class honours degree into the Master's programme and recommend them for transfer to the Doctoral programme within the first year of study. Also, in exceptional circumstances a student with a non-thesis Master's degree of first-class standing (average class grade of A- or better) may be admitted into a research Master's programme with the possibility of transferring into a Ph.D. on the basis of demonstrating outstanding academic and research potential. Students who wish to transfer from a Master's to a Doctoral programme must normally do so within the first 15 months of initial registration.

2.4 English Language Competency

As the standard language of study at Dalhousie University is English, candidates whose native language is not English must demonstrate their capacity to pursue a graduate-level programme in English before admission. The standard test is the TOEFL. The Faculty sets a minimum acceptable score of 580 for the written TOEFL and 237 for the computer, but some programmes within the Faculty set a higher minimum (especially if the students are expected to be Teaching Assistants). It is also recommended that potential students take the Test of Written English (TWE) component of the TOEFL in addition to the regular test. Where TOEFL is unavailable, the following tests will be accepted with the following minimum scores: MRLAB, 90; IRLTS, 7.

Further information on the TOEFL may be obtained from Test of English as a Foreign Language, Box 899, Princeton, NJ, 08540, USA.

Candidates with a TOEFL score of between 550 and 579 on the written TOEFL or between 213 and 236 on the computer TOEFL or who are unable to sit the TOEFL or other equivalent test, but otherwise meet all admission requirements and conditions, may be admitted to Dalhousie University with the pre-requisite that they attend the approved university preparatory programme. Students must successfully complete the programme and obtain a TOEFL score of 580 or better before being allowed to start their programme of study. In exceptional circumstances, such students may be admitted to their programme with the condition of successfully completing the language programme concurrently with their academic programme as long as it is completed no later than the end of the first twelve months of the programme. Additional requirements (such as the Test of Written English) may be required. This option is limited to situations where the university has entered into a special international agreement or in exceptional individual cases, and admission is at the sole discretion of the Faculty on recommendation of the department. For Teaching Assistants, a written TOEFL of at least 600 is normally required.

2.5 Conditional Admissions

If a conditional admission is approved, the condition (such as a successful TOEFL completion or other requirements) must be met within the first year of the programme at the latest. If the condition is not met within 12 months of initial registration, the student's registration will be terminated. Note that the Faculty may set a shorter time period for a condition to be met. Conditions on admission cannot subsequently be waived.

2.6 Graduate Examination

Some departments require GRE or GMAT scores of applicants as a criterion for admission. Check departmental listings for information on specific programme admission requirements.

2.7 Advanced Standing

Normally advanced standing cannot be given for classes already counted towards a previous degree but it can be used to reduce a master's programme from two years to one when the student's previous degree and standing markedly exceed the normal qualifications.

2.8 Students with Learning Disabilities

See University Regulations, page 11.

III. Graduate Application Process

3.1 Faculty Application Forms and Supporting Materials

All applicants for graduate programmes at Dalhousie must complete the Faculty of Graduate Studies Application for Admission Form. These forms may be obtained from the Registrar's Office, Dalhousie University, Halifax, NS, B3H 4H6, and should be returned to that office along with the application fee. All supporting materials (including references, official transcripts from all postsecondary institutions attended, official GMAT or GRE scores, official TOEFL scores, etc.) should be sent directly to the department to which the student is applying. In the case of applicants to the Interdisciplinary PhD programme, the supporting material should be sent to the Dean's Office of the Faculty of Graduate Studies. Note that supporting documents (transcripts, letters of reference, etc) will be verified for authenticity. Applicants submitting fraudulent documents will have their names published on the listserv of the Association of Registrars of Universities and Colleges in Canada.

3.2 Application Deadlines

See Admission Dates, pg. 3. Applicants who wish to be considered for university scholarship support are strongly advised to apply by January 31. All eligible candidates should also apply for external awards. Consult with your chosen department to determine scholarship availability and eligibility.

Applicants who require a student visa and are not funded by the University or an officially recognized funding agency must provide proof of financial ability with their application. Canadian immigration is increasingly rigorous about requiring proof of sufficient financial support to complete the programme of studies.

3.3 Departmental and Faculty Approval

All applications are reviewed by the appropriate department (usually the department's Graduate Studies Committee), and the department makes a recommendation to the Faculty for acceptance or rejection, including any required conditions of admission. At this stage, many departments will contact the applicants to let them know that the department has made a positive recommendation to the Faculty. While this may be a useful indication to the applicant that their application is progressing, it does not constitute official acceptance into the graduate programme, even if it is in the form of a written letter. Official acceptance is achieved when the Department recommendation has been approved by the Faculty, and a formal letter of acceptance is issued by the Registrar's Office. Successful applicants will also receive a letter from the Dean of Graduate Studies.

3.4 Official Response

All applicants will receive an official letter from the Registrar's office indicating whether or not they have been accepted into the graduate programme. This letter is the only official notification that the university sends out. All other forms of communication, including letters from the department and the Faculty, do not constitute official acceptance or rejection by the university.

3.5 Scholarship Awards

Successful applicants who are also approved for a Dalhousie Graduate Scholarship will receive a letter of notification of their award from the Dean of Graduate Studies.

IV. Registration Procedures and Regulations

Registration is the process by which the student officially establishes with the University (through the Office of the Registrar) the degree programme (MA, MSc, PhD, etc.) and status (full-time, part-time, etc.) and pays the appropriate academic fees (Student Accounts). Both aspects of the process (programme/status and fee payment) must be completed before a student can be said to be registered. Graduate students must maintain their registration status on a continuous basis and pay the required fees.

4.1 Registration Procedures

Registration material will be mailed to Canadian and continuing visa students in late June. Such students are encouraged to register early. Such students are reminded that they must inform the Registrar's Office or the Faculty of Graduate Studies Office of their current address. New visa students must register in person on or before the day specified by the Faculty. Students registering in person may do so at either the Registrar's Office or the Faculty of Graduate Studies office.

Continuing students who require an extension to their programme or have an outstanding progress report will not be permitted to register until the extension progress report has been officially approved by the Faculty of Graduate Studies. Students who do not register on or before the university's last day to register must apply in writing to the Faculty for permission to register. A financial penalty will apply. Any student who fails to register by the official deadlines will not be allowed to submit a thesis or obtain any service whatsoever from the University during that academic year.

Students who change their registration status by the addition or deletion of classes must report this to the Faculty Office. Changes in status, i.e. part-time to full-time or full-time to part-time, cannot be made after initial registration without permission of the Faculty of Graduate Studies.

For students registering in September, no changes to registration status will be allowed after November 30th.

Withdrawal from a degree programme should be reported immediately to the Faculty Office since reimbursement of fees is calculated from the official date of withdrawal.

4.1.1 Late Registration

Registration after the university's deadline is normally only permitted in unavoidable circumstances such as illness or required absence for research at the beginning of the next academic year (in September), but in all cases the penalty fee must be paid.

For continuing students, no late registration for September will be allowed after November 1.

New students accepted to begin programmes at other times must register by the deadlines listed in the Schedule of Academic Dates.

4.1.2 Failure to Register

Students who fail to register within the appropriate deadlines will not be allowed to submit a thesis nor will they receive any services whatsoever from the University during that academic year. Continuing students who fail to register by the final deadline will be automatically withdrawn from their programme, and will have to apply for readmission during the next available admissions cycle (see 4.1.5 below).

4.1.3 Withdrawal

Students who withdraw from a programme should immediately inform the Graduate Coordinator for their programme. The immediacy of notification is important since the amount and speed of fee reimbursement is influenced by the date of withdrawal. A withdrawal is not official until it has been approved by the Faculty and received in the Registrar's Office. Under no circumstances will the Faculty back-date a withdrawal notice. In any programme

designated as a "Limited Enrolment Programme", the first instalment of the fee is not refundable except on compassionate grounds (e.g. illness).

4.1.4 Required Withdrawal

A student may be required to withdraw from a programme for academic reasons (e.g. resulting from class failure or failure of comprehensive exams), for academic offences such as plagiarism, irregularities in the presentation of data, etc., (see Intellectual Honesty, pg. 16 and Senate Discipline Committee, pg.17), or for non-academic reasons, (see Code of Student Conduct, pg.). The student will be notified by the appropriate body of the reason for the required withdrawal.

4.1.5 Readmission of Students

A student who is withdrawn for academic reasons, voluntarily withdraws or whose registration has lapsed may apply for readmission within ten years of initial registration. Readmission is not automatic because of the competition for places with incoming students.

Readmitted students must pay fees for the years they were not registered, at the current fee rate.

Students in thesis programmes who have not maintained registration are normally required to have a satisfactory thesis in hand or a timetable for completion approved by the department's Graduate Coordinator and signed by the student and thesis supervisor, before they can be readmitted.

Students may be readmitted only once during the course of a programme. Application for readmission must meet normal application deadlines, and all outstanding fees must be paid.

A student who is academically withdrawn in a programme which allows them to carry one failure may be immediately reinstated following a recommendation by the Graduate Coordinator for an appropriate replacement of the failed course.

4.1.6 Concurrent Registration

A student may, with the Dean's permission, register for two concurrent degrees, either at Dalhousie or one at Dalhousie and one elsewhere, for a maximum of twelve months, usually the first academic year of the Dalhousie graduate programme. This does not apply to a Dalhousie student finishing a master's degree who has been accepted into a PhD programme. In that case, the student must first complete the master's and then register in the PhD programme in January, May or September as applicable and approved by the department. If the student fails to complete the master's degree for a particular entry point, the onus is on the department to defer the admission to the next available start date.

4.2 Categories

All students must register in each year and in each term of their graduate programme in one of the following categories:

4.2.1 Full-Time Student

A student who is carrying more than two and one-half (2.5) full-credit classes during the 12-month academic year or a student who has not yet completed the minimum number of years of full-time study required for a particular degree programme (e.g. the first two years of a doctoral programme require full-time status). A student may register full-time and hold jobs simultaneously only if the job involves no more than 16 hours' work per week, including a maximum of 10 hours as a teaching assistant.

4.2.2 Part-Time Student

A Master's student who is carrying not more than two and one-half (2.5) full credit classes during the 12-month academic year, or a student who has not yet completed the minimum number of years of part-time study required for a particular degree programme.

4.2.3 Continuing Student

A student who has completed the programme fee and residency requirements but has not yet finished all the degree requirements (usually the thesis). The student is required to pay a Continuing Fee. A Continuing Fee for a single term may apply during the final year in programme if all requirements can be met during that term.

4.2.4 Qualifying Student (Master's only)

A qualifying student is a person with a Bachelor's degree or its equivalent who meets normal Faculty admission standards and in whom a department has expressed an interest as a potential graduate student, but who is without a sufficiently strong academic background in a particular discipline to be enrolled directly into a Master's programme. For example, a Qualifying Year may be used for a student to take an Honours equivalency certificate, or to take a year of senior undergraduate courses in an area of deficiency in their undergraduate degree. Only in exceptional circumstances may a student be admitted to a Qualifying Year to upgrade a below-standard undergraduate degree or academic record.

Qualifying students can be full-time or part-time; take as little as one half-credit (0.5) class or as many as ten one-half (10 x 0.5) credit classes chosen from undergraduate classes or a mixture of undergraduate and graduate classes. If advanced standing for the graduate classes is anticipated, this information must be specified in the comments section of the application form. Because it is a prerequisite, a qualifying programme cannot be used to reduce the length of a subsequent regular graduate programme. Qualifying students are not eligible for scholarship or bursary support and must apply for admission to the appropriate graduate programme in the usual way towards the end of the qualifying period. Qualifying students must pass all the classes with no grades below a B- and an average of at least B, and fulfil any other requirements in order to be considered for admission.

There is no Qualifying Year for doctoral students, however, some departments admit students to the master's programme first and then consider them for transfer into the doctoral programme at a later date.

4.2.5 Special Student-Graduate Studies (SSGS)

With permission of the Faculty, students are sometimes permitted to take a graduate class outside of a programme. Such students, who have not been admitted to a graduate programme, may normally take a maximum of two full-credit classes (four half classes) with the permission of the class instructor and the appropriate graduate coordinator. Because all graduate classes must be taught at a consistent standard to graduate level students, non-programme students must have records which meet the minimum entrance requirements for a graduate programme (hence they must be approved by the Faculty as admissible to a graduate programme). Students are ineligible to apply for Special Student status in a class if they have been rejected from the programme on account of academic standing, or have been withdrawn from the programme. The registration category for non-programme students taking graduate classes is Special Student-Graduate Studies (SSGS).

Students who register in this category do so normally as an enrichment to their professional fields. Students trying to qualify for entry to a graduate programme must follow a different route: either a Qualifying Year programme, if eligible, or a programme of study as a Special Student in an undergraduate faculty.

Classes completed under SSGS status may not be used for credits towards formal graduate programmes unless approval has been granted by the Faculty at the time of admission.

4.2.6 Spring and Summer Sessions (Summer School)

In cases where a student is required by his/her department to take classes in their approved programme that are offered only during spring or summer sessions (known as Summer School), the fee will be waived by the Faculty. One credit is allowed in each of the two Summer School sessions within the limits allowed by the student's programme. Recommendations should be submitted by the department before the beginning of the first summer session. Registration dates for summer school appear in the Academic Dates section, pg. 1 of this calendar. Any student who is entitled to have the summer school fee waived must report to the Faculty Office prior to the beginning of the class.

4.2.7 Letters of Confirmation

A letter confirming a student's registration and/or scholarship status can be produced on request for an administrative fee of \$5. Students should contact the Faculty of Graduate Studies Office or the Registrar's Office for information on this service.

4.3 Approval of Programme

Every graduate student must have an individually approved programme of studies. The programme or course of study for each graduate student must be approved by the Graduate Coordinator in each department or programme and submitted for final approval to the Faculty of Graduate Studies. The Graduate Coordinator will enter the proposed programme (with the total number of credits required, the names and numbers of all courses required (including ancillary classes), and any other requirements and conditions) on the Programme Approval Form. The form must be signed by the student and the Graduate Coordinator before submission to the Faculty. The signed form should normally be submitted to the Faculty within one month of the official start of the student's programme of studies. Once approved, the Programme Form constitutes an agreed contract between the student and the university for the requirements to complete the programme. Any changes to the approved Programme Form must be agreed to by the Graduate Coordinator and the Faculty.

4.4 Leave of Absence

Students who need to take leave from their programme of study because of illness or a serious problem outside the student's control, may apply in writing through their department or school for a "Leave of Absence". If the department or school recommends to the Faculty that leave of absence be granted, and if the Faculty is also satisfied that the need is justified, such leave will be granted (see 4.4.2 below for permissible leave periods).

4.4.1 Terms of a Leave of Absence

An official leave of absence does not count towards time in programme (in effect, the clock stops ticking). Students may not hold any Dalhousie Scholarships during a leave of absence. During a leave of absence a student cannot study elsewhere for credit at Dalhousie.

A leave of absence not only frees the student from the necessity of paying tuition fees, it also releases the university from the obligation to provide the student with services. These include consultations with professors and student library privileges.

4.4.2 Periods and Application Deadlines for Leaves of Absence

Leaves of Absence can be granted for the following periods: September to December; September to August; and January to August.

Students at DalTech programmes may apply for leaves on a per term basis.

Applications for leave of absence (normally limited to one leave period during an individual's programme) must be made by August 31 for a leave commencing September 1 and December 20 for a leave commencing January 1 (DalTech students should check with the DalTech Graduate Studies Office for deadlines for applying for Leaves of Absence).

Under no circumstances will retroactive approval be given for leaves of absence.

4.4.3 Fee Refunds

If the leave is for four or eight months, the fees will be pro-rated accordingly. Any refund of fees will be governed by university regulations, see Fees Section Table III.

4.5 Suspension of Studies

Unexpected circumstances and short-term emergencies that do not warrant a Leave of Absence can be accommodated through a suspension of programme but no fee rebate is possible in such cases. A student must apply in writing to the Faculty for a suspension of programme stating the reasons and the length of time requested, and it must be supported by the Graduate Coordinator. A suspension relieves the student from responsibilities for completing classwork and other programme requirements during the period of suspension, but it does contribute to time in programme (*i.e.* the clock does not stop ticking).

4.6 Maternity Leave

Maternity leave of four or eight months will be granted without prejudice to academic standing or eligibility for financial support. Any refund of fees will be governed by university regulations, see Fees Section, Table III. In exceptional circumstances, paternity leave of 4 months may be granted.

4.7 Fees

Graduate students pay "programme fees" for fixed periods either as full-time or part-time students, followed by continuing fees until all requirements have been completed. Graduate students must remain registered continuously throughout their entire period of study, and payment of fees is essential for students to maintain their status in the programme and at the university.

4.7.1 Maintenance of Registration Status

All graduate students must maintain their registration status at all times and pay all the required fees (programme and continuing fees). Failure to pay required fees will result in the cancellation of registration. Graduate fees are paid per term. Students who fail to pay their fees on time will not be entitled to receive any services from the university or use any university facilities until they have been formally reinstated in their programme.

4.7.2 Programme Fees for Full-Time Students

Full-time graduate students pay Programme Fees for a specific number of years depending on the programme, after which they pay Continuing Fees until all the programme requirements are completed. Some programmes (mainly course-based) have fixed periods of fees regardless of undergraduate record, while for others the level of undergraduate qualification determines the number of years of programme fees that are required (this is normally reflected also in the number of courses required to complete the degree programme). Some programmes may vary between one year and two year fees depending upon the number of additional classes required to address a weakness in the undergraduate record. A few specialized programmes, such as the MBA (Financial Services) and the MEng (Internetworking), charge on a per-class fee structure. See Section 1.3 in these Regulations. The Graduate fee structure is under review and some changes may be made in 1999/2000.

4.7.3 Programme Fees for Part-Time Students

Part-time graduate students pay the same programme fee as full-time students spread over a maximum of three part-time years of study for every full-time year, except for the LLM degree where the maximum fee period for a one-year part-time programme is two years. If a part-time student completes the requirements for the degree before the normal full programme fees have been paid, the balance of those fees must be paid prior to graduation. Part-time students may take up to two and one-half (2.5) full credit classes in a 12-month academic year.

4.7.4 Continuing Fees

After students have completed the required programme fee period and have paid all their fees, but are still short of completing their programme, they pay a Continuing Fee until all the academic requirements of the programme have been completed. Usually, Continuing Fees are paid by students who are in the process of completing a thesis or graduate project.

Note: Under the programme or continuing fee, students may take only those classes specified by the department as requirements for the degree.

4.7.5 Differential Fees for International Students

Non-Canadian students are required to pay an additional Differential Fee (the amount being determined by the university and the Government of Nova Scotia) on top of the regular programme fees according to the following schedule:

Full-time Master's student (except Oral Surgery)	2 years (or equivalent)
Full-time Master's/MD student Oral Surgery	4 years
Part-time Master's student	6 years
Full-time PhD student (following a Master's degree)	3 years
Full-time PhD student (following a Bachelor's degree)	5 years

4.8 Identification Cards

Full-time, part-time and continuing students in a degree programme, will receive ID cards entitling them to University services.

4.9 Notification of Address

Students are required to keep the Registrar's Office, the Payroll Department (for students on funding) up to date on changes of address. Notifications from the University will be sent to the most recent address possessed by these offices; students will be held responsible for complying with these notifications, and non-receipt of material because of failure to report a change of address will not excuse students from such responsibility.

V. Scholarly Integrity, Intellectual Property, and Conflict of Interest

At all times, faculty members and graduate students must maintain the highest levels of integrity in their research, teaching, and educational endeavours.

5.1 Conflict of Interest

Faculty members and students are expected to declare any conflict of interest of a personal or financial nature which may influence explicitly or implicitly their participation in graduate programmes and graduate administration. In a small community such conflicts are sometimes unavoidable. It should nonetheless be possible to avoid conflict of interest in the following cases:

Members of FGS committees shall refrain from voting on matters pertaining to their own departments. No elected committee member shall serve on an award or grant committee (*i.e.* scholarship, postdoctoral fellowship, research development fund) for more than two consecutive terms.

No faculty member shall evaluate in a teaching context or supervise the thesis or project of a student who is a daughter, son, spouse, partner or other close relative, or a faculty colleague in the same department.

No student or supervisor shall have a financial or family interest in the industry or business in which the student is pursuing his/her thesis research. If a student is employed by the company in which the research is being conducted or the student's research is marketable under terms of the supervisor's grant or contract used to provide support for the student, protection must be given to the student's contribution to the research by means of an appropriate contract, finalized before the research for the degree is commenced and signed by all parties involved.

No graduate student can teach a graduate class without completing all the preliminary programme requirements and then only with the permission of the Dean of Graduate Studies and on the understanding that the graduate student is not the "professor of record". The class must not include any of the graduate student's peers (*e.g.* a PhD student can teach only Master's students). Graduate students in programmes offered at DalTech are not permitted to teach graduate courses.

5.2 Intellectual Honesty and Plagiarism

All students should read and be familiar with the University policies on Intellectual Honesty, pg. 16 as described in the University Regulations section of this Calendar.

5.3 Policy on Integrity in Scholarly Activity

In accordance with the Senate Policy on Integrity in Scholarly Activity, the Faculty of Graduate Studies has adopted guidelines which focus upon the involvement of graduate students in research and scholarly activity. Copies of the guidelines are available from the Faculty Office, from Graduate Coordinators, and from the Faculty web page.

5.4 Policy on Intellectual Property

Students should read and be familiar with the Faculty Policy on Intellectual Property, which is available from the Faculty Office and from the Faculty web page.

If students and/or faculty have concerns or doubts about any issue pertaining to any part of this Section 5, consult with your Chair, Graduate Coordinator, or Supervisor, or contact the Faculty Office for advice. If you feel uncomfortable with approaching your immediate supervisor, then go to the next level and ask to be heard in confidence.

VI. Degree Requirements

Graduate students have a maximum period of time within which to complete all of the requirements for their graduate programme.

6.1 Length of Programme

The normal upper time limits for the completion of degrees are:

One-year Master's, full-time:	Four years
One-year Master's, part-time:	Five years
Two-year Master's, full-time:	Five years
Two-year Master's, part-time:	Seven years
PhD and JSD, full-time only:	Six years

6.1.2 Extensions

Students in thesis programmes may apply for extensions to the upper time limits. A first extension of one year may be granted by the Faculty on the recommendation of the department, along with a satisfactory Progress Report Form completed and signed by the student and the supervisor.

Request for one further one year extension, the Final Extension, must include a report of progress in the previous year together with a detailed plan and timetable for completion of the thesis within the following twelve (12) month period. The student is then expected to defend and submit the approved thesis within that academic year. Further extension will only be given for one term to provide for necessary revisions to the thesis following defence. Under no circumstances can a student be registered in a programme for more than 10 years.

6.2 Requirements for the Master's Degree

Two types of Master's degree are offered: one based primarily on research (involving a thesis) and the other based primarily on formal classes. The class-based programmes are usually terminal degrees, while the thesis-based programmes can lead to doctoral studies. Master's programmes may also have additional requirements such as graduate projects, practicums, or internships.

6.2.1 Thesis-based Master's Degrees

The course of study for the research degree (MA, MASC, MARCH (First Prof), MSc, MDE, MEDS, MES, MURP and the thesis options available in the LLM, MArch (Post-Prof), MCSc, MEDS, MSc in Human Communication Disorders, MN, MLIS and MSW) may include graduate classes, seminars, preparation of fields of study, comprehensive examinations, demonstrations of foreign language proficiency, a thesis, and oral presentation and defence of the thesis.

Requirements vary considerably from programme to programme, and even within the same programme, depending upon students' previous experience and qualifications.

6.2.2 Class-based Master's Degrees

Non-thesis Master's programmes include the MBA, MBA (IT), MEng, MHSA, MITE, MMM, MPA, and non-thesis options in the MArch (Post-Prof), MEDS, MSc (Human Communication Disorders), LLM, MCSc, MN, MLIS and MSW. The number of classes varies and a graduate research project is often required.

6.2.3 Specialty and Executive/Mid-Career Master's Degrees

A number of specialty master's degrees have been and continue to be developed to meet specific needs and demands for graduate education in commerce, public service, and industry. Some but not all of these programmes are executive degrees designed for mid-career professionals. These are primarily class-based programmes, with some component of work and professional experience (either as part of the programme or as pre-requisites for admission). These programmes are normally based on a full cost-recovery, class-fee basis. They currently include the MBA (Financial Services), MPA (Management), MEng (Internetworking), and the MITE. Other such programmes are being developed.

6.3 Requirements for the Doctoral Degree

A candidate must demonstrate the ability to carry out research of high quality leading to an advance of knowledge in his/her area of study. In general, at least two (2) years must be spent in full-time study on the Dalhousie campus. The candidate's course of study will be initiated with the advice and direction of a supervisory committee. The Supervisory Committee must consist of the research supervisor and at least two (2) other members. The course of study

must include a preliminary examination and/or a comprehensive examination (to be taken in the second year of the programme, or not later than the beginning of the third year, and in no case not less than one (1) year before submission of the thesis) and preparation and oral defence of a thesis.

The course of study may include classes, seminars, comprehensive examinations, qualifying examinations, preparation of fields of study, demonstrations of foreign language proficiency, and any other requirements considered necessary for the clear demonstration of post-Master's-level comprehension, scholarship, and ability in the candidate's particular area of study. Comprehensive exams are only taken after all coursework is completed.

Candidates for graduate degrees frequently have teaching duties which are remunerated through the undergraduate and professional teaching faculties. The teaching duties of full-time graduate students must not exceed ten hours a week, including preparation time.

6.4 Classes

Classes may be full or half year (full or half credit respectively) and may be designated by the candidate's committee as "Required" (pass mark is B-) or "Ancillary" (normal undergraduate pass mark). Some departments cross-list postgraduate classes with senior undergraduate classes in which case the requirements for graduate students are more demanding than those for undergraduates.

If a student is permitted to take an undergraduate class (with an appropriate additional work requirement as approved by the Curriculum Committee) as part of their graduate coursework, the minimum B- grade also applies. Note that there is no W (Withdrawal) grade for graduate students. (See also 6.4.5 below.)

In those doctoral programmes which require completion of a specific number of graduate credits, students are not permitted to take undergraduate courses for credit, although such courses may be included within the required programme of studies (*i.e.* they are in addition to the required number of graduate credits).

6.4.1 Grading Policy

Faculty regulations stipulate that graduate students must achieve a minimum, or passing, grade of "B-" in all classes required as part of their degree programme. Any lower grade will be recorded as a failure (including Marginal Failure). All instructors of graduate classes (*i.e.* designated 5000 and above), with the exception of a few classes for which a pass/fail grading scheme has been approved, will use the following grading scheme:

Letter Grade	Numerical (%) Equivalent
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
FM (Marginal Failure)	67-69
F	<67

6.4.2 Ancillary Classes

Undergraduate classes which a department recommends as advisable additional background to the degree programme, but not specifically required for that programme, are termed ancillary classes and must normally be taken in a department other than the one in which the student is registered. The pass grade in these is the same as for the undergraduate faculty unless otherwise specified by the department. Ancillary classes must be listed on the Programme of Graduate Studies form but do not count towards the required number of classes for the graduate programme. Normally students are limited to one ancillary class (6 credit hours) in each year of their programme.

6.4.3. Letters of Permission for Classes Taken Outside Dalhousie Classes approved by the department and faculty (after examination of class descriptions) can be taken at other universities on "Letter of Permission" as part of the graduate degree programme provided that the class is not available at Dalhousie (including DalTech). The

maximum number of classes taken outside Dalhousie University shall normally be confined to 25 per cent of the class requirements except in those cases where a university-level agreement, governing specific cooperative arrangements, has been negotiated and is in operation. Grades received below B- for courses taken on a Letter of Permission at another institution will be recorded as a failing grade on the student's Dalhousie record. For non-Dalhousie classes taken by letter of permission, students must achieve a B- or better in order to achieve a pass standing at Dalhousie.

Graduate Students must be registered at Dalhousie and have paid appropriate fees before letters of permission will be approved. Full- and part-time students are eligible to apply to take a class on a letter of permission. Students may take no classes outside Dalhousie for graduate credit unless prior approval of a Letter of Permission has been received from the Faculty. Letters of Permission are not approved retroactively.

Dalhousie will normally pay the tuition for students to take classes by letter of permission that are offered at other Maritime universities, provided the class is not available at Dalhousie. Students who are required to take classes at other institutions outside the Maritimes will be considered on a case by case basis, e.g. if the class is a necessary component of a student's programme. Students who wish to take classes at institutions within or outside the Maritimes for non-academic reasons or for convenience may do so at their own expense.

Students who fail a class may not replace that class on a letter of permission.

The normal regulations governing grading policy (6.4.1) apply to classes taken at other institutions (i.e., a C+ on a graduate class taken elsewhere will be deemed an "F" in the student's programme and may render him/her liable to academic withdrawal).

6.4.4. Audits

Students may take one audit (equivalent of 6 credit hours) in each residency year of their formal programme. Audits must be listed on the Programme of Graduate Studies form, and must be relevant to the student's programme of study. Audits cannot be taken on Letter of Permission and will not be approved as part of a Qualifying programme.

6.4.5. Withdrawal From Classes

The final date for withdrawal from a class shall be the end of the first third of the class (see Academic Dates, pg. 1). For withdrawals within this period, the class and the withdrawal is not recorded on the academic record. After these dates, the student is responsible for the content of the class and receives a grade for it. Students must complete the appropriate class add/drop form, which must be approved by the instructor concerned. A late class drop is recorded as a failure. Unlike undergraduate classes, no "W" (withdrawal) grade exists for graduate courses.

6.4.6. Incomplete classes

A student who fails to complete the required work for a particular class during the normal period of the class will receive a grade of "F." However, where circumstances warrant it, a grade of "Incomplete" may be assigned. Subsequent completion of the work following the end of the class may result in a change of grade by the class instructor, as long as the work is completed before the following deadlines:

Fall term classes	Feb 1
Winter and Regular term classes	June 1
May-June classes	Aug 1
May-August classes	Oct 1
July-August classes	Oct 1

After these deadlines, an "Incomplete" grade cannot be changed without permission of the Faculty and will appear on the official academic record of the student.

At the discretion of the instructor, alternate arrangements for examinations, tests or the completion of assignments may be made for students who are ill, or in other exceptional circumstances.

Where illness is involved, a certificate from the student's physician will be required. This certificate should indicate the dates and duration of the illness, when possible should describe the impact it had on the student's ability to fulfil academic requirements, and

should include any other information the physician considers relevant and appropriate. To obtain a medical certificate, students who miss examinations, tests or the completion of other assignments should contact the University Health Services or their physician at the time they are ill and should submit a medical certificate to their instructor as soon thereafter as possible. Such certificates will not normally be accepted after a lapse of more than one week from the examination or assignment completion date.

For exceptional circumstances other than illness, appropriate documentation, depending on the situation, will be required.

Requests for alternate arrangements should be made to the instructor in all cases. The deadline for changing a grade of ILL is February 1 for Fall term classes and June 1 for Winter term and full year classes for the Regular session. For May-June classes the deadline is August 1. For July-August classes or classes that run from May-August, the deadline is October 1. Requests to change grades after these deadlines must be submitted in writing to the appeals committee of the appropriate school, college or faculty.

NOTE: Any student whose request for special arrangements has been denied and wishes to appeal, should refer to Appeals, page 110.

6.4.7 In Progress Classes

The grade of "In Progress" may be used only to report thesis classes, research project classes, and those designated as "open to independent completion of study." Final submission of grades for project and independent study classes is April 30 for A classes and August 31 for B and R classes.

VII. Examinations

There are four types of examinations for graduate students: 1. Class Examinations; 2. Qualifying or Preliminary Examinations, 3. Comprehensive Examinations; and 4. Thesis Examinations. This section deals with 1., 2., and 3. Thesis examinations are covered in Section 9.

7.1 Class Examinations

Examinations will normally be the method of grade assessment in graduate classes. There are no supplementary examinations for Graduate Students.

Pass Standard

- 1) Graduate students must achieve a minimum, or passing, grade of "B-" in all classes required of their degree programme, except those in programmes listed in 2) below. Any lower grade will be recorded as a failure. A student who fails to meet these requirements in any year is automatically withdrawn (academically dismissed) immediately from the programme. However, such a student may apply, in writing, to the department for readmission. Students who receive an FM are not necessarily assured of readmission and students who receive an F can still be considered for readmission. Readmission to a programme must be supported by the Graduate Co-ordinator, and must be approved in writing by the Faculty. Note that any academic withdrawal and readmission will be recorded on the student's official transcript.
- 2) In the following programmes, Business Administration, Health Services Administration, Library and Information Studies, Public Administration, and all DalTech programmes, students are allowed to carry one failing grade. However, no credit will be granted for the failing grade and the class must be repeated and a grade of "B-" or better obtained. (Failed core classes must be repeated, electives may be repeated or replaced at the discretion of the department). Failure of a second class results in immediate academic dismissal.

7.2 Qualifying or Preliminary Examinations

Some doctoral programmes require Qualifying or Preliminary Examinations. These occur early on in the doctoral programme (often within the first year) and are sometimes used to assess the transfer of a student from a master's to a doctoral programme. The exam may take the form of the presentation and defence of a doctoral research project, or it may involve a written or oral examination.

7.3 Comprehensive Examinations

These examinations in the candidate's area of study are part of Master's degree programmes in some departments and all PhD degree programmes. Refer to particular departmental entries for details. It is the responsibility of departments to make the necessary arrangements for these examinations. The PhD Comprehensive Examination should be taken in the second year of the programme or not later than the beginning of the third year. In no case should the Comprehensive be held less than one year prior to the submission of a thesis for defence. Comprehensive exams may only be taken after the completion of all required coursework.

The Comprehensive Examination may be oral, written, or both and covers subjects relevant to the general area of the candidate's research and teaching competency. Departments are required to set out their rules on PhD examinations in writing and to give a copy to each PhD student on or before registration and to the Faculty Office if the Departmental handbook provides insufficient detail. Failure to pass will result in academic withdrawal and may result in dismissal. However, on the recommendation of the department a student may be readmitted and permitted to repeat the examination (once) within twelve months of readmission. The Faculty Office must be notified immediately upon the successful completion of the examination process, and the result becomes part of the student's official record.

7.4 Academic Accommodation for Students with Learning Disabilities

See page 11 of the University Regulations section of this calendar.

VIII. Thesis Supervisors and Supervisory Committees

All thesis students must have a Supervisor (or co-supervisors) and a Supervisory Committee. In many departments, especially in the natural sciences and engineering, the appointment of a supervisor is a pre-requisite for admission into the programme. All graduate research projects must also have an Advisor, and in some departments, including all DalTech programmes, graduate research projects also require an Advisory or Guiding Committee.

8.1 Qualifications of the Supervisor

A thesis supervisor or co-supervisor must be a member of the Faculty of Graduate Studies, and will normally be from within the student's academic department or programme.

Depending on the unit, experience on supervisory or examining committees, teaching graduate classes, or acting as a co-supervisor may be necessary before undertaking the role of thesis or project supervisor. Most natural science and engineering departments require faculty research funding as a criterion for supervision. All programmes must lodge a copy of their criteria for supervision with the Faculty of Graduate Studies.

A doctoral student must be supervised by a faculty member with a PhD or its equivalent, and a master's student must be supervised by a faculty member with at least a Master's degree or its equivalent. Equivalency must be based on a faculty member's record of research activity and supervisory experience. In the case of co-supervision, at least one of the supervisors must have a doctoral degree or its equivalent (or in the case of a master's thesis, a Master's degree or its equivalent). In the event of a dispute over equivalency, the FGS Academic Planning Committee will be the final arbiter. Members holding post-retirement appointments or active in research in retirement cannot normally take on new students to supervise, but they can co-supervise with a full-time member of the faculty.

8.2 Co-supervision

The Faculty recognizes four types of co-supervision:

1. that dictated by regulation 8.1 above where a co-supervisor is added because the other supervisor does not have an appropriate academic qualification (e.g. a doctoral degree or equivalent);
2. that which arises from the desire of a student to draw equally upon the expertise of two individuals, or where an interdisciplinary project may require the equal expertise of two supervisors from different disciplines;

3. that which introduces a new faculty member to the standards of the department by providing an opportunity to work with an experienced supervisor; and
4. that which conforms to the Faculty practice regarding external supervisors or supervisors not from the student's department or programme. An honorary faculty member may be the academic supervisor of a Dalhousie student provided the student also has an internal advisor (see 8.3 below) to handle the administrative details. This is usually done to support the student within the department and the University, rather than for any reasons of academic need.

8.3 Internal Advisor

Not all units give the internal advisor the status of a co-supervisor. In those units where university-level agreements exist for the cooperative governance of the programme or where successful involvement of an external supervisor (honorary member of FGS) has occurred to the unit's satisfaction, the internal advisor is not necessarily a co-supervisor, the implication being that in a vote on a thesis, the external supervisor has an independent voice.

8.4 Supervisory Committees

All departments maintain supervisory committees for graduate students in thesis programmes, and many (including all DalTech programmes) maintain them for graduate research projects as well. Supervisory Committees are selected by the supervisor in consultation with the student, and should complement the expertise available to the student in completing their research programme. The selection of all Supervisory Committees is approved by the Faculty. It is in the selection of Supervisory Committees that the greatest involvement of Adjunct members of the faculty occurs. Supervisory Committees should meet at least twice a year during the thesis research period and more often in the writing stages of a student's programme. Normally the agreement of all committee members is required before a department brings forward a thesis for examination.

8.5 Guidelines for the Supervision of Graduate Students

These guidelines were developed in 1981 at a conference sponsored by the Faculty of Graduate Studies and the Dalhousie Association of Graduate Students. They were reviewed and endorsed by the Dean and Graduate Coordinators in January 1992. They were updated for inclusion in the FGS Governance Manual in 1995 (see revised manual, 1998). In 1996 they were updated and incorporated within the Faculty Guidelines on Integrity in Scholarly Activity, and will be updated again as the need arises. Where appropriate, units can adopt these guidelines for project students and their supervisors but they are designed primarily for thesis students.

8.6 Difference between theses in the Sciences and the Humanities/Social Sciences

In the Sciences, the MSc thesis may be regarded as a miniature PhD thesis, while in the Humanities and Social Sciences the MA thesis is considered as qualitatively different from the PhD thesis in degree of originality, sophistication of research, and the level of insights and interpretations expected.

In the Sciences and Engineering a change of supervisor may be more difficult to arrange than it is in the Humanities/Social Sciences, as Science students are generally more dependent upon the research grants of their supervisors. However, every effort should be made to rectify unpleasant situations.

8.7 Selection of Supervisor

In the Sciences, where students are not normally admitted until their research areas have been identified and faculty members have agreed to supervise them, a potential difficulty should be drawn to the attention of new students: some restriction of students' freedom to follow their own lines of research may result from dependence upon supervisors' research grants for a significant portion of their income. In extreme cases, students may feel that they are being used by supervisors for their own ends. When such conflicts of interest arise, the graduate coordinator and the candidate's supervisory committee should play a significant role in overseeing the development of the research and in protecting the student against over-specialization.

In the other disciplines which do not assign supervisors at the time of admission, the selection of a supervisor should be based primarily upon competence in the field of the proposed thesis topic. Within this restriction, the department should seek to accommodate the student's choice of supervisor, although it is not obliged to guarantee the choice. Departments are expected to maintain guidelines for determining the number of thesis supervisions a faculty member can concurrently undertake.

8.8 Responsibilities of Supervisors

When faculty members accept the supervision of graduate students, they assume several responsibilities:

- to provide reasonable access to students and to be available for consultation at relatively short notice;
- to be as helpful as possible in suggesting research topics and in assisting students to define their theses;
- to tell students approximately how long it will be before written work, such as drafts of chapters, can be returned with comments;
- to be thorough in their examination of thesis chapters, supplying, where appropriate, detailed comments on such matters as literary form, structure, use of evidence, relation of the thesis to published work on the subject, footnoting, and bibliographical techniques, and making constructive suggestions for rewriting and improving the draft;
- to indicate clearly when a draft is in a satisfactory final form or, if it is clear to the supervisor that the thesis cannot be successfully completed, to advise the student accordingly;
- to know the departmental and University regulations and standards to which the writer of a thesis is required to conform, and to make sure that the student is aware of them;
- to continue supervision when on leave, possibly with arrangements also being made for members of the supervisory committee to assist the student for the leave period;
- to advise and help the student to approach other faculty members for assistance with specific problems or even to request the reading of a chapter or section of the thesis.

8.9 Responsibilities of Students

When graduate students undertake the writing of a thesis, they assume several responsibilities:

- to choose a topic (often with the supervisor's help) and to produce a thesis that is essentially their own work;
- to produce a thesis which meets the standards of scholarship required by the University and the department, including demonstration of their capacity for independent scholarship and research in their field;
- to acknowledge direct assistance or borrowed material from other scholars or researchers;
- to realize that the supervisor has undergraduate or other duties which may at times delay the student's access to the supervisor at short notice;
- to give serious and considered attention to advice and direction from the supervisor;
- to submit their work to the judgment of the department and to abide by its decision when any rights of appeal, if exercised, have been exhausted;
- to know the departmental and University regulations and standards to which the writer of a thesis is required to conform.

8.10 Rights of Supervisors

Supervisors have the following rights:

- to expect students to give serious and considered attention to their advice concerning what they regard as essential changes in the thesis;
- to terminate supervision and advise the student to find another supervisor if the student does not heed advice and ignores recommendations for changes in the thesis, or if the student is not putting forth a reasonable effort;
- to have their thesis supervision properly credited by the department as an intrinsic part of their workload so that, in the assignment of duties, they are not overburdened to the point of having their effectiveness impaired as supervisors;
- to have the thesis-writer acknowledge, by footnoting, all portions of the supervisor's own research over which the supervisor wants to retain future rights of authorship;

- to have thesis-writers give permission for the results of their research to be used for the benefit of a larger project when they are working as assistants with their supervisor on research that is part of such a project — this is always with the understanding that students will retain scholarly credit for their own work and be given acknowledgment of their contribution to the larger project.

8.11 Rights of Students

Students have the following rights:

- to have a clear understanding of what is expected in thesis writing (expected length, acceptable methodology, validity of topic, notification of progress);
- to expect help from their supervisor in establishing a feasible topic and in solving problems and assessing progress as the thesis is being written;
- to receive a fair assessment of the completed thesis and explanations of negative criticism;
- to be allowed to have a new supervisor when they can offer convincing reasons to the department for the change;
- to be protected from exploitation by their supervisor or other faculty members if the latter should
 - a) intrude upon the student's right of authorship or fail to give a student authorship credit for team research (where applicable, the department's protocols on authorship should be provided to students before they embark on research), or
 - b) divert the student's efforts from the timely completion of the thesis;
- to submit a thesis even if the supervisor is not satisfied, although such action should be taken only in extreme cases and after full consultation with the department.

8.12 Responsibilities of the Department

Departments have certain responsibilities in supporting and maintaining their graduate programmes:

- to provide necessary facilities and supervision for each student admitted, and not to accept more candidates than can be offered effective supervision (Therefore departments should consider carefully such matters as faculty retirements, sabbatical leaves, teaching loads, and library resources before admitting each student with a declared research interest. When, as is often the case in many disciplines, applicants are unable to choose a field of research until they have had some experience in graduate study or in a particular department, the department should still regulate admissions according to the number of faculty members available for supervision);
- to uphold a high academic standard for theses;
- to provide adequate supervision at all times, so that, when a supervisor leaves the University for another permanent position, substitute arrangements are made as soon as possible;
- to allow students to change supervisors if their research interests shift or develop in a new direction and a change of supervisor will not deprive them of financial support;
- to provide procedures which assist and encourage students to complete the thesis, such as early review and approval of topic and methodology, guidelines on access and appeals, oversight of the students' schedule, and a clearly stated system of thesis review and evaluation;
- to regard supervision of graduate students as a major consideration in making replacement appointments for faculty;
- to encourage students to give papers as they proceed, so that they can test their ideas on a wider audience than the supervisory committee;
- to ensure that the graduate coordinator acts as a general overseer of students' progress;
- to instruct all students (or see that they attend Faculty-level workshops) on research ethics;
- to explain to students the University's policies on intellectual property rights.

IX. Thesis Regulations

9.1 Ethical Review

All thesis research involving human subjects must be approved by the Human Ethics Review Committee of the Faculty of Graduate Studies (some programmes use the Ethics Review Committee of the

Faculty of Health Professions). Application forms are available from the Faculty Office. Students should allow at least four weeks for processing during the regular school year, and at least five weeks in the summer months. Research using animals must be approved by the university's Animal Care Committee.

9.2 Preparation of Manuscript and Submission of Theses

Thesis manuscripts must be prepared in accordance with Faculty of Graduate Studies rules.

9.2.1 Preparation of Graduate Theses

All graduate theses, whether for master's or doctoral degrees, must be completed according to the formal Faculty regulations for thesis preparation and submission. All thesis students must obtain a copy of these regulations, and students are responsible for ensuring that their theses comply with all aspects of these regulations. Failure to do so may cause delays in completion, and may even result in the cancellation of a scheduled defence or examination.

Prior to amalgamation, Dalhousie and TUNS had their own regulations for thesis style and production. At the time of printing this Calendar, students at DalTech will continue to use the TUNS regulations, while students in all other graduate programmes will use the Dalhousie regulations. During the 1998/99 academic year, a single set of thesis production regulations will be produced. All students will be notified when that has been completed.

In the meantime, students may get copies of their appropriate thesis preparation manual from the following locations: for DalTech graduate students: DalTech Graduate Studies Office on the Sexton Campus will provide a copy of the TUNS manual on thesis submission and format entitled "The Preparation of Graduate Theses". This is also available on-line.

For all other graduate students: the Faculty of Graduate Studies Regulations for Submission of Theses are available from the Office of the Dean on the Studley Campus.

The regulations give details on: Manuscript Originality; Format and Preparation of Manuscript; the Order of Contents; Submission Deadlines; Mailing Costs; and other pertinent information.

9.2.2 Thesis Originality and Editing

A thesis must present the student's own work, and all students are advised to read the university regulation on Plagiarism (including self-plagiarism) under the University Regulations part of this Calendar. Also, students are advised to obtain a copy of the Faculty of Graduate Studies Policy on Integrity in Scholarly Activity (available from the Dean's Office or on the Graduate Studies web site), as well as the regulations for thesis preparation and submission.

All students are expected to be able to write their theses (and indeed, all their papers) in excellent English (or whatever language is permitted, such as in the case of some theses in the foreign language departments). While editorial correcting occurs as part of the supervisory process (as sections of the thesis are read and commented upon by Supervisory Committee members), faculty are not expected to have to make excessive correction to the standard of English. A committee member may refuse to read materials if they are not of an adequate standard of writing and expression for a graduate level programme. Supervisors should identify English problems early on, and ensure that the students take corrective measures, such as attendance at the university's Writing Workshops. These requirements can be made compulsory if the student's language deficiencies are problematic to the progress and success of the research.

Just as the academic content of the thesis must reflect the student's own work, so must the standard of writing and expression. While students are encouraged to make use of standard spelling and grammatical checkers within their word processing software, and indeed to have individuals proofread their papers and draft manuscripts, the use of "professional" editorial services (other than strict proofreading and formatting) is prohibited. The use of editorial services which provide substantive rewriting and/or improvement of the written English within a thesis is a form of academic fraud (similar to plagiarism) because it presents a

standard of work that has not been achieved by the student, and is therefore giving a false impression of the quality of the student's work.

If the use of any professional services (outside the University's Writing Workshops) is contemplated, students must consult with their supervisor and Graduate Coordinator before taking any action. If the Graduate Coordinator is in doubt, he/she should contact the Faculty Office for advice.

9.2.3 Submission and Registration Deadlines

All thesis students must refer to the Schedule of Academic Dates in this calendar for submission deadlines and registration deadlines. Students must be registered for the term in which they present their approved unbound theses to the Faculty Office, as well as for the term in which they have their defence. Students will not be permitted to submit their thesis or proceed to defence unless they are appropriately registered and all fees have been paid. Deadlines for the submission of fully completed and approved theses (following examination and revision) are final in all cases. Failure to meet the deadlines will result in additional registration fees being applied.

It is the responsibility of the student to ensure that all regulations have been met. Failure to comply with the regulations can result in delay in graduation.

9.3 Master's Theses

Theses for the Master's degree must be presented to the department for examination not later than March 14, for Spring Convocation, or August 25, for the Fall awarding of degrees. Five (5) unbound copies are required (original and four copies).

9.3.1 Supervision and Examination

Students who were registered in a master's thesis programme prior to September 1, 1997 should consult Regulation 9.3 in the 1996-97 Graduate Studies Calendar.

The mode of supervision and examination of master's theses varies somewhat from department to department. This diversity recognises differences in the nature of theses within master's programmes (such as the differences between Engineering, Sciences and the Humanities/Social Sciences) and differences in the culture of thesis examination within different disciplines at the master's level. The Faculty of Graduate Studies requires the following minimum arrangements for the supervision and examination of master's theses:

a) Master's Thesis Supervisory Committee

Each master's thesis candidate shall have a Supervisory Committee, comprising of at least two faculty members of the student's graduate department, one of whom shall be the supervisor. The supervisor may act as the Chair of the Committee, or an independent Chair may be appointed.

Additional full or adjunct members of the Faculty of Graduate Studies may be appointed as appropriate. Additional members of the Committee who are not members of the Faculty of Graduate Studies, including members of the non-university community (such as a practicing profession), may be appointed to the Supervisory Committee where their particular expertise makes it appropriate.

b) Master's Thesis Examining Committee

Each master's thesis shall be examined by an Examining Committee, which shall consist of:

1. A Chair, who shall be a department representative (either the Graduate Coordinator or their designate) who was not a regular member of the Supervisory Committee. If the Supervisory Committee had an independent Chair, that person may also Chair the Examining Committee. The main role of the Chair is to organize the examination of the thesis, inform the Faculty Office of the membership of the Examining Committee, ensure that the procedures are carried out in an appropriate manner, record the examiners' written comments and the results of the examination for inclusion in the student's file, and inform the Faculty of the outcome of the examination;
2. The Supervisory Committee or at least two members of the graduate faculty appointed by the department at least one of whom shall have not been involved with the supervision or direction of the thesis;

3. Where the Supervisory Committee is part of the Examining Committee, at least one additional member of the graduate faculty shall be appointed who may be from the candidate's graduate programme or department, but preferably should be from outside the involved programme or department. The additional examiner must not have been involved with the supervision and direction of the thesis and must be in a position to render an objective and impartial assessment of the quality of the work. Where appropriate, the additional examiner may be from a graduate faculty of another university. With permission of the Dean, the additional examiner may be a non-faculty member (such as a practicing professional who does not hold an Adjunct appointment with the Faculty) where it is deemed that they have the appropriate professional and academic qualifications and expertise to assess a graduate thesis. Departments may also use an External Examiner in a manner similar to that used for the examination of doctoral defences (i.e. the thesis cannot be approved without the agreement of the External Examiner).
4. The Dean of Graduate Studies (or his/her designate) may appoint a Faculty representative if it is deemed necessary, or at the request of the student or the Chair of the Examining Committee.
5. The examination of a master's thesis may be conducted either by use of an oral defence or by written submission of the thesis to the Examining Committee.
 - a) Oral Defence: In the case of an oral defence, it shall be public at least to the extent of being open to the faculty members and graduate students of the home department and any other departments that would be specifically interested. Where appropriate, interested members of the academic and non-academic communities beyond Dalhousie University should also be invited. A written description of the outcome of the defence, including written reports of the readers and any changes required, shall be included as part of the candidate's departmental file. The oral defence shall be carried out according to standard procedures, usually involving: a short presentation by the student; questions from the thesis committee (one or more rounds); in camera deliberation by the committee and agreement on the evaluation; presentation of the results of the exam to the student. Questions from the audience may be permitted before the in camera session if desirable.
 - b) Written Defence: Examination by written submission must provide for the candidate to be able to respond to the comments, criticisms and recommendations of the Examining Committee through the exchange of written commentary, and be required to make revisions as deemed appropriate by the Examining Committee. In the case of programmes that do not normally require an oral defence, the Dean of Graduate Studies may require such a defence if the circumstances warrant or if the Examining Committee or candidate requests it.
5. All theses are either approved or not approved. The categories are:
 - a) approved as submitted;
 - b) approved upon specific corrections being made (a clear timetable for completion of the revisions must be presented to the student, normally with a maximum of one month to complete the revisions);
 - c) rejected but with permission to re-submit a revised thesis for re-examination (a clear timetable for completion must be presented, normally with a maximum of one year to re-submit); and
 - d) rejected outright. In all cases, all members of the Examining Committee must submit written examination reports, dated and signed, which shall become part of the candidate's departmental file. The Chair's written report shall summarize the outcome of the examination process, the final decision and any conditions attached. In the case of an outright failure or failure with a right to submit by a specific date, the Graduate Coordinator must send a written notification of failure to the Faculty.

The above regulations are the minimum requirements of the Faculty of Graduate Studies, and some departments or programmes (including all programmes at DalTech) may have specific regulations which exceed these requirements. Students must check

with their Graduate Coordinator for details on how their department handles master's thesis supervision and examination. For all programmes at DalTech, master's thesis defences and research project presentations are organized and administered through the DalTech Graduate Studies Office by the Associate Principal for Graduate Studies and Research.

9.4 Doctoral Theses

Doctoral theses must display original scholarship expressed in satisfactory literary form consistent with the discipline concerned and be of such value as to merit publication. The subject of the PhD thesis must be approved by the Faculty at least twelve (12) months before the date of final examination.

9.4.1 Doctoral Supervisory Committees

All doctoral candidates must have a formally constituted Supervisory Committee, consisting of the Thesis Supervisor and at least two other members of the Faculty of Graduate Studies who are knowledgeable in the field of research. Membership of all doctoral Supervisory Committees must be approved formally by the Faculty.

9.5 Deadline for Graduation

For thesis students the published deadlines for the submission of the copies of the thesis to the Faculty Office in order to be eligible to graduate in May or October are final in all cases.

9.6 Regulations for the Defence of a Doctoral Thesis

All doctoral theses must be examined in a public oral defence, to be conducted by an examining committee recommended by the department and approved by the Faculty. A candidate shall not be permitted to proceed with the oral defence and examination until all of the following requirements have been met: (i) All required coursework completed successfully; (ii) Comprehensive examination passed; (iii) Thesis title approved; (iv) Examining Committee established; (v) the style and format of the thesis meets the requirements of the University and appropriate copies of the thesis have been submitted as per regulations and deadlines in paragraphs 1-10 below. Normally a candidate proceeds to oral defence with the approval of the supervisor and Supervisory Committee. A candidate may proceed without the consent of the supervisor and committee but a signed declaration included on the Thesis Submission Form is required by the Faculty.

Note that candidates in DalTech programmes submit their theses and associated forms to the DalTech Graduate Studies Office. Candidates in all other programmes submit them to the Office of the Dean.

9.6.1 Doctoral Defence Procedures

1. Registration of Thesis Title: The candidate shall register the proposed title of the thesis with the Faculty of Graduate Studies, no later than six months before submission of the completed thesis.
2. Appointment of External Examiner: The Chairperson of the Department (or Graduate Coordinator where appropriate) shall recommend to the Associate Dean three names (with C.V.s) listed in order of preference as submitted by the thesis supervisor (and approved by the Supervisory Committee) for the appointment of an external examiner at least three months before the anticipated date of completion of the thesis. The persons suggested should be acknowledged experts in the field or discipline of the research being examined in the thesis, must not have been directly involved in the student's research in any way, and should possess a doctoral degree or equivalent, and should normally have demonstrated experience of doctoral supervision and/or examination. Brief C.V.s should be submitted along with the names. The choice of the external examiner must be approved by the Faculty of Graduate Studies. If the first choice is unacceptable to the Faculty or if that person is unavailable, then the other names will be considered in order of identified priority. The formal invitation to the external examiner is issued by the Faculty (see para. 6. below).
3. Copies of Thesis Required for Examination: A minimum of five copies of the thesis are required, more if the Examining Committee is larger than the minimum Faculty requirements. The candidate shall submit one unbound copy of the completed thesis to the Faculty Office (two copies in the case of DalTech programmes and Interdisciplinary Ph.D. students),

together with the Thesis Submission Form and a c.v.. The thesis will be given a preliminary check by the Faculty for formatting and style. The deadlines for submitting unbound PhD theses to departments (see the Schedule of Academic Dates in the Faculty of Graduate Studies calendar under August, November and February) are also the deadlines for submission of the one unbound copy (with completed Thesis Submission Form) to the Faculty of Graduate Studies (see also para. 5. and 6. below). The copy is then sent to the External Examiner by the Graduate Studies office. At that time the candidate shall provide a copy of the abstract page from their thesis and a brief biographical sketch for publication in a public notice of the defence (this material must be submitted on an MS-DOS formatted disk in Word Perfect compatible format, or e-mailed to the Faculty Office).

4. Committee and Department Copies: The other four (or more as required) copies of the thesis will be submitted by the candidate to the departmental graduate coordinator, who will distribute them immediately to local members of the examining committee. One copy is held in the departmental secretary's office (or in the case of DalTech programmes in the DalTech Graduate Studies office) for use by other interested faculty and students.
5. No arrangements will be made for the oral examination until all of these requirements are fulfilled. The examination will be held no earlier than four weeks after submission of the thesis, thereby allowing adequate time for the thesis to be read by the external examiner.
6. The Associate Dean of Graduate Studies or the DalTech Associate Principal for Graduate Studies and Research will issue a formal invitation to the external examiner and will send a copy of the thesis (see para. 3. above) to him/her at least four weeks before the examination, with a request to submit a written appraisal (the Examiner's Report - see para. 8 below) of the thesis with a recommendation for the defence to either proceed or not proceed no later than one week prior to the date of the defence. If the recommendation is not to proceed, then the external will be asked to identify what would be required to make the thesis acceptable, and to return the thesis and cease any further involvement with the process unless otherwise contacted by the Faculty of Graduate Studies.
7. In consultation with the Chairperson of the Department, the graduate co-ordinator, and the research supervisor, the Faculty will establish a time and place for the examination.
8. The external examiner will submit by mail a constructively critical and analytical report (the Examiner's Report) to the Graduate Studies Office at least one week prior to the scheduled date of the defence, who will send a copy to the department chair or graduate co-ordinator. As stated in para. 6 above, the Examiner's Report must include a recommendation on whether or not the thesis should proceed to defence. Where the recommendation is not to proceed, the report should indicate what, if anything, would be required to make the thesis acceptable. Note that a decision to proceed to defence does not imply that the thesis is approved, only that it is acceptable for defence. The external examiner (and the examining committee) will have questions which must be answered to their satisfaction, and a thesis can be rejected as a result of the defence. The Examiner's Report must not be disclosed to the candidate or the Supervisory Committee (however, see para. 9. below). Normally the external examiner will attend the defence, but in the rare event of the external examiner not attending, the written report, accompanied by detailed questions to be read at the defence on the examiner's behalf should be submitted to the Faculty one week before the defence. The department will make every effort to arrange for alternative facilities (such as video- or teleconferencing) if they are appropriate to provide for the external examiner to participate in the defence even though he/she cannot be there in person.
9. The defence will only occur if the External Examiner states that the thesis may proceed. If the External Examiner states that the thesis should not proceed, then the department chair or graduate co-ordinator may, after consultation with the Supervisory Committee, request that the Faculty approach the next external examiner from their original list to get a second opinion (the candidate may have to provide another copy of

the thesis for this purpose). The Associate Dean or the DalTech Associate Principal for Graduate Studies and Research may request additional suggestions for external examiners if necessary. If the second external does not feel the thesis should proceed to defence, then the entire defence procedure will be cancelled and the candidate will have to meet with the Supervisory Committee to determine a course of action to revise and re-submit the thesis at a later date. Within 12 months, a revised and re-submitted thesis may be sent to the original external examiner(s) or an alternative examiner as deemed appropriate by the Faculty.

10. If the external recommends that the thesis proceed to defence, notice of the public defence of the thesis will be published and sent to all relevant departments by the Faculty. All interested faculty, students, and members of the public will be welcome to attend.
11. Variation of the regulations outlined above may be permitted only with the written permission of the Dean of Graduate Studies.

9.6.2 Oral Examination

The oral examination of a doctoral thesis is the culmination of the candidate's research programme. It exposes the work to scholarly criticism and gives to the candidate the opportunity to defend the thesis in public.

1. Chair of the Defence: The Examination is chaired by the Dean, the Associate Dean of Graduate Studies, the DalTech Associate Principal for Graduate Studies and Research or a member of the Panel of PhD Defence Chairs.
2. Examining Committee: The examining committee consists of, the research supervisor or co-supervisors, at least two additional members (who shall normally have been members of the Supervisory Committee), and the external examiner who shall be from outside the University. A departmental representative (either the chairperson of the department or a designate) may also be included as a member of the committee.
3. Order of Examination Proceedings: (i) the Chairperson opens the defence with a brief description of the proceedings; (ii) the candidate is questioned on the thesis following a summary presentation no longer than 20 minutes; (iii) the Chairperson will give priority to questions from the external examiner and then from the other members of the examining committee in some pre-arranged order; (iv) the audience will then be invited to ask questions; (v) the Chairperson adjourns the examination when the examining committee decides that further questioning is unnecessary, and the candidate and all members of the audience are required to leave the room; (vi) the Chair then presides over the examining committee during its deliberations in camera; (vii) following the in camera session, the candidate is invited back into the room and is informed of the decision of the committee; (viii) the Chair oversees the completion of the signing sheet as appropriate and completes the Defence Report and returns it immediately to the Faculty Office.
4. In camera Deliberations and Grading: The decision of the Examining Committee is based both on the thesis and on the candidate's ability to defend it. No thesis shall be approved without the agreement of an external examiner, except that a negative opinion of an external examiner who does not attend the examination should not prevail over the unanimous opinion of the other examiners present and voting. The thesis is graded "approved" or "not approved". A thesis can be accepted by the Examining Committee as submitted; accepted on condition that specific corrections are made; rejected with permission to submit a revised thesis; or rejected outright with no possibility of re-submission. It should be stressed that theses can be rejected on grounds of form as well as content.

If specific corrections are required, the thesis will be returned to the candidate and a time limit during which the corrections must be completed will be decided upon by the examining committee. Specific corrections will normally be left to the satisfaction of the local committee and research supervisor.
5. Proceedings in the Case of Rejection: If the thesis is rejected with permission to submit a revised thesis (within 12 months of the first defence), the revised thesis will be re-read by an examining committee, at least two of whose members were on

the original committee. The thesis shall be submitted to an external examiner who may be the original external examiner if the Associate Dean of Graduate Studies or the DalTech Associate Principal for Graduate Studies and Research considers this to be desirable. The candidate shall defend the thesis before an examining committee in the usual way. If rejected again, there are no third chances.

6. In all cases, the recommendation for degree must be approved by the Faculty of Graduate Studies and by the Senate.
7. Variation of the procedures stipulated above may be permitted only with the written permission of the Dean of Graduate Studies.

9.7 Thesis Binding

At the time of submitting their unbound, approved thesis (original and four copies) to the Graduate Studies Office, students will present a cheque for \$100.00* payable to the Faculty of Graduate Studies, Dalhousie University. This sum will cover the cost of binding. An additional charge will be made (where appropriate) to cover mailing costs.

The Faculty Office will arrange for the binding and subsequent distribution of theses as follows:

- (a) One (1) copy is sent to the author.
- (b) Two (2) copies are sent to the student's Department.
- (c) Two (2) copies are sent to the University Library which arranges for the production of microform copy to be retained in the National Library, Ottawa and listed in Dissertation Abstracts International or Masters Abstracts International. The National Library can then circulate such copy according to the International Inter-Library Loan Code, with full copyright protection; it also guarantees a permanent record of the thesis. The University Library retains one (1) bound copy in the University Archives.

* Binding cost is subject to change without notice

X. Convocation

Convocation ceremonies are held in May and October.

10.1 Letter of Confirmation for Completion of Degree

When a student has fulfilled all the requirements (including payment of all programme fee requirements and any continuing fees), for the degree in advance of the official graduation date, a letter to that effect can be obtained from the Registrar's Office. A small administrative fee (\$5 at the time of writing) will be charged.

10.2 Conferring of Degrees

Successful candidates for degrees are ordinarily required to appear at Convocation in the proper academic costume to have the degree conferred upon them. By special permission of the Senate, degrees may be conferred in absentia. Any graduating student who is unable to appear at the convocation is expected to notify the Registrar in writing prior to May 4 for the Spring Convocation, or October 1 for Fall convocation, giving the address to which the degree or diploma is to be mailed.

10.2 Academic Costume

Graduates of the University are entitled to wear gowns and hoods of black stuff. The distinctive part of the costume is the lining of the hood, which for the various degrees currently offered are as follows:

- MA: Crimson silk
 MBA: Turquoise silk
 MDE: Medium blue/scarlet border
 MES: Brown silk
 MHSA: Sky blue silk/white border
 LLM: Purple silk
 MArch (First Prof.): White/two parallel stripes of red corded border
 MArch (Post-Prof.): White/vermillion border
 MASc: Blue/gold border with white piping
 MASc/MURP: Peacock blue/gold border with white piping
 MCSc: Emerald green/gold border with white piping
 MBDS: White/three parallel stripes of white and vermillion corded border
 MEng: Blue/gold border
 MEng/MURP: Peacock blue/gold border
 MITE: Teal Green/white border with gold satin piping
 MLIS: Mid-forest Green silk
 MMM: Navy silk/seagreen border
 mN: Apricot silk

MPA: Sky Blue silk

MSc: Scarlet silk

MSc (Agriculture): Scarlet silk/gold chevron

MSc (DalTech): Blue/white corded border

MSW: Citron silk

MURP: Peacock blue/green corded border

PhD: Black gown faced with yellow silk; black hood with a lining of yellow silk; birretum is the doctor's bonnet of black velvet with yellow cord.

PhD (DalTech): Black gown with front panels of royal blue velvet edged with white; the yoke is pointed in the back with velvet edged in white, the sleeves are lined in white and covered half way up with velvet piped in gold; the hood is lined in white with a blue velvet border with gold piping along the inner side of the blue velvet, with a mortar board.

JSD: Black gown faced with olympic blue silk bordered with yellow silk; black hood with a lining of olympic blue silk bordered with yellow silk; birretum is the doctor's bonnet of black velvet with yellow and blue cord.

XI. Awards on Graduate Transcripts

A select number of Dalhousie Scholarships/Awards are recorded on the students official Dalhousie transcript. They are:

- Killam and Honorary Killam Scholarships,
- Eliza Ritchie and honorary Eliza Ritchie Scholarship,
- J. R. Johnston and honorary J. R. Johnston Scholarship,
- Governor General's Gold Medal.

An official letter confirming other Dalhousie scholarships (e.g. Dalhousie Graduate Scholarships) can be obtained upon request from the Faculty of Graduate Studies Office. An administrative fee of \$5.00 will be charged.

XII. Appeals

Faculty decisions are subject to the normal appeals procedures which begin with the Department, School or College, then, if necessary, the Dean. If still unresolved, the student may appeal to the Academic Appeals Committee of the Faculty of Graduate Studies. There are no appeals on admission decisions, or decisions on scholarships or bursaries.

XIII. Departmental Listings

The following entries are designed to provide general information about particular graduate programmes. Although general Faculty of Graduate Studies requirements apply to all graduate programmes, the methods of fulfilling these requirements vary considerably among Departments.

Detailed, up-to-date information is located in departmental publications.

Each Departmental entry includes the following information:

1. A list of faculty members engaged in the teaching of graduate classes and/or the direction of graduate research. Faculty members whose major appointments are in other Departments are so indicated. In addition, the names of other researchers in the Department and honorary appointees may be listed. Beside each name there may be a list of keywords indicating the major areas of research expertise and interest of the faculty member.
2. A description of facilities available may be included. Some general regulations may be described.
3. A list of admission requirements in addition to those of the Faculty of Graduate Studies. In some cases the minimum requirements outlined in Section 2 are not sufficient for entry into a particular programme. Other particular requirements may be listed.
4. A description of degree programme requirements includes:
 - (a) Minimum time required to complete the programme
 - (b) Tuition Fees (based on the previous year's fees)
 - (c) Class work required
 - (d) Other academic requirements
 - (e) Thesis requirement
 - (f) Other requirements

5. A representative list of class offerings and brief class descriptions. Not all of the classes will necessarily be offered in a given year.
6. An extensive list of areas of specialization.

Departments are listed alphabetically. Programmes at DaTech are listed together following the other graduate programmes.

Agriculture

Location: Nova Scotia Agricultural College
Truro, NS B2N 5E3
Telephone: (902) 893-6360
Fax: (902) 897-9399

Professors

- Adsett, J.**, BSc (Agr) (McG), MScE (UNB), PhD (Sask), Agricultural Engineering. Automated Monitoring, Machine Design & Development, Environmental Concerns, Aquifer Thermal Energy Storage.
- Anderson, D.M.**, BSA, MSc (Man), PhD (Sask), Animal Science Department. Nutrition and Metabolism of the monogastric Species; Swine, Fin Fish, Poultry, Management of Swine, Head.
- Asiedu, S.**, BSc (Agr), MSc, PhD (McG), Plant Science Department. Plant-microbe Interactions, Post-Harvest Physiology/Pathology of Horticultural Crops, Potato Physiology, Production Management.
- Burnside, E.B.**, BSA, MSA (Tor), PhD (N Carolina), Animal Breeding Genetic Improvement of Cattle for Profitability, Strategies.
- Caldwell, C.D.**, BSc (MtA), MSc (Dal), PhD (East Anglia), Plant Science Department. Crop Physiology, Carbon & Nitrogen Assimilation, Water Relations, Cereals & Oil Seeds Management.
- Crober, D.C.**, BSc (Agr), MSc (McG), PhD (UBC)
- Farid, A.**, BSc (Bishops), MSc (Shiraz), PhD (Alta), Animal Science Department. Quantitative Genetics, Animal Breeding, Population Genetics, Application of Molecular Genetics in Animal Improvement, Genetics of Growth and Carcass Composition, Sheep Production and Management.
- Fredeen, A.H.**, BSc (Sask), MSc (Guelph), PhD (Davis), Animal Science Department. Dairy Systems, Nutrition, Sustainable, Modelling, Pasture, and Milk Composition.
- Gray, A.B.**, BSc (Bishops), MSc, PhD (McG), Environmental Sciences Department. Plant Pathology. Control of fungal diseases of ginseng, fruit crops and forages.
- Ju, H.Y.**, BSc (Agronomy) (Seoul), MSc, PhD (McG), Plant Science Department. Fruit Crops, ginseng, mushrooms, growth regulator, cold hardiness, embryo development
- Le Blanc, J.-P.**, BA (Montreal), BSc (Quebec), PhD (McGill), Environmental Sciences Department. Integrated pest management, subsurface drainage, and irrigation scheduling.
- Lirette, A.**, BScS (Medicine), BScA, MSc (Laval), PhD (Alta), Animal Science Department. Beef Cattle, opportunity feeds, aging, energy metabolism, digestive physiology, NMR, MRI, animal tissue culture.
- Madani, A.**, BSc (Pahlavi), MSc (UBC), PhD (Wash), Agricultural Engineering. Water quality, water table management, subsurface drainage, and irrigation scheduling.
- Nowak, J.**, MSc, PhD, PhD Hab (Olsztyn), Plant Science Department. Forage legumes, plant stress physiology, test tube ecophysiology, utilization of beneficial microorganisms, potatoes tissue culture. Head.
- Stratton, G.W.**, BSc (Agr), MSc, PhD (Guelph), Environmental Sciences Department. Environmental contaminants, Industrial Wastes, Pesticides, Microbial Aspects of Nutrient Cycling, Biodegradation of Environmental Toxicants.
- Tennissen, T.**, BSc, MSc, PhD (Alta), Animal Science Department. Applied ethology, domestic animal behaviour, animal welfare, design of housing for farm animals.
- Warman, P.R.**, BSc (Agr) (Rutgers), MSc, PhD (Guelph), Environmental Sciences Department. Soil fertility, composting research & sustainable agriculture.

Assistant Professors

Goodyear, S.N., BSc (Agr) (McG), MSc, PhD (Guelph), Plant Science Department. Vegetable production management and cultivar evaluation, physiology of vegetable crops.

Associate Professors

- Astatkie, T.**, BSc, MSc (Addis Ababa), PhD (Queen's), Math, Physics and Humanities Department. Time series analysis, linear, nonlinear and nonparametric regression, and design of experiments.
- Atlin, G.**, BSc (Agr), MSc (Guelph), PhD (Iowa), Plant Science Department. Plant breeding, quantitative genetics.
- Brewster, G.**, BA (Hon), MSc, PhD (Western), Environmental Sciences Department. Soil conservation, spatial variability and human impact assessments.
- Crowe, N.L.**, BSc (Agr), MSc (McG), PhD (Guelph), Environmental Sciences Department. Food chemistry, food quality, food safety, modified atmosphere packaged food, chemical analysis of essential oils.
- MacLaren, L.A.**, BSc, MSc (Alta), PhD (Calif), Animal Science Department. Bovine reproductive physiology, integrin expression, implantation, embryo development, and estrus synchronization.
- Martin, R.C.**, BA, MSc (Carleton), PhD (McG), Plant Science Department. Forage agronomy and sustainable agriculture, multiple cropping systems, rotational grazing.
- Nams, V.O.**, BSc (UofT), MSc (Alta), PhD (Calif), Environmental Sciences Department. Spatial scales, landscape ecology, gracial analysis, behavioural ecology, and mammals.

Research Professors

- Barika, E.**, BSc (Marrakech), MSc (Bordeaux-II), PhD (Reims), Plant Science Department. Plant Physiology. Potato tuberization, postharvest physiology and plant stress mechanisms.
- Lada, R.R.**, BSc (Hort.), MSc (Hort.) (TNAU, Coimbatore), PhD (Adelaide), Plant Science Department. Biostress Defense Molecules, Inter & Intra-Plant Communication, Environmental Regulation of Plant Development, Bulking Physiology, Resource competition Modelling.
- Omielan, J.**, BSc (Agr) (Guelph), MS (Penn State), PhD (Calif), Plant Science Department. Cropping Systems. Nutrient management, soil quality, stress physiology, plant genetics and agroecosystem dynamics.
- Percival, D.**, BSc (Agr), MSc, PhD (Guelph), Environmental Sciences Department. Lowbush blueberry, plant nutrition, regulation and water relations, carbon assimilation and metabolism.
- Rouvinen, K.**, BSc, MSc, PhD (Kuopio), Animal Science Department. Fur Animal Nutrition and Management. Nutrient digestion and excretion in carnivores, feedstuff utilization, feed quality and fur growth cycle.

Adjunct Professors

- Boiteau, G.**, BSc, MSc (Laval), PhD (N.Carolina)
- Christie, B.R.**, BSA, MSA (UofT), PhD (Iowa)
- Doohan, D.J.**, BSc (Agr) (Guelph), MSc, PhD (NC State)
- Gordon, R.J.**, BSc, MSc (McG), PhD (Guelph)
- Papadopoulos, Y.A.**, BSc, MSc, PhD (Guelph), Agriculture Canada
- Prange, R.K.**, BSc (Acadia), MSc (BC), PhD (Guelph)
- Singh, R.P.**, BSc (Agr), MSc (Agr) (Agra Univ), PhD (N. Dakota)

The above NSAC faculty and adjunct professors are members of the Faculty of Graduate Studies, Dalhousie University.

I. Admission

The Nova Scotia Agricultural College has facilities for advanced study and research leading to an MSc in Agriculture.

The Master of Science degree is granted by Dalhousie University in cooperation with the Nova Scotia Agricultural College.

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. All inquiries for admission should be addressed to: The Research & Graduate Studies Office, Nova Scotia Agricultural College, P.O. Box 550, Truro, Nova Scotia B2N 5E3

Please refer to the Admission Dates section for final dates for receipt of application for admission.

A. MSc Degree Programme

Formally approved in the Spring of 1993, the Master of Science in Agriculture represents a unique co-operation between Dalhousie University and the Nova Scotia Agricultural College.

The Master of Science degree is granted by Dalhousie University in association with the Nova Scotia Agricultural College, the only educational institution in the Atlantic Region with the faculty and facilities capable of providing such a programme of study.

Graduate students attend classes at the Nova Scotia Agricultural College and, on occasion, supplement their programme with courses at Dalhousie University. Students may choose to concentrate their studies in any of the following areas:

Agribiology: Waste Management, Environmental Microbiology, Ecology, Pest Management, Botany, Plant Pathology
Agricultural Chemistry: Food Science, Agricultural Chemistry
Soil Science: Soil Chemistry, Nutrient Management, Soil Fertility, Geology, Composting and Waste Management, Drainage, Irrigation, Water Table Management, Water Quality
Animal Science: Nutrition, Animal Behaviour, Genetics and Breeding, Animal Product Technology, Physiology, Animal Management, Aquaculture
Plant Science: Crop Physiology, Plant Breeding, Plant Biotechnology, Crop Management, Agronomy

The MSc in Agriculture programme is research centred. All students must complete a research thesis embodying original contribution in the thesis field of study. The thesis is defended at an oral examination.

Required classes include AGRI 5700.03R Communication Skills and Graduate Seminar and AGRI 5710.03R Graduate Module Class, the content of which is influenced by specific student needs.

In addition, each student demonstrates in the laboratory of at least one undergraduate course in order to gain knowledge and experience in classroom instruction.

II. Classes Offered

Graduate classes are intended only for students registered in the MSc programme and may be taken by undergraduate students only under exceptional circumstances.

Where an undergraduate student wishes to take one of these graduate classes, the following signatures are required for approval: the instructor(s), the relevant Department Head(s), and the Graduate Coordinator.

Classes marked with an asterisk (*) are offered in alternate years. Please check the current timetable to see whether a particular class is being offered.

AGRI 5210.03: Special Topics in Environmental Microbiology.

This class will allow students to study a particular topic in the field of environmental microbiology in more depth than would be practical in a general course. The student will choose a topic in consultation with the instructor. An in-depth literature search will be required and the material gathered will be discussed in weekly tutorial sessions. Laboratory work will be conducted when required and if appropriate to the topic chosen. Topics for study can be of either a theoretical or applied nature, with the needs of the student being a primary factor in finalizing the topic.

INSTRUCTOR: G. Stratton
FORMAT: Lecture 3 hours

AGRI 5220.03: Special Topics in Weed Science.

Topics might include: evolution of weeds, impact of weeds on human history, weed ecology and physiology, crop/weed interactions, herbicide chemistry, physiological and biochemical behaviour of herbicides in plants, environmental fate of herbicides, myco-herbicides, biorationals. Two term projects and a research critique will be required.

INSTRUCTOR: D. Doohan
FORMAT: Lecture 3 hours

AGRI 5240.03: Special Topics in Environmental Impact.

This class will allow students to study a particular topic in the field of environmental impact or environmental toxicology in more depth than would be practical in a general course. The student will choose a topic for study in consultation with the instructor. An in-depth literature search will be required and the material gathered will be discussed in weekly tutorial sessions. Laboratory work will be conducted when required and if appropriate to the topic chosen. Topics for study should be related to the student's area of research or interests.

INSTRUCTOR: G. Stratton
FORMAT: Lecture 3 hours

AGRI 5250.03: Soil Microbiology.

This class is designed to provide an intensive study of the microbiology of soils and will emphasize nutrient cycling and biodegradation. Topics covered include the relationships between the abiotic and biotic components of soils, the microbial biochemistry of the carbon, nitrogen, sulphur, phosphorus, and selected micronutrient cycles, heavy metal cycling, and the microbial degradation of industrial wastes and pesticides. The laboratory classes will concentrate on techniques to monitor the microbial biomass in soil and the microbial components of nutrient cycles. These include new advances in bacterial taxonomy and identification and the use of gas chromatography and high performance liquid chromatography in quantitating nutrient cycling. In addition to a major term paper, a comprehensive laboratory report on the entire term's lab work, and a single take-home examination, graduate students will be required to:

- modify the term paper into a critical review of some aspect of soil microbiology (chosen in consultation with the instructor); the review must be current and in depth; it must be written in manuscript format and will be graded accordingly,
- perform additional laboratory exercises not assigned to undergraduate students; use more replicates; perform a full statistical analysis of data; provide a report in manuscript format,
- give a seminar to the class on their term paper topic.

INSTRUCTOR: G. Stratton

CROSS-LISTING: B400

FORMAT: Lecture 3 hours, lab 4 hours

AGRI 5260.03: Special Topics in Plant Pathology.

This class will be custom-designed to meet the specific needs of graduate students specializing in the area of plant pathology who need further specific knowledge and/or skills.

INSTRUCTORS: A.B. Gray, R.P. Singh
FORMAT: Lecture 3 hours

AGRI 5270.03: Economic Entomology.

Insect pest management in agriculture with emphasis on a selection of non-chemical approaches to insect control, e.g. natural, mechanical, physical, cultural, biological, biochemical, and/or legal control. According to student(s) interest, a section on chemical control can be included. This class is consistently in accord with the theory and principles of integrated pest management (IPM) and consequently, the term assignments will incorporate the study of sampling techniques and monitoring methods of insect pests and related beneficial arthropods. Attendance to certain relevant seminars may be required and directed readings may be assigned. A case history of a major agricultural insect pest will be included to satisfy the course requirement. The material will be submitted in term paper format and also delivered in an oral presentation. The case history will include the life cycle, host plants, pest status, damage, losses, control measures, research needs and IPM programs pertinent to the particular species.

INSTRUCTOR: J.-P. Le Blanc

FORMAT: Lecture 2 hours, tutorial 1 hour

AGRI 5310.03: Special Topics In Applied Ethology.

Class content will vary. Topics covered will be chosen so as to meet the requirements of individual graduate students. Aspects could include the assessment of farm animal welfare, foraging behaviour, environmental enrichment, social dynamics of livestock, early rearing environment and the effect on later behaviour.

INSTRUCTOR: T. Tennesen

FORMAT: Lecture 3 hours

AGRI 5320.03: Special Topics In Animal Nutrition.

The class is designed to provide an opportunity to study specific aspects of animal nutrition. Aspects could include study of a particular nutrient, a process in nutrition, a nutritional state, or nutrient metabolism of a specific species with focus on the research method. The student is advised to consult with their supervisor to determine the specific scope of the topic to be studied.

INSTRUCTORS: D. Anderson, A. Fredeen

FORMAT: Lecture 3 hours

AGRI 5340.03: Special Topics In Animal Physiology.

This class is for students with a major interest in animal physiology. The class will consist of discussions, term papers and presentations. Students will be expected to nominate topics for consideration and to prepare major reviews and class presentations of selected topics.

INSTRUCTOR: L. MacLaren

FORMAT: Lecture 3 hours

AGRI 5350.03: Animal Research Methods.

This class is designed for students who are, or expect to be, working in Animal Science, or who have an interest in the methodology and ethics of animal research. The class will include consideration of some of the common or promising laboratory and field methods associated with domestic animal research, ethics of animal research, the analysis and interpretation and reporting of results. Students will be expected to participate in exercises, to contribute to discussions, and to present reviews on various aspects.

INSTRUCTOR: Animal Science Faculty

FORMAT: Lecture 3 hours

***AGRI 5360.03: Protein Nutrition.**

(May not be offered in 1998-99)

A study of the sources, availability and metabolism of protein and amino acids for the domestic animal. Subjects addressed include discussion of sources of protein, factors affecting digestibility of protein, digestion and absorption of protein and nitrogen, urea recycling, individual amino acid metabolism, excretion of nitrogenous wastes in birds and mammals, and protein and amino acid requirements of animals.

INSTRUCTOR: D. Anderson

FORMAT: Lecture 3 hours

AGRI 5370.03: Special Topics In Animal Breeding and Genetics.

Provides students with an opportunity to pursue more detailed studies in Animal Breeding/Genetics. Topics will be decided on by the student in consultation with faculty members for the purpose of meeting the student's specific needs as defined by the thesis research. Delivery will be a combination of directed reading and tutorial discussions.

INSTRUCTOR: D.C. Crober

FORMAT: Lecture 3 hours

AGRI 5380.03: Quantitative Genetics.

An introduction to quantitative genetics theory and to statistical techniques used in domestic animal improvement. Computing and statistical techniques will be demonstrated, will be presented and relevant literature will be surveyed. Reference will be made throughout to performance recording programs used in Canada and throughout the world.

INSTRUCTOR: D. Patterson

FORMAT: Lecture 3 hours

AGRI 5390.03: Molecular Genetic Analysis of Populations.

This class is designed to give graduate students some understanding of the theoretical aspects of population and molecular genetics. Various DNA fingerprinting techniques, such as minisatellites, microsatellites, RAPD-PCR, RFLP-PCR and SSCP-PCR, and their applications in population genetic studies will be discussed. Students will acquire hands-on experience with some of these techniques. Analysis of molecular data to estimate intrapopulation populations (heterozygosity, Hardy-Weinberg equilibrium) and interpopulation parameters (test of heterogeneity of allele frequency distributions, genetic distances, phylogenetic analysis, bootstrapping, F-statistics) will be covered.

INSTRUCTOR: A. Farid

FORMAT: Lecture 3 hours, labs 4 hours

AGRI 5410.03: Special Topics In Soil Fertility.

This class is designed to provide an opportunity to study specific aspects of soil fertility. Topics may include the influence of soil biological, chemical and physical properties and processes on nutrient absorption and plant growth, with emphasis on essential plant nutrients in the soil and methods for evaluation, as well as the use of inorganic and organic amendments.

INSTRUCTOR: P. Warman

FORMAT: Lecture 3 hours

AGRI 5430.03: Special Topics In Environmental Analysis.

Students may apply to undertake either a specially designed class in environmental analysis, or to undertake additional work further to Organic Environmental Analysis. This may be facilitated with written consent from the instructor who then assumes personal responsibility for supervising the work.

INSTRUCTOR: J. Hoyle

FORMAT: Lecture 3 hours

***AGRI 5440.03: Organic Environmental Analysis.**

(May not be offered in 1999-2000)

This class has limited enrollment. The course will involve the study of the analytical chemical techniques used in the analysis of environmental samples obtained from the atmosphere, hydrosphere, and lithosphere. Included in this study will be the sampling methods used for air, water, soil, food and wastes, and modelling of environmental contamination. In addition, government regulations, hazard assessment and public awareness of these issues will be discussed. In addition to successfully completing examinations graduate students will be required to perform the following tasks:

- To write a major paper on an important topical issue.
- To present that paper as a seminar before Departmental faculty, staff & students.
- To write a research proposal prior to starting the laboratory project.

INSTRUCTOR: J. Hoyle

FORMAT: Lecture 3 hours, labs 4 hours

CROSS-LISTING: CS420

***AGRI 5450.03: Environmental Soil Chemistry.**

(Next offered in 1999-2000)

This class is designed to provide an opportunity to study specific aspects of environmental soil chemistry. Topics may include the chemical composition of soils with special attention to soil biochemistry and soil organic matter with an emphasis on organic matter-clay interactions, soil organic N, P and S, and soil enzymology. Graduate students will be expected to participate in lecture/discussion sessions and complete required reading assignments. In addition, graduate students will be required to complete research papers and present their findings at in-class seminars.

INSTRUCTOR: P. Warman

FORMAT: Lecture 3 hours, labs 4 hours

CROSS-LISTING: CS440

AGRI 5460.03: Special Topics in Soil and Water Management.

This class will discuss state-of-the-art soil and water management practices in either humid or arid regions, depending on the specific needs of the graduate students. Topics may include: fundamentals of soil and water properties; drainage and water table control; management of farm irrigation and drainage systems; salinity control; irrigation water requirements; drainage requirements for humid and arid regions; soil conservation; and computer modelling of irrigation and drainage systems. Guest speakers will be invited to share their experience with students.

INSTRUCTORS: R. Gordon, A. Madani, P. Havard
FORMAT: Lecture 3 hours

AGRI 5470.03: Special Topics in Analytical Instrumentations for Researchers.

This class will be designed to meet the needs of graduate students who are using analytical instruments in their research. The class will provide the graduate student with specific theoretical knowledge and the necessary practical skills required to properly use the instruments of interest. The student will select either one of the following areas for a detailed consideration of 2 to 3 of the following areas for a more general coverage: gas chromatography, liquid chromatography, atomic analysis, DNA or protein electrophoresis, infrared or fluorometric analysis, NMR, and mass spectrophotometry, microscopy.

INSTRUCTORS: N. Crowe, G. Stratton
FORMAT: Lecture 3 hours

AGRI 5510.03: Special Topics in Plant Breeding.

This class will be designed to meet the specific needs of graduate students specializing in the area of Plant Breeding who need further specific knowledge and/or skills.

INSTRUCTORS: G. Atlin, Y. Papadopoulos
FORMAT: Lecture 3 hours

AGRI 5520.03: Plant Breeding Methods.

Genetic and statistical principles underlying modern plant breeding methods are introduced. Those principles will be reinforced through the use of computer models. Cultivar development techniques for self- and cross-pollinated species are examined in detail. Applications of tissue culture, genetic engineering, and marker-facilitated selection are discussed. This class is open to students who have had introductory courses in genetics, plant breeding, statistics, and molecular biology.

INSTRUCTORS: G. Atlin, Y. Papadopoulos
FORMAT: Lecture 3 hours, labs 2 hours

***AGRI 5530.03: Nitrogen in Crop Production.**

Students will study the transformations of N in air, soil, water, and plants and consider crop requirements for N. Topics include the chemistry of N, the N cycle, N transformations in soil, N metabolism in plants, N transport in plants, N-fixation, N losses in agricultural systems and an evaluation of N fertilizer in these systems.

INSTRUCTOR: R.C. Martin
FORMAT: Lecture 3 hours

***AGRI 5540.03: Special Topics in Crop Physiology.**

This class will be designed to meet the specific needs of graduate students specializing in the area of Crop Physiology who need further specific knowledge and/or skills.

INSTRUCTORS: C.D. Caldwell, S.K. Asiedu, N. Goodyear, R.C. Martin
FORMAT: Lecture 3 hours

***AGRI 5560.03: Advanced Crop Physiology.**

Physiological processes relevant to crop plant development and production of harvestable yield will be examined.

INSTRUCTOR: C.D. Caldwell
FORMAT: Lecture 3 hours

AGRI 5570.03: Special Topics in Agricultural Biotechnology.

This class will be designed to meet the specific needs of graduate students specializing in the area of Agricultural Biotechnology who need further specific knowledge and/or skills.

INSTRUCTOR: J. Nowak
FORMAT: Lecture 3 hours

***AGRI 5580.03: Plant Biotechnology.**

(May not be offered in 1999-2000)

Theoretical bases of plant tissue culture, overview of the organization and operation of a tissue culture laboratory and tissue culture techniques and their application to nuclear seed potato production, multiplication of horticultural crops and landscape plant material, production of secondary metabolites, germplasm development and plant breeding and conservation of genetic resources. Outline of the techniques of manipulation of plant genome will also be a part of this course. Students must complete an assigned project.

THIS COURSE HAS LIMITED ENROLLMENT

INSTRUCTOR: J. Nowak
FORMAT: Lecture 3 hours, labs 4 hours
CROSS-LISTING: PS475

***AGRI 5590.03: Biotechnology in Agriculture - Opportunities, Issues and Choices.**

(Next offered in 1999-2000)

The main focus of this class will be an overview of current developments in the application of biotechnology techniques to agriculture and related fields and their impact or potential impact on plant and animal production, food and feed quality and bioresource and waste management. Seminars and class discussions will also address socio-economic, environmental and ethical considerations. Guest speakers and the general public will contribute to the seminars and class discussions. Graduate students will be expected to give one additional seminar (three seminars per student), chair one discussion topic (including introduction of a guest speaker and facilitation of class discussion) and write a summary of the discussion as an essay. The essay will require preparation of an up-to-date literature review and critical evaluation of the discussion per se.

INSTRUCTOR: J. Nowak
FORMAT: Two lectures and 3 seminars per week
CROSS-LISTING: IN475

AGRI 5610.03: Special Topics in Animal Product Technology.

This class will review areas important in the technology of foods derived from animals (meat, fish, eggs, milk). Such areas could include chemistry (lipid oxidation, Maillard reactions), physics (changes caused by freezing, sol-gel conversion, colour) and microbiology (spoilage, pathogenic organisms, modified-atmosphere packaging, HACCP). Each student will be expected to present a review of a particular topic.

INSTRUCTOR: N.L. Firth
FORMAT: Lecture 3 hours

***AGRI 5620.03: Ruminant Digestive Physiology & Metabolism.**

(Next offered in 2000-2001)

This class is designed to provide an intensive study of food intake and digestion, and nutrient absorption and metabolism, in the ruminant animal. The class details current knowledge and focuses on aspects of future research interest. Students are expected to contribute to discussions and present reviews to the class on various aspects of the subject.

INSTRUCTORS: A.H. Fredeen, A. Lirette
PREREQUISITE: AS300, AS305, CS360
FORMAT: Lecture 3 hours, lab 2 hours

AGRI 5700.03: Communication Skills and Graduate Seminar.

Through practical assignment students will be able to test and develop their communication skills. Topics will include review, criticism and writing of journal papers, grant applications, posters, seminars, lectures and interviews. This course is required for students enrolled in the M.Sc. in Agriculture Programme.

FORMAT: Lecture 2 hours

AGRI 5710.03: Graduate Module Class I.

This course normally consists of three modules. Each module consists of one month of lectures or assignments (2-3 hours per week) dealing with a topic in the lecturer's area of expertise. Research interests of incoming students are taken into account each year when module topics are solicited. Depending on the background of the student selecting the module, the work will be at an introductory graduate level. However, students should not apply to take a module unless they have at least a second year undergraduate background in related material. A formal evaluation is made at the end of each module. This course normally consists of three modules. All graduate students are required to complete this course, and are encouraged to do so in their first year of study.

COORDINATOR: C. Caldwell

AGRI 5705.03: Graduate Module Class II.

COORDINATOR: C. Caldwell

AGRI 5720.03: Applied Statistics & Experimental Design for Agriculture.

This class is designed to provide: (a) practical skills in statistical methods and experimental designs, and (b) an appreciation of situations when more complex models and methods are required. Topics include linear and nonlinear regression, split-plot designs, repeated measures and response surface methods. Students will be expected to successfully complete practical exercises involving real experimental problems and data sets. Students will also be expected to acquire proficiency in at least one advanced statistical software package. This class is recommended for students enrolled in the MSc in Agriculture programme.

INSTRUCTOR: T. Astatkie

FORMAT: Lecture 3 hours

PREREQUISITE: MP420 or equivalent

AGRI 9000.00: MSc Theses.

Students register for this course when they are engaged in research work for credit towards the MSc in Agriculture degree.

Anatomy and Neurobiology

Location: Sir Charles Tupper Medical Building, 13th Floor
Halifax, NS B3H 4H7
Telephone: (902) 494-6850
Fax: (902) 494-1212
e-mail: anatomy@is.dal.ca
WWW: <http://www.anatomy.dal.ca>

Head of Department
Hopkins, D.A.

Professors

Currie, R.W., BSA, MSc, PhD (Man), Heat shock proteins and protection of heart and brain
Dickson, D.H., BA, MSc, PhD (Western), Retinal cell biology; Structural and functional studies of the retina and retinal pigment epithelium
Hopkins, D.A., BSc (Alta), MA, PhD (McM), Anatomy and function of the autonomic nervous system
Neumann, P.E., BA, MD (Brown), Development neurogenetics, pattern formation and experimental neuropathology
Rutherford, J.G., BA (Cornell), MS (Syracuse), PhD (SUNY), Subfornical organ regulation of blood pressure
Semba, K., BEd, MA (Tokyo), PhD (Rutgers), Brain mechanisms of sleep and wakefulness
Wassersug, R.J., BSc (Tufts), PhD (Chicago), Metamorphosis and adaptations of Anuran larvae

Associate Professors

Ellenberger, H.H., BA, MSc, PhD (Miami), Brainstem control of cardiorespiratory homeostasis
Hagg, T., MD (Leiden), PhD (UCSD), Neurotrophic factors and CNS recovery
Mobbs, I.G., BSc (Aberdeen), MSc (McM), PhD (Western), Kidney structure and function

Assistant Professors

Allen, G.V., BSc, PhD (Dal), CNS responses to ischemia and pain
Baldrige, W.H., BSc (U of T), PhD (McM), Structure and function of the vertebrate retina
Clarke, D., MDCM, PhD, FRCS (McGill), Neuronal survival and regeneration following injury in the central nervous system
Darvesh, S., MD (Dal), PhD (UNB), FRCP (C) (Dal), Synthetic chemistry of neurogenerative disorders
Mathieson, W.B., MSc (Carleton), PhD (Ottawa), Thermoregulatory control in metamorphic Anurans
Mendez, I., MD, PhD (Western), Neural transplantation in the mammalian CNS
Morris, S., BSc (Victoria), MD (Ottawa), MSc (Uof T), Anatomy and physiology of surgical skin and muscle flaps
Smith, F.M., BSc, MSc, PhD (UBC), Autonomic control of the circulation

Adjunct Professors

Tasker, R.A.R., BSc, MSc, PhD (Queen's)
Toews, D.P., BSc, MSc (Alta), PhD (UBC)

Lecturer

Sinha, G., MBBS (Banaras)

The Department of Anatomy and Neurobiology provides facilities for advanced study and research in Neuroscience, Histology, Embryology, Cell Biology and Evolutionary Biology.

I. Admission Requirements

All general requirements for admission to the Faculty of Graduate Studies must be fulfilled. In addition, applicants are expected to have received a sound training in biology and chemistry.

A. Honours degree holders in Biology

Applicants with an excellent background and an A- or better average should apply for direct admission to the PhD programme. Others apply for the MSc programme, with option to transfer to the PhD programme after one year, contingent upon the recommendation of student's advisory committee.

The content of this year of study will be recommended by the Department of Anatomy and Neurobiology Graduate Studies Committee.

B. Master's degree holders in a biological science
May apply for direct admission to PhD programme.

C. Medical graduates

Individuals showing an aptitude for research may apply for admission to either the MSc or PhD programme.

All students entering the MSc programme are expected to advance to the PhD programme.

II. Degree Programmes

A. Doctor of Philosophy (PhD)

Residency requirements for the PhD degree are summarized in Section 1.3 in the Faculty of Graduate Studies regulations.

The class requirements for each PhD candidate are determined by consultation between the student, the research supervisor and the Department of Anatomy and Neurobiology Graduate Studies Committee at the beginning of the first year. Students fulfill a minimum of one credit of required courses or more if they have not taken core courses in anatomical sciences. Students should maintain an A- average. All PhD candidates must participate in the departmental seminar programme during each full year of training. The acquisition of teaching skills is an integral part of the programme. Therefore, the student is also required to assist in laboratory teaching (approximately 30-40 hours per year) and to deliver 2-4 hours of lectures during the course of his/her training. Students are also expected to spend 4-6 months in another laboratory to perform research that can be included in their thesis.

A written thesis (ANAT 9530.00) based on original research of a high calibre must be submitted and defended orally.

Financial assistance is available for qualified candidates for no more than four years.

Evaluation

Students will submit a research proposal to their Advisory Committee by the end of the first year. Students who were admitted without an MSc degree are required to pass a qualifying (written and oral) exam at the end of the second year.

All PhD candidates must pass a preliminary examination during the third year but no later than 1 full year prior to the submission of a thesis. The examination will include material related to the general and specific areas of research. The examining committees will be selected by the student's Advisory Studies Committee after consultation with the candidate's research supervisor and will conduct the examination in accordance with the regulations established by the Department of Anatomy and Neurobiology.

Thesis Examination

MSc and PhD theses will be defended in accordance with the regulations of the Faculty of Graduate Studies.

B. Master of Science (MSc)

The minimum residency requirements for the MSc degree are as indicated in Section 1.3 of the Faculty of Graduate Studies regulations.

A minimum of five graduate-level credits is required which includes two credits for required courses. A written thesis reporting original research must be submitted and defended orally. The MSc thesis (ANAT 9000.00) may count for up to three of the five graduate level credits required for the degree. All MSc candidates must participate in the departmental seminar programme during each year of training. Classes are determined by consultation between the student, research supervisor and the Department of Anatomy and Neurobiology Graduate Studies Committee at the beginning of the first year. For each candidate, classes will be selected from those listed below or, where appropriate, from those offered by other Departments. Consent of the instructor is required for admission into each class. Normally, 24 months (2 years) are necessary to complete all requirements for the MSc degree.

The acquisition of teaching skills is an integral part of the programme. Therefore, all MSc candidates must assist in laboratory teaching or an equivalent (approximately 30-40 hours) after the first year.

Financial assistance is available for qualified students for no more than two full years.

C. Doctor of Philosophy, Anatomy/Neuroscience (PhD)

Anatomy and Neurobiology also offers a PhD in Anatomy/Neuroscience through the interdisciplinary Neuroscience programme.

D. Doctor of Philosophy with Doctor of Medicine (combined MD/PhD)

For information on the combined MD/PhD programme see "Interdisciplinary and Joint Programmes".

III. Classes Offered

Students take one of the following required courses:

ANAT 5030X/Y.06: Human Histology.

The class consists of a series of lectures and laboratories describing the structure of the tissues and organs of the human body. The lecture and the laboratory work is supplemented with tutorials.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will only be given if both are completed consecutively.

COORDINATOR: M.M. Hansell

ANAT 5100.06: Human Neuroanatomy.

This class is designed to acquaint the student with the anatomy and organization of the human central nervous system. Lectures dealing with cellular morphology; gross and microscopic anatomy of the spinal cord, brain stem, diencephalon (Thalamus, hypothalamus, etc.), and telencephalon cerebral hemispheres); blood supply of the CNS, and meninges, and cerebrospinal fluid are presented.

Laboratory exercises involve exposure to aspects of microscopic and ultrastructural morphology of the CNS examination of selected cross sections of spinal cord, brain stem, and diencephalon, and dissection of the brain. In addition, students participate in a series of discussion sessions held once every week. Outside readings on selected topics are assigned, and form the basis for the subjects considered in these sessions. Students take written and practical examinations and are expected to submit a term paper on a topic agreed upon in consultation with the instructor.

COORDINATOR: K. Semba

ANAT 5160X/Y.09: Human Gross Anatomy.

This class is offered over three terms and is designed to introduce students to the gross anatomy of all regions of the human body. Terms I and II emphasize functional anatomy of the upper and lower limbs respectively and are given in conjunction with the anatomy programme offered to 2nd-year Occupational and Physiotherapy students. During Term III, the student will undertake a self-directed study and dissection of the head and neck, thorax,

abdomen and pelvis. A faculty advisor will be assigned to assist students with the study of each major region of study. Tutorials are offered on a regular basis. Student presentations of regional anatomy and its application to common clinical problems are an important component of the programme. Enrollment is limited to 8 students with first consideration given to graduate students within the Department of Anatomy and Neurobiology.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

COORDINATOR: I.G. Mobbs

ANAT 5200X/Y.06: Research Laboratory Techniques in Anatomy and Neurobiology.

(Limited to Anatomy and Neurobiology students; required)

This class is designed to acquaint first year graduate students with the theoretical and practical aspects of research techniques in Anatomy and Neurobiology. Lecture and laboratory sessions will be provided by all Faculty members. Participation in this course will be required of and restricted to first year Anatomy and Neurobiology graduate students. Students will be evaluated on their participation and written critiques of research techniques used in relevant manuscripts by the respective Faculty members.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

COORDINATOR: T. Hagg

Electives

Students can also elect to take any of the following courses or those offered by other departments.

ANAT 5035.03: Human Genetics.

Topics include inborn errors of metabolism, human development, transmission genetics, DNA structure, gene function, mutation and chromosomal alterations, population genetics, genetics of immunity and cancer, genetic technology in medicine and ethical and social issues related to medical genetics.

PREREQUISITE: BIOC 3400/BIOL 3014, or permission from the instructor

FORMAT: Lecture 3 hours, tutorial 2 hours

COORDINATORS: Drs. D.C. Riddell, P.E. Neumann and W.L. Greer

CROSS-LISTING: PATH 5035.03

ANAT 5041.03: Light Microscope Techniques.

The aim of this class is to teach both theoretical and practical aspects of light microscopy used in anatomical research. Brightfield, darkfield, interference, polarizing and fluorescence microscopical techniques are learned as well as tissue preparation, paraffin and freezing microtome sectioning. Students will be introduced to immunocytochemistry, autoradiography and neuronal staining methods.

COORDINATOR: W.B. Mathieson

ANAT 5042.03: Electron Microscope Techniques.

This class, similar to ANAT 5041.03, will teach theoretical and practical aspects of transmission and scanning electron microscopy. The use of image analysis to quantify ultrastructural data will be demonstrated. Students will prepare tissue for ultrastructural analysis and operate the electron microscopes to produce research-quality micrographs of their work.

COORDINATOR: D.H. Dickson

ANAT 5060.03: Neurobiology of Neurological Disorders.

This class is designed to acquaint the student with a variety of neurological disorders and develop familiarity with disease-oriented basic research. Classes are given every other week during winter and spring and consist of a one-hour lecture covering neuroanatomy, neurochemistry, cell biology, etiology and existing treatments of one disease per session (e.g. ischemia, Alzheimer's and Parkinson's disease, ALS, MS, spinal cord injury, genetic disorders, peripheral nerve disorders, cancer, etc.). The lecture is followed by a half to one hour discussion of recent important basic

research developments and potential future directions for which the students will prepare a literature search and read relevant publications. At the end of the class, students are expected to prepare a short grant proposal to an imaginary "Disease" Foundation, based on their own research.

COORDINATOR: T. Hagg

CROSS-LISTING: NESC 5060.03

ANAT 5062.03: Autonomic Regulation: Central Mechanisms

This class will acquaint students with the principles for the organization and neurobiological mechanisms governing the central nervous system regulation of autonomic functions. The class will begin with an introduction to the basic neuronal mechanisms and neuroanatomical basis for central regulation common to all autonomic systems. This will be followed by the presentation and discussion of specific examples of the regulation of individual organ systems. The central origins of patterned neural activity and reflex pathways will be examined for each system. The format of the class will be a combination of lecture, discussion of original research reports and student presentations on selected topics.

Students will be evaluated based on the instructor's assessment of participation in class discussions (50%) and oral presentation (50%)

COORDINATOR: H.H. Ellenberger

CROSS-LISTING: NESC 5062.03

ANAT 5063.03: Neurobiology of the Peripheral Autonomic Nervous System.

This class is intended as an overview of classical concepts of the function of the peripheral autonomic nervous system and re-evaluation of these concepts in the light of recent research on the roles of autonomic neurons in control of specific end-organs. The main issues addressed are the importance of peripheral autonomic neurons to the maintenance of homeostasis, and the integrative processes of which these neurons are capable. The target students are those with a general interest in autonomic neurobiology or whose thesis topics cover aspects of organ function with an autonomic component. The content of this class was selected to complement that of other graduate classes dealing with the autonomic nervous system.

COORDINATOR: F. Smith

CROSS-LISTING: NESC 5063.03

ANAT 5070.03: Chemical Neuroanatomy.

The goal of this class is to acquaint the student with neurotransmitters and neuromodulators, including excitatory amino acids, acetylcholine, monoamines, neuropeptides. Anatomical, biochemical, physiological, pharmacological, behavioral, and clinical aspects of individual neurotransmitter systems will be discussed.

Students are expected to write an examination and a review.

Lectures are given by the instructors.

COORDINATOR: K. Semba, M. Wilkinson

CROSS-LISTING: NESC 5070.03, PHYL 5494.03, NESC 4070.03

ANAT 5090.03: Cellular Development in the Nervous System.

This class explores the events and principles of development in the vertebrate nervous system. The class consists of readings and weekly tutorial/discussion periods of 2 hours. Textbooks required. Evaluation is based on participation in discussion (50%) and weekly one-page written critiques of student-selected papers in the relevant literature (50%). Duration of the course is 14 weeks. This class will be offered in alternate years.

ANAT 5120X/Y.06: Human Embryology.

The student learns descriptive human prenatal development from Moore's, *The Developing Human*, from certain medical and dental lectures and labs, from reading assignments, from special dissections of the placenta and fetus and from a weekly tutorial. The experimental aspect of the subject is achieved by means of an essay and a project. The prerequisites for this class are a knowledge of gross anatomy and histology.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

PREREQUISITE: ANAT 5150.03 and 5160.09, an equivalent or the consent of the instructor.

COORDINATOR: M.M. Hansell

ANAT 5170.03: Special Topics.

This is a flexible class permitting a student to work closely with one or several faculty members; the content of the class is determined by the individual student in consultation with the faculty member involved and is intended to enable students to take advantage of specialized educational opportunities that fall outside the normal class offerings of the Department. A description and justification of class content must be prepared and approved by the student's advisory committee and the Department graduate studies committee.

COORDINATOR: Arranged according to research topic

ANAT 5609.03: Anatomical and Molecular Neuropharmacology of the Basal Ganglia: The Scientific Basis for Grafting and Neural Transplantation.

This will be a graduate seminar and lecture class in the structure and function of the basal ganglia with particular reference to the use of neural grafting techniques to reconstruct neuronal circuits involved in control of movement. The class will first examine in detail the neuroanatomical connections of the basal ganglia and their physiological role in the normal individual. The pathological changes in the basal ganglia during Parkinson's disease will be studied in the classroom and in the clinic. There will be extensive advanced discussion of the role of dopamine and dopamine receptors and the neuropharmacological basis for the treatment of Parkinson's disease using drugs. The importance of drugs, especially dopaminergic agonists, in understanding the function of the basal ganglia will be considered as well as the role of D1 and D2 dopamine receptor mechanisms in the function of neural grafts. Finally, there will be a number of seminar/lectures on the theory, practice and problems of neural transplantation in animals and in man, especially as related to Parkinson's disease.

COORDINATOR: I. Mendez

CROSS-LISTING: PHAC 5609.03

ENROLLMENT: Graduate Students in Neuroscience, post-doctoral fellows and residents in post-graduate programmes in the Faculty of Medicine

ANAT 9000.00: MSc Thesis

ANAT 9530.00: PhD Thesis

Architecture

Location: 5410 Spring Garden Road
Halifax, NS B3J 1E7
Mail: Faculty of Architecture
DalTech
Dalhousie University
P.O. Box 1000
Halifax, NS B3J 2X4
Telephone: (902) 494-3971
Fax: (902) 423-6672
E-mail: Arch.Office@Dal.Ca
Website: www.dal.ca/architecture

Dean

Emodi, T., BArch (Melbourne), MES (York), NSAA
Telephone: (902) 494-3972

Academic Coordinator, School of Architecture

Parcell, S., BArch (Toronto), MArch (Cranbrook)
Telephone: (902) 494-3908

Administrative Assistant to the Dean

Barnstead, M., BSc (Dal), BEd (MSVU)
Telephone: (902) 494-3210

Departmental Secretary - Architecture

Morash-Kent, S., BA, BEd, MEd (SMU)
Telephone: (902) 494-3971

Co-op Coordinator for Architecture

Costello, P., BEDS, BArch (TUNS), NSAA
Telephone: (902) 494-6201

Introduction

The Faculty of Architecture includes the School of Architecture and the Department of Urban and Rural Planning. The Faculty's degree programmes are primarily for individuals who intend to become professional architects or planners. However, the Faculty also offers several classes for non-majors that are open to all students in the university, as well as undergraduate and graduate classes that may be taken with permission from the instructor. Architecture classes and programmes are described in this section. Planning classes and programmes are described in the "Urban and Rural Planning" section of this calendar.

Professors Emeriti

Blakaps, O., BArch (Tor), MArch (Florida), FRAIC
Jackson, A., DiplArch (Poly London), ARIBA

Professors

Baniassad, E., BArch (Illinois), MA, PhD (Manchester), FRAIC, FAIA (Hon.), ARCUK. Architectural design, theory and education, as applied in the fields of design of education programs, design of public buildings, and international development.

Emodi, T., BArch (Melbourne), MES (York), NSAA. Use of computers in design with a particular interest in projects to improve health of individuals, communities and the environment.

MacKay-Lyons, B., BEDS, BArch (TUNS), MArchUD (UCLA), NSAA. Private practice design work in private homes, urban design, public buildings, and artificial intelligence software design.

McAleer, J.P., AB (Columbia), MFA (Princeton), PhD (London), FSA. Architectural history of the Medieval Period with specialization in British Romanesque and Gothic ecclesiastical architecture, particularly with respect to the facade, the public face of the church.

Procos, D., BArch (MIT), MArch (Pratt), NSAA, MCIP. Energy issues in the built environment, such as passive solar heating, in rural and urban settings ranging from the metropolitan to the single building.

Wanzel, J.G., BArch, MArch (Tor). Human condition and the role of architecture in improving quality of life; especially the design and development of non-profit and co-operative housing; economic, social, and housing policy; and design studies of small towns and their territories.

Associate Professors

Cavanagh, E., BSc, BArch (McGill). Architectural design, the history of building technology, the relation of architecture and craft; and the historic relation of building technology and culture as exemplified in conventional light wood-frame construction.

Kroeker, R. BSc (Manitoba), AADipl, ARCUK. Building and culture; creating strategies for healthy, habitable structures which are responsive to the natural environment and contribute to a sense of community identity.

Macy, C., BA(Arch) (Calif. at Berkeley), MArch (MIT), OAQ. Design of public buildings and spaces, tourism, festival architecture and lightweight structures, as well as architectural history and criticism.

Parcell, S., BArch (Toronto), MArch (Cranbrook). History and theory of architectural representation, and phenomenology and hermeneutics in architectural design.

Assistant Professors

Bonnemaison, S., BSc (Concordia), BArch (Pratt), MSc(Arch) (MIT), PhD (UBC). Representations of nature in architecture, especially late 19th and early 20th-century American architecture.

Fugier, T., BArch (Carleton), MArch (McGill). Architectural design; the relationship of design to history; the study and modeling of late medieval double-curved ribbed vaults; perceptions of the North American city.

Mannell, S., BES, BArch (Waterloo), NSAA, OAA. The Architecture of public works, the history and practice of post-war modern architecture, contemporary architectural criticism, and professional practice.

Parsons, A., BSc (McGill), MES (Dal). Building performance; specializing in the development of sustainable user requirements, visualization techniques, and applied physical and computer modeling methods.

Quek, C., DiplEng (Singapore), BSDesign (Clemson), MArch (Manitoba). Computer-related applications in architecture, dealing with the impact of culture and history on the built environment with a focus on Chinese architecture and city planning.

Savage, N., BA (Alberta), BEDS, MArch (TUNS), NSAA. Private practice: design of residential buildings, public buildings, and non-profit housing developments; architectural visualization and its graphic applications.

Lecturer

Kelly, P., BSc (Dal), MSc (TUNS). The use of multimedia tools in architectural design, geographical information system, and astroarchaeology (astronomical alignments of ancient structures).

Adjunct Professors

Hoffman, D., BArch (Cooper Union)

Lewis, D., BArch (Cooper Union)

Sampson, B., BArch (Toronto)

I. Introduction

The School of Architecture, now part of the Faculty of Architecture in the DalTech college of Dalhousie University, was established in 1961 to serve the Atlantic region. While it continues to fulfil its original mandate, the School also contributes nationally and internationally to architecture. Its primary aim is to educate

individuals who intend to become professional architects. The School's professional degree programme includes the two-year Bachelor of Environmental Design Studies degree and the two-year Master of Architecture (First Professional) degree. Most of the programme is conducted within the School of Architecture by full-time faculty members. It also includes co-op work terms in which students gain practical experience in an architectural office.

Design

The central activity of the professional degree programme is architectural design - the creative study of buildings and cities. In the School's design studios, students examine historical and contemporary buildings in Canada and abroad, and respond through the design of new architectural projects. From the core studies of the undergraduate programme to the elective studies and design thesis of the graduate programme, students learn to rely on their artistic skill, their knowledge of history and technology, their social and cultural awareness, and their critical imagination. Architecture is a multi-disciplinary profession, with alliances to the fine arts, the humanities and technologies, and many undergraduate disciplines provide an effective entry into architecture. Conversely, architectural studies provide an excellent foundation for careers in a variety of design-related fields.

Facilities

Following this emphasis on architectural design, one-third of the Architecture building is devoted to studio spaces that are open to Architecture students twenty-four hours a day. The building also has several computer labs with a wide array of equipment, as well as a fully-equipped woodworking shop, photographic facilities, and a large exhibition hall. The DalTech Library's Architecture collection is located nearby.

Co-op Work Terms

The School's professional degree programme includes two work terms that provide students with practical experience in building design and responsible professional practice. The School's Co-op Programme has been operating since 1970, and the University's Co-op Office assists students in finding suitable work-term placements. In recent years, Architecture students have been employed in every province and territory in Canada, and approximately one-third have chosen to work abroad - in Antigua, Bahamas, Barbados, Belgium, Bermuda, Botswana, Chile, Czech Republic, Denmark, Dubai, England, France, Germany, Hong Kong, Indonesia, Ireland, Italy, Japan, Laos, Lebanon, Malaysia, Mexico, Netherlands, Norway, Portugal, Singapore, Scotland, Spain, Switzerland, and the United States.

Accreditation

The School's professional degree programme is fully accredited by the Canadian Architectural Certification Board and is validated by the Commonwealth Association of Architects. The entire six-year programme consists of two years of undergraduate study at a recognized university, followed by two years of undergraduate study at the School of Architecture (BEDS) and two years of graduate study at the School of Architecture (MArch [First Prof.]).

In Canada, all provincial associations recommend a degree from an accredited professional degree programme as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB), which is the sole agency authorized to accredit Canadian professional degree programmes in architecture, recognizes two types of accredited degrees: the Bachelor of Architecture and the Master of Architecture. A programme may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. Master's degree programmes may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Professional Registration

After receiving the professional degree, a graduate may fulfil additional requirements for professional registration, including a period of post-graduate practical experience and the completion of registration examinations. In Canada, these additional requirements are determined by provincial organizations that are empowered to register an individual for professional practice. Reciprocal

registration in Canada and the United States is facilitated by the standard Architectural Registration Examination (ARE) that is used now in both countries. An American citizen who graduates from the School's MArch (First Prof.) programme is qualified to become an architectural intern in the United States and to complete the examination for professional registration there. Applicants from other countries are advised to contact their national architectural organization about requirements for professional registration.

II. Classes for Non-Majors

The Faculty of Architecture offers several classes that are open to all students in the university:

- ARCH 1000X/Y.06 Introduction to Architecture
- ARCH 3101.04 Survey of Western Architecture I
- ARCH 3102.04 Survey of Western Architecture II
- ARCH 3103.04 History and Theory of Modern Architecture
- ARCH 4101.04 History and Theory of Modern Architecture

Some classes in the School's ARCH 4000 and ARCH 6000 series, as well as the Department of Urban and Rural Planning's PLAN 6000 series, may be open to students from other faculties and universities, with the permission of the instructor and the Faculty of Architecture. Graduate classes also require approval from the Faculty of Graduate Studies. Please consult the university's academic timetable for available classes. Individuals who are not currently registered at Dalhousie University should refer to the university's regulations in this calendar for details on Special Student status.

III. Undergraduate Degree Programme

The Bachelor of Environmental Design Studies programme description is included here in the graduate calendar to provide an overview of the entire professional degree programme in the School of Architecture, which includes both the BEDS and the MArch (First Prof.) degrees. Please refer to the undergraduate calendar for undergraduate regulations.

Bachelor of Environmental Design Studies

BEDS is a two-year, full-time, pre-professional programme for a student who has already completed at least two years of university studies. It consists of five academic terms in residence and a fourteen-week work term. The BEDS degree recognizes a student's successful completion of a minimum of four years of university study, including two at the School of Architecture.

The BEDS programme consists primarily of required classes in Design, Humanities, Technology and Professional Practice. These classes provide a base of academic knowledge and design skill from which a student may proceed to a graduate programme. The BEDS programme leads to the MArch (First Prof.) programme, as well as to the Faculty's other graduate programmes in Environmental Design Studies and Urban and Rural Planning. A BEDS graduate may also choose to continue into another related field in design, environmental studies, management, etc.

IV. Undergraduate Admission Requirements

A. Admission Criteria

Each September, approximately fifty students are admitted into the BEDS programme. The Admissions Committee gives priority to applicants with a combination of academic performance and creative ability. In assessing one's suitability for the Architecture programme, a potential applicant should consider the following:

- Professional programmes are highly focused and require a high degree of motivation. Architecture is no exception. In addition to intellectual ability, a student needs initiative, tenacity, and creative ability. Much of the programme calls for critical judgment in situations where there are no clear-cut solutions.

- Architectural studies require an understanding of individual and social needs, and a knowledge of humanities, fine arts and technology. Well-rounded personal and academic experience is beneficial, as well as experience in drawing, craft, and computer applications. Architecture students often benefit from previous undergraduate classes in anthropology, art history, literature, mathematics, music, philosophy, and physics.

B. Minimum Academic Requirements

The minimum academic requirements for admission to the programme are:

- Two years in a university degree programme (normally, ten full-year classes), with a minimum 2.5 grade point average;
- A full-year university class in mathematics. Calculus is recommended, but a math-based class in Physics, Economics, Engineering or Statistics may be acceptable.

Post-Secondary Institutions

The Admissions Committee may grant up to one year of university credit for an applicant who has attended a post-secondary institution that is not considered a university. Two or more years at a college or an institute of technology plus one year of university normally is acceptable as a minimum.

Mature Students

An application will be considered from a Mature Student - an individual who will be at least 25 years old at the time of registration in the BEDS programme and does not meet the minimum academic requirements for admission (two years of university, mathematics class, 2.5 GPA). In the application, a Mature Student should describe related work experience, and any other pursuits and skills that may serve as grounds for admission. A portfolio of creative work and any post-secondary academic transcripts also must be submitted.

Transfer Students

The School of Architecture welcomes applications from transfer students from other architecture schools in Canada and abroad. Level of entry is based on classes completed elsewhere that are equivalent to required classes at Dalhousie, on the level of achievement in the design portfolio, and on the applicant's total years of university. To meet professional accreditation standards, the School cannot offer a level of entry that would permit a student to obtain the MArch (First Professional) degree with less than six full years of university.

C. Documents

A BEDS applicant must submit all of the following documents before the application can be reviewed:

1) To be submitted to:

Admissions
Registrar's Office
Dalhousie University
Halifax, NS B3H 4H6

- A completed application form;
- The appropriate application fee.

2) To be submitted to the Faculty of Architecture:

Admissions, Faculty of Architecture, DalTech, Dalhousie University, 5410 Spring Garden Road (B3J 1E7), P.O. Box 1000, Halifax, NS B3J 2X4

- An official academic transcript from all previous post-secondary institutions;
- Evidence of competency in English for applicants whose native language is not English.
- A portfolio of work (about 10-15 items) that demonstrates creative ability and/or artistic skill. The portfolio may include free-hand sketches, precision drawings, paintings, furniture, sculpture, craft objects, creative photography, construction projects, etc. Three-dimensional objects and large works should be included as photographs so that the portfolio can be sent safely and easily through the mail. The portfolio

need not be large or elaborate; a folder or binder is sufficient. The applicant's name and address should be identified on the portfolio and any separate items.

- A letter written by the applicant, describing his/her interest in architecture and in the BEDS programme, and giving the Admissions Committee a sense of the applicant as a person: aspirations, interests, reading, travel, recreational activities, etc.
- Two letters of recommendation, including one from an academic instructor with close personal knowledge of the applicant's academic background.

D. Application Deadline

The deadline for applications from Canada and the United States is June 1, but late applications may be considered up to August 1. An early response will be given to an application arriving by March 1. The deadline for non-North American applications is April 1.

V. Undergraduate Regulations

For academic regulations that apply to undergraduate students in the School of Architecture (including workload, class changes, withdrawal, transfer credits, extramural classes, part-time studies, duration of undergraduate studies, minimum degree requirements, assessment, incomplete class work, reassessment of a grade, and academic standing), please refer to the undergraduate calendar. Please note that some undergraduate regulations differ from their graduate counterparts.

VI. Undergraduate Classes Offered

A. Professional Degree Programme

The following chart illustrates the distribution of terms throughout the four years of the professional degree programme in the School of Architecture. The first two years are Bachelor of Environmental Design Studies and the final two years are Master of Architecture (First Professional).

	Fall	Winter	Summer
BEDS - Year 1	B1 (academic term)	B2 (academic term)	B3 (academic term)
BEDS - Year 2	B4 (work term)	B5 (academic term)	B6 (academic term)
MArch - Year 1	M1 (academic term)	M2 (work term)	M3 (work term)
MArch - Year 2	M4 (academic term)	M5 (academic term)	

B. Bachelor of Environmental Design Studies

Year 1 - Term B1 (Fall)

- ARCH 3001.06 Design
- ARCH 3004.02 Communication
- ARCH 3101.04 Survey of Western Architecture I
- ARCH 3201.03 Construction and Structures
- ARCH 3204.01 Environment

Year 1 - Term B2 (Winter)

- ARCH 3002.06 Design
- ARCH 3005.02 Communication
- ARCH 3102.04 Survey of Western Architecture II
- ARCH 3202.03 Construction and Structures
- ARCH 3205.01 Environment

Year 1 - Term B3 (Summer)

- ARCH 3003.06 Design
- ARCH 3006.02 Communication
- ARCH 3103.04 History and Theory of Modern Architecture
- ARCH 3203.03 Construction and Structures
- ARCH 3206.01 Environment
- ARCH 3301.01 Professional Practice

Year 2 - Term B4 (Fall)

- ARCH 8891.01 Professional Practice (Co-op Work Term)

Year 2 - Term B5 (Winter)

- ARCH 4001.08 Design
- ARCH 4101.04 History and Theory of Modern Architecture
- ARCH 4201.04 Building Systems Interface
- Elective

Year 2 - Term B6 (Summer)

- ARCH 4002.08 Design
- ARCH 4102.04 Architectural Research and Criticism
- ARCH 4202.04 Building Systems Interface
- Elective

Undergraduate Electives

- ARCH 4103.02 History and Theory of Housing
- ARCH 4104.02 History and Theory of Urbanization
- ARCH 4105.02 History and Theory of Building
- ARCH 4106.02 History and Theory of Landscape Architecture
- ARCH 4107.02 Architectural History
- ARCH 4108.02 Community Design
- ARCH 4109.02 Studies in Architectural Representation
- ARCH 4203.02 Innovation in the Building Industry
- ARCH 4204.02 Computers in Architecture
- ARCH 4302.02 Directed Studies in Professional Practice

For an undergraduate elective, a student may take a class offered by another Department or Faculty at Dalhousie University. The subject need not be directly related to architecture, and the class may be at any undergraduate or graduate level. With a Letter of Permission, a student may also take a class at another university, if the class is not available at Dalhousie University.

VII. Undergraduate Class Descriptions

Class Numbers

The first digit of an ARCH class number indicates its level: introductory classes open to all university students (1), Year 1 of BEDS (3), or Year 2 of BEDS (4). The second digit indicates the area of study: Design (0), Humanities (1), Technology (2), Professional Practice (3), or Special Studies (4). Classes in the BEDS programme have various credit-hour extensions (01-08) that indicate the approximate class hours each week and reflect the appropriate balance of subjects for professional accreditation. Classes may be interchanged between academic terms, depending on the availability of instructors. Not all elective classes (*) may be offered each year. Please consult the academic timetable for current listings. Instructors are listed only for classes that may be available to students from outside the Faculty of Architecture.

ARCH 1000.06: Introduction to Architecture.

An introductory class showing architecture as a bridge between the Arts and Science, and providing an insight into professional studies. In the first term, discussion centres around some components of architectural design; in the second term, architecture in present day life.

FORMAT: Lecture/seminar

ARCH 3001X/Y.06: Design.

This class introduces principles of architectural form and design. It focuses on elementary forms - the hut, the room and the pavilion - on the land and in the city. Projects include analyses of historical buildings and exercises in design.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1001

ARCH 3002.06: Design.

This class continues ARCH 3001.06. The basic topic is the architecture of the house in the city, and its development throughout history.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1002

ARCH 3003.06: Design.

This class continues ARCH 3002.06. In the studio, students examine issues of building type, program and construction through the design of a small public building. In the field, student groups participate in design projects that may include on-site construction.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1003

ARCH 3004.02: Communication

This class introduces graphic skills and representational conventions for architectural design. Topics include line drawing, orthographic and axonometric projections, tonal drawing, and design presentation.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1010

ARCH 3005.02: Communication.

This class continues ARCH 3004.02. Topics include perspective construction, colour analysis, and the use of interpretive drawings/models to represent building characteristics and present design ideas. Studio work is done manually and with computer applications.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1011

ARCH 3006.02: Communication.

This class continues ARCH 3005.02. Topics include the use of computer applications for two-dimensional composition and three-dimensional modeling. The class also considers the integration of computer-aided design into architectural studio work.

FORMAT: Lecture/studio
RESTRICTION: BEDS students
EXCLUSION: ARB1012

ARCH 3101.04: Survey of Western Architecture I.

This class surveys the history of western architecture, beginning with the ancient civilizations of Mesopotamia and Egypt and tracing developments through Greece, Rome and Medieval Europe to the beginning of the Romanesque styles in the early eleventh century. The focus is on the evolution, transformation and definition of styles demonstrated by selected major buildings.

INSTRUCTOR: J.P. McAleer
FORMAT: Lecture
EXCLUSION: ARB1112

ARCH 3102.04: Survey of Western Architecture II.

This class continues ARCH 3101.04. It begins with the formation of the Romanesque styles and examines the subsequent process of stylistic evolution, revolution and counter-revolution in Europe to the end of the Rococo period in the first half of the eighteenth century.

INSTRUCTOR: J.P. McAleer
FORMAT: Lecture
EXCLUSION: ARB1113

ARCH 3103.04: History and Theory of Modern Architecture.

This class introduces major architects and buildings in Europe and North America from the mid-eighteenth century to the mid-twentieth century. It concentrates on recognized buildings representing influential lines of thought, placed in their cultural contexts. To develop skills in research and criticism, students investigate these buildings through primary and secondary sources, including articles, photographs and drawings.

INSTRUCTOR: T. Cavanagh
FORMAT: Lecture/seminar
EXCLUSION: ARB1116

ARCH 3201.03: Construction and Structures.

The class provides an introduction to the construction process, examining the materials, methods and sequences of building construction as embodied in simple frame-built and mass-built buildings. It is taught through lectures and studio exercises, with reference to historic and contemporary built examples, as well as student projects in the design studio.

FORMAT: Lecture/studio

RESTRICTION: BEDS students

EXCLUSION: ARB1208

ARCH 3202.03: Construction and Structures.

The class presents the principles of construction and structure as they relate to architecture. Methods of structural analysis are studied, including tools for the modelling and analysis of building structure. Building materials are studied in respect of their structural properties and their constructional implications. Principles of assembly and jointing are presented, and an analytical model for the study of building construction in terms of compound assemblies and the relationship between discrete assemblies is developed.

FORMAT: Lecture/studio

RESTRICTION: BEDS students

EXCLUSION: ARB1210

ARCH 3203.03: Construction and Structures.

This class extends the study of structure to include statutory requirements and industry performance standards. More complex structural systems are examined, as well as the interaction of various forces and structural subsystems within a building, and the performance issues related to the selection of structural systems and materials are introduced. The study of building construction is extended to include the performance of materials in assemblies, including the dynamic actions and weathering of building materials. The act of building is examined at the level of the construction detail, including performance of the building envelope.

FORMAT: Lecture/studio

RESTRICTION: BEDS students

EXCLUSION: ARB1212

ARCH 3204.01: Environment.

The principles and theories of electrical and light engineering are used to study light in architecture. Both natural and artificial sources are studied, quantified and discussed. The class concludes with an investigation of light-sensitive environments in architecture, such as art galleries.

FORMAT: Lecture

RESTRICTION: BEDS students

EXCLUSION: ARB1207

ARCH 3205.01: Environment.

The principles and theories of mechanical engineering are used to study heat in architecture. Both natural and artificial sources are studied, quantified and discussed. The class concludes with an investigation of heat-sensitive environments in architecture, such as laboratories.

FORMAT: Lecture

RESTRICTION: BEDS students

EXCLUSION: ARB1209

ARCH 3206.01: Environment.

The principles and theories of acoustics are used to study sound in architecture. Both natural and artificial sources are studied, quantified and discussed. The class concludes with an investigation of sound-sensitive environments in architecture, such as theatres.

FORMAT: Lecture

RESTRICTION: BEDS students

EXCLUSION: ARB1211

ARCH 3301.01: Professional Practice.

Topics include the relation between the architect and society; the political, social and economic environments in which architects practice; and an introduction to office organization and project management.

FORMAT: Lecture/seminar

RESTRICTION: BEDS students

EXCLUSION: ARB1303

ARCH 4001.08: Design.

This class explores particular facets of architecture. Studio options are offered in topics such as housing, urban design, adaptive re-use of buildings, process of building, and environmental issues.

FORMAT: Lecture/studio

RESTRICTION: Year 2 BEDS students

EXCLUSION: ARB2001

ARCH 4002.08: Design.

This class involves the design of a major public building in an urban situation. The project encourages the integration of previous undergraduate studies in design, humanities and technology.

FORMAT: Lecture/studio

RESTRICTION: Year 2 BEDS students

EXCLUSION: ARB2002

ARCH 4101.04: History and Theory of Modern Architecture.

This class is a survey of twentieth-century modern architecture, with a focus on North America. Works are situated in their social and political contexts, and discussed in terms of theoretical constructs that influenced their development.

INSTRUCTOR: C. Macy

FORMAT: Lecture/seminar

EXCLUSION: ARB2111

ARCH 4102.04: Architectural Research and Criticism.

This class explores contemporary critical architectural discourse, with a focus on the ethical, social and political dimensions of architecture. Topics vary from year to year, but may include marxism, feminism, ecology, phenomenology and post-structuralist theory.

INSTRUCTOR: C. Macy

FORMAT: Lecture/seminar

PREREQUISITE: ARCH 3103.04, ARCH 4101.04 or equivalent

EXCLUSION: ARB2118

***ARCH 4103.02: History and Theory of Housing.**

This class compares significant historic housing schemes with contemporary examples. It focuses on historic examples such as the Weissenhof Exhibition, Le Corbusier's contribution to housing, Le Corbusier's imitators, and the work of Team X.

INSTRUCTOR: J.G. Wanzel

FORMAT: Lecture/seminar

RESTRICTION: BEDS students, or permission of instructor

EXCLUSION: ARB2106, ARP0112, PLAN 6111.03

***ARCH 4104.02: History and Theory of Urbanization.**

This class investigates urban form, theory and "urban experience" in the metropolis from the mid-eighteenth century to the present.

Nineteenth- and twentieth-century urban design proposals which identified and proposed solutions to the problems of the industrial city are discussed and analyzed in terms of the social, historical and economic forces that shaped them.

FORMAT: Lecture/seminar

RESTRICTION: BEDS students, or permission of instructor

EXCLUSION: ARB2115, ARP0110, PLAN 6101.03

***ARCH 4105.02: History and Theory of Building.**

This class investigates materials and methods of production for buildings from the mid-eighteenth century to the present. Modern architecture is considered in relation to changes in the weight, strength, refinement and workability of building materials, and changes in convention, building assembly, reproduction and engineering theory.

FORMAT: Lecture/seminar

RESTRICTION: BEDS students, or permission of instructor

EXCLUSION: ARB2117

***ARCH 4106.02: History and Theory of Landscape Architecture.**

This class deals with changing landscapes and perceptions of the natural world during the past 250 years. It discusses the effects of technology and resource use on the design of landscapes as small as a private garden and as large as a bio-region, and examines the changing role of landscape architects, their writings and their collaboration with architects.

INSTRUCTOR: S. Guppy
FORMAT: Lecture/seminar
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2108, ARP0114, PLAN 6108.03

***ARCH 4107.02: Architectural History.**

This class is a survey of a major period or personality in architectural history prior to the nineteenth century. The development of style is charted through an examination of the artistic and cultural phenomena that may have shaped it.

INSTRUCTOR: J.P. McAleer
FORMAT: Lecture/seminar
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2113

***ARCH 4108.02: Community Design.**

This class is an overview of the theory and practice of community planning with emphasis on the physical organization of communities. Alternatives to indiscriminate urbanization are derived from a deeper understanding of the urbanization process. This involves technical studies of the urban fabric. At the same time, students further their understanding of the socio-economic context in which community planning operates, through analytic work in paper and seminar form.

INSTRUCTOR: D. Procos
FORMAT: Lecture/seminar
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2112

***ARCH 4109.02: Studies in Architectural Representation.**

This class examines critical issues in architectural representation and its history and theory. Topics may include intention, mode of representation, media, and geometry.

FORMAT: Seminar/studio
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2119

ARCH 4201.04: Building Systems Interface.

This class studies the interfacing of building technologies - structural, constructional and environmental systems. These studies are directly related on a consultancy basis to work that is on-going in the design studio. They enable the student to appreciate all the technical influences on architectural design and to develop an understanding of buildings as complex systems.

FORMAT: Lecture/studio
RESTRICTION: Year 2 BEDS students
EXCLUSION: ARB2201

ARCH 4202.04: Building Systems Interface.

Continuation of ARCH 4201.04.
FORMAT: Lecture/studio
RESTRICTION: Year 2 BEDS students
EXCLUSION: ARB2205

***ARCH 4203.02: Innovation in the Building Industry.**

This class studies innovation, the process of bringing invention into use, analyzed into components and made subject to rational control, with innovation in design and production processes the main concern.

FORMAT: Lecture/seminar
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2204

***ARCH 4204.02: Computers in Architecture.**

This class focuses on principles of computer-aided architectural design, involving representations of architectural form in 2D and 3D.

FORMAT: Lecture/seminar
RESTRICTION: BEDS students, or permission of instructor
EXCLUSION: ARB2202

***ARCH 4302.02: Directed Studies in Professional Practice.**

This class is a directed study, guided by an architectural practitioner, in architectural research related to her or his practice. The research project may be proposed by the practitioner, or by the student in consultation with the practitioner. The project outline must be approved by the chair of the Professional Practice teaching group. Refer to the publication, "Guidelines for Directed Studies in Professional Practice".

RESTRICTION: BEDS students
EXCLUSION: ARB2305

ARCH 8891.01: Professional Practice (Co-op Work Term).

A student works in some aspect of the profession for a total of fourteen weeks, and completes a research report or assignment. Work placements are coordinated by the Co-op Coordinator for Architecture and must be approved by the School. A student may apply to satisfy up to fourteen weeks of the time requirement through supervised research related to Professional Practice.

RESTRICTION: Year 2 BEDS students
EXCLUSION: ARB2304

VIII. Graduate Degree Programmes

A. Master of Architecture (First Professional)

Master of Architecture (First Prof.) is a two-year, full-time programme consisting of three academic terms in residence and a 28-week work term. It includes required classes that complete the core requirements for the School's professional degree programme. Elective classes also enable a student to focus on a particular area of study such as housing, urban design, history and theory, building technology, environmental design, and computer applications. In the final year each student works on a design thesis, supervised by a faculty member.

B. Master of Architecture (Post-Professional)

Master of Architecture (Post-Prof.) is a one-year programme for a student who already has obtained a professional degree in architecture. It may be taken through full-time or part-time study. A student focuses on a particular area of study, with supplementary studies in one or two other areas. In consultation with a faculty supervisor, each student assembles a programme of classes currently offered in the Faculty. General areas of study coincide with the various curriculum streams: Design, Humanities, Technology, and Professional Practice.

Two options are available for completing the MArch (Post-Prof.) programme:

- Eight half-credits of classes plus a MArch (Post-Prof.) Major Project equivalent to two half-credits.
- Six half-credits of classes plus a MArch (Post-Prof.) Thesis equivalent to four half-credits.

C. Master of Environmental Design Studies

Master of Environmental Design Studies is a one-year, non-professional programme for a student with an undergraduate degree in environmental design or a related field. It may be taken through full-time or part-time study. The programme is intended for a student who wishes to pursue graduate studies in a particular area of environmental design, but does not intend to become a professional architect or planner. In consultation with a faculty supervisor, each student assembles a programme of graduate classes currently offered in the Faculty. Depending on class availability, a student may major in a field such as urban studies, housing studies, Canadian studies, computer applications, or conservation of the built environment.

Two options are available for completing the MEDS programme:

- (a) Eight half-credits of classes plus a MEDS Major Project equivalent to two half-credits.
- (b) Six half-credits of classes plus a MEDS Thesis equivalent to four half-credits.

IX. Graduate Admission Requirements

A. Minimum Academic Requirements

Candidates for all graduate programmes must meet the minimum admission requirements of the Faculty of Graduate Studies.

Master of Architecture (First Professional)

Admission is based on the applicant's design portfolio and academic record. A minimum of 4 1/2 years (9 academic terms) of university is required, including architectural studies equivalent to the Dalhousie BEDS degree with a minimum B average. In assessing external applicants, the Admissions Committee looks for academic strengths in design, humanities and technology that are equivalent to standards at the end of the BEDS programme.

The Admissions Committee assesses transfer credits and recommends the level at which an applicant is eligible to enter the professional degree programme. To meet professional accreditation standards, the committee cannot offer a level of entry that would permit a student to obtain the professional degree with less than six full years of university. An applicant who is ineligible for Master of Architecture (First Professional) admission may be offered entry at an advanced level in the BEDS programme.

Master of Architecture (Post-Professional)

An applicant must have a professional degree in architecture with high academic standing from a recognized university. Admission is based on the applicant's design portfolio and academic record.

Master of Environmental Design Studies

An applicant must have an undergraduate degree with high academic standing from a recognized university. This degree must be either a Bachelor of Environmental Design Studies degree, a Bachelor's degree with honours, or a Bachelor's degree with a major in a subject related to the applicant's proposed field of study in the MEDS programme.

B. Documents

An applicant to one of the School's graduate degree programmes must submit all of the following documents before the application can be reviewed:

- 1) To be submitted to:
Admissions
Registrar's Office
Dalhousie University
Halifax, NS
B3H 4H6
 - a completed application form;
 - the appropriate application fee (see Graduate Studies Fees in this calendar).

To confirm receipt of the items above, please contact the Registrar's Office: (902) 494-2450.

- 2) To be submitted to the Faculty of Architecture:
Admissions, Faculty of Architecture, DalTech, Dalhousie University, 5410 Spring Garden Road (B3J 1E7), P.O. Box 1000, Halifax, NS, B3J 2X4
 - an official academic transcript from all previous post-secondary institutions;
 - evidence of competency in English for applicants whose native language is not English (see Graduate Studies Admission Requirements in this calendar);
 - a portfolio of design work that demonstrates the applicant's architectural design ability. Three-dimensional objects and large works should be included as photographs so that the portfolio can be sent safely and easily through the mail. The portfolio need not be large or elaborate; a folder or binder is sufficient. The applicant's name and address should be identified on the portfolio and any separate items. (A portfolio is optional for a MEDS applicant.)

- a letter written by the applicant, describing his/her interest in architecture and in the chosen graduate programme, and giving the Admissions Committee a sense of the applicant as a person: aspirations, interests, travel, etc. An applicant for MArch (Post-Prof.) or MEDS must also indicate the general area of study he/she intends to pursue.
- two letters of recommendation, including one from an academic instructor with close personal knowledge of the applicant's academic background.

To confirm receipt of the items above, please contact the Architecture Office: Arch.Office@Dal.ca or (902) 494-3971.

C. Application Deadline

The deadline for applications from Canada and the United States is June 1, but late applications may be considered up to August 1. An early response will be given to an application arriving by March 1. The deadline for non-North American applications is April 1.

X. Graduate Regulations

A. School of Architecture Regulations

In addition to the Faculty of Graduate Studies regulations in this calendar, the following regulations apply to graduate programmes in the School of Architecture.

Part-Time Study

Part-time study is available in the MArch (Post-Prof.) and MEDS programmes, but not the MArch (First Prof.) programme.

Retention of Student Work

All work executed at the School is the property of the School, and may be retained indefinitely for exhibition or other purposes. The School seeks to provide reasonable care for work retained and will return it to the author when it is no longer needed. This regulation does not in any way remove the intellectual property rights of students as authors of their work.

XI. Graduate Classes Offered

A. Master of Architecture (First Professional)

Professional Degree Programme

The following chart illustrates the distribution of terms throughout the four years of the professional degree programme in the School of Architecture. The first two years are Bachelor of Environmental Design Studies and the final two years are Master of Architecture (First Professional).

	Fall	Winter	Summer
BEDS - Year 1	B1 (academic term)	B2 (academic term)	B3 (academic term)
BEDS - Year 2	B4 (work term)	B5 (academic term)	B6 (academic term)
MArch - Year 1	M1 (academic term)	M2 (work term)	M3 (work term)
MArch - Year 2	M4 (academic term)	M5 (academic term)	

The class requirements for the MArch (First Prof.) programme are as follows:

Year 1 - Term M1 (Fall)

- ARCH 5001.06 Design
- ARCH 5101.04 History and Theory of Cities
- ARCH 5301.01 Professional Practice
- Elective

Year 1 - Term M2 (Winter)

- ARCH 5302.0X Professional Practice (Co-op Work Term)

Year 1 - Term M3 (Summer)

- ARCH 5302X.01 Professional Practice (Co-op Work Term)

Year 2 - Term M4 (Fall)

- ARCH 9001X.16 MArch (First-Prof) Thesis
- ARCH 5201.04 Building Systems Interface
- ARCH 5304.01 Professional Practice
- Elective

Year 2 - Term M5 (Winter)

- ARCH 9001Y.16 MArch (First Prof.) Thesis
- Elective

Graduate Electives

- ARCH 6101.02 Housing Research Seminar
- ARCH 6102.02 Buildings in Perspective
- ARCH 6103.02 Topics in Urban Design
- ARCH 6104.02 Women and the Built Environment
- ARCH 6105.02 Multimedia in Architecture
- ARCH 6106.02 Interdisciplinary Studies for Architecture
- ARCH 6107.02 Advanced Seminar in Humanities
- ARCH 6110.02 Advanced Seminar in Computer Applications
- ARCH 6113.02 Research Studies in Humanities
- ARCH 6116.02 Research Studies in Computer Applications
- ARCH 6201.02 Construction
- ARCH 6202.02 Innovations in Architecture and Building
- ARCH 6203.02 Advanced Seminar in Technology
- ARCH 6206.02 Research Studies in Technology
- ARCH 6301.02 Directed Studies in Professional Practice
- ARCH 6302.02 Advanced Seminar in Professional Practice
- ARCH 6303.02 Research Studies in Professional Practice
- ARCH 6401.02 Personal Project

For a graduate elective, a student may take a class offered by another Department or Faculty at Dalhousie University. The subject need not be directly related to architecture, but must be at a graduate level or advanced undergraduate level (normally, 2000-level or above). With a Letter of Permission, a student may also take a class at another university, if the class is not available at Dalhousie University.

B. Master of Architecture (Post-Professional)

ARCH 7001.04: MArch (Post-Prof.) Major Project

ARCH 9002.08: MArch (Post-Prof.) Thesis

Other available classes are listed in the Master of Architecture (First Prof.) section above and in the Urban and Rural Planning section of this calendar.

C. Master of Environmental Design Studies

ARCH 7002.04: MEDS Major Project

ARCH 9003.08: MEDS Thesis

Other available classes are listed in the Master of Architecture (First Prof.) section above and in the Urban and Rural Planning section of this calendar.

XII. Graduate Class Descriptions

Class Numbers

The first digit of an ARCH class number indicates whether it is a required MArch (First Professional) class (5), a graduate elective (6), MArch (Post-Prof)/MEDS class (7), or Thesis (9). The second digit indicates the area of study: Design (0), Humanities (1), Technology (2), Professional Practice (3), Special Studies (4). Classes have various credit-hour extensions (01-16) that indicate the approximate class hours each week and are based on the appropriate balance of subjects for professional accreditation. Required classes may be interchanged between academic terms, depending on the availability of instructors. Not all elective classes (*) may be offered every year. Please consult the academic timetable for current listings. Instructors are listed only for classes that may be available to students from outside the Faculty of Architecture.

ARCH 5001.06: Design.

This class explores contemporary architectural questions through the design of a building of broad urban and cultural significance. Its emphasis on imagination and criticism characterizes self-motivated work in the graduate programme.

FORMAT: Lecture/studio

RESTRICTION: Graduate students in the Faculty of Architecture

PREREQUISITE: ARCH 4002.08 or equivalent

EXCLUSION: ARM3001

ARCH 5101.04: History and Theory of Cities.

This class examines selected major cities, their originating form, important buildings, and building types in their history. The aim of the class is to explore the relationship between architecture and urbanism, and the relationship between individual buildings and the city.

INSTRUCTOR: E. Baniassad

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3112

ARCH 5201.04: Building Systems Interface.

The objective of the class is to provide the student with a knowledge and understanding of the processes of building as they influence design through building systems: structure, construction, environmental technology and building services. Students learn to evaluate different processes of building as a means of developing the design, and undertake a project relating technology to design, the technological content of which provides a basis for further study in subsequent class work.

FORMAT: Lecture/studio

RESTRICTION: Graduate students in the Faculty of Architecture

PREREQUISITE: ARCH 4202.04 or equivalent

EXCLUSION: ARM3201

ARCH 5301.01: Professional Practice.

The class focuses on practice management: contracts, codes, reference documents, finance, costing techniques, and contract administration.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture

EXCLUSION: ARM3302

ARCH 5302X/Y.01: Professional Practice (Co-op Work Term).

A student works in some aspect of the profession for a total of twenty-eight weeks, and completes a research report or assignment. Work placements are co-ordinated by the Co-op Co-ordinator for Architecture and must be approved by the School. A student may apply to satisfy up to fourteen weeks of the time requirement through supervised research related to Professional Practice.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

RESTRICTION: MArch (First Prof.) students

EXCLUSION: ARM3305

ARCH 5304.01: Professional Practice.

Topics include professional ethics, partnerships, corporate practices, professional responsibility, and legal aspects of practice.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture

PREREQUISITE: ARCH 5301.01

EXCLUSION: ARM4301

*ARCH 6101.02: Housing Research Seminar.

This seminar explores the interactions of the residential construction industry's constituent parts: real estate, finance, government policy and programmes, development interests, etc. An open-ended inquiry touches on such questions as housing quality, housing distribution patterns, employment, industrialization, urbanization, rural under-development, foreign ownership, and the role of the industry in the Canadian political-economy.

INSTRUCTOR: J.G. Wanzel

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3109

***ARCH 6102.02: Buildings in Perspective.**

One or more buildings are examined as art, as part of a stylistic development, and as an expression of a particular historical period. Emphasis is also placed upon research methodologies in the history of architecture.

INSTRUCTOR: J.P. McAleer

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3116

***ARCH 6103.02: Topics in Urban Design.**

A theoretical overview of the practice of urban design, designed to inform students on the subject in their thesis preparation. Readings in the history and theory of urbanism, visual material and critiques of Urban Design competitions are used to structure the class along a series of topics. Acceptable student work ranges from physical design to essay and from specific plan of action to theoretical exploration.

INSTRUCTOR: D. Procos

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3111

***ARCH 6104.02: Women and the Built Environment.**

The objective of this class is to create in students an awareness of the built environment as a feminist issue. Students study women's roles as consumers, critics and creators of the built environment, and explore the idea that women use and conceptualize it differently than men. The class includes lectures, field trips, student seminar presentations and reaction papers.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3115

***ARCH 6105.02: Multimedia in Architecture.**

This class examines the use of various technologies in visualizing, developing, and displaying multimedia presentations of architectural designs. It also considers how architectural design work may be informed by an effective use of multimedia.

INSTRUCTOR: P. Kelly

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6106.02: Interdisciplinary Studies for Architecture.**

This class examines affinities between architecture and other disciplines in the arts and/or humanities. It considers specific works and cross-disciplinary translations according to their technical means, theoretical premises and cultural intentions. Students are expected to have a working knowledge of architecture and at least one other discipline.

INSTRUCTOR: S. Parcell

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6107.02/6108.02/6109.02: Advanced Seminar in Humanities.**

This seminar class focuses on an advanced topic in the humanities. Specific topics may change from year to year.

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6110.02/6111.02/6112.02: Advanced Seminar in Computer Applications.**

This seminar class focuses on an advanced topic in computer applications. Specific topics may change from year to year.

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6113.02/6114.02/6115.02: Research Studies in Humanities.**

This class invites student involvement in a current research project by a faculty member.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6116.02/6117.02/6118.02: Research Studies in Computer Applications.**

This class invites student involvement in a current research project by a faculty member.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6201.02: Construction.**

This class reviews previously-studied subjects of building construction, with an introduction and consideration of recently introduced materials, to bring students up-to-date in their awareness of constructional options.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3205

***ARCH 6202.02: Innovations in Architecture and Building.**

This seminar explores influences which may lead to innovations in architectural design and building construction in response to emerging environmental issues and work/lifestyle. Means of study include research, design and making.

INSTRUCTOR: T. Emodi

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6203.02/6204.02/6205.02: Advanced Seminar in Technology.**

This seminar class focuses on an advanced topic in technology. Specific topics may change from year to year.

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6206.02/6207.02/6208.02: Research Studies in Technology.**

This class invites student involvement in a current research project by a faculty member.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6301.02: Directed Studies in Professional Practice.**

This class is a directed study, guided by an architectural practitioner, in architectural research related to her or his practice. The research project may be proposed by the practitioner, or by the student in consultation with the practitioner. The project outline must be approved by the chair of the School's Professional Practice teaching group. Refer to the publication, "Guidelines for Directed Studies in Professional Practice".

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARM3306

***ARCH 6302.02: Advanced Seminar in Professional Practice.**

This seminar class focuses on an advanced topic in professional practice. Specific topics may change from year to year.

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6303.02: Research Studies in Professional Practice.**

This class invites student involvement in a current research project by a faculty member.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

***ARCH 6401.02/6402.02/6403.02: Personal Project.**

A Personal Project is a term-long, self-directed study proposed by a student and supervised by a faculty member. (Alternately, a qualified person outside the university may supervise the project if a faculty member agrees to act as an advisor.) Like a class outline, a Personal Project proposal must describe the academic objectives, the anticipated product, previous experience in this area, a general schedule, and criteria for evaluating the final work. The proposal must be approved by the supervisor/advisor and the School's Academic Co-ordinator.

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

ARCH 7001.04: MArch (Post-Prof.) Major Project.

A Major Project is intended to address a question of personal interest and relevance to the field of study. It may be a work of design (accompanied by a written report) or an entirely written document. It is supervised by a faculty member, and additional advisors also may be involved. Unlike a Thesis, a Major Project is not presented formally at an oral defence, nor is it submitted to the DalTech Office of Graduate Studies.

RESTRICTION: MArch (Post-Prof.) students

EXCLUSION: ARM5004

ARCH 7002.04: MEDS Major Project.

A Major Project is intended to address a question of personal interest and relevance to the field of study. It may be a work of design (accompanied by a written report) or an entirely written document. It is supervised by a faculty member, and additional advisors also may be involved. Unlike a Thesis, a Major Project is not presented formally at an oral defence, nor is it submitted to the DalTech Office of Graduate Studies.

RESTRICTION: MEDS students

EXCLUSION: ARM5002

ARCH 9001X/Y.16: MArch (First Prof.) Thesis.

Each student formulates a thesis question of personal and disciplinary importance, and pursues it through a design for a building. The work is supervised by a faculty member nominated by the student. The student is expected to become fluent in the history and theory of the topic and to devise an appropriate strategy for carrying out the work. The thesis concludes with a graphic/model presentation, an oral examination, and a formal thesis document that is submitted to the DalTech Office of Graduate Studies. Detailed requirements are described in the MArch (First Prof.) thesis booklet. The thesis requires a minimum of two terms of residence and may extend to a maximum of five terms.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

RESTRICTION: MArch (First Prof.) students

EXCLUSION: ARM4001/4002

ARCH 9002.06: MArch (Post Prof.) Thesis.

A Thesis is intended to address a question of personal interest and relevance to the field of study. It may be a work of design (accompanied by a written document) or an entirely written document. The Thesis is guided by a supervisor and an advisor, at least one of whom must be a member of the Faculty of Architecture. The student presents the work at an oral defence, and the thesis document is prepared in accordance with university thesis standards and submitted to the DalTech Office of Graduate Studies.

RESTRICTION: MArch (Post-Prof.) students

EXCLUSION: ARM5003

ARCH 9003.08: MEDS Thesis.

A Thesis is intended to address a question of personal interest and relevance to the field of study. It may be a work of design (accompanied by a written document) or an entirely written document. The Thesis is guided by a supervisor and an advisor, at least one of whom must be a member of the Faculty of Architecture. The student presents the work at an oral defence, and the thesis document is prepared in accordance with university thesis standards and submitted to the DalTech Office of Graduate Studies.

RESTRICTION: MEDS students

EXCLUSION: ARM5001

Atmospheric Science

Location: Physics Department
Sir James Dunn Building
Halifax, NS B3H 1Z9

And: Oceanography Department
Life Sciences Centre, Third Floor
Halifax, NS B3H 4J1

WWW: www.atm.dal.ca

Professors

Chylek, P., Diploma (Charles, Prague), PhD (Calif)

Assistant Professor

Fu, Q., BSc, MSc (Peking), PhD (Utah)

Associate Professors

Folkins, I., BSc (Dal), MSc, PhD (UofT)

Lohmann, U., MSc, PhD (Hamburg)

Adjunct Professors

Barker, H., BSc (Uof T), MSc, PhD (McMaster), ARMP, AES

Isaac, G., PhD (McG)

King, M., PhD (Az)

Lealtch, R., PhD (York)

Li, Z., BSc, MSc (Nanjing), PhD (McGill), CCRS

I. Graduate Degrees

Graduate degrees in Atmospheric Science may be taken through either the Physics or the Oceanography departments.

A. MSc Degree Programme

Minimum course requirements are a total of five half-credit classes. Each student must take three core half-credit classes including PHYC 6570.03/OCEA 5570.03; PHYC 6580.03/OCEA 5580.03; and one of PHYC 5520.03/OCEA 5520.03, PHYC 5411.03/OCEA 5411.03, OCEA 5595.03. Classes may be taken through Physics or Oceanography. Research and Thesis are required.

B. PhD Degree Programme

Prospective graduate students should refer to the class requirements for the Departments of Physics or Oceanography. The classes required in the chosen department must include three core half classes described under the MSc programme.

If the student is registered in Oceanography, a student must take a comprehensive oral exam and he or she must write and defend a proposal for thesis research; if in Physics, a preliminary oral examination must be taken in the first year.

All candidates must prepare, research and orally defend a thesis.

Biochemistry

Location: Sir Charles Tupper Medical Building, 9th Floor
Halifax, NS B3H 4H7
Telephone: (902) 494-2480
Fax: (902) 494-1355
WWW: <http://www.biochem.dal.ca>

Head of Department

Falmer, F.B.St.C., BSc, PhD (UWO) Professor and Head

Professors

Breckenridge, W.C., BSc (Queen's) MSc, PhD (UofT)
Dolphin, P.J., BSc, PhD, DSc (Southampton)
Doolittle, W.F., AB (Harvard), PhD (Stanford)
Gray, M.W., BSc, PhD (Alta)
Lazier, C.B., BA (UofT), MSc (UBC), PhD (Dal)
Palmer, F.B.St.C., BSc, PhD (UWO)
Singer, R.A., AB (Princeton), PhD (Harvard), Graduate Coordinator
(Telephone: 494-2306)
Wallace, C.J.A., BA, MA, DPhil (Oxon)

Associate Professors

Byers, D.M., BSc, MSc (Dal), PhD (Alta), major appointment in
Pediatrics
Cook, H.W., BSc, MSc (McG), PhD (Dal), major appointment in
Pediatrics
Dobson, M.J., BSc (Dal), DPhil (Oxon)
Liu, P.X.-Q., BSc (Wuhan), PhD (Cornell)
Ridgway, N.D., BSc, MSc (Dal), PhD (UBC), joint appointment in
Pediatrics
Ro, H.-S., BSc, PhD (McM)

Assistant Professors

Bearne, S.L., BSc (Acadia), PhD (UofT), MD (McG)
McLeod, R.S., BSc, PhD (UBC)
McMaster, C.R., BSc, PhD (Man), major appointment in Pediatrics
Riddell, D.C., BSc, PhD (Queen's), major appointment in Pathology
Too, C.K.L., BSc, MSc (Malaya), PhD (Hawaii)

Adjunct Professor

Sensen, C.W., Dr.rer.nat. (Cologne), Associate Research Officer,
National Research Council, Institute for Marine Biosciences
Ewart, K., Vanya, PhD (MUN), Assistant Research Officer, National
Council, Institute for Marine Biosciences

I. Admission Requirements

General requirements for admission to the Faculty of Graduate Studies are given in section 2 of "Faculty Regulations". In addition, foreign applicants must submit the results of the Graduate Record Examination. A TOEFL score of at least 600 is required of applicants whose native language is not English (Section 2.4 in the Faculty of Graduate Studies regulations).

II. General Regulations

The Department accepts applicants with degrees in Biochemistry and also those with training in related fields such as biology, chemistry and related biomedical sciences. Our programme is designed to ensure that all graduate students acquire a general background in biochemistry that will provide a solid foundation for career development. In addition, each student specializes in one of the following areas: gene expression and cell regulation; lipids, lipoproteins and membranes; molecular evolution; proteins. Advanced knowledge within a specialty is developed by formal classes and/or guided study arranged for each student through

consultation with a supervisory committee. Students also participate in the Biochemistry seminar series (BIOC 5910.06-5913.06) and in teaching/laboratory demonstrating.

Entering graduate students are assessed with regard to their general background in biochemistry, in an open-book written fashion, to ensure that they have a grasp of the important principles in solving biochemical problems and have the background necessary for advanced classes. A preliminary examination related to the subject area of the thesis occurs at the end of the first year of study. Application may be made at that time for transfer from an MSc to a PhD programme. Scholarship support is available, and students are eligible for the Patrick Prize, awarded by the Department to recognize excellence in graduate research. Additional information can be obtained by contacting the Department for a copy of our booklet, *Research and Graduate Study in Biochemistry*.

III. Degree Programmes

A. Master of Science (MSc)

A thesis describing original research done by the candidate is prepared and defended orally. A Thesis Supervisory Committee consisting of the research director and two others is appointed to assist the candidate.

The minimum residence requirements for the two MSc programmes (see section 1.3.1 in the Faculty of Graduate Studies regulations) are 1 and 2 years, respectively. Experience has shown that most candidates require an additional 6-12 months to complete the thesis.

B. Doctor of Philosophy (PhD)

The preparation and oral defence of a thesis describing an extensive original investigation carried out by the candidate is the major requirement. A Thesis Supervisory Committee consisting of the research director and three others is appointed to oversee the research. The minimum residence requirements of the PhD are 2 years from the MSc and 3 years from the BSc (see section 1.3.2 in the Faculty of Graduate Studies regulations). Most students require an additional 1-2 years to complete the thesis.

C. Doctor of Philosophy in Biochemistry/Neuroscience (PhD)

Biochemistry also offers a PhD in Biochemistry through the interdisciplinary Neuroscience programme.

D. Doctor of Philosophy with Doctor of Medicine (Combined MD/PhD)

For information on the combined MD/PhD programme see "Interdisciplinary and Joint Programmes", page 239.

IV. Areas of Specialization

A. Gene Expression and Cell Regulation

Dobson, M.J. - Chromosome Structure and Function: yeast plasmid segregation, organization of human telomeric DNA, yeast artificial chromosome vectors, protein-DNA interactions.
Lazier, C.B. - Androgen Action: androgen regulation and gene expression in the prostate (with R.S. Rittmaster, Dept. of Medicine)
Riddell, D.C. - Human Molecular Genetics: tumor suppressor genes. Gene mapping.
Ro, H.-S. - Signal Transduction Pathway in Adipocyte Differentiation: gene expression, heterotrimeric G protein, MAP kinase, obesity, transgenic and knockout mice.
Singer, R.A. - Cell Growth Control: eukaryotic (yeast) gene expression and membrane dynamics (with G.C. Johnston, Microbiology and Immunology).
Too, C.K.L. - Prolactin Action: signal transduction, gene expression and regulation of lymphoid cell growth.

B. Lipids, Lipoproteins and Membranes

Breckenridge, W.C. - Lipoproteins and Atherosclerosis: structure and function of lipids and apolipoproteins in relation to lipoprotein metabolism.

- Byers, D.M. - Membrane Proteins and Lipids: protein kinase C substrates and cell signalling; regulation of cholesterol and fatty acid metabolism; structure and function of acyl carrier protein.
- Cook, H.W. - Membrane Lipid Metabolism and Signal Transduction: lipid second messengers, protein kinase C isoforms and lipid turnover in neural cells; plasmalogens and peroxisomal disorders.
- Dolphin, P.J. - Lipoprotein Metabolism: molecular enzymology of lipolytic enzymes; genetic defects in man and animal models; reverse cholesterol transport.
- McLeod, R.S. - Lipoprotein Assembly: structure and function of apolipoproteins; regulation of hepatic apoB secretion; hepatocyte lipid mobilization.
- McMaster, C.R. - Phospholipids: molecular analyses of the enzymes regulating their fatty acyl composition. Lipid regulation of vesicle mediated intracellular trafficking events.
- Palmer, F.B.St.C. - Functions of Membrane Phospholipids in receptor-linked transmembrane signalling.
- Ridgway, N.D. - Sphingomyelin and Cholesterol: metabolic and coordinate regulation.

C. Molecular Evolution

- Doolittle, W.F. - Genome Evolution: genomics, molecular phylogeny, archaeobacterial genetics.
- Gray, M.W. - Structure, Function and Evolution of Mitochondrial Genomes and Ribosomal RNA: plants and protists; transcription, RNA processing and RNA editing.
- Liu, P.X.-Q. - Gene Structure and Function: intein and protein splicing; plastid genome evolution.
- Sensen, C.W. - Genome Sequencing and Analysis of Genomic Sequence.

D. Proteins

- Bearne, S.L. - Enzyme Catalysis: transition state analogues; enzyme inhibition; bio-organic reaction mechanisms; biochemical recognition; protein modifications.
- Ewart, K.V. - Fish Biochemistry and Physiology: protein structure and function, gene expression, innate immunity, freeze avoidance.
- Wallace, C.J.A. - Protein Engineering: chemical and genetic remodelling of cytochrome *c* for studies of mitochondrial electron transport and protein structure-function relationships.

V. Classes Offered

Graduate Classes in Biochemistry

Classes marked (*) are not offered every year. Please consult the Department.

BIOC 5000.06: Special Topics in Biochemistry.

Students interested in topics not covered in formal classes may ask the department for special classes to meet their needs. The fields in which the department can offer instruction are reflected in the list of research topics.

BIOC 5001.03: Special Topics in Biochemistry.

Students interested in topics not covered in formal classes may ask the department for special classes to meet their needs. The fields in which the department can offer instruction are reflected in the list of research topics.

BIOC 5300.03: Biochemical Communication: Membranes and Cell Signalling.

This class examines the biochemical mechanisms underlying signal transduction of neurotransmitters, hormones and growth factors. Topics include membrane biogenesis and vesicle trafficking, first messenger synthesis, structure and regulation of receptors, G-proteins, lipid second messengers and calcium, protein kinases/phosphatases, and hormonal regulation of gene expression. Emphasis is on modern biochemical approaches to the elucidation of transmembrane signalling components and pathways in the nervous and endocrine systems. Evaluation is based on a mid-term examination, an essay and oral presentation on an advanced topic, and a final examination.

INSTRUCTORS: D.M. Byers, C.B. Lazier, and C.R. McMaster

FORMAT: Lecture 3 hours

PREREQUISITES: BIOC 3200, 3300, and 3400 or equivalent, or special permission.

BIOC 5301.03: Biochemistry of Lipids.

The biochemistry and metabolism of a variety of lipids are studied, especially of fatty acids, eicosanoids, steroids, phospholipids and glycolipids with specialized physiological or lipid-second messenger functions. Data from recent literature reports supporting central aspects of lipid metabolism and lipids as second messengers are emphasized. Evaluation is based on a mid-term examination, an oral presentation on an advanced topic in lipid metabolism, an essay and a final examination.

INSTRUCTORS: H.W. Cook and N.D. Ridgway

FORMAT: Lecture 3 hours per week

PREREQUISITE: An introductory class in biochemistry

*BIOC 5302.03: Structure, Biosynthesis and Metabolism of Lipoproteins.

The plasma lipoproteins are ordered macromolecular complexes of lipids with specific proteins which program the metabolic fate of the lipid component. The levels and distribution of lipoproteins within the blood are intimately connected with the genesis and regression of atherosclerotic vascular disease. The structure of lipoproteins at the physicochemical level, their biosynthesis, assembly and secretion are considered. The metabolism of lipoproteins within the vascular compartment and their subsequent removal by receptor mediated processes is explored in relation to both lipid transport and genesis/regression of atherosclerotic lesions. Emphasis is placed upon the interpretation of original experimental data reported in the current literature. Evaluation is based upon a mid-term essay and a final examination.

INSTRUCTORS: P.J. Dolphin and W.C. Breckenridge

FORMAT: Lecture 2 hours

PREREQUISITES: A comprehensive introductory class in biochemistry.

*BIOC 5401.03B : The World of RNA.

This class examines many of the interesting biochemical reactions in which RNA directly participates. Topics may include catalytic RNA; self-splicing introns and maturases; processing of eukaryotic mRNA (cis- and trans-splicing); processing of eukaryotic rRNA; and RNA editing. Evaluation is normally based on class participation (including one or more oral presentations) and a final review-type paper on an assigned topic.

INSTRUCTOR: M.W. Gray

FORMAT: Lecture/seminar, guided reading and discussion 2 hours

PREREQUISITES: BIOC 4403 and 4404, taken previously or concurrently, or equivalent preparation

*BIOC 5402.03: Biochemical Evolution.

Students will produce a substantial literature review in an area of molecular (gene and protein) evolution, to be decided on with the instructors. In the past, topics have included "selfish DNA", "directed" mutagenesis and the origins of introns.

INSTRUCTORS: W.F. Doolittle and C. J. A. Wallace

FORMAT: Seminar/discussions and guided reading

BIOC 5403.03: Genes and Genomes.

This course discusses the organization of genes into genomes. It deals with (i) compartmentalization of genetic material in nuclear and organellar genomes, (ii) the structure, behaviour and origins of components of both nuclear and organellar genomes which are not genes (transposable and other repetitive elements, introns), (iii) genetic and physical methods for mapping genomes, and (iv) the significance of genetic organization and higher order chromosomal structure and function. The methodology and prospects of the Human Genome Project will be discussed at some length.

Evaluation is based on a mid-term examination and paper, an oral presentation and a final examination.

INSTRUCTORS: P. Liu and W.F. Doolittle

FORMAT: Lecture 3 hours

PREREQUISITE: Permission of instructor

BIOC 5404.03: Gene Expression.

The different mechanisms for regulation of gene expression in bacterial and eukaryotic cells, and their viruses, are emphasized. Topics include genomic, transcriptional, and post-transcriptional modes of regulation. Evaluation is based on a mid-term examination, an essay and oral presentation on a topic selected by the student, and a final examination.

INSTRUCTOR: R.A. Singer

FORMAT: Lecture 3 hours

PREREQUISITES: Introductory molecular biology equivalent to BIOC 2030, BIOC 3400 and MICR 3033, or permission of the instructor

BIOC 5603.03: Advanced Laboratory in Biochemical Techniques.

This class will consist of a series of laboratory modules (each of 4 weeks duration, 6 hours per week) organized collaboratively by the departments of Biochemistry, Biology, and Microbiology & Immunology. A choice of modules will be offered in 3 sections covering techniques used in the study of molecular biology, protein structure-function, and specific metabolic processes. Graduate students may select their 3 modules from any section or sections, subject to availability of space. This class is open to senior undergraduate students and the number of places in the class is limited. If necessary, priority for enrolment will be given to undergraduate students for whom this is a required class for their degree programme. Students may not necessarily be assigned to the modules of their first choice but every effort will be made to accommodate those needing the techniques provided in a specific module or who have to meet distribution requirements among the three sections.

Students must obtain a class outline from the Biochemistry Office prior to registration and return the module selection form at least 24 hours prior to the organizational meeting, the date of which will be indicated in the Registration Timetable.

INSTRUCTORS: Biochemistry, Biology and Microbiology & Immunology faculty members.

COORDINATOR: H-S. Ro

FORMAT: Laboratory approximately 72 hours total

BIOC 5700.03: Proteins.

The theme of this class is the relationship between the structure and function of the most versatile class of biological macromolecules. The role of the sequence of monomeric units in the kinetic and thermo-dynamic determination of the protein fold is explored, and methods to determine that three dimensional fold, and to modify it for experimental or practical purposes considered. Specific details of how form determines function in the proteins' role in binding other molecules both small and large, in membranes, and in energy transduction will be provided. This class will also examine the ways for orderly elimination of superannuated proteins, and how the present variety of form has evolved from primeval origins. Most weeks, in addition to lectures, students will independently research and write about specialized topics suggested by the instructor and occasionally present these to the class in discussion group format.

INSTRUCTOR: C.J.A. Wallace

FORMAT: Lecture 3 hours

PREREQUISITE: BIOC 3200, plus CHEM 2301 and 2302 or CHEM 2303, or instructor's consent

BIOC 5701.03: Enzymes.

Fundamental principles of enzyme catalysis and its regulation are examined. Use of tools such as steady-state and presteady-state kinetics, isotope effect measurements, site-directed mutagenesis, spectroscopy, X-ray crystallography, and mechanism-based inhibitors to study the architecture and mechanism of action of enzyme active sites are presented. The catalytic mechanism and transition state stabilization are considered in detail for selected enzymes that have been well-characterized structurally. Classic and current papers in the literature are reviewed so that the experimental and conceptual approaches used may be critically appraised.

INSTRUCTOR: S.L. Bearne

FORMAT: Lecture 2.5 hours, seminar/tutorial 0.5 hours

PREREQUISITE: 3000-level courses in Biochemistry, CHEM 3403, CHEM 2301, and CHEM 2302, or instructor's consent

BIOC 5811.03: Biochemistry of Clinical Disorders.

This class is an introduction to the pathophysiology of disease. It provides the clinical and the laboratory approach to their diagnosis. Topics include cardiovascular, renal, gastrointestinal and hepatobiliary disorders, in addition to acid-base, blood and immune abnormalities. Students should contact the Department of Pathology to obtain information on this course.

COORDINATOR: B.Nassar

FORMAT: Lecture 3 hours, case studies and assignments

CROSS-LISTING: PATH 5011.03

BIOC 5812.03: Biochemistry of Clinical Disorders.

This class is an introduction to the pathophysiology of disease. It uses the same approach as BIOC 5811.03 but different groups of diseases are discussed. Topics include carbohydrate, lipid and amino acid disorders; endocrine and rheumatological diseases, as well as tumor markers and toxicology. Students should contact the Department of Pathology to obtain information on this class.

COORDINATOR: B. Nassar

FORMAT: Lecture 3 hours, case studies and assignments

CROSS-LISTING: PATH 5012.03

BIOC 5910.06-5913.06: Biochemistry Seminar.

Students define and select topics related to a theme of current interest in biochemistry, then prepare and present seminars based on this material to the entire Department. Regular meetings are held with Faculty advisors to develop necessary background and to learn data organization and presentation skills. Students present one journal presentation (30 min) per term to gain experience in presenting to both scientists and lawyers. Students participate in the evaluation of these presentations as well the Department seminars. In addition, students are expected to attend all general department seminars and take part in discussion groups with the speakers.

COORDINATOR: H-S. Ro

FORMAT: Tutorial 1 hour, presentations by arrangement

BIOC 9000.06: MSc Thesis.**BIOC 9530.06: PhD Thesis.**

Biology

Location: Life Sciences Centre
1355 Oxford Street
Halifax, NS B3H 4J1
Telephone: (902) 494-3515
Fax: (902) 494-3736

Chair
O'Dor, R.K.

Professors Emeriti

- McLaren, I.A., MSc (McG), PhD (Yale), George S. Campell Professor.
Copepod growth rates; population biology; copepods; birds;
seals.
Vining, L.C., MSc (Auck), PhD (Cantab), FRSC. Antibiotics,
resistance, biosynthesis, microorganisms, molecular
mechanisms, biotechnology, antibiotic production, secondary
metabolism.
von Maltzhan, K.E., MS, PhD (Yale)

Professors

- Brown, R.G., MSc (McG), PhD (Rutgers). Immuncontraception of
seals, contraceptive vaccine, harp and grey seals, fertility control
of finfish.
Croll, R., PhD (McG), major appointment in Physiology/
Biophysics. Molluscan neurobiology, development and
reproduction.
Fentress, J.C., PhD (Cantab), major appointment in Psychology.
Behavior in mammals, rodents, wolves.
Freedman, B., MSc, PhD (UofT). Pollution, disturbance, forest
harvesting, wildlife, site quality, biodiversity, conservation,
environmental education.
Hall, B.K., PhD, DSc (UNE), FRSC, Killam Professor of Biology.
Vertebrate skeleton, mammalian embryos, neural crest-derived
craniofacial skeleton, developmental biology, evolution, fish
embryos, bird embryos, development and evolution, cell
differentiation, morphogenesis.
Kimmins, W.C., PhD (Lond). Wildlife management, parasitology,
reproductive physiology, immunology.
Lane, P.A., MSc (SUNY Binghamton), PhD (SUNY Albany).
environment-economy interaction, ecosystem health,
environmental management, sustainability in Cuba, water
pollution, freshwater and marine ecosystems, food web
analysis.
Lee, R.W., MA (Mass), PhD (SUNY Stony Brook). Mitochondrial
genetic systems, green algae, Chlamydomonas, mitochondrial
ribosomal RNA coding regions, mitochondrial gene sequences,
mitochondrial ribosomes, recombination of mitochondrial
DNA.
MacRae, T.H., MSc, PhD (Windsor). Cell/molecular biology, tubulin
gene expression, gamma-tubulin, centrosome, microtubule
organization, cytoskeleton, small heat shock/*s*-crystallin
protein, molecular chaperone, embryo development.
Meinertzhagen, I.A., PhD DSc (St Andrews), Killam Professor in
Neuroscience, major appointment in Psychology. Visual system
in flies, *Drosophila*, synapse formation, computer 3-D
construction techniques, circadian rhythms, cell lineage,
neurons in ascidian tadpole larva, evolution of all of these.
Mills, E.L., MS, PhD (Yale), major appointment in Oceanography,
Killam Professor of Ocean Studies. History of Science, marine
biology, biological oceanography, social and scientific factors.
Myers, R.A., BSc (Rice), MSc, PhD (Dal). Population ecology;
Fisheries science; fisheries management; conservation biology;
evolution of life histories; meta analysis; statistical ecology.

- O'Dor, R.K., PhD (UBC). Energy costs, marine animals,
cephalopods, planktonic bivalve larvae, Nautilus, squid,
cuttlefish and octopus, acoustic telemetry.
Patriquin, D.G., MSc, PhD (McG). Agroecology, seagrasses, nutrient
cycling.
Scheibling, R.E., BSc, PhD (McG). Community ecology, marine
rocky intertidal, subtidal zones, disturbance, succession,
community structure, larval settlement, benthic marine
invertebrates, predator-prey interactions, behavioral ecology,
population dynamics, sea urchins.
Shaw, S.R., BSc (London), PhD (St Andrews), major appointment in
Psychology. Insect sensory neurobiology; nervous system
evolution; blood-brain barrier; visual and acoustic coding.
Stoltz, D.B., PhD (McM), major appointment in Microbiology.
Polydnviruses; parasitism in insects; honeybee viruses.
Wassersug, R.J., PhD (Chic), major appointment in Anatomy and
Neurobiology. Functional morphology; amphibian larvae;
vertebrate adaptations; development; evolution.
Willison, J.H.M., PhD (Nottingham). Biodiversity conservation,
biodiversity monitoring protocols, urban ecology, marine
protected areas, protected areas systems.
Whitehead, H., MA, PhD (Cambridge). Behaviour, ecology,
population biology of whales, social structure in vertebrates.
Wright, J.M., PhD (Memorial). Gene expression, eukaryotic
genomes, DNA fingerprinting, fish, DNA markers, genetics.

Associate Professors

- Johnston, M.O., PhD (Chic). Evolutionary genetics, plant evolution,
plant ecology, plant reproduction, evolution of self-fertilization,
inbreeding depression, speciation, floral development, sex
allocation in hermaphroditic animals.
Leonard, M.L., PhD (Ottawa). Behavioral ecology, parent-offspring
interactions, conflict, sibling competition, avian communication
and energetics.
Pinder, A. PhD (Mass), NSERC Research Fellow. Respiration,
circulation, metabolism in amphibians and fish, cardiovascular
system, oxygen transport, gas exchange, microcirculation,
environmental physiology, amphibians, hypoxia, blood flow.
Pohajdak, B., MSc, PhD (Man). Molecular immunology, (NK) cells,
tumors, cloning techniques, immunocontraception vaccines,
transgenic fish, hume insulin.
Walde, S.J., PhD (Calgary), NSERC Research Fellow. Predator-prey
interactions, terrestrial arthropod populations, metapopulation
dynamics, dispersal, competition.

Associate Professor (Research)

- Newkirk, G.F., PhD (Duke). International Development, production
systems for coastal waters, community based coastal resources
management, development of aquaculture options.

Assistant Professors

- Hutchings, J., MSc, PhD (Memorial). Ecology of fishes, life history
evolution, salmonid fish, population biology, commercially
exploited fishes, reproductive strategies, evolutionary ecology.
Hart, M., BSc (Alberta), MSc (Dal), PhD (Washington)
Iverson, S.J., PhD (Maryland), WFA. Reproductive strategies in
mammals, lactation and energetics lipid metabolism, fatty acids,
diets in marine mammals.
Latta, R., BSc, MSc (Toronto), PhD (Colorado)
Lloyd, V., BSc, MSc (Geneva), PhD (BC)

Adjunct Professors

- Aiken, D., MSc (New Hamp), PhD (Alta), Fisheries and Oceans
Armstrong, S.L., MSc (Mt. A), PhD (Memorial), NRC
Asiedu, S., BSc, MSc, PhD (McG), HRA
Boutillier, R., MSc (Acadia), PhD (East Anglia)
Bowen, W.D., PhD (UBC), BIO
Brodie, P.F., MSc (McG), PhD (Dal)
Caldwell, C.D., PhD (East Anglia), NS Agric Col.
Campana, S.E., PhD (UBC), BIO
Castell, J.D., MSc (Dal), PhD (Oregon)
Chapman, A., PhD (Liverpool)
Cone, D.K., MSc (Guelph), PhD (UNB), St. Mary's University
Craigie, J.S., MSc, PhD (Queens), Inst. Marine Bioscience, NRC
Douglas, S.E., MSc, PhD (Dal)
Doull, J., PhD (Dal) MSVU

Doyle, R., MSc (Dal), PhD (Yale)
 Harrington, F., PhD (State U. of N.Y.), MSVU
 Harrison, W.G., PhD (New York at Stony Brook)
 Hatcher, B., MSc (Dal), PhD (Sydney), Dal
 Head, E., MPhil (London), PhD (Wales), BIO
 Ju, H.Y., PhD (McG), NSAC
 Karma, O., MSc (NC State), PhD (Wash)
 Kenchington MSc (Dal), PhD (Tasmania), Fisheries and Oceans
 Kepkay, P.E. MSc, PhD (Dal), BIO
 Kerr, S.R., MSc (Queen's), PhD (Cal), BIO
 Lall, S.P., MSc, PhD (Guelph), NRC
 Mann, H., MSc, PhD (UWO), SMU
 Mann, K.H., PhD (Reading), DSc (Lond), FRSC, BIO
 McLachlan, J.L., MA, PhD (Oregon State College), Acadia University
 Oliver, Gilles, BSc, MSc, PhD (Montreal)
 Nowak, J., PhD (Olsztyn), PhD (Dal), NSAC
 Platt, T.C., MA (Uoft), PhD (Dal), BIO
 Ragan, M., PhD (Dal), NRC
 Ruzzante, D.E., PhD (Dal)
 Silver, M., PhD (Syracuse)
 Tennessen, T., PhD (Alta), NSAC
 Van der Meer, J.P., PhD (Cornell), NRC
 Vandermeulen, J., MSc (Alta), PhD (U of Calif, LA), BIO
 Vasseur, L., MSc (Quebec), PhD (Queen's), SMU
 Warman, P.R., MSc, PhD (Guelph), NSAC
 White, M.J., BSc (McM), PhD (SMU)
 Wright, J.L.C., PhD (Glasgow), NRC
 Zouros, L., MSc, PhD (Agr Col Athens), PhD (Chicago)

I. Admission

The Biology Department has facilities for advanced study and research leading to the MSc and PhD degrees.

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies and normally a student will not be permitted to earn all three degrees (BSc, MSc, and PhD) at Dalhousie. All inquiries for admission to the graduate programme should be addressed to Dr. Finn Sander, Biology Department.

II. Degree Options

A. MSc Degree Programme

Students are required to obtain five full credits at the graduate level; of these at least two must be graduate classes and include Biology 5700.03 and Biology 5705.03; they may include graduate classes from other departments, and in the case of students supervised at Nova Scotia Agricultural College, may include classes given at the College. The thesis may count as 1, 2, or 3 credits. Additional classes may be specified by supervisory committees.

Students are required to demonstrate in an undergraduate biology class for at least one year and must be admitted to candidacy before they are permitted to submit and defend a thesis.

A thesis reporting original research must be submitted and defended orally.

Students are expected to participate in weekly departmental seminars.

B. PhD Degree Programme

BIOL 5700.03 (or 5701.03) and BIOL 5706.03/5707.03 are required classes and additional classes may be specified by supervisory committees.

A preliminary examination on subjects in the general area of the thesis research is required for all PhD students. Students must pass the preliminary examination at least one year before submitting a PhD thesis.

Students are required to demonstrate in an undergraduate biology class for one year, and must be admitted to candidacy before submitting a thesis.

A thesis reporting original research must be defended orally. Students are expected to participate in weekly departmental seminars.

III. Programme Requirements

MSC Programme

Students are required to obtain five graduate credits. The thesis may count as 1, 2, or 3 credits (usually 3). Of the remaining credits, at least two must be graduate classes and must include BIOL 5700C and BIOL 5705C, (each one-half credit). The other graduate class credit may be taken from any department. Additional classes may be specified by supervisory or examining committees up to a maximum of 6.5 credits (including thesis) for a 1-year programme.

PhD Programme

Students are required to take only BIOL 5700C (or 5701C) and BIOL 5706C (or 5707C). First year PhD students who have already taken 5700C should take 5701C.

Ancillary and Audit Classes

At the discretion of the Supervisory Committee, Faculty Advisor or ATC examiners, a student may be directed to take for credit classes needed to make up deficiencies or acquire skills considered beneficial but of subsidiary importance. If these are undergraduate level classes they are designated as ancillary, to be passed with a minimum grade of D. They must be reported to the Graduate Coordinator or Stream Chair at the interview in September. They may *not* be used for *graduate credit*.

Students may also elect or be required to audit classes relevant to their programme. No credits are received for these. A maximum of one audit class is allowed for each year of the specified programme (i.e. One for a 1-year MSc, two for a 2-year MSc, etc.). Continuing Students may not audit. However, additional classes may always be audited if paid for with extra fees.

IV. Streams

The graduate programme in Biology is organized in three "streams", representing broad subdivisions of the discipline. Each student must elect to belong to one of these.

Stream A: Population Biology - M. Johnston/M. Leonard, Chair
 Stream C: Cellular & Molecular Biology - R. Lee, Chair
 Stream D: Organismal Biology - B. Hall, Chair

Class Selection

Classes with the extension .03 are half-credit classes. All others (sometimes shown with the extension .06) are one-credit classes.

Some classes are given only in alternate years. Others are suspended due to sabbatical leaves but will resume when the staff return. All class offerings are included in this listing so that students may plan their entire course in their first year. Such planning is necessary because the Faculty of Graduate Studies requires that a complete programme be prepared for each student by October 15th in their first year.

V. Required Classes

BIOL 5700.03: Communication Skills.

Scientists must be able to communicate with other scientists in a variety of spoken and written formats. Communication with the public via the mass media is increasingly important in many science jobs. Through realistic, practical assignments students will be able to test and develop their communication skills. There will also be some consideration of other aspects of the work of a biologist (e.g. ethics).

INSTRUCTOR: H. Whitehead

FORMAT: Two hours/week 1:30 p.m. - 3:30 p.m. Fridays

NOTE: Required of all MSc and PhD students. PhD students who have already completed BIOL 5700C (and others by special arrangements) may take BIOL 5701C.

This class will be given mostly in the Fall term and is graded pass/fail.

BIOL 5701.03: Communication Assignment.

This class is for first year PhD's who have already completed BIOL 5700C, and others by special permission. Permission to register in this class must be obtained by October 15th.

Assignments appropriate to the student's background and interests will be organized to further develop communication skills.

INSTRUCTOR: H. Whitehead

BIOL 5705.03/5706.03/5707.03: Graduate Module Classes

All new graduate students must complete a module class as early as possible in their programme. All students choose from the same set of modules, but the course number depends on whether you are a MSc or PhD student and whether you want to take additional modules. So if you are a:

MSc Student - you must take BIOL 5705C which is three modules and is letter graded. If you want additional modules, for a second half credit, you may take 5706C which is two modules and also letter graded.

PhD Student (no MSc at Dal) - you must take either BIOL 5706C which is three modules and letter graded or BIOL 5707C which is also three modules, but is graded pass/fail. If you want additional modules, you may take whichever of BIOL 5706C or BIOL 5707C you did not take before. This will be two modules and either letter or pass/fail graded depending on the course.

PhD Student (MSc at Dal) - you must take either BIOL 5706C (if not done as a MSc student) which is three modules and letter graded or BIOL 5707C which is also three modules, but graded pass/fail. If you want additional modules you may take whichever of BIOL 5706C (if not taken previously) or BIOL 5707C you did not take as a PhD student. This will be two modules and either letter or pass/fail graded depending on the course. This means if you took BIOL 5705C and BIOL 5706C as a MSc student you must take BIOL 5707C as a PhD student and you cannot take additional modules.

PhD Student (transfer from MSc) - you must take BIOL 5705C when you initially enroll in the MSc programme. This is three modules and letter graded. If you want additional modules you may take either BIOL 5706C which is two modules and letter graded or BIOL 5707C which is also two modules, but graded pass/fail.

Several modules may also be offered at the Nova Scotia Agricultural College (NSAC) in Truro. Their titles will also be listed on the module bulletin board. A student wishing further information about these modules should contact Dr. Claude Caldwell at NSAC (1-902-893-6680).

VI. Summary of Class Offerings

Related to Steam A

BIOL 5060.03	Environmental Ecology
BIOL 5061.03	Experimental Design and Data Analysis in Biology
BIOL 5616.03	Ecosystem Analysis
BIOL 5651.03	Marine Mammalogy
BIOL 5214.03	Physiology and Biochemistry of Marine Algae

Related to Stream C

BIOL 5012.03	Advanced Laboratory in Biochemical Techniques
BIOL 5020.03	Advanced Cell Biology
BIOL 5024.03	Microscopy
BIOL 5030.03	Topics in Genetics
BIOL 5101.03	Industrial Microbiology and Biochemistry
BIOL 5439.03	Topics in Human and Medical Genetics

Related to Steam D

BIOL 5070.03	Advanced Topics in Animal Physiology
BIOL 5072.03	Animal Nutrition
BIOL 5103.03	Infectious Diseases of Aquatic Organisms
BIOL 5600.03	Invertebrate Fisheries and Aquaculture

The following Biology graduate classes are suitable for students at the Nova Scotia Agricultural College:

BIOL 5060.03	Environmental Ecology
BIOL 5101.03	Industrial Microbiology and Biochemistry
BIOL 5070.03	Advanced Topics in Animal Physiology
BIOL 5072.03	Animal Nutrition

The following graduate classes are normally given at the Nova Scotia Agricultural College. Phone Dr. C. Caldwell (1-902-893-6680) for more information.

Regular Classes

AG527:	Economic Entomology
AG535:	Animal Research Methods
AG536:	Protein Nutrition
AG538:	Quantitative Genetics
AG539:	Molecular Genetic Analysis of Populations
AG552:	Plant Breeding Methods
AG553:	Nitrogen in Crop Production
AG556:	Advanced Crop Physiology
AG570:	Communication Skills & Graduate Seminar
AG571:	Module Course
AG572:	Applied Statistics & Experimental Design for Agriculture
AG573:	Module Course II
AG900:	Graduate Thesis

Special Topic Courses

AG521:	Special Topics in Environmental Microbiology
AG522:	Special Topics in Weed Science
AG524:	Special Topics in Environmental Impact
AG526:	Special Topics in Plant Pathology
AG531:	Special Topics in Applied Ethology
AG534:	Special Topics in Animal Physiology
AG537:	Special Topics in Animal Breeding and Genetics
AG541:	Special Topics in Soil Fertility
AG543:	Special Topics in Environmental Analysis
AG546:	Special Topics in Soil and Water Management
AG547:	Special Topics in Analytical Instrumentation for Researchers
AG551:	Special Topics in Plant Breeding
AG554:	Special Topics in Crop Physiology
AG557:	Special Topics in Agricultural Biotechnology
AG561:	Special Topics in Animal Product Technology

Cross-Referenced Courses

Cross references with undergraduate courses are shown in brackets ().

AG525:	Soil Microbiology (B400)
AG544:	Organic Environmental Analysis (CS420)
AG545:	Environmental Soil Chemistry (CS440)
AG558:	Plant Biotechnology (PS475)
AG559:	Biotechnology in Agriculture - Opportunities, Issues and Choices (IN475)
AG562:	Ruminant Digestive Physiology & Metabolism (AS475)

VII. Class Descriptions

BIOL 5012.03: Advanced Laboratory in Biochemical Techniques.

This class will consist of 3 laboratory modules (each of 4 weeks duration, 6 hours per week) organized collaboratively by the departments of Biochemistry, Biology and Microbiology. A choice of modules will be offered in 3 sections covering techniques used in the study of molecular biology, protein structure-function, and specific metabolic processes. Graduate students may select their 3 modules from any section or sections, subject to availability of space. This class is open to senior undergraduate students and the number of places in the class is limited. If necessary, priority for enrolment will be given to undergraduate students for whom this is a required class for their degree programme. Students may not necessarily be assigned to the modules of their first choice but every effort will be made to accommodate those needing the techniques provided in a specific module or who have to meet distribution requirements among the three sections.

Students must obtain a class outline from the Biochemistry Office prior to registration and return the module selection form at least 2 hours prior to the organizational meeting, the date of which will be indicated in the Registration Timetable.

INSTRUCTORS: J. Ro and J.M. Wright
COORDINATOR: H.-S. Ro

FORMAT: Laboratory, approximately 72 hours total
CROSS-LISTING: BIOL 4603.03/5603.03, BIOL 4012.03, MICR
4601.03/5601.03

BIOL 5020.03: Advanced Cell Biology.

The eukaryotic cell is examined as an integrated structural/functional unit. Lecture material is selected from the current literature. Students are urged to suggest topics and they may lecture on subjects of interest to the class. Evaluation includes two essays, one seminar and class participation.

INSTRUCTOR: T.H. MacRae

FORMAT: Lecture, 3 to 4.5 hours per week

PREREQUISITE: An introductory course in cell biology or permission of the instructor.

NOTE: Not offered in 1998/99.

BIOL 5024.03: Electron Microscopy.

This class is an introduction to microscopy, with emphasis on electron microscopy. Topics covered in theory include: optics of microscopes; specimen preparation techniques in electron microscopy (thin-sectioning, staining techniques, replica preparation); interpretation of micrographs. The importance of a proper understanding of the physical and/or chemical principles governing technical procedures is emphasized. Practical instruction in the operation of the photo microscope, the transmission electron microscope and the scanning electron microscope is provided to all students. Students opt for a project which involves learning one (or sometimes two) methods of specimen preparation for electron microscopy. Evaluation is based upon: three written critiques of journal articles, in which micrograph interpretation is critical; a project report, given both orally and in writing; production of satisfactory photographic micrographs (printed by the student) from each type of microscope; and a final theoretical examination.

INSTRUCTORS: Ping Li, D.B. Stoltz, G.T. Faulkner

BIOL 5030.03: Topics in Genetics.

This class involves independent study and is intended for graduate students who wish to investigate, under the direction of a professor, an area of biology not covered in other classes. Students should first consult with a faculty member to arrange the topic of study. An outline of the class content and method(s) of evaluation must be submitted to R.W. Lee who is the only person who should sign the approval form.

INSTRUCTOR: R.W. Lee

FORMAT: Essay and seminar

BIOL 5060.03: Environmental Ecology.

Various topics within the field of Environmental Ecology are discussed. Emphasis is on the organism and/or ecosystem effects of forestry practices and other types of land management, including recreation. The effects of various types of pollutants, including acid precipitation, oil spills, heavy metals, sulphur dioxide, and chemical pesticides will be considered. The class format is discussion-type seminars plus presentations by students.

INSTRUCTOR: B. Freedman

FORMAT: Lecture/tutorial, 3 hours

PREREQUISITE: None

CROSS-LISTING: BIOL 3060.03

BIOL 5061.03: Experimental Design and Data Analysis in Biology.

The purpose of this class is to introduce students who have previously taken formal classes in statistics to the practice and pitfalls of experimental design and data analysis in Biology. Using many real examples, especially from the ecological literature, we will show how experiments should be designed and analysed in different situations, with emphasis on potential problems and how they may be overcome.

INSTRUCTORS: R. Scheibling

FORMAT: Lecture, 3 hours

CROSS-LISTING: BIOL 4061.03

BIOL 5070.03: Advanced Topics in Animal Physiology.

Whereas the introductory animal physiology classes emphasize common principles, this class emphasizes the diversity of physiological solutions to common problems among animals. A different problem is chosen each year and each student presents two seminars reviewing the literature of particular animals' solutions. The student also writes a short term paper based on one of their presentations.

INSTRUCTORS: A. Pindor, R.K. O'Dor, S. Iverson

FORMAT: Lecture, 2 hours; open lab

PREREQUISITE: Classes in organic chemistry, general biochemistry, physiology and plant biology normally necessary. Permission of instructor required

CROSS-LISTING: BIOL 4070.03

BIOL 5101.03: Industrial Microbiology and Biochemistry.

A lecture and assignment course on the chemical, physical and biological aspect, of industrial processes. Assignments include problem-solving, proposal and report writing, and oral presentations.

INSTRUCTOR: M. Silver

FORMAT: Lecture/seminar 2 hours

BIOL 5103.03: Infectious Diseases of Aquatic Organisms.

This class will examine a variety of pathogens (viral, bacterial, fungal and protozoan) with emphasis on disease prevalence, diagnosis, control and pathogen identification. Immune systems of invertebrates and vertebrates will be discussed in relation to disease.

INSTRUCTORS: R. Brown, D. Cone, D. Strongman and D. Stoltz

FORMAT: Lecture 3 hours

CROSS-LISTING: BIOL 4012.03

BIOL 5214.03: Physiology and Biochemistry of Marine Algae.

Algae are examined in terms of their major processes and products with attention directed toward the influence of environmental factors, such as light, nutrition and temperature. The taxonomic classes are compared by means of pigment composition, nitrogenous compounds, reserve products and cell wall structure. Students will be expected to search the literature on specific topics and present verbal or written reports.

INSTRUCTOR: A. Cembella and J.S. Craigie

FORMAT: Lecture, 2 hours

BIOL 5600.03: Invertebrate Fisheries and Aquaculture.

Subject matter will deal with commercially exploited invertebrates (crustaceans and molluscs) with a heavy emphasis on bivalves.

Topics to be covered include: 1) Review of the major invertebrate harvest fisheries (locations, methods, population cycles, fisheries models), 2) biology and ecology of the Bivalvia (feeding, bioenergetics, growth, and reproduction), 3) Shellfish aquaculture (methods, species site location, economics). These topics will be covered with respect to the Maritimes as well as non-local fisheries. Class structure will be a mixture of lecture and class discussion. Course requirements will include 3 research papers.

INSTRUCTORS: J. Grant (Oceanography)

FORMAT: Lecture/discussions, 3 hours

PREREQUISITE: Fundamental knowledge of statistics; permission of instructor

CROSS-LISTING: BIOL 4600.03, OCEA 4600.03/5600.03

BIOL 5616.03: Ecosystem Analysis.

This class involves critical discussions of recent developments in the theory and practice of ecosystem analysis. The research literature is the text. The term is divided into four sections: 1) general systems theory, 2) quantitative ecosystem description methodologies - multivariate statistics, niche theory, 3) systems analysis-computer simulation; and 4) qualitative techniques - loop analysis, food webs and time averaging. Each student is required to lead some discussions and to submit a term paper demonstrating a creative application of these methodologies to an environmental problem at

the ecosystem level. Students complete problem sets and exercises in data analysis and to conceptual applications to gain experience using the various techniques. Aquatic ecosystems are emphasized.

INSTRUCTOR: P. Lane

FORMAT: Lecture/discussion, 3 hours

NOTE: Not given in 98/99

CROSS-LISTING: BIOL 4616.03

BIOL 5851.03: Marine Mammalogy.

The class will examine the characteristics that mammals brought with them when they returned to the ocean, the evolution of the different groups of marine mammals, some of their special adaptations, the roles of marine mammals in oceanic ecosystems and general principles of the marine mammal population in biology. Students will use information on the biology of marine mammals to explore conservation/management issues.

INSTRUCTOR: H. Whitehead

FORMAT: Lecture/projects, 3 hours

CROSS-LISTING: BIOL 4060.03

PREREQUISITE: Permission of instructor required

VIII. Special Topics Classes

BIOL 5800-5899: Special Topics and Projects in Biology.

A suitable combination of directed reading, seminars, written assignments, individual study and discussion or laboratory projects in a prescribed area. Classes are organized and scheduled by appropriate faculty, Adjunct Professors or Honorary Research Associates when requested by interested students. Students should approach potential instructors directly with their requests. Each separate topic must be approved by the Graduate Coordinator and is not normally given for students taking a class from their research supervisor. Approval must be requested by the instructor in writing and must have been received before October 1. A class description is required before approval can be given. Classes may be worth a half or a full credit, depending upon duration and content.

PREREQUISITE: Permission of the instructor

BIOL 5801.03: Special Topic in Agricultural Biology.

BIOL 5802.03: Special Topic in Animal Behaviour.

BIOL 5803.03: Special Topic in Animal Physiology.

BIOL 5804.03: Special Topic in Animal Science.

BIOL 5805.03: Special Topic in Aquaculture.

BIOL 5806.03: Special Topic in Biochemistry.

BIOL 5807.03: Special Topic in Biological Education.

BIOL 5808.03: Special Topic in Biomathematics.

BIOL 5809.03: Special Topic in Biostatistics.

BIOL 5810.03: Special Topic in Cell Biology.

BIOL 5812.03: Special Topic in Ecology.

BIOL 5813.03: Special Topic in Environmental Biology.

BIOL 5814.03: Special Topic in Evolutionary Biology.

BIOL 5815.03: Special Topic in Fish Biology.

BIOL 5816.03: Special Topic in Functional Morphology.

BIOL 5817.03: Special Topic in Genetics.

BIOL 5818.03: Special Topic in History of Biology.

BIOL 5819.03: Special Topic in Industrial Microbiology.

BIOL 5820.03: Special Topic in Limnology.

BIOL 5821.03: Special Topic in Marine Biology.

BIOL 5822.03: Special Topic in Marine Ecology.

BIOL 5823.03: Special Topic in Marine Microbiology.

BIOL 5824.03: Special Topic in Microbiology.

BIOL 5825.03/5925.06: Special Topic in Molecular Biology.

BIOL 5826.03: Special Topic in Philosophy of Biology.

BIOL 5827.03: Special Topic in Phycology.

BIOL 5828.03: Special Topic in Plant Biology.

BIOL 5829.03: Special Topic in Plant Ecology.

BIOL 5830.03: Special Topic in Plant Physiology.

BIOL 5831.03: Special Topic in Plant Science.

BIOL 5832.03: Special Topic in Population Biology.

BIOL 5833.03: Special Topic in Zoology.

BIOL 9000.00: MSc Thesis

BIOL 9530.00: PhD Thesis

Business Administration

Location: School of Business Administration
6152 Coburg Road
Halifax, NS B3H 1Z5

Telephone: (902) 494-7080

Fax: (902) 494-1107

The School of Business Administration offers a curriculum of undergraduate and graduate studies designed to equip students to serve the community in business, government, and the professions.

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Director of the School

Klapstein, R.E.

Director, Centre for International Business Studies

Brooks, M.R.

Professors Emeriti

Brookbank, C.R., BA, MA, PhD (Tor)
George, R.E., BSc (London), MS (Bristol), PhD (London)
Parker, J.R.E., BCom (Dal), MBA (Wash), CPhil (Mich), FCA

Professors

Brooks, M.R. BOT (McG.), MBA (Dal), PhD (Wales). International marketing, international transportation & distribution, strategic management of international operations

Fooladi, L., BSc (Iran), MA (Tehran), MS, PhD (Oregon). Risk Management and bond Portfolio Strategy.

MacLean, L.C., BA, Bed (StFX), MA, PhD (Dal)

McNiven, J.D., BA, MA, PhD (Mich). Business/gov't relations & economic development policy

Rosson, P.J., (Dean, Faculty of Management), Dip. MS (Salford), MA (Lancaster), PhD (Bath). International marketing, gov't assistance to exporters, company trade fair strategies

Sankar, Y., BA (McG), MA (UofT), PhD (Johns Hopkins)

Schellinck, D.A., BSc, MBA (Dal), PhD (Illinois). Marketing Informatics, the impact of international standards on the competitiveness of nations, international management education and research as an executive of international Federation of Scholarly Associations of Management, Marketing research, bank marketing.

Associate Professors

Archibald, B.C., BA (Queen's), MSc (Stanford), PhD (Wat)

Blunden, R.G., BCom (Dal), MM (Northwestern), PhD (Western). Strategy Formulation & Implementation, Entrepreneurship, Family Business

Carroll, R., BBA, BEd (StFX), MBA (Dal), FCGA, PhD (Dal)

Cherry, D.C., BCom (Dal), MBA (McM), CMA. Financial & managerial Accounting, International Development, Financial Management

Conrod, J.E.D., BCom (Dal), MBA (Tor), CA

Dirksen, C.J., BS (Santa Clara), MBA, PhD (Oregon)

Duffy, J.F., BS, MS, PhD (Iowa). Human Resource Management, Business Strategy, Database Design, Database Administration, User Interfaces

Ellison, R.A., BSc (UNB), MBA (McM), PhD (Tenn)

Gassmann, H.J., Vordiplom (Stuttgart), MS (Oregon State), PhD (UBC). Stochastic Programming, Operations Research, Financial applications, computer-aided modelling, Algorithms

Klapstein, R.E., (Director) BSc (Calg), BA (Alta), MBA, LLB (Dal), LLM (Osgoode), CMA

Larsson, S.O., BSc (SGW), MSc (Alta), PhD (UBC)

Maddox, R.N., BA, MBA, PhD (Ohio). Consumer behaviour, consumer satisfaction, marketing research

Mealiea, L.W., AB, MBA (Rutgers), PhD (Mass)

Oppong, A., BSc (Ghana), MBA (Chic), PhD (Iowa), CGA

Patton, D.J., BA (UNB), MA (UofT), DBA (Indiana). International Business; Multinational Corporations; International Trade; Exporting; Business Strategy; Environment; Environmental Management; Asean; Indonesia; Phillipines

Peacock, A.C., BA, MA, PhD (Western). Business strategy formulation & implementation

Rumsey, J.D., AB (UCLA), MSc (Victoria), BEd (Tor), MBA, PhD (York)

Scott, E.W., BCom (Dal), MBA (Col), CA, CMA. Financial & managerial accounting; Canadian taxation

Shafai, Y., BSc, MPA (Tehran), MBA, PhD (Mich)

Street, R.A., BCom, LLB, LLM (Dal), MBA (Western), LLM (Dal)

Assistant Professors

Baigant, G., BEng (TUNS), MBA (SMU), PhD (Kent State)

MacLean, B.W., BCom, MBA (Dal), CA

Grisé, M.L., BComm (Queen's), PhD (Queen's)

Sagebien, J., BA (Hamshire), MA (Naropa), MBA (Simmons), PhD (London School of Economics). Canada-Latin America Business, Cuban Economy, Marketing strategy, International Trade

Sharma, P., BSc (Panjab Agricultural University), MBA, PhD (Cal). Succession issues in family business, entrepreneurship, strategic management

Part-Time Faculty

Herteis, E., MA (Glasgow), MA (McGill)

Hiscock, R., BA (Western), MBA (Dal)

McGee, A., BSc, MBA (Dal)

Miller, B., BS (SUNY), MA (William and Mary), MBA (Dal)

Research Associate

Silver, D.L., PhD (ABD), MSc (Western), CIM (SMU), BSc (Acadia). Chair in Marketing Informatics. Knowledge discovery, data warehousing and mining, knowledge management and informatics, machine learning, knowledge transfer in inductive systems, artificial neural networks, data mining applied to business, data mining applied to health care and medicine

I. Introduction

MBA Programme

The aim of the MBA programme is to prepare students to become effective managers in small or large organizations. The programme concentrates on developing the ability to make sound decisions and judgements, and trains students in the analysis and evaluation of data for decision making. These skills have wide application in business, government and other organizations. Core classes develop basic skills, while elective subjects strengthen functional skills and deepen understanding of the complex and changing environment facing modern organizations. Required modules in communication develop skills through application. Integration of current computer technology into the curriculum ensures that the learning environment closely approximates that in which graduates will be working. While students may choose to concentrate elective studies in one or two areas, there is no requirement that a major be formally declared.

Additional information on the MBA programme, including class descriptions, is found in a brochure published by the School of Business, and available from the School. Students seeking further information should contact the MBA Programme Director, School of Business Administration.

Telephone: 1-888-432-5622
E-mail: MBA.Admissions@Dal.Ca
Website: <http://www.mgmt.dal.ca/sba/mba>

NOTE: The core curriculum was altered in 1996. Students admitted to the MBA programme before this date should consult the calendar of the year admitted.

II. Admission Requirements

Regulations of the Faculty of Graduate Studies govern admissions. Admission is approved by the Faculty of Graduate Studies, on the recommendation of the School of Business Administration. Applicants must hold a degree recognized by Dalhousie University as the equivalent of a Bachelor's Degree in one of its own faculties. Applicants are welcomed from those who have concentrated in the humanities, the social sciences, the physical sciences and engineering.

The School of Business actively seeks applicants also having relevant full-time work experience, but some candidates will be admitted directly from undergraduate studies. A résumé should accompany every application.

All applicants are required to submit results of a Graduate Management Admission Test (GMAT). Information on test dates, locations and registration can be obtained from the Dalhousie Registrar, or by writing directly to GMAT, Educational Testing Service, Box 966, Princeton, NJ, U.S.A. 08541. (1-800-GMAT-NOW or <http://www.gmat.org>) Contact the School of Business office for the minimum scores required for admission.

Candidates whose native language is not English are required to submit results of the Test of English as a Foreign Language (TOEFL). Information on test dates, locations and registration can be obtained by writing to TOEFL, Educational Testing Service, P.O. Box 899, Princeton, NJ, U.S.A. 08540.

Admission criteria and procedures are identical for the part-time and full-time programmes.

Admissions are made on a rolling basis, commencing in September for the following January, and in November for the following September. Interim (official) transcripts will be considered for candidates currently attending university, if all other documentation is complete. Since space in the programme is limited, it is strongly recommended that all documents be submitted before May 31 for entry the following September. (January 31 for PRC applications, March 31 for foreign students.) Applications received after these dates will be considered on a space available basis.

A complete application includes:

- Faculty of Graduate Studies application form
- Two reference letters, (academic)
- GMAT results
- TOEFL results, where applicable
- Proof of financial ability, where applicable (see Faculty Regulation, item 3)
- Transcripts from each institution attended (two copies)
- A brief statement explaining how you expect the Dalhousie MBA to benefit you, and what you will contribute to the programme (two copies)
- Your résumé (two copies)

The application form, together with the application fee, should be sent to the Registrar's Office. All supporting documentation should be sent directly to the School of Business Administration. Reference letters must be originals, sent directly by the referees. Only official transcripts received directly from the issuing institution will be accepted. GMAT and TOEFL score reports must be forwarded by the Educational Testing Service. Applicants must score 500 or better on the GMAT. Those who are required to rewrite the GMAT will have only one attempt at reaching the needed GMAT score.

All admitted applicants must confirm in writing their acceptance of the offer of a place, and provide a non-refundable deposit of \$200. This fee will be applied toward tuition but will be forfeited if the student does not register in the academic year for which he or she was admitted. Please note that this deposit is separate from any application or pre-registration fees, and is the means by which candidates to whom orientation materials are to be sent are identified.

Tuition deposits are normally due:

- By April 30 for offers made before April 1
- Within 30 days for offers made between April 1 and June 15
- Within 10-15 days for offers made after June 1

The Faculty of Law will require a deposit in addition to that required by the School of Business.

III. Grading System and Good Standing

Under the regulations of the Faculty of Graduate Studies and the requirements of the School of Business, MBA students are required to achieve a grade of B- or better in all classes taken. In order to graduate, students must achieve a B average (3.0 GPA) for the programme. Students are permitted to continue in the programme with one FM grade if an overall B average is maintained for the year. No credit towards a degree is granted for any class in which a grade of less than B- is obtained. Grades submitted for classes taken outside Dalhousie by letter of permission must conform to Dalhousie standards; that is, a grade of "C" recorded in another institution's transcript will be treated as a "Failure" (below the minimum passing grade of B-) on the Dalhousie transcript.

Students who do not meet these requirements may not continue in the programme unless readmissions is recommended by the School and approved by the Faculty of Graduate Studies.

Failed Core classes must be repeated and passed at the earliest opportunity; failed elective classes may be repeated and passed or replaced. When a failed class has been successfully repeated or replaced, only the repeated or replaced grade will be used to calculate the GPA. A second failure in the programme, regardless of when such failure occurs, will normally result in immediate dismissal from the MBA programme. Within two weeks of the first meeting of a class, each instructor shall make available a written description of the method of evaluation to be used in this class. In any class for which 25 percent or more of the evaluation is based on group work, there must be an exam(s), which must be passed on average.

Special examinations may be granted to students only in the case of illness supported by a medical certificate, or in other exceptional circumstances. Medical certificates must be submitted at the time of the illness and will not normally be accepted after a lapse of one week from the date of the examination.

IV. Degree Programmes

A. One Year MBA Programme Structure

Students with a recognized undergraduate degree in business (i.e., BCOM, BBA, HBA) with a GPA of at least 3.3 and a GMAT of 550 or better, will be granted up to a maximum of seven half credits of Advanced Standing, reducing their total MBA programme to 13 classes. Students may receive exemptions for core classes for which a demonstrated overlap is shown, replacing exempted classes with electives of their choice. The minimum number of classes required is thirteen half credits. Normally, the one year MBA can be completed in ten months.

Fall Term

- Five classes

Winter Term

- Five classes

Summer Term

- Three Classes

NOTE: The core classes will vary for individual students depending on their undergraduate classes. Please consult the MBA Programme Office for a personalized requirements listing.

B. Two Year MBA Programme Structure

The Two-Year MBA programme includes eleven required core classes, one required non-credit class and nine free electives (six for LLB/MBA). All MBA classes are half-credit classes. Normally, the two-year MBA can be completed in 20 months. The minimum number of classes required of students in the two-year MBA programme is seventeen (17) half-credit classes.

Full-time students are normally required to carry a full class load in the first year, consisting of ten half-credit classes and one non-credit class.

Term

- BUSI 5003.00: Communications and Career Planning - Module 1 (non-credit)
- BUSI 5103.03: Accounting
- BUSI 5503.03: Quantitative Decision Making
- BUSI 5511.03: Management Information Systems (formerly 6903.03). Cross-listing: LIBS 5505.03, PUAD 6925.03
- BUSI 5703.04A: Business Economics
- BUSI 5801.03: International Business (formerly 6801.03)

Second Term

- BUSI 5003.00: Communications and Career Planning - Module 2 (non-credit)
- BUSI 5201.03: Financial Management. Prerequisite: BUSI 5103.03, 5703.04, or permission of the instructor
- BUSI 5305.03: Management of People (formerly 5311.03/5315.03)
- BUSI 5401.03: Marketing Management
- BUSI 5551.03: Production and Service Management
- One elective

The second year normally consists of two required core classes and eight electives, to total ten classes.

Third Term

- BUSI 6004.03: Business Policy I: Strategy Formulation. Prerequisite: All first year required classes, or permission of the instructor.
- Four electives

Fourth Term

- BUSI 6005.03: Business Policy II: Strategy Implementation. Prerequisite: BUSI 6004.03
- Four electives

A variety of electives allows a student to develop a programme in keeping with his/her career plan.

Students may elect to take, with the approval of the School, graduate classes in other faculties and departments, such as Mathematics, Statistics and Computing Science, Resource and Environmental Studies, Economics, Public Administration, Law, etc. Throughout the programme, candidates will be expected to attend lectures given by visiting professors and business executives and to take part in projects involving the analysis of the problems of local business firms.

C. Part-time MBA Programme

The MBA degree may be earned through part-time study. A student must normally complete the requirements for the MBA degree within six years of initial enrolment in the programme. Extensions may be granted in special cases upon petition to the Faculty of Graduate Studies.

Many core classes and a selection of electives are offered at night each year on a rotating basis, and several summer classes offered are scheduled at night.

There is no prescribed order of completion of classes in the part-time programme, except as dictated by class prerequisites. However, MBA 6004.03A (Strategy Formulation) and 6005.03B (Strategy Implementation) are among the last classes taken, since they provide an integration of the whole programme and require a major field project.

No more than five (5) half-credit classes may be taken in each twelve month academic year, including summer sessions. Only Graduate level classes will be eligible for credit.

Part-time MBA students will be enrolled in classes together with full-time MBA students.

D. Combined LLB and MBA Programme

This is a four-year programme which enables students to select classes leading to the degrees of Bachelor of Laws and Master of Business Administration. The usual order of the programme is:

Year 1

- First-year classes of MBA programme, with a minimum of ten half-credit classes. See "Two Year MBA Programme Structure" for details.

Year 2

- First-year classes of the LLB programme

Year 3

- Three half-credit classes from the MBA programme
- 25 hours of classes from the LLB programme, including 7/9 hours from the Business Law area

Year 4

- Four half-credit classes, including BUSI 6004.03A and 6005.03B from the MBA programme
- Between 23 and 25 hours of classes in law.

Candidates for the LLB/MBA programme must satisfy the entrance requirements of the Faculty of Law (see Dentistry, Law and Medicine calendar) and may obtain further information about the combined programme by writing either to the Faculty of Law or to the Coordinator of the MBA programme. For admission, students must apply to both the Law School and the Business School.

E. Advanced Standing and Exemptions

Students with relevant academic background may receive advanced standing or exemption for core classes in the MBA programme. For further information, contact the MBA Coordinator. Full-time students will not normally be permitted to carry less than a full work load in the first year of the programme, regardless of the number of waivers granted.

Students may not apply for advanced standing or exemptions once their programme of study has been approved.

F. Concentrations

Environmental Management

Environmental threats and opportunities are becoming increasingly important for business. To prepare managers to respond to this growing challenge, with its ethical, legal, social and managerial dimensions, the Dalhousie School of Business Administration in conjunction with the School for Resource and Environmental Studies, offer a MBA concentration in Environmental Management.

Students choosing this area of concentration must complete the following prescribed classes:

- Management and the Natural Environment (6813)
- Environmental Management Systems for Business (6809)
- Environmental Impact Assessment (ENVI 5002)
- Management of Chemicals and Wastes (ENVI 5004)
- Environmental Law (ENVI 5200)

Additional classes are available as electives, including Industrial Ecology, Resource Systems & Economic Development, Environmental Policy, and Environmental Ecology. A large number of related elective classes are offered by the Faculty of Management and other Dalhousie faculties.

Finance

The Dalhousie School of Business finance program enjoys an enviable reputation within Canada's financial community for the outstanding work of its faculty and the quality of its graduates. In addition to solid backgrounds in both finance theory and practice, Dalhousie MBA graduates are recognized for their leading edge view of the financial industry. Electives allow students to more fully explore such topics as short term financial management, investment and portfolio management, the management of financial institutions, theory of finance, international financial management, and international banking. Students wishing to concentrate in finance are expected to complete as many finance electives as possible including Investments I (6201), Capital Markets (6203), Working Capital Management (6204), Capital Budgeting (6205), and Portfolio Theory (6206).

Information Systems/Information Technology

In today's increasingly complex and fast paced environment, information systems and technology have become critical to both the strategic and day-to-day success of the business. In manufacturing, marketing and service sectors, investment in information technology can account for a significant percentage of annual capital expenditures. With this heightened level of investment has come the need for managers with the specialized knowledge and skills to manage these assets for optimum efficiency and relevance.

To answer this need, the School of Business in conjunction with the School of Library and Information Studies offer an MBA concentration in Information Systems/Information Technology Management.

This exciting program focuses on emerging technologies, the internet and world wide web, electronic commerce, data mining, intranets, expert systems, and groupware, as well as management issues such as system analysis and design and database management.

Students choosing this field of study must complete the introductory class, Management Information Systems (5511), and earn four credits from current Management and Information Sciences class offerings. Additionally, a minimum of four electives are selected from over 19 related classes offered by the Dalhousie Faculty of Management or at other universities in the Halifax area.

International Business

Students choosing International Business as their area of concentration must complete International Business (5801) and Strategic Management of International Operations (6802), plus any two IB electives from the following list:

- Doing business Effectively in Asia
- Doing Business in the Americas
- Environmental Management Systems for Business
- Foreign Business Program
- Intercultural and comparative Management
- International Banking
- International Financial Management
- International Marketing
- International Transporting
- Special Topics in International Business
- Management and the Natural Environment, An International Perspective (Intercultural and Comparative Management is strongly recommended, and is required of Fellowship recipients.)

In addition to class electives, IB students at Dalhousie can further their learning experience through a number of interesting activities and opportunities supported by the Centre for International Business Studies. From an annual European Business Program and World business Forum Speaker Series to internship programs and case competitions, the MBA Program at Dalhousie has much to offer.

Students hoping to be considered for International Business Fellowship are expected to complete: 5801.03 International Business, 6802.03 Strategic Management of International Operations, 6315.03 Intercultural and Comparative Management, and at least one of the other International business classes offered by the School.

Marketing & Transportation

It is said that marketing is the discipline of managing relationships between the organization and its external customer environment. Marketing classes provide insight into the market forces and organizational skills needed to develop and execute successful marketing strategies. Transportation classes reflect Halifax's role as one of Canada's most important international transportation gateways.

A wide choice of electives covers the many activities organizations use to develop, promote, and distribute products and services. Through lectures, casework and project assignments, students learn to develop effective marketing plans and strategies and to define and serve customer needs. Students also learn to integrate regulatory issues, ethical issues, and capital return requirements in a competitive marketplace.

In addition to the core Marketing Management class (5401), students choosing a Marketing and Transportation concentration are required to complete Marketing Research (6401) and the Marketing Strategy Seminar (6450) along with a minimum of two other Marketing and Transportation Electives.

Other recommended classes include Buyer Behaviour, International Marketing, Advertising Management, Marketing Channels, Sales Management, Domestic Transportation, and Logistics Management.

G. MBA (Information Technology) Programme

Dalhousie University and ITI Information Technology Institute have joined forces to bring you Canada's first MBA in Information Technology (IT). Designed in consultation with key industry leaders and building upon the expertise of both institutions, it represents an exciting new breed of MBA programming.

Beginning in February 1999, the MBA (IT) Programme will offer students the opportunity to gain both the technical skills and the management training that are necessary to succeed in the knowledge-based economy.

1. Introduction

The MBA (IT) curriculum is rigorous, thorough and rewarding. You'll be called upon to stretch yourself to the limits as your personal and intellectual growth are fostered. The workload is purposefully demanding. And you'll be challenged by new ideas and concepts. But when you succeed in the MBA (IT) programme, you will be ready to manage the future.

Students will learn by doing, through observation, coaching and modeling. The result is a unique learning environment for MBA students that involves both problem-based learning and collaborative learning. The majority of time will be spent in teams, solving real-life scenarios. Business oriented projects form the stimuli for learning. People from diverse backgrounds will work together as a team to solve a problem. The emphasis is on comprehension and problem-solving rather than information transmission.

In keeping with the MBA (IT) Programme's philosophy of an integrated core curriculum, the faculty members work closely with each other, crossing disciplinary paths to plan the programme and integrate the business world into the curriculum. They are actively involved in your learning process.

Additional information on the MBA (IT) programme, including class descriptions, is found in a brochure published by the School of Business Administration.

2. Admission Requirements

The requirements for this programme are successful acceptance into the ITI Applied Information Technology Programme and acceptance by the Faculty of Graduate Studies into Dalhousie's MBA programme. When applying for Admissions please note that each programme is processed separately and must meet both admission requirements.

The MBA admissions requirements are as follows:

1. Minimum 3.0 GPA in your undergraduate programme;
2. A minimum score of 500 in the GMAT;
3. A Dalhousie University application;
4. \$55 application fee;
5. Official transcripts from all postsecondary institutions;
6. 2 letters of reference (at least one academic reference);
7. TOEFL results, where applicable.

All of the above information should be sent directly to the School of Business, Program Coordinator.

3. Application Procedure

For the 1999/2000 academic year applications (including all supporting documents) must be post-marked no later than 6 weeks prior to the start of the programme.

- January 8 for February
- July 1 for August
- October 1 for November

These dates are subject to change and should be considered as approximate only. A complete application includes:

1. Faculty of Graduate Studies application and fee;
2. Two letters of reference (at least one academic);
3. One original transcript from each educational institution attended;
4. Official GMAT score;
5. TOEFL results where applicable.

4. Contact

Students seeking further information should contact:

Marianne R. Hagen
MBA (IT) Program Administrator
School of Business Administration
6152 Coburg Road
HALIFAX, NS
Telephone: 902-494-7142
Toll Free: 1-888-432-5622
Fax: 902-494-7154
E-mail: Marianne.Hagen@dal.ca
WWW: <http://www.mgmt.dal.ca>

H. MBA (Financial Services) Programme

This MBA degree is designed to further prepare managers in the financial services industry to exercise leadership, sound general business knowledge, analytical skills and judgment in their managerial and client service roles. The MBA (Financial Services) consists of sixteen graduate level classes, including seven classes offered by the Institute of Canadian Bankers through the Professional Banking Program (PBP) or the Personal Financial Planning (PFP) and Personal Trust Program (PTP), and nine classes provided by the School of Business Administration. To be eligible for admission to the programme, applicants will be required to have successfully completed a minimum of four approved ICB classes and either meet the normal undergraduate requirements for admission to the MBA programme at Dalhousie, or possess at least five years experience in relevant management positions. Once accepted to the programme, a student must complete the requirements for the MBA (Financial Services) degree within seven years.

The nine Business Administration classes are offered via a distance education format, using university texts supplemented with teaching notes prepared by university professors. Each of the initial eight core classes in the programme will consist of 17 weeks of distance study and assignments, followed by a three day intensive learning session. The Capstone class, Strategic Leadership and Change, consists of 9 weeks of distance study and assignments, followed by a one week intensive learning session conducted at Dalhousie University.

The programme offers two academic terms per year, commencing in mid September and mid February; admissions are made for either term. There will be four classes available in each term. Classes will only be offered if there are an acceptable minimum number of students enrolled in a class section. The Capstone class will be offered during the summer break between the two regular terms, commencing in 1999.

There is no prescribed order of completion of classes in the programme, except as dictated by class prerequisites. However, a student may only enrol in the capstone class after having successfully completed the preceding 15 classes in the programme.

1. Application Procedure

For the 1999-2000 academic year applications (including all supporting documents) must be post-marked no later than June 1, for the term commencing September 13, 1999, and no later than November 15 for the term commencing February 7, 2000. A complete application includes:

- Faculty of Graduate Studies Application for Admission
- Two letters of reference (one academic, one employment)
- One original transcript from each educational institution attended
- One original ICB transcript
- One copy of your resume
- One Confirmation of Employment Record

2. Classes

The classes available to students in the MBA (Financial Services) programme are:

September Term

- BUSI 5103.03: Accounting
- BUSI 5503.03: Quantitative Decision Making
- BUSI 6317.03: Management in a Multicultural Setting
- BUSI 5801.03: International Business

February Term

- BUSI 5703.03: Business Economics
- BUSI 6207.03: Advanced Corporate Finance
- BUSI 6326.03: Management Skills Development
- BUSI 6410.03: Advanced Marketing

Summer Term

- BUSI 6990.03: Strategic Leadership and Change

MBA (Financial Services) students are permitted to take these classes in the distance format only.

3. Contact

Students seeking further information should contact the Director, MBA (Financial Services) Programme at:

Location: School of Business Administration
6152 Coburg Road
Halifax, NS B3H 1Z5
Telephone: (902) 494-1378
Toll Free: 1-800-205-7510
Fax: (902) 494-5164
e-mail: J.Macdonald@Dal.ca
WWW: <http://mbafs.mgmt.dal.ca>

V. General Classes

BUSI 5003.03: Business Communications and Career Management (non-credit).

This required non-credit class is designed to make students more effective communicators, focusing on the oral and written communication skills which are vitally important for success in both education and work. The career management component assists students in further developing their understanding and appreciation of themselves, and in gathering and analyzing additional information about the business environments in which they will be managing their careers.

BUSI 5103.03: Accounting.

This class is an introduction to the principles and practices to process and communicate information about an organization to different user groups. The emphasis is on financial statement accounting, reporting, analysis, and management information needs. Topics covered include: accounting information used to measure return and risk; the measurement principles and their impact on the reliability of the accounting information; financial statement analysis; cost allocation; and information needs for planning, control, and decision making.

BUSI 5503.03: Quantitative Decision Making.

This is an introductory class in quantitative methods with emphasis on business applications. Topics covered in statistics include: descriptive statistics, elementary rules in probability, random variables, distribution functions, expectations, sampling distributions, methods of sampling, classical estimation and hypothesis testing, simple and multiple regression, and correlation. Topics covered in operations research include decision analysis and linear programming. Throughout this class an emphasis is placed on helping the student to recognize situations and areas in business in which quantitative analysis might be useful.

BUSI 5703.03: Business Economics.

The external environment within which businesses operate presents opportunities, constraints, and threats to the operating and competitive decisions of business managers. This class provides a framework for the economic analysis of these issues. The class will focus on the microeconomic analysis of the industry-specific economic forces affecting an individual firm, as well as, to a lesser extent, macroeconomic analysis of the determinants of aggregate output, inflation, unemployment, interest rates, and exchange rates.

BUSI 5801.03: International Business.

This class provides a survey treatment of international business that will benefit all MBA students and build a foundation for those proposing future study in this area. For students not going on in the field, it provides the tools needed to manage the interdependence between domestic and international markets. It begins by tracing the growth in world trade in the post-World War II period, looking at the evolution of major trading nations (the US, Germany, Japan), examines the emergence of major trading blocs (EC, ASEAN, NAFTA), and analyzes the role and performance of institutions involved in world trade (World Bank, IMF, international financial institutions). A second part of the class deals with the various methods through which firms of all sizes do business overseas, but with particular attention paid to the dominant role played by multinational corporations. The trading history, performance, and problems of Canadian firms receive special attention. A final section will deal with the social and cultural sensitivity and adaptation made necessary by foreign operations, with an emphasis on evaluating responses to such diverse business situations.

BUSI 5201.03: Financial Management.

This is an intensive and complete overview of finance, with special emphasis on analytical techniques involved in short- and long-term corporate financial decisions. Equal emphasis is placed on theory and application of theory to financial problems. The instruction methodology includes lectures, cases, assignments, and spreadsheet analysis. Major topics, including valuation, working capital management, capital budgeting, long-term financing, capital structure, and dividend policy are tied together through emphasis on basic financial theoretical principles.

BUSI 5305.03: Management of People.

This class helps to build understanding in dealing effectively with human problems in organizations. The focus of the class is management behaviour in the process of working with people to produce effective results. Some of the topics covered in this class are motivation, leadership, communications perception, values and ethics, personality leadership, organizational politics, group dynamics, inter-group behaviour, basic human resource functions, and strategies for optimizing human resources.

BUSI 5401.03: Marketing Management.

Marketing Management is concerned primarily with problem-solving and decision-making situations which confront management in the administration of marketing operations. The class seeks to develop an understanding of the dynamics of market demand, considers the elements of the marketing mix, and shows how the enterprise's operations may be adapted to the marketing environment. The goal of this class is to develop skill in the sound analysis of given marketing situations, resulting in effective management action to capitalize on opportunities. Instruction will be a mixture of case discussions, projects, and lectures.

BUSI 5511.03: Management Information Systems.

This class is meant to provide the student with a basic knowledge of information systems and their role in business organizations. Fundamental to this basic knowledge is an understanding of the variety of information systems in business. An understanding of the use of computers in current and future information systems is stressed. Hardware configurations, software concepts and systems, and data base management issues, as well as system analysis, design, and evaluation will be introduced. Operating, tactical, and strategic management uses of MIS are covered. Applications from marketing, purchasing, production, personnel management, and finance will be studied.

BUSI 5551.03: Production and Service Management.

All managers should be familiar with the key concepts and techniques required to manage the production function of an organization (whether it provides goods or services), regardless of their specialist functional interests. This is especially true for those who aspire to reach senior general management positions. The purpose of this class is to provide an introductory overview of production/operations management for such individuals, covering the key concepts and the latest developments in the field.

BUSI 6004.03: Strategy Formulation.

Strategy formulation is the first of two required classes in strategic management which form the capstone of the MBA programme. They are about general management—the practice of managing a business from the perspective of the general manager. Strategy Formulation explores the nature of effective strategies and develops students' skills in evaluating and formulating strategies. To do so the class examines the role of the general manager in the organization, environmental, and industry factors, the impact of personal values on strategy, and organizational resources and capability constraints. Students are exposed to a wide variety of organizations through case studies, and have the opportunity to examine a single organization in detail through field projects. The field projects which are completed in small groups, put students in the role of consultants to actual organizations, addressing strategic and operating issues of concern to them.

BUSI 6005.03: Strategy Implementation.

Strategy Implementation picks up where Strategy Formulation leaves off. While Strategy Formulation is focused on the "what" of strategy (what should the organization be? What should it do?) Strategy Implementation focuses on how the strategy should be achieved. How should the business implement its strategy? How should it proceed? Such questions are complex, situational, and not easily answered. The class develops students' abilities to understand the complex issues of implementing strategies and managing strategic change in all types of organizations. Like Strategy Formulation, it uses case studies extensively to expose students to a wide variety of organizations and situations. Similarly, it allows students to understand a single organization in detail through a group field project where students, serving as consultants, develop detailed strategic proposals and implementation plans for actual organizations.

VI. Elective Classes

NOTE: Classes marked with an * are not offered every year. Please consult the university timetable for a list of current offerings.

Accounting Electives

BUSI 6101.03: Public Auditing.

This class covers the theory and practice of public auditing according to generally accepted auditing standards. The first half of the class considers the forces impacting on the setting of auditing standards and the current level of standards. This part includes pronouncements of the accounting profession, reporting standards, professional ethics, statute laws, legal liability and responsibilities, standards for examination of internal control in both manual and computerized environments, standards for the quality of evidence, statistical sampling and the sufficiency of evidence, documentation,

and working papers. The second half of the class considers typical audit programmes for examination of balance sheet and income statement accounts.

FORMAT: Seminar

PREREQUISITE: BUSI 5103.03

CROSS-LISTING: COMM 3114.03

BUSI 6102.03: Taxation.

This class takes an in-depth look at personal income taxation and provides an introduction to the taxation of corporations in Canada. It is designed for accounting majors as well as for students wishing to acquire a working knowledge of the Canadian Income Tax Act and its application. Topics covered include computation of income from employment, business, and property; capital gains and losses; taxable income and taxes payable, for individuals and corporations; and tax planning. The class is revised each term to provide up-to-date coverage in a rapidly changing taxation environment.

FORMAT: Seminar

PREREQUISITE: BUSI 5103.03, 5703.04

CROSS-LISTING: COMM 4120.03

***BUSI 6103.03: Advanced Taxation.**

This class is a follow-up to 6102 and provides a more detailed examination of the corporate taxation system in Canada. It demonstrates, with some examples, how tax awareness and planning can be a significant element in the regular business decision-making process for both individuals and corporations, especially private corporations. Students will make seminar presentations of their researched topics.

FORMAT: Seminar

PREREQUISITE: 6102.03

CROSS-LISTING: COMM 4121.03

BUSI 6106.03: Advanced Managerial Accounting I: Cost Accounting.

This class provides an in-depth understanding and rigorous applications of the managerial/cost accounting concepts introduced in 5102. Most of the topics introduced in 5102 are re-examined, with the objective of developing professional accounting skills.

Additional topics to be covered include cost allocation systems, modern product costing systems (such as activity-based costing, just-in-time systems, and backflush costing) in automated manufacturing settings, standard costing, and budgeting. Computer spreadsheets are used to solve some standard cost accounting problems, such as budgeting and cost allocations.

FORMAT: Lecture

PREREQUISITE: BUSI 5703.03 or permission of the instructor

CROSS-LISTING: COMM 3112.03

BUSI 6107.03: Advanced Managerial Accounting II: Organizational Control.

This is a capstone class in managerial accounting and as such relies not only on the student's accounting background but also knowledge from other functional and core areas of management.

The class is about management control systems. These systems are designed for the implementation of strategies in different types of organizations (manufacturing, service, and non-profit). Topics covered in the class include: types of responsibility centres and their control, transfer pricing, control of operations, performance evaluation, executive compensation, value of information, cost-volume-profit analysis under uncertainty, and information requirements of decision models (for example, linear programming).

The class is conducted by means of problem solving and case analysis. Students make case presentations in the class.

FORMAT: Lecture

PREREQUISITE: BUSI 6106.03 or permission of the instructor

CROSS-LISTING: COMM 3120.03

BUSI 6108.03: Advanced Financial Accounting I.

This class and its follow-up, 6113, are meant to provide an understanding of corporate financial reporting and the related conceptual framework. The class develops technical expertise in various financial accounting topics, some of which were introduced in 5101 and 5102. The focus is on understanding the implicit

interrelationships in the framework, and the environmental factors that work to establish generally accepted accounting principles (GAAP).

FORMAT: Lecture

PREREQUISITE: BUSI 5103.03 or permission of the instructor

CROSS-LISTING: COMM 3111.03

BUSI 6109.03: Advanced Financial Accounting II.

This class has two primary objectives: first, to provide an in-depth study of the interrelated topics of intercorporate investments, business combinations, and consolidated financial statements and foreign operation; second, to develop a framework that may help to resolve controversial issues in advanced financial accounting. The class makes extensive use of case analysis and problems.

FORMAT: Lecture

PREREQUISITE: BUSI 6108.03 or permission of the instructor

CROSS-LISTING: COMM 4102.03

BUSI 6110.03: Advanced Financial Accounting III.

This class covers intermediate and advanced topics in accounting, as well as several specialized accounting issues. The following is a list of some of the topics covered in the class: non-profit accounting, current accounting standards, special industry accounting, valuation, capital market theory and information efficiency, estates and trusts, and bankruptcy. In addition, the class provides an in-depth review of some topics treated in prerequisite classes. Guest speakers are invited occasionally to share their knowledge on some specialized accounting issues.

***BUSI 6112.03: Financial Statement Analysis.**

This class is intended to provide an analytical understanding of the usefulness of conventionally reported financial data in investment and credit decision-making. It covers topics that include the following: prediction of future earnings, prediction of financial distress, and the relationship between financial statement numbers and behaviour of stock prices. The class also examines the preparation and interpretation of alternatives to conventionally prepared financial statements.

FORMAT: Lecture

PREREQUISITES: BUSI 5103.03, 5201.03, and 5503.03

BUSI 6113.03: Advanced Financial Accounting IV.

This class and its prerequisite, 6108, are meant to provide an understanding of corporate financial reporting and the related conceptual framework. The class examines the assumptions underlying topics in the external reporting model, and the consequences of relaxing those assumptions. In, for instance, the study of accounting measurement models. Quantitative technical skills are emphasized simultaneously with the qualitative factors governing accounting policy choices.

BUSI 6114.03: Information Systems Controls.

This class examines special considerations when auditing in a computerized environment. Three major areas covered in the class are: (1) internal control techniques/requirements, including standards for acquisition, development, implementation, conversion, testing, and maintenance of systems. The class also covers the standards associated with computerized processing of transactions, creation and control over databases, and special planning for interruption and restart of computer operations; (2) audit procedures in a computerized environment. For each special internal control technique, there exists a number of possible audit procedures. Audit strategy is considered, including auditing around the system, reliance on and examination of computerized controls, and computer-assisted audit techniques. (3) Use of computer-assisted audit techniques, including "Interactive Data Extraction and Analysis", a software package from the Canadian Institute of Chartered Accountants, developed by the Auditor-General of Canada.

FORMAT: Lecture

PREREQUISITES: BUSI 5103.03, 5511.03

Finance Electives

BUSI 6201.03: Investments.

This class covers investment theory and its applications to practitioners and investment analysts. Students employ quantitative tools of investment and security analysis, financial models, statistics, and software, along with standard library sources, to write investment reports. An emphasis will be placed on the fundamental and economic analysis. Class format is lecture and discussion. Grade evaluation includes term paper, examinations, and when relevant, an investment game.

FORMAT: Lecture

PREREQUISITE: BUSI 5201.03.03.

RECOMMENDED: BUSI 5103.03

***BUSI 6202.03: Investments II.**

This class focuses on derivative securities, including futures, forward contracts, and options. Applications of derivative security theory in traditional and innovative securities, index arbitrage, and portfolio insurance are emphasized, along with the macro impact of derivative securities on the capital market. Participants are required to conduct original applied empirical research. Class format is lecture and discussion.

FORMAT: Lecture

PREREQUISITES: BUSI 5201.03, BUSI 6201.03

BUSI 6203.03: Canadian Capital Markets.

The objectives of the class are to identify Canada's capital markets, to review the flow of funds within these markets, to evaluate financial assets/financial liabilities in terms of risk/return relationships, and to identify and evaluate the relative positions of the main participants in the markets. The primary topics considered include: (a) the nature of the capital markets and their associated financial assets/financial liabilities; (b) a capital market model of the savings-investment function which is used to evaluate flow-of-funds data; (c) the participants (investors and borrowers) in the various segments of the market; (d) the role of individuals and non-financial firms in the system; and (e) domestic-international market linkages. These topics are handled in terms of reading assignments, research cases, and classroom discussion. Student assignments and seminars on assigned topics play an important role in this class.

FORMAT: Lecture

PREREQUISITE: BUSI 5201.03.

RECOMMENDED: BUSI 5103.03

BUSI 6204.03: Short-Term Financial Management.

This class applies quantitative techniques to solve problems of short-term financial management. Topics include cash management, sources of short term financing, financing strategies, and hedging. Emphasis is also placed on the discussion of cases to examine theoretical approaches under real-world situations. The class pays special attention to banking applications.

FORMAT: Lecture

PREREQUISITE: BUSI 5201.03,

RECOMMENDED: BUSI 5103.03

BUSI 6205.03: Capital Budgeting.

This class provides an exposure to the decision-making process involving capital expenditures and fixed asset replacement problems. The importance and usefulness of capital budgeting techniques are shown by applying them in a variety of contexts. Main topics covered include long-term investment criteria, risk analysis for capital budgeting, cost of capital, financial structure, and lease versus buy. The content will be both analytical and quantitative in nature. Emphasis will be on the impact of capital expenditure decisions on the value of the firm. The class makes use of case analysis as well as real-world projects as teaching vehicles.

FORMAT: Lecture

PREREQUISITE: BUSI 5201.03

BUSI 6206.03: Portfolio Theory.

This class is designed to introduce to students a modern theory of investment and finance, portfolio theory, and to discuss its applications to individual investors and financial institutions. It covers a thorough review of portfolio theory from Markowitz to the latest developments in the field in order to provide students with

the needed skills to face, successful, the challenging world of portfolio and money management. Regular classroom lectures and problem-solving methods are used throughout the term, but students will also be heavily exposed to the approaches taken by money managers and to the literature from this industry. A project, involving the analysis of actual data, is also used as a teaching instrument.

FORMAT: Lecture

PREREQUISITE: BUSI 5201.03

BUSI 6250.03: Theory of Finance.

This class is intended to enhance students' understanding of the theory of finance to a level which enables them to critique current research published in academic journals, and to apply selected research to financial management issues. The class is designed with the assumption that students have a background in financial economics. In addition to the main text, several journal articles will be reviewed in each area. Seminar style classes will feature discussion and student participation.

FORMAT: Seminar

PREREQUISITE: Concentration in Finance and permission of the instructor.

BUSI 6807.03: International Financial Management.

There are two distinct but related parts to this class. In the first, the macro environment in which international financial decisions are made is studied. Topics include: theories and policies of international adjustments, foreign exchange rates and the forward market, capital flows, hedging, arbitrage and the efficiency of foreign exchange markets, forecasting, foreign direct investment and risk diversification, and the Eurocurrency market. The second part of the class has a micro focus. This permits a detailed examination of the modern theory of foreign exchange from the standpoint of the multinational enterprise, its exposure to international risk, taxation and transfer pricing, cost of capital and sources of funds for the multinational enterprise, international capital budgeting, and management of the finance function.

FORMAT: Seminar

PREREQUISITES: BUSI 5703.04, 5201.03 and 5103.03

RECOMMENDED: BUSI 5801.03, strongly recommended

CROSS-LISTING: COMM 4201.03

BUSI 6808.03: International Banking.

See International Business electives.

FORMAT: Seminar

PREREQUISITE: BUSI 5703.04

RECOMMENDED: BUSI 5801.03 (strongly recommended)

Human Resource Management Electives

BUSI 5312.03: Organizational Design.

The behaviour and performance of individuals are significantly influenced by organizational design. The design involves the formal systems and process, specialization, hierarchy, authority-power, communications, reward systems, and accountability. The purpose of the class is to examine the evolution of design strategies, review some of the different approaches to design now being utilized in organizations, and consider differences in behaviour and performance in organizational systems employing different design strategies. The class will not offer a particular design as the answer to organizational-managerial problems, but will propose some steps that managers should consider before designing their organizations.

BUSI 5331.03: Labour-Management Relations.

This is an introductory class in industrial relations for MBA and other graduate students who have had little or no prior work in the area. As an introductory class, it is designed to cover a broad subject matter of relevance to future managers and union leaders. Five areas will receive major attention: the participants in industrial relationships, the legal framework governing participants' behaviour, union organizing strategies, contract administration (grievance procedures and arbitration), and the building of industrial relations systems which will meet the strategic needs of the firm.

BUSI 6313.03: Organizational Change.

This class provides the student with an understanding of major conceptual approaches to the changing organization, including changing people, technology, and structure. Emphasis will be placed on the analysis of the dynamics and process of change through case studies, and the exploration of programmes of organizational change, including grid and laboratory programmes, and the use of consultation.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5305.03

BUSI 6315.03: Intellectual and Comparative Management.

This class is designed to familiarize participants with behavioural problems and challenges facing managers interacting with people from other cultures in foreign or domestic work settings. The class will also examine research findings in the field to investigate the similarities and differences found in managerial practices of selected cultures. Designed primarily for management generalists and staff specialists, it is intended to develop the sensitivity and understanding necessary to operate effectively in a wide variety of cultural contexts. A combination of lectures, guest lectures, group case studies, experiential exercises, film, videos, student presentations, and class discussions will be employed to cover the class content.

FORMAT: Lecture
PREREQUISITE: BUSI 5801.03 or permission of the instructor

BUSI 6322.03: Selection - Testing & Interviewing.

This class considers the strategies and problems in personnel selection and examines its impact on organizational effectiveness. Topics include: basic selection models; job analysis; interviewing theory, methods, and uses. The description and evaluation of the usefulness of selection techniques such as personnel tests, interviews, biographical data, and managerial assessment centres; decision-making strategies in personnel selection; and human rights legislation in Canada will also be covered. As all managers participate in selecting subordinates, this class is appropriate for the generalist as well as the human resource specialist.

FORMAT: Seminar/lecture
PREREQUISITE: BUSI 5305.03 or permission of the instructor

BUSI 6323.03: Training & Development.

This class will cover methods currently employed in the training and development field. The primary purpose will be to develop students' expertise in the training and development area, and will employ such learning techniques as structured exercises, guest lecturers, role plays, and videos. Students will also be exposed to the most current research findings which directly relate to effective training and development within today's complex organizations. Specifically, the student will learn to: identify micro and macro training/development needs; plan and organize appropriate training/development programmes; implement pre-planned training/development programmes; and evaluate the effectiveness of training/development efforts. Since all managers have to develop themselves and their subordinates, this class will be relevant for generalists as well as human resource specialists.

FORMAT: Seminar
PREREQUISITE: BUSI 5305.03 or permission of the instructor

BUSI 6324.03: Performance Appraisal & Compensation.

This class will expose the student to current practice and theory in the area. The objectives are: to learn and practice equitable job evaluations; to teach the student the difference between and the correct use of various performance rating formats; to develop an understanding of the relationship between pay, performance, and satisfaction in a variety of organizational settings; to improve the student's unbiased rating skills; to practice effective feedback of performance appraisals; to understand the concepts behind various fringe benefit packages; and to evaluate the effectiveness of performance appraisal and compensation policies. Lectures, readings, case studies, role plays, and video tape behavioural modeling will be used to achieve these objectives.

FORMAT: Seminar/lecture
PREREQUISITE: BUSI 5305.03 or permission of the instructor

BUSI 6326.03: Management Skills Development.

This class will expose students to key knowledge, skills, and attitudes (KSAs) considered critical to managerial success. Such an exposure is designed to provide the student with behaviours which will help ensure that, when managing human resources, staff will perform at or near peak capabilities. This is a skill-building class. Specifically, students will be able to: (a) articulate the key KSAs necessary to help ensure managerial success, (b) identify and describe appropriate support behaviour for each KSA, (c) assess one's own personal strengths and weaknesses for each KSA, (d) develop acceptable proficiency levels for each KSA, and (3) interact effectively with other managers and staff so as to help ensure high levels of productivity.

Topic areas include: understanding what a successful manager needs to know, understanding the personal self, communications, interpersonal negotiations, goal setting, managing innovation and change, handling conflict and anger, performance evaluation, counselling and feedback, and management attitudes needed for success. Significant amounts of classroom time will be devoted to behaviour modeling exercises, role plays, case studies, and group discussions.

FORMAT: Seminar
PREREQUISITE: BUSI 5305.03 or permission of the instructor

***BUSI 6332.03: Negotiation and Collective Bargaining.**

This class examines the processes of union organization and certification, from the perspective of management. Major attention is given to collective bargaining and the negotiation process, in both the private and public sectors. Attention is given to legal and illegal strikes, as well as other job actions.

FORMAT: Seminar

International Business Electives

BUSI 6802.03: Strategic Management of International Operations.

Large cross-border movements of goods, services, capital, and technology increasingly demand a global view of the firm's strategy and operations. Some international corporations seek competitive advantage through coordination of geographically dispersed units, while others choose to tailor their international operations to the economic, political, and social aspirations of diverse national governments.

This class critically examines the generic and functional strategies open to multinational enterprises and, through numerous industry and business case studies, seeks to test the applicability of these concepts to actual situations. Each student is expected to prepare a major research paper, and a simulated negotiation is included to help sharpen top management skills crucial for success in international operations.

FORMAT: Seminar
PREREQUISITE: BUSI 5801.03

BUSI 6803.03: International Transportation.

The general objective of the class is to provide students with a conceptual and factual overview of international transportation from a Canadian perspective. The focus will be primarily on shipping, as this is the predominant form of transportation for goods destined for overseas markets; however, some time will be spent on international air cargo, truck, and rail services. Over the term, the following general topics will be addressed: the market structure in transportation, cargo systems, common carriers, and chartering; ship finance and operating decisions; airplane investment and operations; documentation, and regulation.

FORMAT: Seminar
RECOMMENDED: BUSI 5801.03

***BUSI 6805.03: Seminar on Marine Resources and Ocean Industry.**

The class objective is to introduce seminar participants to the nature and operations of ocean business, both traditional and modern. The content recognizes both national and international dimensions in such areas as policy, ownership, technology, finance, marketing, and operations. In the process, participants are also made aware of

the relevant aspects of ocean management and law. Specialists from business, government, and the academic community address the seminar on their particular areas of expertise. The class moderator provides for the integration of the material, drawing out the business implications of each aspect. A major research paper is required.

FORMAT: Seminar

BUSI 6806.03: International Marketing.

This class examines the process by which firms expand their operations to foreign markets, the decisions that must typically be made along the way, and how these decisions might best be made. Some lecturing will take place, but a heavy emphasis is given to case discussions and project work. Projects may be based on actual firms or on a topic of interest to the student. Project presentations form an important part of the class. Case discussions will focus on companies of contrasting sizes, with different product/service offerings, at varying stages of marketing involvement overseas, and selling into a range of geographic markets. However, emphasis is placed on smaller firms, since these often face the greatest problems and are more typical of Atlantic Canada.

FORMAT: Seminar

BUSI 6807.03: International Financial Management.

See Finance Electives.

BUSI 6808.03: International Banking.

This class introduces students to the global nature of financial markets and the role of international banking. The class is being offered at a time when the problem of rescheduling, which followed a dramatic increase in international lending, has now led many banks to examine their lending practices and to move away from sovereign lending back to corporate lending. Instruction methods include lectures, class and case presentations, and case assignments.

BUSI 6812.03: European Business Programme.

A group of MBA students travel to predetermined foreign destinations. The aim of this trip is two-fold: first, to meet with business leaders, government officials, and academics in selected countries, and second, to make separate business calls on behalf of specific Canadian firms seeking to do business in these countries. Prior to departure, participants will attend a series of lectures on the European business environment and familiarize themselves with their Canadian client companies. Following their return, students will present oral and written reports to the companies for which they have carried out a market investigation.

PREREQUISITE: BUSI 5801.03

BUSI 6813.03: Management and the Natural Environment - An International Perspective.

A major public issue in the minds of business executives, politicians, scientists, and others is the effects that industrial, agribusiness and other human activities have on the bio-physical environment. While urgent questions are raised at all levels - local, regional, national, and international - the perspective of senior management in large multinational enterprises operating in environmentally sensitive industries is taken in this class. The class examines those questions which pointedly and forcefully confront multinational enterprises and explore the choices decision makers must make within a complex of different economies, markets, cultures, social systems and, perhaps most important, regulatory regimes.

CROSS-LISTING: ENVI 5818.03

BUSI 6815.03: Doing Business Effectively in Asia.

The class will focus on the opportunities for trade and investment between Canada and the countries of ASEAN and East Asia, as well as Japan. The class will study opportunities that have been identified by contact with Canadian Embassies in the ASEAN region, East Asia, and Japan, as well as the main methods for transacting business in these locations. A variety of learning approaches will be employed. The class will be team taught by senior faculty associated with the Centre for International Business Studies and who have first-hand experience in the Asia-Pacific region.

FORMAT: Lecture/seminar

PREREQUISITE: BUSI 5801.03

CO-REQUISITE: BUSI 6802.03 or permission of the instructor.

BUSI 6816.03: Environmental Management Systems for Business.

Environmental threats and opportunities are becoming increasingly important for business. Environmental problems such as climate change, ozone depletion and loss of biodiversity have become important national and international issues. Governments continue to adopt regulations and standards which influence industrial activity on a daily basis. Banks, insurance companies and other investors have become conscious of liabilities imposed by improper handling of materials and contamination of property. Suppliers and customers are also setting their own requirements. With the advent of the Business Charter on Sustainable Development, the European Environmental Management and Audit Scheme and the ISO series of environmental standards, companies are responding to these challenges by establishing structured environmental management systems.

Class sessions comprise lectures, discussions, addresses by practicing managers and business leaders, as well as individual and group presentations. The major component of this class is the preparation by teams of students of environmental management systems for local companies.

PREREQUISITE: BUSI 5801.03, 6813.03

BUSI 6817.03: Doing Business in the Americas.

Latin America presents many challenges and opportunities for Canadian trade and investment. The complexity of Latin American society and the cultural enigma presented by the combination of old world traditions and newly liberalized economies requires a careful examination of the region. This class will provide an overview of the region which will highlight the history, politics and economic events which have shaped Latin America's hemispheric identity. The class will also take a close look at several Latin America countries which are of specific international importance to Canada. Students will gain an understanding of the opportunities and challenges facing Canadian business when pursuing trade and investment opportunities available in Latin America.

PREREQUISITE: BUSI 6816.03

BUSI 6850.03: Special Topics in International Business.

This class will be used to deliver seminars in current and emerging trends and issues in international business. Please consult the Centre for International Business Studies for a detailed outline.

BUSI 6315.03: Intercultural and Comparative Management.

(See Human Resources Management Electives.)

BUSI 6553.03: Managing Technological Innovation.

(See Management and Information Sciences Electives.)

NOTE: Students awarded International Business Fellowships must complete International Business, Strategic Management of International Operations, Intercultural and Comparative Management, and at least one of the other International Business classes offered by the School.

Management and Information Sciences Electives

***BUSI 6501.03: Operations Research.**

This class continues the search for "best" solutions of problems which can be formulated as mathematical models. It considers extensions of linear programming (such as integer, nonlinear, and stochastic programming). It also considers the usefulness of simple rules or heuristics for obtaining "good" suboptimal solutions in place of the complex rules for precisely optimal solutions.

FORMAT: Lecture

PREREQUISITE: BUSI 5503.03

CROSS-LISTING: COMM 4501.03

***BUSI 6503.03: Simulation Models.**

This class examines how to build simulation models in a broad range of settings using Excel. By analysing the (simplified) model one gains insight into the (complex) real situation. Parts of the model can be changed and the effects of the changes measured. The class starts with deterministic, "what if" models, where the value of variables in the model are decided by the modeller, and continues with stochastic or Monte Carlo models, where the modeller specifies the probability of distribution of some of the variables. The emphasis is on model building skills in the general and the modelling of randomness in particular.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5503.03

***BUSI 6504.03: Applied Statistics.**

The convenience of packaged statistical programmes (e.g. SPSSX and Minitab) has opened the area of data analysis to researchers with a wide variety of backgrounds. Since it is possible to operate statistical software without understanding advanced mathematics, there is a need for a class designed around a packaged statistical programme which introduces the user to the basic concepts underlying the techniques. Students use and interpret statistical programmes with data sets from such business areas as marketing, finance, and organizational behaviour.

FORMAT: Seminar
PREREQUISITE: BUSI 5503.03
CROSS-LISTING: COMM 4538.03

BUSI 6507.03: Advanced Operations Research Project.

This is a project class, which may carry full or half credit. Projects are drawn from real life, and students suggest their own topics for approval by faculty members in the M&IS area. See the area group coordinator for requirements.

FORMAT: Tutorial
PREREQUISITE: See the Management and Information Science area coordinator for requirements

BUSI 6512.03: Telecommunication and Business Strategy.

This is not a class on products, services, and high technology; it is a class on strategy and the use of technology. The focus will be on how to manage and apply the rapidly changing technologies of computers and communications. Guest lecturers are chosen to bring experts in key fields into the class and thereby expose students to the latest in these specific areas. Group projects, presentations, and individual reports are utilized to help students put their thoughts into action.

FORMAT: Seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6905.03 in 1992/93 and 1993/94

BUSI 6514.03: Systems Analysis and Design.

The major objective of this class is to enable students to understand, design, and develop small-scale computing systems within business organizations. Students will analyze existing business systems and redesign them for computer applications. Students must have completed Managing Information Systems (5511) and be familiar with computing hardware, software, and management terminology and concepts.

FORMAT: Seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6904.03 (former number)
CROSS-LISTING: LIBS 5580.03

BUSI 6515.03: Special Topics in Management Information Systems.

This class builds on topics introduced in Management Information Systems (5511). Targeting both the specialist and the generalist, it will take a more in-depth look at the major topics of the field. The content of this class will change rapidly as the field progresses. Topics currently covered are: telecommunications, information security, overcoming resistance to new systems, project management, structured programming, CAD/CAM, 4GLs, and recorders.

FORMAT: Seminar

PREREQUISITE: BUSI 5511.03

EXCLUSION: BUSI 6905.03 (former number)

BUSI 6516.03: Database Management Systems.

Database design and administration are at the core of any organization's information system. Any MIS professional needs to understand the fundamentals of organizational and network database design and the new technique of object oriented analysis. The student will develop an appreciation of current problems in database design and administration. Hands-on experience with both micro-based and mainframe database management systems will be acquired.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6906.03 (former number)
CROSS-LISTING: LIBS 6540.03

BUSI 6517.03: Management of the Information Resource.

Information systems development should be co-ordinated to meet the information needs of the organization. There are problems of interacting with and relating to the organizational functions for which information systems provide support. There are a number of alternative ways an information system may be structured; the selection among the alternatives is based primarily on matching the information system organization to the over-all organization. In addition to these issues, regarding the relationship to the utilizing organization, there are issues of internal management for effectiveness and efficiency.

The class is designed as a capstone; it ties together concepts provided in other classes. The information needs of various organizational functions are integrated with information systems through the master development plan. Administration and policy considerations are applied to specific areas of information systems management.

FORMAT: Seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6907.03 (former number)

***BUSI 6518.03: Expert Systems.**

This class covers the normative view of decision making, the artificial intelligence techniques in capturing knowledge from experts, the development tools and skills for decision support systems and expert systems, and the testing and evaluation of the developed system. Particular applications in the areas of accounting, marketing, and finance will be examined.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6908.03 (former number)

BUSI 6519.03: Systems Analysis and Applications Development.

This class is designed to provide students with a basic understanding of system analysis and an overview of application development. Students will be involved in the development of database using various software applications, primarily Access and Visual Basic. In addition, students will develop, document, and deliver an application to an outside end-user. This practical experience will enable students to understand and gain valuable experience in systems analysis and application development process.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5511.03
EXCLUSION: BUSI 6908.03 (former number)

BUSI 6520.03: Electronic Commerce.

For years businesses have been using the computer and information technology to achieve internal efficiencies. With the convergence of Information Technology and telecommunications over the last decade, Electronic Commerce has emerged to redefine the way that these organizations do business with their suppliers, customers and support infrastructure such as distribution providers and financial institutions. In particular, the class will examine the recent and rapid growth of Electronic Commerce from four approaches: an

Introduction to Electronic Commerce; EDI and re-engineering; Electronic Commerce and the Internet; and organizational issues in implementing Electronic Commerce.
CROSS-LISTING: BCMM 6020.03

BUSI 6521.03: Supporting Teamwork Through Information Technology.

Meetings are a way of life in every organization. In this class, theory and practice are blended to give students a practical approach to teamwork support. Topics explored include facilitation, electronic meeting systems, collaboration technologies, Group Support Systems research, cognition and decision making behaviour, group dynamics and, group communication theory.

BUSI 6522.03: Knowledge Discovery & Data Mining.

From various automated sources – such as bar-code scanners, credit card readers, usage recording devices, and most recently the internet – today's organizations receive volumes of data, which defy methods of manual summary and analysis. Thus, a major challenge facing organizations is how to convert their expanding data stores into useful knowledge. Over the last 10 years research in statistics, machine learning, and database theory has resulted in automated methods of "mining" for "nuggets" of knowledge from data. Data mining technology and the surrounding management processes are now collectively referred to as Knowledge Discovery in Databases (KDD). KDD methods have been successfully deployed in the financial, marketing, and quality control areas of major corporations and for various special projects in engineering, science, and medicine.

This class will cover the KDD process and the theory and practical application of data mining technologies such as artificial neural networks, inductive decision trees, and deductive modelling software to real-world problems of business and industry. We will also discuss some broader issues of Knowledge Management and what is required to have organizations move into a "true" information age. A project will be used to develop the students' familiarity with the database and data mining tools and the management process and practices.

Marketing and Transportation

BUSI 5402.03: Buyer Behaviour.

Designed to emphasize the "marketing concept", this class is basically an overview of the literature in consumer/industrial buyer segmentation and consumer/industrial buyer behaviour models. The objectives are: (a) to allow the student an in-depth understanding of the concept of market segmentation, target marketing, or market positioning; (b) to provide the student with a framework or model of buyer behaviour in terms of "product" choice, "product class" choice, and consumption decisions; and (c) to develop in the student a basic skill in analyzing marketing decision making with buyer behaviour constructs. The method of instruction will be lecture, discussion, and case materials.

FORMAT: Lecture
CROSS-LISTING: COMM 3401.03

BUSI 6401.03: Marketing Research.

This class is designed to give the student an appreciation of the scope of marketing research techniques. The goal of the class is to provide students with sufficient background to make them knowledgeable users of marketing research information. Marketing research will be related to model building, information systems, and the concept of value of information. Research designs, sampling procedures, and questionnaire designs are discussed. Each student is required to develop and execute a research project. The class uses readings, lectures, and case studies.

FORMAT: Seminar
PREREQUISITES: BUSI 5402.03, BUSI 5401.03
RECOMMENDED: BUSI 6504.03, strongly recommended

BUSI 6402.03: Marketing Channels.

Marketers have devoted a good deal of attention to the institutions involved in the flow of goods from the producer to the marketplace. Since most manufacturers' products pass through the hands of distribution intermediaries, an understanding of channel processes

is of some importance. The channel is viewed as a system-made up of separate but interdependent members whose relationships can be at the same time cooperative and conflicting. Instruction is through lectures/discussions, case analysis, and research papers.

FORMAT: Lecture
PREREQUISITE: BUSI 5401.03
RECOMMENDED: BUSI 5402.03

BUSI 6403.03: Advertising Management.

Designed to improve analytic skills and decision-making capabilities through the practical application of advertising concepts and principles, the class considers market positioning, the psychology of mass communication, copy strategy, media selection, budgeting, and advertising research. The major learning activities are case analysis, class discussion, and an advertising project. The emphasis is on integrating and organizing the concepts, principles, and theories into an evaluative framework for the analysis of advertising strategy. A major resource for the class is the use of case analysis to apply the theories and propositions.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5401.03
RECOMMENDED: BUSI 5402.03

BUSI 6405.03: Sales Management.

Sales Management is designed to provide students with an understanding of the tasks and problems facing today's sales manager and to familiarize them with current sales force management practice. Specifically, this class will provide an exposure to the concepts, techniques, and procedures in buyer-seller relations, salesmanship, organization of the sales force, personnel management, selection, sales training, motivation, compensation, evaluation and supervision, budgets, quotas, territories, and sales control. Extensive use of the case method and classroom discussion will be made to extend the basis text material and examine other points of view.

FORMAT: Lecture/case studies
PREREQUISITE: BUSI 5401.03
CROSS-LISTING: COMM 3409.03

BUSI 6406.03: Domestic Transportation.

This class examines the development of the transportation modes and national transportation policy in Canada. The characteristics and cost structures of the various modes (air, motor, pipeline, rail and water) and the effect of such costs on the carriers' pricing decisions are studied. Topics include the National Transportation Act and other governmental legislation, the evolution of the agencies of control, structure of the transport industry, regulation versus deregulation, passenger policy, urban transportation, transportation and environmental issues, current issues, and future directions. Particular attention is paid to transportation development, problems, and opportunities in the Atlantic region.

FORMAT: Lecture/seminar
CROSS-LISTING: COMM 3408.03

BUSI 6407.03: Logistics Management.

This class is an introduction to the decision problems faced by the manager of a logistics system: to achieve the coordination of purchasing and materials management, the channels of distribution, the transportation and storage of products, and the communications and data processing system, in order to minimize the total cost of these activities and satisfy the marketing requirements of the firm. Topics include customer services, order processing, purchasing, transportation, packaging, inventory management, distribution centres, logistics organization and systems controls, and reverse distribution and recycling.

FORMAT: Lecture/seminar
PREREQUISITE: BUSI 5551.03 or permission of the instructor
CROSS-LISTING: COMM 3407.03

BUSI 6420.03: Marketing Informatics.

Technological developments in database storage and mining, the development of relationship marketing, the rise of direct marketing and introduction of new media such as the internet have revolutionized the way marketing is conceptualized and executed. This revolution in marketing requires marketers who have a whole new set of skills and knowledge focused in the application of

technology and associated practices. These skills are required for growth areas of marketing practice such as direct marketing, where demand for marketing graduates grew 40% in 1996. Large companies require marketers with the skills necessary to work with IT people to develop effective customer information files and information from other sources. They need to be able to use data mining tools and techniques to understand buyer behaviour, identify relevant segments, and develop effective strategies using all of today's new media and channels.

BUSI 6450.03: Marketing Strategy Seminar.

This class is the capstone class in marketing. As such, it is designed to draw together the individual marketing classes offered in the MBA programme. Extensive use will be made of case studies requiring students to develop complete marketing strategies for companies in "real-life" situations. Student presentations of their case analysis will form an important part of the class.

FORMAT: Seminar

PREREQUISITES: BUSI 5401.03 and at least two 6000-level marketing classes, (which may be taken concurrently) or permission of the instructor

BUSI 6803.03: International Transportation.

(See International Business Electives)

BUSI 6806: International Marketing.

(See International Business Electives)

Other Electives

***BUSI 6002.03: New Venture Creation.**

New Venture Creation is about entrepreneurship: the process of creating new businesses. It employs cases, experiential exercises, and a major project to expose students to the issues, problems, and challenges of creating viable new business. The project provides students with the opportunity, within the framework of a formal class, to explore and develop business ideas they have been considering or wish to investigate. The final output of the project is a feasibility study, business plan, and financing proposal for a new venture.

PREREQUISITES: BUSI 5103.03, 5201.03, 5401.03
CROSS-LISTING: ECMM 6024.03

***BUSI 6003.03: Management of Diversification.**

Managing diversification addresses the practice of strategic management in the diversified firm. Through cases, readings, and projects, the class examines the theory of diversification and alternative diversification strategies, internal growth, acquisition, related and unrelated diversification. Other topics addressed include integration of the new acquisition and divestiture.

PREREQUISITES: BUSI 5103.03, 5201.03, 5315.03, 5401.03, 5503.03, 5551.03, or permission of the instructor

***BUSI 6006.03: Managing the Family Enterprise.**

Managing the Family Enterprise is about the special problems and issues that confront family businesses. It explores the family system, the business system, and their interactions-functional and dysfunctional. Specific topics examined include: the decision to join a family firm, establishing credibility as a son or daughter, succession in the family firm, retaining key non-family employees, strategic planning in family firms, and other issues especially relevant for family firms. The class has two main purposes. First, it provides an organized framework for students to understand the dynamics and special issues of family firms. Second, it is designed to allow students to explore their interest in joining a family firm. Therefore, it is especially intended for students who come from families which are in business or for students considering joining a family business. Others who wish to explore a key segment of Canadian business are also welcome.

PREREQUISITES: BUSI 5103.03, 5201.03, 5305.03, 5401.03, 5503.03, 5551.03, or permission of the instructor
CROSS-LISTING: COMM 3308.03

BUSI 6901.03: Business Law.

To meet the challenges of the marketplace with increasingly complex relationships between the consumer, business, and government, this class seeks to provide students with the knowledge and analytical skills needed to reach well-formulated decisions on some of the legal problems that they might have to face as members of the business community. As a survey of Canadian law relating to business activities, the class examines the meaning and sources of law; the machinery of justice; the law of torts; the law of contracts: formation of a contract, essential requirements for the validity of a contract, the requirement of writing, privity of contract and assignments, interpretation, breach and discharge of a contract; the law of sale of goods and services, warranties and guarantees, false advertising, unfair trade practices and consumer protection; the law of insurance, guarantee, bailment, agency, employment, negotiable instruments, real property, mortgages, partnership, corporations; legal devices for securing credit and the rights of creditors. In addition to a basic text book, emphasis is placed on additional readings and the use of the Dalhousie Law School library for case analysis.

FORMAT: Seminar

BUSI 6902.03: Business and Government.

The aim of this class is to explore the relationship between businesses and the public sector. Government impinges on business policy and activities through laws, regulations, subsidies, taxes, and its spending powers. How businesses can and do influence decisions in these areas constitutes the technical matter of the class. As a matter of necessity, the class assumes some prior general knowledge of the Canadian political system. This can be gained from either general politics classes or by some preliminary reading on the subject.

FORMAT: Lecture

CROSS-LISTING: PUAD 6500.03

BUSI 6951.03A/6952.03: Research Reading and Conference.

Supervised study on a topic of special interest to the student (proposed by the student and faculty member involved, and approved by the Curriculum Committee).

BUSI 6960.03: Internship.

This class is intended to provide students an opportunity to apply in the business environment, the knowledge, skills, and abilities gained in the programme.

PREREQUISITE: Successful completion of first year core classes

Chemistry

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Chairperson of Department

Boyd, R.J.

Graduate Coordinator

Burford, N.

Professors Emeriti

Knop, O., DSc (Laval), FCIC, Harry Sherriff Professor of Chemical Research. Structural and solid-state inorganic chemistry
Ryan, D.E., BSc (UNB), MA (UofT), PhD, DSc (Lond), DIC, FCIC.

Professors

Arnold, D.R., BS (Bethany College), PhD (Roch), FCIC, Alexander McLeod Professor of Chemistry. Development of photochemical and electrochemical synthetic methods
Aue, W.A., PhD (Vienna), FCIC. Basic and applied chromatography
Boyd, R.J., BSc (UBC), PhD (McG), FCIC, Faculty of Science Killam Professor of Chemistry. Quantum chemistry reaction mechanisms; density functional theory and surface chemistry
Burford, N., BSc (Wales, Cardiff), PhD (Calgary), Faculty of Science Killam Professor of Chemistry. Synthesis and comprehensive characterization of main group compounds
Cameron, T.S., BA, MA, DPhil (Oxon). X-ray structural studies on inorganic compounds
Chatt, A., BSc (Calcutta), MSc (Roorkee), MSc (Wat), PhD (UofT), FCIC. Nuclear and bioanalytical methods; trace elements in the environment.
Coxon, J.A., MA (Cantab.), MSc, PhD (East Anglia). Electronic spectra; laser spectroscopy; chemiluminescence
Dahn, J.R., BSc (Dal), MSc, PhD (UBC), NSERC/3M Canada Inc. Industrial Research Chair, cross-appointment with Physics. Materials for advanced batteries
Grindley, T.B., BSc, MSc, PhD (Queen's), FCIC. Carbohydrate chemistry; molecular modeling, synthesis
Grossert, J.S., BSc, MSc, PhD (Natal), FCIC. Mass spectrometry and organosulphur chemistry.
Kwak, J.C.T., BSc, MSc, PhD (Amsterdam), FCIC. Colloid and polymer chemistry.
Pacey, P.D., BSc (McG), PhD (UofT), FCIC. Temperature dependence of reaction rates
Pincok, J.A., BSc, MSc (Man), PhD (UofT), FCIC. Studies on reaction mechanisms involving both ground and excited states
Ramaley, L., BA (Columbia), MA, PhD (Princeton), FCIC. Mass spectrometry and chemical instrumentation
Wasylshen, R.E., BSc (Wat), MSc, PhD (Man), FCIC, FRSC, Faculty of Science Killam Professor of Chemistry. Multinuclear NMR studies of solids and liquids
White, M.A., BSc (Western), PhD (McM), FCIC, Killam Research Professor of Materials Science. Material science, thermal properties of solids

Associate Professors

Grundy, K.R., BSc, MSc, PhD (Auckland), Synthesis and reactivity of transition metal complexes containing unusual molecular and ionic species
Guy, R.D., BSc (SFU), PhD (Carleton). Method development for the speciation of toxic metals and organics

Hooper, D.L., BSc, MSc, PhD (UNB), FCIC. Spectroscopic methods; high field multinuclear NMR
Kusalik, P.G., BSc (Lethbridge), MSc, PhD (UBC), NSERC University Research Fellow. Computer simulation of liquids and solids
Warren, C.H., BSc (Western), PhD (McM). Molecular graphics, theoretical chemistry
Wentzell, P.D., BSc (Dal), PhD (Mich State). Chemometrics; sensors; continuous flow analysis
White, R.L., BSc (Dal), PhD (McM), FCIC. Biosynthesis of natural products and enzymes of secondary metabolism

Assistant Professors

Cozens, F.L., BSc (York), PhD (UofT), NSERC WFA. Nanosecond laser flash photolysis, physical organic chemistry in homogeneous and heterogeneous media
Schepp, N.P., BSc, PhD (Tor). Biologically important reactive intermediates, nanosecond laser flash photolysis

Adjunct Professors

Aquino, M.A.S., BA, BSc (Queen's), MSc (Queen's), PhD (Carleton), St. Francis Xavier University, Antigonish, NS. Coordination Chemistry.
Boyd, R.K., BSc, PhD (St. Andrews, Scotland), FCIC, National Research Council, Institute For Marine Biosciences, Halifax. Separations science; mass spectrometry.
Figeys, D., BSc, MSc (Montreal), PhD (Alberta), National Research Council, Institute for Marine Biosciences, Halifax, NS. Protein analysis
Kiceniuk, J., BSc (Alberta), MSc, PhD (UBC). Dept. of Fisheries and Oceans, St. John's, NF. Environmental chemistry and toxicology
Lamoureux, M., BSc (Ottawa), PhD (Carleton), St. Mary's University, Halifax, NS. Environmental and analytical chemistry
Marangoni, D.G., BSc (Acadia), PhD (Dal), St. Francis Xavier University. Surfactant technology
Singer, R.D., BSc (SMU), PhD (Simon Fraser). St. Mary's University, Halifax, NS. Metals in organic chemistry
Thibault, P., BSc, PhD (Montreal), National Research Council, Institute for Marine Biosciences, Halifax, NS. Biological mass spectrometry

Visiting Scientists

DeCosta, D.P., University of Colombo, Sri Lanka
Kiceniuk, J.W., Fisheries and Oceans Canada, St. John's, NF

Postdoctoral Fellows, Research Associates/Assistants and Lecturers

Baumann, K., PhD (Wuerzburg)
Beasy, M., BSc (Dal), MSc (Waterloo)
Bessonette, P., BSc, PhD (Dal)
Cano, M., BSc (Universidad de Valencia), PhD (Universidad Politécnica de Valencia)
Chan, M., BSc (Calgary), PhD (Dal)
Corde, R.E., BSc (Dal), MSc (UBC)
Furue, H., BSc, MSc (Osaka), PhD (Queen's)
Goodwin, W.E., BSc (Mt A), PhD (Dal)
Lam, M., BSc (UBC), PhD (Dal)
LeBlanc, D.J., BSc (St FX), PhD (McMaster)
Lowery, N.B., BSc, PhD (Dal)
MacKay, J., BSc (Acadia), MSc, PhD (Dal)
Murashov, V., MSc (Inst. For Fine Chem. Tech., Moscow), PhD (Dal)
Murphy, C., BSc, PhD (Queen's Univ., Belfast, Northern Ireland)
Pincok, A.L., BSc, MSc (Manitoba) BFA (NSCAD)
Singh, H., BSc (Guyana), PhD (Dal)
Smith, C., BSc (Queen's), MSc (Dal)
Stefanova, R.S., BSc (HP Inst., Shumen, Bulgaria)
Sullivan, E., BSc (Queen's), PhD (Dal)
Wang, J.-H., BSc, MSc, PhD (Hunan Univ., PRC)

Programmes leading to MSc and to PhD degrees are offered. Research for these degrees can be undertaken in analytical, inorganic, organic, physical/theoretical chemistry or combinations thereof.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. Normally, a MSc Degree may be required as a prerequisite for entry into a PhD programme. It is recommended that all students from outside Canada submit the results of the advanced Graduate Record Examination in Chemistry. In some cases this will be made a precondition to consideration of the student's application for admission. For those whose first language is not English a minimum TOEFL score is required (see section 2.4 in the Faculty of Graduate Studies regulations).

A. General Regulations

All graduate students are required, as part of their training, to instruct in the undergraduate laboratories and to attend departmental seminars which are given by invited speakers. The Department will hold an annual meeting at which time it will review the work of all graduate students. Permission to continue will be contingent upon a satisfactory decision by the Department. All graduate students must be in the Department and available for teaching assistant duties by September 1st of each year. Further details of degree regulations are presented in a Handbook for Graduate Students in Chemistry, which may be obtained from the Departmental Office.

II. Degree Options

A. MSc Degree

Full-time Programme

Two full credit classes, or the equivalent, together with the presentation and oral defence of a thesis based on original research are required. Faculty regulations permit a 1-year MSc candidate to graduate after 12 months of resident study. Experience has shown that most MSc candidates in the Department require at least 16 months to complete their work. Financial support is not available for more than two years.

Part-time Programme

The full-time MSc class requirements and thesis regulation apply. The thesis must be supervised by a member of the Department. No stipends are available from the Faculty of Graduate Studies.

B. PhD Degree Programme

Three full-credit classes, or the equivalent, are required. A preliminary oral examination must be completed successfully. Original research, together with preparation and oral defence of a thesis, is required. For the minimum time required to complete the programme, see Section 4. Financial support is not available for more than four years.

III. Classes Offered

Core classes, specialized classes and modular classes are offered by the department. The core classes constitute the main framework of a student's formal course work, and are designed to be broad-based but at an advanced level. They are intended to help the student gain a wide understanding in several major branches of chemistry and thus students are required to take such classes outside their area of specialization.

The following half-credit core classes are offered at least every other year. Please consult the Department to ascertain which classes are being given.

Core Classes

Analytical

CHEM 5201.03: Advanced Topics in Separations.

Chemistry started as the science of separations and separations are still its most prominent feature in most laboratories around the world. This class deals mainly with chromatography and associated techniques; in particular, gas chromatography in its regular, capillary and supercritical forms, high-pressure liquid (including ion), chromatographies, capillary electrophoresis, and gas and liquid

chromatography combined with other instrumental techniques such as mass spectrometry. The original ideas behind the design of separation media and detection modes are emphasized, and their consequences for the analysis of living and environmental systems. This class does not present a survey of the field; rather, it focuses primarily on past (and future) innovation.

CHEM 5202.03: Topics in Advanced Analytical Spectroscopy.

Instrument designs for emission, absorption and fluorescence measurements are described and their sensitivity and signal-to-noise characteristics discussed. Additional topics include laser-based methods and optical rotation.

CHEM 5204.03: Chromatography.

Chemistry started as the science of separations, and separations are still crucial to most chemical laboratories. This class deals mainly with chromatography and associated techniques, i.e. gas chromatography in its packed-column, capillary, and supercritical forms; high-pressure liquid (including ion) chromatographies; capillary electrophoresis; various detectors; gas and liquid chromatographs linked with other instruments such as mass or light spectrometers; and different analyte introduction devices, for instance electrospray. The original ideas and circumstances behind the design of separation media and detection modes are emphasized, and their consequences for the analysis of living and environmental systems. This class does not present a survey of the field; rather, it focuses primarily on past (and possibly future) innovations.

Inorganic and Structural

CHEM 5101.03: Topics in Advanced Main Group Chemistry.

A brief overview of the fundamental aspects of preparation, structure and bonding for familiar systems is followed by examination of selected topics in detail. An emphasis is placed on apparently novel structure and bonding in comparison to the chemistry of carbon leading to conclusions on a more general bonding model for the elements of the main group.

CHEM 5102.03: Advanced Transition Metal Chemistry.

Organotransition metal chemistry has grown over the last several decades into one of the most important areas of research and development in inorganic chemistry. In this class the most important types of organic ligands and their bonding characteristics are surveyed, as are the most important reaction pathways such as migratory insertion, oxidative addition, nucleophilic addition, etc. The class concludes by examining homogeneous catalysis by organotransition metal complexes.

CHEM 5103.03: Topics in Solid State Chemistry.

Structural methods in inorganic chemistry. Topics include: powder diffraction, the method of compound identification, reitveld analysis and the determination of structures from powders (maximum entropy method), synchrotron and neutron radiation; electron diffraction, transmission electron microscopy and X-ray fluorescence and X-ray photoelectron spectroscopy; Mossbauer spectroscopy; vibrational spectroscopy, the determination of inorganic structures by consideration of symmetry and spectra; IR, Raman and isotopic dilution methods; magnetic measurements in transition metal chemistry and the structural information provided by these measurements.

Organic

CHEM 5401.03: Synthesis in Organic Chemistry.

This class is designed to allow the student to understand the modern synthetic organic literature. It includes discussion of the main techniques for carbon-carbon bond formation and for functional group interconversion. Concepts in organic synthesis are introduced through study of syntheses of a number of molecules of biological and chemical interest.

CHEM 5402.03: Organic Structure Determination.

This class reviews and considerably extends the work in organic structure determination which is usually taught in the third or fourth year of undergraduate study as the first formal class in structure determination. Topics are chosen in infrared, mass and NMR spectroscopy, however, more than half the lectures deal with the theory and application of nuclear magnetic resonance. The description, in English, of spectra and of the process by which spectra are interpreted to give a particular molecular structure, is demonstrated and then given an important place in the marking of assignments and tests.

CHEM 5403.03: Organic Reaction Mechanisms.

The fundamental concepts of bonding, structure, and dynamic behaviours of organic compounds are discussed. The applications of molecular orbital theory and molecular mechanics calculations are introduced. Methods for determining the mechanisms of organic reactions are discussed. Topics considered include applications of kinetic data, linear free energy relationships, acid and base catalysis, concerted reactions and the importance of orbital symmetry, steric effects, solvent effects, and isotope effects.

Physical and Theoretical

CHEM 5301.03: Theory of Chemical Bonding.

This class surveys contemporary methods for electronic structure calculations. The emphasis is on the qualitative features and physical basis of molecular orbital theory and its application to chemistry. Empirical, semi-empirical, and *ab initio* methods are included. Each student is expected to undertake a computational project relevant to her or his research interests.

CHEM 5304.03: Kinetics and Catalysis.

This class relates the properties of molecules in motion to the rates of chemical changes. Collision, transition state and diffusion theories are applied to significant industrial, biological and atmospheric process. Photochemistry, and its converse, luminescence, are interpreted. Mechanisms of catalyst activity are discussed. In assignments, students apply theories to systems of their own choice.

CHEM 5305.03: Introductory Statistical Thermodynamics.

This class is intended to introduce interested students to the subject of statistical thermodynamics. The prerequisites are good grounding in thermodynamics and mathematical methods. No previous class in statistical thermodynamics is required. The class introduces the postulates of statistical thermodynamics and the various ensembles, and then these concepts are applied to a variety of problems. The text followed is "Introduction to Statistical Thermodynamics" by T.L. Hill. The student is evaluated on problem assignments, one or two seminars and a three-hour closed-book final examination.

CHEM 5306.03: Magnetic Resonance.

The basic principles of magnetic resonance are discussed and reinforced with examples of applications to problems in chemistry. Topics discussed include: electron and nuclear spin, quantum mechanics of magnetic moments in external fields, analysis of high-resolution NMR spectra in isotropic media, elementary theory of ESR and NMR parameters, Fourier transform spectroscopy, nuclear spin relaxation, chemical exchange, introduction to special NMR pulse sequences, 2-dimensional NMR, and NMR of solids.

Interdisciplinary

CHEM 5504.03: Diffraction Techniques in Solid State Chemistry.

All chemical elements and compounds can exist as crystalline solids. This class studies the arrangements of atoms and molecules in such solids and examines the methods used to determine these structures. Particular emphasis is placed on the techniques of X-ray crystallography.

Additional specialized classes at the 6000 level provide the opportunity for in-depth study of selected topics which are more closely related to the student's research area. These classes vary from year to year depending on students' needs and interests.

Specialized Classes

Inorganic

CHEM 6106.03: Advanced X-Ray Crystallography and Group Theory.

This is a class for specialist crystallographers. Topics covered include: the theory of diffraction and the theory and design of diffractometers; modern Patterson methods of structure determination, modern "Direct Methods" and the relationship between Patterson and Direct methods; least-squares refinement, absorption and disorder; incommensurate structures and the methods used to examine them; constrained and restrained refinement, the theory and practice; methods of libration analysis. Prerequisite: CHEM5504.

CHEM 6199.03: Special Topics in Inorganic Chemistry.

Analytical

CHEM 6203.03: Environmental Chemistry.

This class is designed to illustrate the applications of basic chemistry to the characterization of environmental systems. The basic concepts of equilibria, kinetics, and mass transport are used to develop models for the distribution of organic chemicals in environmental systems as diverse as sewage treatment plants, room air quality, fresh water lakes, and bioaccumulation of pollutants by fish. The computational and graphical aspects of the models are developed using simple spreadsheets. The case studies discussed in the lectures are selected to illustrate both environmental interactions and analytical methodology. The most important topics covered are: characteristics of environmental systems, box models of the environment, fugacity description of organic interactions, QSARs, acid/base equilibria for natural waters, Eh-pH diagrams, and metal speciation.

CHEM 6204.03: Analytical Radiochemistry.

This class introduces basic concepts of nuclear chemistry and nuclear analytical methods. The course includes: discovery of radioactivity; nuclides and natural decay chain; types of radioactive decay; nuclear reactions; research reactors; instrumental, preconcentration and radiochemical neutron activation analysis; and two laboratory sessions on NAA.

CHEM 6205.03: Chemometrics.

This class considers the application of mathematical, statistical and computer-based methods to chemical measurements. Topics include descriptive statistics, probability, propagation of error, experimental design, analysis of variance, experimental optimization, regression (linear and nonlinear), multivariate calibration, digital filtering, Fourier transforms, and principal components analysis. Topics are often tailored to class interests. Some exposure to computers is assumed, but programming experience is not essential.

Physical/Theoretical

CHEM 6301.03: Advanced Electronic Structure Theory.

This class is primarily concerned with advanced electronic structure methods for the inclusion of the effects of electron correlation. Topics, chosen from the current literature, include configuration interaction, coupled-cluster methods, perturbation theory and density functional theory. This class is intended for students engaged in doctoral studies in theoretical chemistry. PREREQUISITE: CHEM 5301

CHEM 6312.03: Colloid and Surface Science.

This is an introduction to the study of colloidal systems and interfaces. The student is expected to have a background in thermodynamics at the undergraduate level since a review of the

thermodynamics of electrolytes is included in this class. Topics covered include nomenclature of colloidal systems, the thermodynamics treatment of interfaces and adsorption, the electrical double layer, colloid stability, association colloids, and polymer solutions. A number of applications in various industrial processes and resource extraction are discussed. Assessment is through regular take home assignments, literature reviews, a special project, and a written final examination.

CHEM 6313.03: Special Topics in Solid State Chemistry.

This class is intended to introduce interested students to the solid state. The prerequisites are good grounding in thermodynamics and mathematical methods. The class introduces the basics of solid state (lattice types, phonons, lattice models) and then moves on to introduce techniques used to investigate the solid state. These concepts are then applied to a variety of problems. The text followed is "Solid State Physics" by C. Kittel, and a number of other books are used for reference material. The student is evaluated on problem assignments, one or two seminars and a three-hour closed-book final examination.

CHEM 6314.03: Advanced Topics in NMR.

Experimental techniques to measure NMR parameters (e.g., nuclear magnetic shielding tensors, spin-spin coupling tensors, electric field gradient tensors) are discussed in detail. As well, the theoretical interpretation of the above mentioned NMR parameters is discussed.

CHEM 6315.03: Topics in Statistical Mechanics.

Applications of modern statistical mechanics are examined. The topics covered may include nonequilibrium systems, dynamics, modern methods (including computer simulation) and their practical application. Students will be expected to have a working knowledge of the principles of statistical mechanics.

CHEM 6316.03: Theory of Modern NMR Experiments.

The principles behind many of the common 1-D and 2-D NMR experiments are discussed. An introduction to density matrix theory, the product operator formalism and their application to modern NMR spectroscopy are discussed. As well, average Hamiltonian theory and some applications in solid state NMR are covered.

Organic

CHEM 6404.03: Organic Photochemistry.

This course covers the fundamentals of the properties and reactivity of the excited states of organic molecules in solution. The first part deals with transitions between states including the process of absorption, fluorescence, phosphorescence, internal conversion, intersystem crossing and chemical conversion. The approach here is qualitative and descriptive rather than quantitative and theoretical. Kinetic schemes using the steady-state approach are used to discuss quantum yields. The second part is on selected examples of organic functional group reactivity.

CHEM 6405.03: Stereochemistry.

This class covers principles of symmetry, conformational analysis, stereoisomerism, separation and configuration of stereoisomers, and stereoelectronic effects in organic reactions. Most material is taken from E. Juaristi's text, "An Introduction to Stereochemistry and Conformational Analysis", in conjunction with a reading list of other texts. Each student reviews critically at least one paper from the research literature.

CHEM 6409.03: Carbohydrate Chemistry.

This class provides an outline of the structures, functions and preparation of carbohydrates. An introduction to carbohydrate structure and nomenclature is followed by consideration of the principles and methods of conformational analysis, with emphasis on those that apply to carbohydrates. Synthetic topics discussed include glycoside synthesis, blocking groups, neighbouring group participation, nucleophilic substitution, glycals, and others that vary

from year to year. The structures and functions of a few of the most interesting biologically important oligosaccharides and polysaccharides are considered.

CHEM 6505.03: Mass Spectrometry.

The first third of the class reviews a range of modern mass spectrometers and includes a discussion of their physics, electronics and uses in analytical chemistry. The next portion of the class examines fundamental theories of the structures and reactions of ions in the gas phase. The final third of the class reviews fragments of organic ions, generated by electron impact and chemical ionization methods. Students are evaluated by their performance in two term tests, a formal presentation to the class and a final examination.

PREREQUISITES: CHEM 5402.03 or equivalent, or ability to demonstrate an adequate knowledge of mass spectrometry to the class professors

Interdisciplinary

CHEM 6501.03: Electronic Instrumentation for Scientists.

This class starts with basic electrical concepts and describes simple ac and dc circuits. Semiconductors are introduced, followed by a discussion of power supplies and the various types of amplifiers. The various number systems and circuits (gates and flip-flops) used in digital circuits are discussed. Finally digital data transmission, analog-to-digital and digital-to-analog conversion, and computer basics are explored. Chemical instruments are used as examples whenever possible. Practical aspects of electronics such as basic measurements, the use of various electronic instruments, reading circuit diagrams, and troubleshooting are emphasized. No knowledge of physics beyond the first year is required.

Modular

CHEM 6600.03: Special Topics in Chemistry.

This class introduces students to a variety of advanced topics in chemistry, viz. digital electronics, molecular mechanics, NMR instrumentation, X-ray crystallography, and/or mass spectral instrumentation. These are skills needed by the modern chemist, and this class introduces the student to various practical aspects.

This class is taught in a variety of sections ("modules"), each comprising a small section of a subject, emphasizing theory and especially practical aspects, aimed at the practitioner. The topics covered are chosen from the following:

- digital electronics (normally 15 lecture/lab hours)
- molecular mechanics (normally 15 lecture/lab hours)
- routine NMR methods (normally 15 lecture/lab hours)
- X-ray crystallography (normally 15 lecture/lab hours)
- mass spectral instrumentation (normally 15 lecture/lab hours)

with 45 lecture/lab hours (i.e. 3 of above modules) constituting one half class credit. New topics may be added in future years. Normally more than 3 modules will be offered in each academic year. All modules must be taken within a given academic year (September to April) in order that a grade be submitted at the end of the year.

Each module has a test or examination taken under controlled conditions, and this is used to comprise the major portion (50%) of the assessment for that module. Other portions of the assessment is on quizzes, assignments, seminars and other presentations and/or lab work. The numerical marks from each of the modules comprising the class is averaged and converted to a letter grade by a class coordinator, normally a member of the Graduate Studies Committee. This person signs the grade sheet submitted to the Registrar, and the following scale is used for conversion:

A+>89, A>84, A->79, B+>74, B>69, B->64, FM>60, F<59 %.

PREREQUISITES: Any graduate student in the Department of Chemistry can take this class; there are no specific prerequisites. Students from other Departments can take this class with the permission of their supervisory committee and the class coordinator.

Module Descriptions

Digital Electronics

This module introduces the basics and practical application of digital electronics. Topics may include: analog-to-digital conversion; digital-to-analog conversion; personal computer architecture and BUS structure; serial and parallel ports.

INSTRUCTOR: L. Ramaley

EXCLUSION: CHEM 6501.03

Molecular Mechanics

This module teaches students how to use some of the popular molecular mechanics modelling packages, HYPERCHEM, PCMODEL, MM3 and CHEMX. It emphasizes hands-on applications using a variety of computers and models reference compounds as well as some of interest to a student's research.

INSTRUCTORS: T.S. Cameron and/or T.B. Grindley

Routine NMR Methods

This module introduces routine NMR methods, operating the spectrometer under manual control, measuring known compounds. The units offered are: (a) the EM360 spectrometer, (b) spin decoupling with the EM360, (c) automated H-1 spectroscopy on AC250F, COSY, (d) automated C-13 spectroscopy HETCOR (e) manual spectroscopy, (f) T1 and nOesy (g) offline processing (h) an unknown compound. Students normally do units 3-8. Those with no practical NMR experience do all units.

INSTRUCTOR: D.L. Hooper

EXCLUSION: CHEM 4402.03

X-ray Crystallography

This module introduces the technique of X-ray crystallography, both the theory and practical work. A crystal structure is solved.

INSTRUCTOR: T.S. Cameron

EXCLUSION: CHEM 4504.03 and CHEM 5504.03

Mass Spectral Instrumentation

This module introduces the practical side of mass spectrometry.

INSTRUCTORS: R.K. Boyd and/or J.S. Grossert and/or L. Ramaley

Classics

Location: 1244 LeMarchant Street
Halifax, NS B3H 3P7
Telephone: (902) 494-3468
Fax: (902) 494-2467

Chairperson of Department

Atherton, J.P.

Professors Emeriti

Armstrong, A.H., MA (Cantab), FBA
Crouse, R.D., BA (Vind), STB (Harvard), MTh (Trinity), PhD (Harvard)
Doull, J.A., BA (Dal), MA (UofT)

Professors

Atherton, J.P., MA (Oxon), PhD (Liverpool)
Friedrich, R., Dr phil (Goettingen), Graduate Studies Coordinator
Hankey, W.J., BA (Vind), MA (UofT), PhD (Oxon)
Starnes, C.J., BA (Bishop's), STB (Harvard), MA (McG), PhD (Dal)

Associate Professors

House, D.K., MA (Dal), PhD (Liverpool)
Kusmaul, P.F., Dr phil (Basle), Dr phil habil (Heidelberg)

Assistant Professor

Calkin, P., BA (UBC), MA, PhD (Dal)
Createx, G.B., BA, MA, DPhil (Oxon)

The Department invites all students who wish to pursue graduate work in classical studies: in addition to students interested in the historical, literary, and philosophical culture of antiquity, the programme might appeal to students who wish to study the relation of contemporary culture to its classical origins.

MA students may concentrate their work in any of these areas. PhD candidates must work in the area of Hellenic and Hellenistic Studies.

I. Admission Requirements

Candidates must satisfy the admission requirements of the Faculty of Graduate Studies. The requirement of both Classical languages at Honours level may sometimes be relaxed, e.g., where a student has taken a Combined Honours course involving only one Classical language. In such cases at least two classes in the second language will be taken in addition to the MA course proper. In certain programmes, a knowledge of other ancient languages may be required.

II. Degree Options

A. Master of Arts (MA)

Three graduate seminars, two in the general area of interest and a reading and research class related to the thesis subject are required. Candidates are expected to attend graduate seminars related to their theses throughout their period of full-time study. A thesis is required.

MA students should obtain a copy of the Departmental regulations for the degree.

B. Doctor of Philosophy (PhD)

The normal admission requirement is the Dalhousie MA in Classics, or equivalent preparation. The minimum residence requirement for such candidates is two years, during which time they must satisfy

the general requirements of the Faculty, and, in addition, must demonstrate competence in the languages (ancient and modern) necessary for research in their particular fields of study.

All candidates are expected to have a broad understanding of all aspects of Classical culture, and within the general area of Hellenic-Hellenistic Studies, each candidate is expected to concentrate, with the guidance of a Supervising Committee, in one of three fields: History, Literature and Philosophy. Before submitting a thesis, the candidate must pass a comprehensive examination (written and oral) in his/her special field: this will normally be taken towards the end of the second or beginning of the third year of study.

III. Classes Offered

Greek and Latin Literature

CLAS 5010.06: Seminar on Greek Literature (1). R. Friedrich
CLAS 5020.06: Seminar on Greek Literature (2). R. Friedrich
CLAS 5021.03: Reading and Research in Greek Literature (1).
CLAS 5022.03: Reading and Research in Greek Literature (2).
CLAS 5030.06: Seminar on Latin Literature (1). R. Friedrich/J.P. Atherton
CLAS 5040.06: Seminar on Latin Literature (2). R. Friedrich/J.P. Atherton
CLAS 5041.03: Reading and Research in Latin Literature (1).
CLAS 5042.03: Reading and Research in Latin Literature (2).

Ancient History

CLAS 5530.06: Reading and Research in Ancient History (1). P.F. Kusmaul
CLAS 5531.03: Reading and Research in Ancient History (2). P.F. Kusmaul
CLAS 5550.06: Reading and Research in Ancient History (2). P.F. Kusmaul
CLAS 5551.03: Reading and Research in Ancient History. P.F. Kusmaul
CLAS 5552.03: Reading and Research in Ancient History. P.F. Kusmaul

Classical Philosophy

CLAS 5600.06: Seminar on the Philosophy of Aristotle. J.P. Atherton
CLAS 5601.06: Seminar on Plato and Neoplatonism. J.P. Atherton
CLAS 5602.06: Seminar on Hellenistic Philosophy. D.K. House
CLAS 5603.06: Seminar on the Philosophy of Plato. D.K. House

Patristics

CLAS 5700.06: Seminar on the Philosophy of the Church Fathers. R.D. Crouse
CLAS 5701.06: Seminar on the Medieval Interpreters of Aristotle. D. Crouse
CLAS 5705.06: Seminar on St. Augustine (1). C.J. Starnes
CLAS 5706.06: Seminar on St. Augustine (2). C.J. Starnes
CLAS 5800.06: Seminar on Christian Beginnings. W.J. Hankey
CLAS 5801.06: Seminar on Christianity and Neoplatonism. W.J. Hankey

Classes Occasionally Offered

Greek and Latin Literature

CLAS 5011.06: Seminar on Greek Tragedy. R. Friedrich
CLAS 5012.06: Seminar on Greek Comedy. R. Friedrich
CLAS 5013.06: Seminar on Greek Lyric. R. Friedrich
CLAS 5031.06: Seminar on Roman Satire.
CLAS 5032.06: Seminar on Roman Historians.
CLAS 5033.06: Advanced Seminar on Latin Literature.
CLAS 5034.06: Seminar on Greek Literature.

Ancient History

CLAS 5531: Seminar on the Roman Empire and the Rise of Christianity. P.F. Kusmaul
CLAS 5551.03: Ancient Law and Jurisprudence. P.F. Kusmaul

Classical Philosophy

CLAS 5604.06: History of the Interpretation of Aristotle.
CLAS 5605.06: Advanced Seminar on Neoplatonism.
CLAS 5606.06: Greek Philosophical Texts.
CLAS 5607.06: Latin Philosophical Texts.

CLAS 5608.06: Reading and Research.
CLAS 5609.03: Greek Philosophical Texts. J.P. Atherton
CLAS 5610.03: Latin Philosophical Texts.

Patristics

CLAS 5707.06: Readings in Patristic Texts.
CLAS 5708.03: Reading and Research.
CLAS 5900.06: Departmental Seminar.
CLAS 5901.06: Reading and Research.

CLAS 9000.00: Master's Thesis
CLAS 9530.00: Doctoral Thesis

Community Health and Epidemiology

Location: Clinical Research Centre
5849 University Avenue
Halifax, NS B3H 4H7
Telephone: (902) 494-3860
Fax: (902) 494-1597

Head of Department
MacLean, David R.

Director of Graduate Programs
Kirkland, Susan A.

Professors Emeriti

Irwin, A.C., BA (Sask), MD, DPH (UofT), DSM (Edin), FRSH
Stewart, C.B., OC, BSc (Med), MD, CM (Dal), MPH, Dr PH (Johns
Hopkins), FAPHA, FRCPC, MCFP, LLD, DSc (StFX)

Professors

Brown, M.G., BA (Western), MA (Queen's), AM, PhD (Chicago)
Cohen, F., BA (Harvard-Radcliffe), MEd (Harvard), PhD (Minn),
major appointment in Resource and Environmental Studies
Cohen, M., BA (Mich), DMD (Tufts), MSD, PhD (Minn), MPH
(Boston) major appointment in Oral and Maxillofacial Pathology
Kutcher, S., MD (McMaster), FRCPC, major appointment in
Psychiatry
Leighton, A.H., MD (Johns Hopkins), MA (Cantab), MA (Harvard),
DS (Acadia), FRC Psych, DS (Laval), jointly appointed in
Psychiatry
MacLean, D.R., MD (Dal), MHSc (UofT), CCFP
MacLean, L.C., BA, BEd (StFX), MA, PhD (Dal), major appointment
in Business Administration
Murray, T.J., MD (Dal), FRCPC, FACP, major appointment in
Neurology
Sketris, I., BSc (UofT), MPA (Dal), PharmD (Minnesota), major
appointment in Pharmacy
Stewart, M.J., BScN (McM), PhD (Dal), major appointment at
University of Alberta

Associate Professors

Burge, F., MD (Queens), MS Epid & Biost (McGill), CCFP, major
appointment in Family Medicine
Flowerdew, G., BSc (Lond), MSc (London), DSc (Harvard)
Joffres, M., MD (Toulouse), MSPH, PhD (Hawaii)
McIntyre, L., MD, MHSc (UofT), FRCPC, major appointments in
Health Services Administration and Health and Human
Performance
Rockwood, K., BA, BMed, MD (MUN), MPA (Queen's), major
appointment in Geriatric Medicine
Stewart, R., BA, BSc, MD, FACEP, FRCPC, DSc (Hon)
Tan, M., MD (Dal), FRCPC, FACP, major appointment in Medicine
Veldhuyzen van Zanten, MD (Amsterdam), MSc (McM), PhD
(Amsterdam), major appointment in Gastroenterology

Assistant Professors

Cox, J., BA, MD (UofT), FRCPC, major appointment in Cardiology
Curtis, L., BSc(Hons) (Trent), MA, PhD (McM)
Dodds, L., MS (Washington), PhD (UofT)
Gross, M., MSc (McM), MB, BS (Newcastle-upon-Tyne), FRCS (Eng),
FRCPS, major appointment in Surgery
Guernsey, J., BSc (Carleton), MSc, PhD (Iowa)
Johnston, G.M., BSc (McG), MHSA (Alta), PhD (Western), major
appointment in Health Services Administration

Kephart, G., BS (Hons) (California), MS, PhD (Wisconsin)
Kirkland, S., BSc, MSc (Waterloo), PhD (UofT)
Kozousek, V., MD (Laval), MPH (John Hopkins), FRCSC, major
appointment in Ophthalmology
Langille, D., BSc (Acadia), MD (Dal), MHSc (UBC)
Langley, J.M., MD (Dal), MSc (McM) major appointment in
Paediatrics
MacPherson, K., BSc, MD (Dal), MPH (Mich)
Mitchell, T., BFA (NSCAD), MEd, PhD (U of T)
Poulin, C., BSc (Dal), MD (Laval), MSc (McG), FRCPC
Townsend, E., PhD (Dal), MAdEd (St.FX), BSc (UofT), DipP&OT
(UofT), major appointment in School of Occupational Therapy
Veugelers, P., PhD (U of Amsterdam), MSc (U of Wageningen)
Weerasinghe, S., BSc (Jaffna), MSc (Sri Lanka), PhD (Dal)

Lecturers

Anderson, D., BA, MD (Dal), MSc (McM), major appointment in
Medicine
LeBlanc, J., BA (UofT), MD, MSc (McM), major appointment in
Paediatrics

Adjunct Appointments

Baikie, M., BScPhm (UofT), MD (McM), MSc Epidemiology
(McMaster), DTM&H (Liverpool), DOHS (McM), FRCPC
Braunstein, J., BSc(Nursing) (Cornell), Pediatric Nurse Practitioner
Certificate (Virginia), MPH (Minn)
Davidson, K., BA(Hon) (Queen's), MAsc (Waterloo), PhD
(Waterloo)
Farquharson, J., BSc, MSc (Dal)
Hicks, V., BA, MA (Dal)
Hood, R., BPE (Calgary), MS, PhD (Illinois), jointly appointed in
School of Resource and Environmental Studies
Joffres, C., MA (Hawaii), PhD (Alta)
King, D., BSc (Hons), MD (Dal)
MacLean, S., BSc, BA, MA, PhD (Dal)
O'Brien, R., BA (UPEI), MSc (UBC)
Padmos, M., BA (UofT), MD (McMaster), FRCPC
Prentice, J., MD (Dal), MPH (Johns Hopkins), DOHS (McMaster),
CCBOM
Reid, D., MD (Dal)
Scott, J., MBChB (Edin), MHSc (UBC), FRCPC
Scott, K.E., BSc, MD, CM (McG), MSc (Lond), FRCPC, FSS
Sweet, L., BSc (Acadia), MDCM (McG), MHSc (UBC)
White, F.M.M., MD, CM (McGill), MHSc (UBC)
Zahner, G., BA (Weelesley), MA (Boston), PhD (Yale)

Post-Retirement

Brown, M.G., BA (Western), MA (Queen's), AM, PhD (Chicago)
Leighton, A.H., MD (Johns Hopkins), MA (Cantab), MA (Harvard),
DS (Acadia), FRC Psych, DS (Laval), jointly appointed in
Psychiatry
Scott, K.E., BSc, MD, CM (McG), MSc (Lond), FRCPC, FSS

Administrative Assistant

Brunelle, B.

Administrative Secretary - Graduate

Bowdridge, T.
Telephone: (902) 494-3575

Administrative Secretary

Thompson, S.

Technologist - Education Statistics and Computing

Andreou, P., PhD (Western)

I. Introduction

A. Master of Science

The MSc Community Health and Epidemiology (CH&E) programme focuses on knowledge, analytical skills and formal evaluative methods used in assessing community health needs and in designing, implementing and evaluating disease prevention and health promotion initiatives. The programme includes one year of class work plus thesis.

B. Institutional Environment

The Department of Community Health and Epidemiology is part of Dalhousie University's Faculty of Medicine which serves Canada's Maritime Provinces. CH&E full-time and part-time faculty have backgrounds in a number of disciplines including community medicine, epidemiology, biostatistics, economics, occupational and environmental health, psychiatry, demography, sociology and anthropology. CH&E faculty have provided leadership in areas of population health research, prevention, health promotion, assessment of community health service needs, epidemiology, biostatistics, health manpower planning, health services utilization research and in various types of evaluative studies, including international health projects.

II. Admission Requirements

The typical MSc CH&E student has had undergraduate training in a health profession or related discipline and has worked in the health sector. Admission standards are those of Dalhousie University's Faculty of Graduate Studies. An honours baccalaureate degree or an M.D. degree from a recognized university is ordinarily required. Enrolment is limited. A limited number of part-time students are accepted. Applicants must meet English Language Competency and Quantitative Skills requirements. Applicants will be interviewed as part of the selection process.

III. Curriculum

The programme requires a minimum of five Core Classes, three Elective Classes and a Thesis. All class work may be completed in one academic year. The five required classes are: Community Health Principles; Epidemiology Principles; Research Methods for Community Health; Biostatistics II; and Community Health Services Systems.

The Master's Thesis is a major part of the MSc CH&E programme. A thesis may include the design and execution of an applied research project in the field of community health and epidemiology. Full-time students will ordinarily complete their thesis during their second year in the MSc programme.

IV. Classes Offered

CH&E 5000.03: Community Health Principles.

This is an introductory class in Community Health Principles for graduate-level students in the health fields. Community health focuses on the health of populations or groups. The class will cover a broad range of community health issues, and will focus on strategies to improve the health of a population with emphasis on health protection, disease prevention and health promotion. The student will apply community health principles and acquire in-depth knowledge of specific health topics through group and individual projects.

INSTRUCTOR: C. Poulin

CH&E 5010.03: Epidemiology Principles.

This introductory class is intended for graduate-level students with no background or formal training in epidemiology. The class explores the principles, concepts and methods employed in epidemiologic research, with examples from the literature in communicable and non-communicable diseases. The objective is to provide students with an appreciation of the principles and methods of descriptive and analytic epidemiology, including: commonly used measures of disease frequency; sources of data; crude, specific, and adjusted rates; cohort analysis of mortality; standardization; cause-effect relationships; the roles of chance, bias and confounding.

INSTRUCTOR: S. Kirkland

CH&E 5020.03: Biostatistics II.

An intermediate level class in statistics for medical research. The class follows Biostatistics I. Students will acquire the necessary skills to carry out a wide range of statistical analyses. Both SAS and STATA computer package programs will be used.

INSTRUCTORS: S. Weerasinghe/G. Flowerdew

CH&E 5030.03: Research Methods for Community Health.

This class explores the logic and principles of research design, measurement, and data collection. It focuses on the critical evaluation of research articles, research design, research proposal writing. The class covers a range of methodological issues and methods, including experimental and quasi-experimental designs, survey research and sampling, measurement, and qualitative methods.

INSTRUCTOR: P. Veugelers

CH&E 5040.03: Community Health Services Systems.

This class examines community health services systems and their evolution. Topics covered include: health status indices for populations and individuals; health determinants; health service needs and their assessments; systems of care; health services delivery and financing in Canada; managing public health system resources; health and social policy; and the ethics of choice in community health care systems.

INSTRUCTORS: D. Langille/D. Maclean

CH&E Elective Classes

CH&E 5019.03: Biostatistics I.

An introduction to statistics for medical research. The class aims to provide an understanding of the basic principles that underlie research design, data analysis and interpretation of results. Students will become proficient in the use of SAS.

INSTRUCTORS: S. Weerasinghe/G. Flowerdew

CH&E 6001.03: Environmental and Occupational Health.

This class will introduce students to many of the principles and concepts underlying environmental and occupational health, focusing on human health. It will review the nature of a variety of agents, including chemical, physical, biological, ergonomic and radiation hazards, how these agents are dispersed and transformed in the environment, the pathways of human exposure to these agents, and characterization of the health effects resulting from exposure. It will present methods for evaluating and controlling hazards, including occupational hygiene evaluation techniques and risk assessment models used in environmental settings. A number of case studies will be covered in detail, including indoor air quality, heavy metals exposure, and organic dust in workplace environments. Special topics will include risk communication and health promotion in the workplace. The class will conclude with a summary of legislative initiatives and standards which have been implemented to protect human health and an evaluation of their effectiveness.

INSTRUCTOR: J. Read Guernsey

CH&E 6010.03: Community Health Practicum.

INSTRUCTOR: S. Kirkland

CH&E 6020.03: Advanced Epidemiology.

This advanced class focuses on the design, conduct, analysis, and interpretation of epidemiologic studies. Both experimental (community intervention trials) and non-experimental, or observational (cohort, case-control), studies may be covered. Topics for general discussion will include study designs, subject selection, measurement issues pertaining to ascertainment of exposure and outcome, design issues such as stratification and matching, methodological issues such as confounding, effect modification, misclassification, and sources of bias. Data analysis will emphasize the practical application of statistical concepts; measuring associations and effect size, multivariate modelling, logistic regression, Poisson regression, and survival analysis (time permitting), and the combining of individual study results using meta-analysis.

INSTRUCTOR: S. Kirkland

CH&E 6021.03: Advanced Biostatistics.

This advanced Biostatistics class covers special topics like ordinal categorical data analysis, repeated measure designs, longitudinal data analysis and survival data analysis. Special topics like statistical

principals in experimental design, fixed and random effects models will also be discussed. The special emphasis is on the model building strategies, evaluation and interpretation of results. The class requires the knowledge in preliminary data analysis and regression analysis. Students should also be familiar with the programming in SAS.

INSTRUCTORS: S. Weerasinghe/G. Flowerdew

CH&E 6022.03: Evaluation of Health Services and Programmes.

This course is designed as an applied course in the economics of health services. The first half of the course will delve into the economic theories or models necessary to evaluate the efficiency of the market for health services and the efficient allocation of scarce resources in health and health care. Examples of possible topics to be covered are the nature of the market for health services, asymmetries of information, externalities, principal-agent relationships, insurance, and the supply and demand for health services. The second half of the course will concentrate on the economic evaluation of health services. Examples of possible topics to be covered are the efficacy, effectiveness and efficiency of health services, measuring health outcomes, measuring costs, present value analysis, cost-effectiveness, cost-benefit, cost-utility analysis.

INSTRUCTOR: L. Curtis

CH&E 6024.03: Methods in Clinical Trials.

The participants will be introduced to the practical issues in designing a controlled clinical trial by developing a clinical trial protocol throughout the class. Each week, a special topic is covered (e.g., selection of outcome measures, controlling bias, calculating sample sizes) which is relevant to the development of the participants' protocol. Protocols will be presented at the end of the class. Evaluation is based on the written protocol as well as assignments.

INSTRUCTOR: J. LeBlanc

CH&E 6042.03: Determinants of Health in Human Populations.

The class will focus on health from a population and societal perspective, with an emphasis on the determinants and distribution of health in human populations. Students will be introduced to basic demographic tools and concepts useful for studying the health of populations, including the determinants of mortality/morbidity decline and change, the medicalization of health, and the changing institutional structure of health care delivery. Separate treatment will be given to health in developed countries, highlighting differences in the distribution, determinants, and consequences of health in the two settings. Population-based approaches to health policy will be explored.

INSTRUCTOR: G. Kephart

CH&E 6043.03: Principles of International Health.

INSTRUCTORS: L. McIntyre/M. Cohen

CH&E 6045.03: Qualitative Methods In Health Research.

This advanced class in community research is designed to introduce students to the philosophical underpinnings of and practical research tools within qualitative research. The course content will promote a well articulated grounding in qualitative research that acknowledges the epistemological and methodological diversity within qualitative research and examines the critical issues of subjectivity, objectivity, validity and reliability. The course will be balanced between theoretical and practical components such that students will develop a theoretically sound rationale for their proposed research and gain experience in data collection, transcription, and analysis.

INSTRUCTOR: T. Mitchell

CH&E 6050.03: The Political Economy of Health and Development.

This course examines issues of health within a political economy framework. It is intended for graduate students interested in pursuing an interdisciplinary approach to the study of the relations between health and development. The first section of the course

will examine broad issues of health in a comparative context, addressing differences in health status and gaps in health care within and among countries throughout the world and relating these divergencies to theories of international development. The second section will focus on the present context of structural change related to globalization, and will involve in-depth examinations of policy responses by several categories of actors which are relevant to health care in contemporary political economy contexts.

INSTRUCTORS: S. MacLean D. MacLean

CH&E 6060.03: Directed Readings/Studies

CH&E 9000.00: Master's Thesis

Computer Science

Location: 16th Floor, Maritime Center
1505 Barrington Street
Halifax, Nova Scotia

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Fax: 902-492-1517
E-mail: GradChair@cs.dal.ca
WWW: www.cs.dal.ca

Dean, Faculty of Computer Science

Slomin, J., BSc, MSc (Western), PhD (Kansas)

Administrative Assistant to the Dean

Publicover, A., BSc (Dal), BA (Dal) Telephone: 902-494-1199

Departmental Secretary - Undergraduate

Poirier, C., BA (Acadia) Telephone: 902-494-2407

Departmental Secretary - Graduate

Steyer, U. Telephone 902-494-2093

Professors

Bodorik, P., BSc (Calgary), MEng, PhD (Carleton). Databases & distributed databases, architectural support for operating systems.

Cox, P.T., BSc, MSc(Auckland), PhD (Waterloo). Visual programming and design languages; computational logic; logic and functional programming.

Farrag, A., MSc (SFU), PhD (Alta). Centralized and distributed databases, parallel computing, analysis of algorithms.

Grundke, E.W., BSc, MSc (Dal), PhD (Waterloo). Simulation, computer networks.

Hitchcock, P., MA (Oxford), PhD (Warwick). Software engineering.

Jost, A., BSc, MSc, PhD (Dal). Telecommunications, microelectronics, VLSI, computer-aided design, computer networks.

Pietrzykowski, T., MS (Warsaw), PhD (Polish Academy of Science). WAN distributed object models & object-based communication.

Riordan, D., BSc, MSc (Port Elizabeth), PhD (Carleton). Intelligent computer systems.

Shepherd, M.A., MSc, PhD (UWO). Hypertext, information retrieval, distributed information systems, electronic news.

Slomin, J., BSc, MSc (Western), PhD (Kansas), Dean of Computer Science

Associate Professors

Birget, J.-C., Diplôme d'Ingénieur (École Centrale de Paris), MS, PhD (University of California Berkeley). Computational complexity, string rewriting and combinatorial group theory, finite automata

Duffy, J. (Cross appointed with the School of Business Administration). BS, MS, PhD (Iowa State). Human resource management, management information systems.

Milios, E.E., Dipl Eng (National Technical University), Sm & EE, PhD (MIT). Computer vision, mobile robotics, multiagent robotics, knowledge-based signal processing, computational auditory scene analysis, interactive system design.

Springer, J.N., BSc (UBC), MSc, PhD (U. of Western Ontario). Image processing & graphics, data visualization, animation.

Smedley, T.J., BMath, MMath, PhD (Waterloo). Visual programming languages, multimedia, user interface design.

Srinivas, BEng (Bangalore), PhD (Inst. Of Science, Bangalore). Computer architecture, parallel and distributed computing, computer networks.

Watters, C.R., BSc, MSc, MLS (Western Ontario), PhD (Technical University of Nova Scotia). Hypertext, information retrieval, electronic news, technology and learning, hypertext design and modelling.

Wiedenbeck, S., AB (University of Michigan), MA, MLS (Toronto), PhD (Pittsburg). Human-computer interaction, computer training, multimedia interface design and evaluation, empirical studies of programming.

Assistant Professors

Gao, Q., MAsc, PhD (Waterloo). Vision, data mining.

Rau-Chaplin, A., BCompSc (York), MCompSc, PhD (Carleton). Parallel computing, computational geometry, computer aided architectural design.

Sedgwick, A.E., MSc, PhD (Toronto). Programming languages, programming methodology.

Adjunct Professors

Eberbach, E., MSc, PhD (Warsaw University of Technology)

Hartzman, MSc (Toronto), PhD (Colorado)

MacLeod, K., BSc (St. Francis Xavier), MCompSc, PhD (TUNS)

Moriarty, K.J.M., MSc (Dal), PhD (Imp. Coll.)

Phillips, W.J., BSc, MSc (Queens), PhD (UBC)

Robertson, W., BSc, MSc (Aberdeen), PhD (TUNS)

Trudel, A., BSc, MSc, PhD (Waterloo)

Lecturers

Gates, C.E., BSc, MSc (Dalhousie). Neural networks, data mining, applied artificial intelligence.

I. Introduction

Computer Science is a core high-technology discipline and an integral and indispensable part of technical education. The mission of the Faculty of Computer Science is to provide excellent teaching to our students and to conduct research of the highest quality in specific areas within Computer Science, with emphasis on major research programs with Industry's support and participation. The major research foci will be Network Centered Computing and Software Engineering.

The Faculty was formed on April 1st, 1997, following the amalgamation of the Technical University of Nova Scotia and Dalhousie University. Its members came from the School of Computer Science at TUNS and the Computing Science Division of the Department of Mathematics, Statistics and Computing Science at Dalhousie. The Faculty will experience considerable growth over the next few years in all aspects: faculty complement, student enrolment, funding levels and facilities. A new computer science building is planned for August, 1999. We are in the middle of rationalizing our class offerings. The most up to date information will be found on our website: www.cs.dal.ca.

II. Graduate Degree Programmes

Please contact the Faculty of Computer Science Web site at <http://www.cs.dal.ca/> for information concerning updates to the regulations.

A. Master of Computer Science

1. Admission Requirements

To be admitted to the Master of Computer Science programme with a thesis option or project option all students must have completed an undergraduate programme in Computer Science with high standing. Their Computer Science background must be at least equivalent to that covered by the core classes in the Dalhousie Bachelor of Computer Science programme. Students who substantially meet these requirements may be required to take additional specific undergraduate classes to make up deficiencies in addition to their graduate programme requirements..

Students who have completed, with high standing, an undergraduate programme in a discipline other than computer science may be admitted to a qualifying year or two-year programme. Such students are normally required to take specified undergraduate classes to make up deficiencies in core Computer Science subjects.

2. English Language Proficiency Requirement

Information pertaining to the English language proficiency requirement is given in the "Faculty of Graduate Studies Regulations" section of the Calendar. For admission into graduate programmes in Computer Science those students who must supply a TOEFL, must obtain a score of at least 580 on the TOEFL examination.

3. Information and Application Forms

For further information consult the World Wide Web site listed above or contact the Chair of the Computer Science Graduate Committee at (902) 494-2093. Application forms may be obtained from:

Office of the Registrar
Dalhousie University
Halifax, N.S., Canada
B3H 4H6

4. Academic Regulations

Programme Requirements

Students must choose either MCompSc (Thesis) or MCompSc (Project) at the time of application. The thesis option is a research-oriented degree, and a research master's degree is normally required to gain subsequent admission into a Ph.D. programme at most universities. Candidates' programme of studies must be approved by the Faculty of Computer Science and the Faculty of Graduate Studies and must satisfy the breadth requirement of the Faculty of Computer Science.

Thesis Option

An MCompSc thesis option consists of not less than six half-credit classes or their equivalent, and a thesis selected upon the advice of the thesis supervisor. At least four of the classes shall be graduate classes in Computer Science. The remaining two classes shall be at the level of at least final undergraduate year and may be chosen from either Computer Science or, with the approval of the Faculty, other disciplines.

The thesis shall be written under the supervision of a thesis supervisor, and must be satisfactory to an examining committee established by the Faculty. The candidate must present an oral thesis defence.

Project Option

An MCompSc project option consists of not less than eight half-credit classes or their equivalent and a well defined project. At least six of the classes shall be graduate classes in Computer Science. The remaining two classes shall be at the level of at least final undergraduate year and may be chosen from either Computer Science or, with approval of the Faculty, other disciplines.

The project shall be carried out under the direction of a project supervisor and must be satisfactory to an examining committee established by the Graduate Committee of the Faculty. The candidate must give an oral presentation of the project.

Time Requirement

A student is required to register each session to maintain eligibility to continue in the programme. Students who enter the programme meeting normal admission requirements may be able to satisfy the requirements in 16 months. For information on maximum time limits for completion, leaves of absence, and extensions, see the Faculty of Graduate Studies Regulations in this calendar or contact the DalTech Graduate Studies Office.

B. Master of Science

The Faculty is still operating a Master of Science in Computing Science for existing students enrolled in this programme as of September 1997. This degree programme is virtually identical to the Master of Computer Science (Thesis Option). New students are not being admitted into the Master of Science programme at this time.

Existing students in this programme will be permitted to complete their degrees, governed by the degree regulations printed in the 1997/1998 Dalhousie University Graduate Calendar, provided that they complete all degree requirements before May 2002.

C. Master of Electronic Commerce

This is a new programme and had not yet been approved by Senate or the Board of Governors, when the calendar went to press. Regulations are subject to change, and to approval by Senate. Interested students should contact the Faculty of Computer Science or consult the Computer Science, GINI, Registrar's Office and ECOMM Web sites for more current information.

Beginning September 1999, the Faculty of Computer Science's Global Information Networking Institute, in partnership with the Faculties of Management and Law, pending university approval, will be offering the degree of Master of Electronic Commerce.

Electronic Commerce is a discipline whose underpinnings lie equally in technology, business, and social and economic policy. Distinct from any of the disciplines that comprise it, this multi-disciplinary two-year programme consists of eight one-term courses, an industrial internship, and a project. Students study core topics in each of the three areas and concentrate in depth in one of them by choosing one of three streams of study: Technology, Business, and Policy. The programme may also offer the student an opportunity for study abroad at other member universities of an international consortium mandated and endorsed by the G7 to develop a Global Master of Electronic Commerce.

The core of this programme is intended to be common throughout the consortium with institutions offering courses outside the core, according to their individual strengths. Dalhousie University is the only Canadian participant in this international consortium.

Admission Requirements

Students entering this programme will usually have completed a four-year bachelor's programme or other graduate degree in Computer Science, Computer Engineering, Industrial Engineering, Business, Social Science (typically Political Science), Law, or other related disciplines. All applications are individually judged and students from other disciplines may be admitted.

Students must meet normal admission standards for the Faculty of Graduate Studies. Students whose background preparation is judged to be deficient may be admitted conditionally subject to the successful completion of one or more prerequisite courses which will be specified at the time of admission.

Subject to final approval by Senate, the programme of study consists of the following:

Term 1: Core Courses Taken by All Students

- ECMM 6000.03 Global Electronic Commerce
- ECMM 6010.03 Electronic Commerce - Technology Core
- ECMM 6020.03 Electronic Commerce
- ECMM 6030.03 Policy Issues in Electronic Commerce

Term 2: Stream Courses

Students take 3 courses from one stream and one from another stream. Since the programme is a two year program, there is some flexibility as to when the student completes the stream courses.

Technology Stream

- ECMM 6012.03 Electronic Payments and Security
- ECMM 6014.03 Databases, Data Warehouses and Data Mining for Electronic Commerce
- ECMM 6016.03 Networking for Electronic Commerce
- CSCI xxx0.03 (Computer Science graduate elective course)

Business Stream

- ECMM 6022.03 IT Project Management
- ECMM 6024.03 Entrepreneurship
- BUSI 5103.03 Accounting
- BUSI 5401.03 Marketing Strategy

Policy Stream

- LAWS 2019.03 Law and Technology (required in stream)
- LAWS 2168.03 Internet and Media Law (required in stream)
- LAWS 2130.03 International Trade Transactions
- LAWS 2075.03 Legislation
- LAWS xxx.03 Law elective chosen from International Trade Law, Advanced Health Law, or Regulated Industries

Term 3: Industrial Internship

Term 4: Industry Sponsored Research Project

Research projects will be conducted and evaluated under normal guidelines of the Faculty of Graduate Studies for masters level projects.

D. Doctor of Philosophy Degree

1. Admission Requirements

To be admitted, students must have completed a research (thesis) Master's degree programme in Computer Science, or equivalent and must meet the admission requirements of the Faculty of Graduate Studies. In exceptional circumstances, a student may be admitted into the MCompSc (Thesis) programme with the possibility of transferring to the doctoral programme within the first 15 months (subject to approval of the Graduate committee and the Faculty of Graduate Studies).

2. English Language Proficiency Requirement

Information pertaining to the English language proficiency requirement is given in the "Faculty of Graduate Studies Regulations" section of the Calendar. For admission into graduate programs in the Faculty of Computer Science those students who must supply a TOEFL, must obtain a score of at least 580 on the TOEFL examination.

3. Information and Application Forms

For further information consult the World Wide Web site at <http://www.cs.dal.ca/> or contact the Chair of the Graduate Committee at (902) 494-2093. Application forms may be obtained from:

Office of the Registrar
Dalhousie University
Halifax, N.S., Canada
B3H 4H6

4. Academic Regulations

Programme Requirements

- Completion of a thesis containing the results of the student's original scholarship and independent research.
- Completion of graduate classes as required by the student's Supervisory Committee (normally six half-credits).
- Satisfactory performance in a comprehensive examination, conducted by the student's Guiding Committee, normally after 18 months after entry into the programme. A thesis proposal shall be submitted to the Supervisory Committee before it sets a comprehensive examination date. The comprehensive examination will normally include an oral exam for the purpose of ensuring that the candidate has a broad understanding of the fundamentals in the student's area of study and a deep enough knowledge of the proposed thesis topic to conduct original research. Candidates who receive a "fail" on the comprehensive examination will be required to withdraw from the programme.
- Oral defence of the thesis, conducted in accordance with Faculty of Graduate Studies regulations.

Time Requirement

A student is required to register each session to maintain eligibility to continue in the programme. Students entering with a Master's degree in Computer Science degree should expect to spend approximately three years of full-time studies at DalTech to complete the programme. For information on maximum time limits for completion, leaves of absence, and extensions, see the Faculty of Graduate Studies Regulations in this calendar or contact the DalTech Graduate Studies Office.

III. General Programme and Examination Requirements (MSc and PhD)

Supervisors are assigned to Ph.D. students on admittance into the programme. Supervisors are normally assigned to all Master's students within four months of initial registration. If the supervisor is not a full-time member of the Faculty of Computer Science, a co-supervisor will be appointed from within the Faculty. All supervisors and co-supervisors must also be members of the Faculty of Graduate Studies.

Granting credits to a student's programme for classes taken prior to commencement of the programme requires the recommendation of the Graduate Committee and the approval of DalTech Graduate Studies, and is normally limited to no more than two such classes. Transfer of credits from other universities will be considered on a case by case basis.

For Ph.D. students and M.Comp.Sc. students in the thesis option, a Supervisory Committee of at least three members, to be responsible for the candidate's programme and thesis preparation, is normally appointed within eight months of initial registration in the programme. The membership of the Supervisory Committee is conveyed to the DalTech Graduate Studies Office on a form provided by that office, and is recorded in the student's permanent file. The Supervisory Committee will normally consist of the thesis supervisor, at least one member of the Faculty, and one member from outside the Faculty with interests in the proposed area of study. The supervisor will be the Chair of the Supervisory committee.

A proposed title of the thesis/project report must be submitted to the DalTech Graduate Studies Office at least four months prior to the formal submission of the thesis/project.

An Examining Committee is appointed at least four weeks prior to the formal presentation of the thesis/project report. The Examining Committee normally consists of (or is selected by) the Supervisory Committee, and for thesis students must include one external member. For project option students the Examining Committee is appointed by the Graduate Committee. The external member will be from outside the Faculty of Computer Science for M.Comp.Sc. thesis students and outside the University for Ph.D. students. For doctoral theses, the external examiner is appointed by the Faculty of Graduate Studies.

A clean copy of the thesis/project report accompanied by the form "Appointment in an Oral Examination" must be submitted to the Faculty of Graduate Studies at least 10 working days prior to the date of the oral defence (for MSc). For PhD's, two copies must be submitted one month prior to the defence. The DalTech Graduate Studies Office will coordinate the scheduling of the presentation and examination. The oral presentation and examination will not be scheduled until the following requirements for the student's programme of studies have been met:

- Class work completed;
- Guiding Committee approved; and
- Thesis/Project title approved.

The thesis/project report is to be prepared in conformance with the standards of DalTech manual of Form "The Preparation of Graduate Theses", issued by the Office of Graduate Studies at Daltech. NOTE: In 1999/2000, these standards will be replaced by university-wide thesis preparation regulations.

For Master's candidates the Dean of the Faculty of Computer Science or his/her appointee (a faculty member who is not a member of the Examining Committee) shall be moderator of the oral examination/thesis defence. For doctoral candidates the moderator is the Associate Principal (Graduate Studies and Research) or a member of the Panel of PhD Chairs as per Faculty of Graduate Studies Regulations.

The student is responsible to ensure that all members of the Examining Committee receive copies of the thesis to be defended. Copies of the thesis/project must be provided to the Examining Committee at least four weeks prior to the examination.

A Master's or Ph.D. degree candidate must pass all graduate level classes with a grade of at least B-. Any approved or required undergraduate classes taken by a Master's candidate must be passed with a grade of at least B-. At the discretion of the Computer Science Graduate Committee, a graduate student who fails to achieve a passing grade in any class may be allowed to repeat the class or a specified substitute class, but this will be permitted no more than once during his/her programme. A graduate student is not eligible to write supplementary examinations.

Failure to achieve the minimum marks as noted above shall be considered grounds for dismissal. In addition to meeting the grade requirements, failure to maintain acceptable academic progress will result in a student being required to withdraw from the programme.

IV. Graduate Classes

A selection of the following graduate classes is offered each year. Consult the Faculty of Computer Science's Class Information System, on the World Wide Web at <http://www.cs.dal.ca/>, for the selection of classes offered in each academic year.

Classes starting with "CSCI" are computer science classes. Those starting with "ECMM" are electronic commerce classes.

All graduate students are required to attend and participate in regular Faculty seminars.

CSCI 6101.03: Advanced Topics In Analysis of Algorithms.

This research oriented class covers advanced material in the design and analysis of algorithms. It combines mathematically rigorous coverage of traditional topics with recent research results. Problems are taken from a wide range of areas including combinatorics, numerical computation, graph algorithms, string matching, approximation algorithms, computational geometry, NP-completeness.

PREREQUISITE: CSCI 3110 or equivalent
EXCLUSION: COMP 5130.03

CSCI 6201.03: Advanced Operating Systems.

The main emphasis is on three aspects of current advances in operating systems; the invocation, allocation and control of resources; improvements in reliability by efficient combination of software and specific functions of the hardware; and the provision of efficient and secure interprocess communications.

EXCLUSION: CS6064

CSCI 6202.03: Computer Aided Synthesis and Design of Digital Systems.

This class will explore the methodologies and algorithms used to automate the design of large scale digital systems. Topics will include hardware description languages, logic synthesis (boolean minimization, technology mapping, and state machine synthesis), high level synthesis (resource allocation and scheduling), and physical design (placement and routing algorithms, and verification techniques such as circuit extraction).

Students will be expected to read selected papers from current research literature and present class seminars on assigned topics.
PREREQUISITES: CSCI 3121, CSCI 3123 or instructor's consent
EXCLUSION: CS6091

CSCI 6301.03: Computer Software: Requirement Analysis and Specification.

This class will cover the early stages of the system lifecycle. Topics will include needs analysis, software as a system component, the form of a software requirements specification and validation and verification of specifications. A mathematically based formal specification language will be introduced.

PREREQUISITE: CSCI 3130.03 or equivalent
EXCLUSION: CS6059

CSCI 6302.03: Computer Software: Development and Design.

This class will concentrate on the design phase of the software lifecycle, in particular for large scale software development. Topics will include software process models, computer aided software engineering (CASE) tools and how to evaluate a design. It will also include the supporting technologies of configuration management, version control and change management. Testing will also be discussed.

PREREQUISITE: CSCI 3130.03 or equivalent
EXCLUSION: CS6060

CSCI 6303.03: Methodology of Software Evaluation.

Various views on the evaluation of software will be presented. Topics covered include: user interface, run-time efficiency, problem solving power. Implementational issues will be analysed, in particular, portability, life span, maintenance and reusability. Sample software systems will be provided and analysed.

EXCLUSION: CS6071

CSCI 6304.03: Visual Programming.

This class deals with topics relating to the use of visuality in programming. This will include topics such as visual programming languages, program visualisation and data visualisation, as well as discussion of graphical programming aids, including graphical tools for defining user interfaces.

EXCLUSION: CS6087

CSCI 6305.03: Process-Object Oriented Software.

This class introduces the new concept of high-level process-object oriented software, motivated by multimedia and WAN distributed interactive applications. Topics include recent developments in integrating thread management into programming languages, a hierarchical process-object model, various modes of interprocess communication, the use of Petri nets as a model for direct communication, and the integration of hierarchical process management with the resource-sharing model of object orientation. Sample applications are discussed.

PREREQUISITE: Consent of the instructor
EXCLUSION: CS6092

CSCI 6401.03: Distributed Databases.

The class will briefly review the concepts of integrated database systems, computer networks, and distributed processing. The problems and opportunities inherent in distributed databases on a network computer system will be presented. Detailed coverage will be given to topics such as resource allocation, directory systems, deadlock detection and prevention, synchronization, query optimization, and fault tolerance.

EXCLUSION: CS6068
PREREQUISITE: CSCI 3140.03 or equivalent

CSCI 6402.03: Advanced Topics in Database Systems.

Topics vary from year to year depending on the interests of the students and the instructors. Past topics have included concurrency control, scheduling, query optimization and object-oriented databases.

PREREQUISITE: CSCI 4141
EXCLUSION: COMP 5700.03

CSCI 6403.03: Advanced Topics in Information Retrieval.

This class presents students with the latest research topics in the field of Information Retrieval. Information Retrieval is the study of the collection, organization, and dissemination of text-based objects, such as books, articles, and newspaper items. Topics may include advanced issues in hypertext, information filtering, information access on the World Wide Web, delivery of electronic news, and digital libraries. Most topics will be viewed in the framework of distributed information systems on the Internet.

PREREQUISITE: Permission of the instructor

CSCI 6501.03: Intelligent Systems.

Topics covered include knowledge representation, inference mechanisms and search strategies, uncertain reasoning, explanation, induction and evaluation. Students are provided with a selection of readings on these topics. Small expert systems are developed using different development tools with the goal of obtaining a CSCI narrative knowledge of available development tools. A small expert system shell is developed using PROLOG.

EXCLUSION: CS6076, COMP 5210.03

CSCI 6502.03: Artificial Intelligence and Design.

Design and the generation, analysis and exploration of individual designs is at the heart of most technical disciplines. The Architect, Engineer and Computer Scientist all must generate designs, while satisfying the constraints imposed by form, function, and resource limitations. This class examines how computers can be used to both generate new designs and assist in design generation, exploration and analysis. This interdisciplinary class is open to students from any technical design oriented discipline.

PREREQUISITE: CSCI 3150 or equivalent or permission of the instructor

EXCLUSION: CS6090

CSCI 6503.03: Computer Vision.

Computer vision, also known as computational perception, a diverse and interdisciplinary body of knowledge and techniques, has as its goal to understand the principles behind the processes that interpret perceptual signals provided by various sensors. This class introduces the fundamental concepts and paradigms for computer vision which include: sensing and image formation, early processing and image segmentation, visual knowledge representation and recognition strategies. Some application domains of both 2D and 3D vision are reviewed.

PREREQUISITES: CSCI 2130 and permission of the instructor

EXCLUSION: CS6080

CSCI 6601.03: Introduction to CAD/CAM Software and Hardware.

The class introduces the principles of computer-aided design, computer-aided manufacturing, and computer graphics systems. Programming considerations are discussed. Examples are given of CAD/CAM applications. The selection and application of CAD/CAM systems are discussed.

EXCLUSION: CS6058

CSCI 6602.03: Digital Image Processing.

This class deals with important topics of digital picture processing including visual perception, digitization, compression, enhancement, restoration, reconstruction and segmentation. Special applications to medical systems will also be discussed.

EXCLUSION: CS6083

CSCI 6603.03: Applied Digital Image Processing.

Students will apply digital picture processing techniques gained in CSCI6602. This class will consist of a major term project involving the development of an integrated image processing system. The class will simulate a work environment; the term project will be done by team(s) with the instructor filling the role of Project Manager.

PREREQUISITE: CSCI 6602 or equivalent

EXCLUSION: CS6086

CSCI-6604.03: Advanced Computer Graphics.

This class deals with advanced issues of 3D computer graphics. Topics include solid modeling, visible-surface determination, ray tracing, illumination, shading, and rendering. Animation techniques and problems will also be discussed.

PREREQUISITE: CSCI 4160 or permission of the instructor

CSCI 6701.03: Advanced Distributed Systems.

This class examines a number of issues surrounding present and future data communication systems from the viewpoint of the software engineer. The class begins with a review of several well-known networks and protocols. This review is followed by an in-depth examination of a number of networks including IEEE 802.4

and 802.5, FDDI, and CFR, and protocols, such as IEEE 802.2, IP, and SPTP. In addition, reliability issues, gateway design, multicast communication, protocol development tools and ISDN are also discussed.

EXCLUSION: CS6075

CSCI 6702.03: Parallel Computing.

This class explores various aspects of parallel computing including parallel architectures, systems, programming languages and implementation issues. It focuses on solving real problems on existing parallel machines. Students will participate in an implementation of a significant parallel computing project.

EXCLUSION: CS6089

CSCI 6703.03: Topics in Vector and Parallel Computing.

This class is designed to provide a wide range of concepts involved in vector and parallel supercomputing. Topics include pipeline and vector processing, SIMD and MIMD processing, interconnection networks, parallelization techniques, parallel algorithm design strategies. Architecture and applications of important parallel computers are discussed.

PREREQUISITE: CSCI 3121 or CSCI 4121

EXCLUSION: COMP 5360.03

CSCI 6704.03: Advanced Topics in Computer Networks.

Topics covered include Design and operation of computer networks, Gigabit Networking, Fibre Optics and SONET standards, Cell Networking, Asynchronous Transfer Mode, Wide Area and Local Area Cell networks, Gigabit packet networks, Applications, Internetworking Protocols, Traffic Modelling and Performance Issues, Switch Architectures and current research areas. Practical aspects of network software design are also discussed.

PREREQUISITE: CSCI 4170 or CSCI 4171

EXCLUSION: COMP 5550.03

CSCI 6705.03: Computers and Telephony.

The class will explore the architecture of the Public Switched Telephone Network (PSTN), focusing on the concepts surrounding the evolution of the Advanced Intelligent Network (AIN). Topics include recent developments in areas such as the SS7 protocol stack, the TCAP protocol, Integrated Services Digital Networks (ISDN), Service Control Points (SCP), Service Switching Points (SSP) and Signal Transfer Points (STP), call setup and routing, and Computer-Telephony Interface (CTI). Class enrollment will be limited and students will work as a team on a significant term project.

PREREQUISITE: CSCI4170 or CSCI4171, and permission of the instructor

CSCI 6901.03: Directed Studies.

This class offers the student the opportunity to undertake further study into a specific topic of interest that is not covered in the regular class offerings. The student will be supervised by a faculty member competent in the area of interest. Regular meetings between the student and supervising faculty will be held. A substantial project and report are required.

PREREQUISITE: Permission of the Graduate Committee

EXCLUSION: CS6065

CSCI 6902.03: Doctoral Directed Studies.

This class offers the doctoral student the opportunity to undertake further study into a specific topic of interest that is not covered in the regular class offerings. The student will be supervised by a faculty member competent in the area of interest. Regular meetings between the student and supervising faculty will be held. A substantial project and report are required.

PREREQUISITE: Permission of the Graduate Committee

CSCI 6903.03 Special Graduate Topics In Computer Science.

This graduate class examines topics determined by the interests of the students and the instructor.

PREREQUISITE: Consent of the instructor

EXCLUSION: CS6093

ECMM 6000.03: Global Electronic Commerce.

Electronic commerce deals with the conduct of business using computer and communication technologies. It takes place in an environment shaped by government and business policies as well as social attitudes. The class examines issues in global electronic commerce and an understanding of the impact of the interaction and interdependencies of technology, business, and policy on electronic commerce.

COREQUISITES: ECMM 6010.03, BUSI 6520.03, LAWS 2019.03

ECMM 6010.03: Electronic Commerce - Technology Core.

The goal of this class is to examine the technologies and infrastructure required to support electronic commerce. The class examines the major components of the infrastructure including networks, databases and data warehousing, electronic payment, security, and human-computer interfaces.

ECMM 6012.03: Electronic Payments and Security.

Essential for the conduct of electronic commerce are electronic payment systems. Traditional forms of payment are unsuitable for the network medium because of security considerations, inefficiencies, taxation and local laws, or simple inapplicability. This class will cover the various methods of transferring money over the Internet and compare their functionality. The class includes material on electronic cash, electronic checks, electronic credit cards, micro-payments, the encryption and digital signature techniques needed to support electronic cash and the technology available to support secure transactions on the Internet. Implementations of the various payment systems will be examined and compared.

ECMM 6014.03: Databases, Data Warehouses and Data Mining for Electronic Commerce.

Data warehousing and data mining are two emerging technologies which will have a profound effect on the role information plays in organizations. A data warehouse is a repository of data taken from multiple sources that supports querying and analysis tools. Data mining, the process of knowledge discovery from data in a data warehouse, is typically used for strategic planning and has great economic potential for organizations. This course covers key issues in data warehouse architecture, design of data warehouse schemas, design of metadata repositories, the creation, development and maintenance of warehouses, as well as tools and techniques for querying, analyzing and mining the warehouse data. Data mining techniques such as statistical and non-statistical supervised and unsupervised learning methods will be applied to problems drawn from the medical and business world.

ECMM 6016.03: Networking for Electronic Commerce.

This class will cover network protocols that lie at the base of the networks forming the infrastructure of the Internet. After covering the fundamentals of the OSI protocol stack and the operation of the TCP/IP protocol stack, the class will concentrate on applications and application level protocols used in the world-wide-web. The class will include projects that provide hands-on exposure to the major network protocols basic to the Internet.

ECMM 6020.03: Electronic Commerce.

See class description for BUSI 6520.03. in the Business Administration section of this calendar.

ECMM 6022.06: IT Project Management.

The class will cover the principles of management for Information Technology Projects. The history of project management is rooted in Civil Engineering and manufacturing. Information technology projects have several notable differences. Students will learn those

differences as well as generic principles of project management. Through case studies and field investigations of actual IT projects, students will gain a real-world understanding.

ECMM 6024.03: New Venture Creation.

See class description for BUSI 6002.03 in the Business Administration section of this calendar.

ECMM 6030.03: Policy issues in Electronic Commerce.

This class will provide students in the proposed Master of Electronic Commerce degree programme with an overview of law and policy issues in relation to electronic commerce. The class will introduce students to Canadian, U.S. and international policy making institutions and processes, and will illustrate these processes using examples from the emerging domestic and international law relating to electronic commerce. The class will be taught in a lecture format.

Earth Sciences

Location: Life Sciences Centre, Room 3006
1355 Oxford Street
Halifax, NS B3H 4J1
Telephone: (902) 494-2358
Fax: (902) 494-6889

Chair of Department

Reynolds, P.H.

Graduate Co-ordinator

Culshaw, N.

Professors Emeriti

Cooke, H.B.S., MSc, DSc (Witwatersrand)
Medioli, F.S., PhD (Parma)
Milligan, G.C., MSc (Dal), PhD (Harv)

Professors

Clarke, D.B., BSc, MA (Uof T), PhD (Edin). Mineralogy, igneous petrology and geochemistry: petrogenesis of peraluminous granites; studies in the Meguma Zone of Nova Scotia; materials science
Gibling, M.R., BA (Oxon), PhD (Ottawa). Sedimentology and sequence stratigraphy of alluvial and coastal strata, Atlantic Canada; Coal and oil shale; Quaternary rivers.
Hall, J.M., BSc (Wales), PhD, DIC (Lond). Paleomagnetism and crustal studies: construction of oceanic crust and controls on location of volcanogenic massive sulfides; construction of Troodos ophiolite
Jamieson, R.A., BSc (Dal), PhD (MUN). Metamorphic geology and tectonics: P-T-t paths with Appalachian and Grenville applications; metamorphism, structure, geochemistry of gneiss associations, Grenville Province.
Reynolds, P.H., BSc (UofT), PhD (UBC) (jointly with Physics). $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology: application of laserprobe; thermochronological constraints on tectonics in orogenic belts
Robinson, P.T., BSc (Mich), PhD (Calif). Volcanology and ocean crustal studies: petrology of oceanic lithosphere; geochemistry of ophiolites
Scott, D.B., BSc (Wash), MSc (Wash State), PhD (Dal). Micropaleontology and marine geology: microfossils for use in environmental geology of coastal areas; deep-sea paleo-oceanography
Zentilli, M., BSc (Chile), PhD (Queen's). Mineral deposits geology; Andean tectonics, basin analysis, and metallogenesis; fission track thermochronology

Associate Professors

Culshaw, N.G., BA (Keele), PhD (Ottawa). Structural geology and tectonics: Grenville Province; Meguma terrane, Nova Scotia; Makkovik Province, Labrador
Godfrey-Smith, D., BA (Calgary), PhD (SFU). Optical dating and thermoluminescence: response of common silicates and carbonates; dating of Quaternary volcanic deposits
Ryall, P.J.C., BSc (Dal), MSc (Alta), PhD (Dal). Geophysics: magnetic properties of ocean crust; gravity surveys

Honourary Professor (Research)

Schenk, P.E., BSc (Western), MSc, PhD (Wisc)

Associate Professor (Research)

Muecke, G., BSc, MSc (Alta), DPhil (Oxon). Petrology and geochemistry: magmatic evolution of extensional basins

Research Associates

Beaumont, C., major appointment in Oceanography Department
Dick, H., BA (Pennsylvania), PhD (Yale), Woods Hole
Graves, M., BSc (Idaho), MSc (Dal), Cuesta Research, Ltd.
Mukhopadhyay, P.K., PhD (Jadaupur), Global Geoenergy Research
Williams, G., BSc (London), PhD (Sheffield), GSC Atlantic

Adjunct Professors

Barr, S., BSc (UNB), PhD (UBC), Acadia University
Boyd, R., BSc, PhD (Sydney), University of Newcastle
Calder, J., BSc (Saint Mary's), PhD (Dal), NS Natural Resources
Coffin, K., BSc, MSc, PhD (Calgary), GSC Atlantic
Dostal, J., BSc (Charles), PhD (McM), Saint Mary's University
Gayes, P., BSc (SUNY), MSc (Pennsylvania), PhD (SUNY)
Jansa, L.F., BSc, MSc (Masaryk), PhD (Charles), GSC Atlantic
Kronfeld, J., BA (Queens College, NY), MSc (Florida State), PhD (Rice) Tel Aviv University
Mann, H., BSc, BEd (SMU), MSc, PhD (Western), Saint Mary's University
Melchin, M., MSc (Waterloo), PhD (Western), St. Francis Xavier University
Mudie, P.J., BSc (Cape Town), BSc (Leicester), PhD (Dal), GSC Atlantic
Murphy, J.B., BSc (Dublin), MSc (Acadia), PhD (McG), St. Francis Xavier University
Pe-Piper, G., BSc (Athens), PhD (Cambridge), Saint Mary's University
Piper, D.J.W., BA (Hons) (St Catharine's Col, Cantab), MA (Cantab), PhD (Darwin Col, Cantab), GSC Atlantic
Raeside, R., BSc (Aberdeen), MSc (Queen's), PhD (Calgary), Acadia University
Ruffman, A., MSc (Dal), Geomarine Associates Ltd.
Sallsbury, M.H., BSc (MIT), MSc, PhD (Wash), GSC Atlantic
Stea, R., BSc (Acadia), MSc, PhD (Dal), NS Dept of Natural Resources
van Wagoner, N., BA, BSc (Cal State), PhD (Dal), Acadia University
Waldron, J., BA (Cambridge), PhD (Edinburgh), Saint Mary's
Williamson, M., BSc, MSc (Wales), PhD (Dal), GSC Atlantic

Students with degrees in any of the sciences or mathematics who wish to study some aspect of the earth are welcome. Graduate work leading to the degrees of MSc and PhD is possible in a number of different fields. These include for example: Marine geology and geophysics, Appalachian geology, isotope geology, economic geology, petrology, geochemistry and mineralogy, geophysics, sedimentology, micropaleontology and coastal sedimentation, structural geology, metamorphism, and tectonics.

Interdisciplinary studies are encouraged, and there is active cooperation among the science departments (including Oceanography) at Dalhousie University. Students are urged to take full advantage of the opportunities this affords. Research, on scientific problems of mutual interest to Dalhousie and government laboratories such as the Nova Scotia Department of Natural Resources, Nova Scotia Research Foundation and the Geological Survey of Canada Atlantic at the Bedford Institute of Oceanography, is often done. Members of these laboratories frequently serve on supervisory committees.

The complex of departments and laboratories in Halifax and Dartmouth concerned with various aspects of the Earth make graduate study in Earth Sciences very attractive.

I. Admission Requirements

Candidates must satisfy general requirements for admission to the Faculty of Graduate Studies. Candidates seeking financial support should ensure that their applications are complete by January 31.

II. Degree Programmes

A. MSc Degree Programme

The minimum time for completion of the MSc degree is 12 months of full-time study (see Faculty Regulation 1.3.1 in the Faculty of Graduate Studies regulations). Experience has shown that most students take at least 24 months to complete their work. Financial support is available for no more than 24 months.

Part-time study is also possible. Conditions for admission to this programme are the same as those for full-time students. Financial support is not normally available for part-time study.

Research leading to the preparation and oral defence of a thesis is required.

The equivalent of five graduate classes is required, of which the thesis normally counts as three.

Graduate students are required to participate in the Earth Sciences seminar. EARTH 6300.03 and EARTH 6350.03 are compulsory.

B. PhD Degree Programme

The minimum time required to complete this programme is two years from an MSc; normally three years are required (see Section 1.3.2 in the Faculty of Graduate Studies regulations).

The preliminary examination (see Section 7.2 in the Faculty of Graduate Studies regulations) is an integral part of the compulsory classes, EARTH 6300.03 and 6350.03.

Participation in the Earth Sciences seminar is required.

Research leading to the preparation and oral defence of a thesis is required.

III. Classes Offered

The following classes are designed primarily for undergraduates in their final year; they may be taken by graduate students for general interest, because the material is needed to help in their research, or because the student's background may be inadequate.

PLEASE NOTE: Not all classes are offered every year, please consult the current timetable.

ERTH 5141.03: Applied Geology and Mineralogy.

This class is an introduction to the various concepts and techniques utilized by geologists in their study and evaluation of economic concentrations of metals, industrial minerals and energy resources, and of basic principles of mining and metallurgical engineering where geology plays a significant role. The successive stages of an exploration project are analyzed, from reconnaissance through target appraisal, drilling, metallurgical studies to mine development, mining methods, environmental assessment and land rehabilitation. Legal (e.g. staking, mineral rights) and economic aspects (e.g. budgets, prices, grade and tonnage, reserve calculations, net smelter return) will be introduced. The syllabus will vary somewhat from year to year to reflect the interests and backgrounds of the students, and availability of lecturers. Labs will consist of practical exercises with rocks and minerals, problem solving, seminar presentations and discussions.

INSTRUCTOR: M. Zentilli and invited lecturers

FORMAT: Lecture 3 hours, lab 3 hours

ERTH 5151.03: Mineral Deposits.

This class is an introduction to the geology of metallic ore deposits (e.g. gold, copper) and some industrial mineral concentrations (e.g. diamonds, barite), and the genetic hypotheses used in their exploration. Emphasis is given to the chemical, mineralogical, physical, structural, tectonic, igneous, sedimentary and metamorphic processes that lead to economic concentrations of minerals and their subsequent modification or destruction. The class integrates many Earth Science disciplines, and requires extensive reading from the scientific literature, writing, and oral presentations.

INSTRUCTOR: M. Zentilli

FORMAT: Lecture 3 hours, lab 3 hours

ERTH 5152.03: Fossil Fuels.

The class provides an introduction to the principal fossil fuels: peat and coal, oil shale, oil and natural gas, and uranium. We will discuss the chemical nature of each type of fuel, as well as biological and physicochemical factors involved in its genesis and concentration within the earth. The class will also consider practical methods used in resource evaluation and geological and geopolitical factors that make extraction of raw fuel feasible. Economically important deposits in Canada and worldwide will be discussed.

INSTRUCTOR: M. Gibling

FORMAT: Lecture 3 hours, lab 3 hours

ERTH 5270.03: Applied Geophysics.

The application of geophysical methods to petroleum and mineral exploration as introduced in 2050.03 and 3130.03 is here treated at a more advanced level with an emphasis on seismic techniques. Assignments involve the student in interpretation of industry geophysical data and modelling on workstations.

INSTRUCTOR: P.J.C. Ryall

FORMAT: Lecture 3 hours, lab

ERTH 5280.03: Marine Geophysics.

The application of the various geophysical techniques to the study of the sea floor and the principal results obtained are examined. The processes involved in the creation, evolution and destruction of ocean basins and the implications of the experimental observations are also considered.

INSTRUCTOR: K. Loudon

FORMAT: Lecture 3 hours, lab

ERTH 5351.03: Canadian Regional Tectonics.

This class is a required class for Earth Sciences Honours students. It is intended to synthesize the various aspects of geology treated in more specialized classes through an analysis of those processes which have shaped some of the major Canadian geological regions. We will examine the structure, stratigraphy and petrology of mountain belts (Cordillera, Appalachians), Precambrian shield (Grenville, Churchill, Superior), and sedimentary basin (East coast shelf, Western Canada, Sverdrup) in order to determine what processes, including plate tectonic processes, created them.

INSTRUCTOR: N. Culshaw

FORMAT: Lecture 3 hours

ERTH 5380.03: Advanced Geochemistry.

This class begins with a review of the Periodic Table and a discussion of nomenclature, properties, and classification of the elements. The next section on Cosmochemistry covers the origin and distribution of elements including the transuranic superheavies, condensation sequences, origin of solar system and planets, bulk composition and differentiation of the Earth, and origin of the Moon. A major section on Isotope Geochemistry covers the systematics and examples of radiogenic (Rb-Sr, Sm-Nd, U-Pb) and stable (H, C, O, S) isotopic systems. Two other sections cover Geochemical Cycles in the endogenic environment (transfer of elements in the interior of the Earth, and lithochemistry in petrogenetic studies of igneous, sedimentary, and metamorphic rocks), and exogenic environments (lithosphere, atmosphere, biosphere, hydrosphere). A final section on Applied Geochemistry covers the principles and examples of forensic (natural and criminal), exploration, and environmental geochemistry.

INSTRUCTOR: D.B. Clarke

ERTH 5400.03: Advanced Metamorphic Petrology.

Metamorphic rocks are considered as equilibrium systems. The role of fluids in metamorphism, metasomatism and mass transport, kinetics of metamorphic processes, microstructure, and textural development of metamorphic rocks are discussed. The use of metamorphic data in tectonic analysis is considered at length. Laboratory projects and special topics are chosen to suit the students' interests. This class is offered subject to interest.

INSTRUCTOR: R.A. Jamieson

FORMAT: Lecture 3 hours

ERTH 5502.03: Micropaleontology and Global Change.

This class provides a systematic study of major groups of microfossils (principally foraminifera, ostracoda and calcareous nanoplankton). Particular emphasis is placed on the distribution and ecology of recent microfossils, and on laboratory techniques for sampling and studying them. Quaternary paleo-oceanography and faunal distribution is examined based on knowledge of the tolerances of the living organisms.

INSTRUCTOR: D.B. Scott

FORMAT: Lecture 3 hours, lab 3 hours

ERTH 5520.03: GIS Applications to Environmental and Geological Sciences.

Geographic information systems (GIS) provide a rich set of new tools to the geologist and environmental scientist, not only to solve conventional problems, but also to explore questions not readily answered by other means. This class builds on the fundamentals of GIS taught in EARTH 3500.03 to explore analytical tools that aid in decision-making processes encountered in mineral exploration, hydrogeology, site selection, environmental assessment, and global change analysis. The class concentrates on case studies and problem solving, including those requiring multi-criteria and multi-objective decision making processes.

INSTRUCTOR: G.K. Muecke

The following classes are designed specifically for graduate students.

ERTH 6100.03: Seminar in Sedimentology and Stratigraphy.

ERTH 6110.03: Research Topics in Micropaleontology.

ERTH 6120.03A/6220.03: Seminar in Mineralogy, Petrology and Geochemistry.

ERTH 6150.06: Metallogeny in Mineral Exploration.

ERTH 6160.06: Research Topics in Sedimentary Geology I.

ERTH 6170.06: Research Topics in Sedimentary Geology II.

ERTH 6250.03: Directed Studies.

ERTH 6300.03: Research Presentation and Design in Earth Sciences.

ERTH 6350.03: Research Topics in Earth Sciences

ERTH 6500.03: Graduate Seminar in Tectonics

All graduate students must be registered in one of:

ERTH 9000.00: MSc Thesis.

ERTH 9530.00: PhD Thesis.

Economics

Location: 6214 University Avenue
Halifax, NS B3H 3J5
Telephone: (902) 494-2026
Fax: (902) 494-6917
WWW: <http://www.dalgrad.dal.ca/homepage.htm>

Chairperson of Department

Lesser, B.

Faculty Advisors

Burton, P., Graduate Coordinator (494-6745)
McAllister, I., MDE Coordinator (494-6993)

Professors Emeriti

Cornwall, J.L., BA (Iowa), MSc (Lond), PhD (Harvard), FRSC
Konczacki, Z.A., BSc (Lond), BEcon(Hons) (Natal), PhD (Lond)
Sinclair, A.M., BA (Dal), MA, BPhil (Oxon), PhD (Harvard)

Professors

Bradfield, F.M., BCom (McM), PhD (Brown)
Dasgupta, S., BA (Calcutta), MA (Delhi), PhD (Rochester)
Lesser, B., BCom (Dal), MA, PhD (Cornell)
Marfels, C., Diplom-Volkswirt, Dr Rer Pol (Berlin)
McAllister, R.L., MA (Oxon), MA (Cantab)
Osberg, L., BA(Hons) (Queen's), MPhil, PhD (Yale)
Phipps, S., BA(Hon) (Victoria), MA, PhD (UBC)
Rao, U.L.G., MA, MSc (Andhra), PhD (Western)

Associate Professors

Burton, P., BSc (Sask), MA, PhD (UBC)
Cross, M.L., AA (Dawson College), BA (Hons) (Montana), MA (SFU), PhD (Texas A&M)

Assistant Professors

Cyrus, T., BA (UCLA), PhD (Berkeley)
Dayton-Johnson, J., BA, PhD (Berkeley)
Iscan, T.B., MA, PhD (Cornell)
Xu, K., MBA, PhD (Concordia)

Honorary Adjunct Professors

Amirkhalkhali, S., BAHons (Shiraz), MA, PhD (Dal), Saint Mary's University
Badawi, J., BCom (Ain Shams, Ciaro), MBA, PhD (Indiana), Saint Mary's University
Bowles, P., BSc (Southampton), MA (Sussex), PhD (London), UNBC
Comeau, R.L., BA, MA (StFX), PhD (Brown) (retired)
Cornwall, J.L., BA (Iowa), MSc (London), PhD (Harvard), Dalhousie (retired) (Professor Emeritus)
Cornwall, W., BA (MSVU), PhD (Dal), Mount St. Vincent University
George, R., BSc (London), MSc (Bristol), PhD (London) (retired)
Huber, P.B., BA, MA, PhD (Yale)
Klein, E., LL.M. (Buenos Aires), MSc (Dal), Dr Rer Pol (Hamburg)
Mansoorian, BSc (LSE), MA (McM), PhD (Queen's), York University
Ogwang, BStat (Makerere), MA (Leeds), PhD (Dal), UNBC
Pinfold, BA, MA (Western), PhD (Minn)
Rankaduwa, W., BA, MSc (Sri Lanka), MA, PhD (Dal), UPEI
Sharif, N., BA (Punjab), MA (Dacca), MA, PhD (McM)
Sinclair, A.M., BA (Dal), MA, BPhil (Oxon), PhD (Harvard)

I. Degree Options

A. Master of Arts

1. Admission Requirements

Candidates must at a minimum satisfy the general requirements for admission to the Faculty of Graduate Studies as spelled out in section 2.2 of this calendar. Entrance to a one-year MA Programme requires an Honours BA in Economics (or equivalent) with an average of at least 75% (B+) at Dalhousie standards in classes in Economics and related fields. Normally this means completion of at least eight classes in Economics beyond the introductory level including classes in Economic Theory beyond the intermediate level, Statistics, Econometrics and classes in areas related to some of the fields of specialization, other than Economic Theory or Econometrics, that are listed below under Programme Choices. Mathematics classes which are equivalent to Dalhousie MATH 1000.03 and 2030.03 are also required.

Promising students who do not meet the entrance requirements for the programmes may be admitted to a Qualifying Year to permit them to bring their work up to full admission standards, or may be considered for a two year MA.

Applicants should also consult regulations 2., "Admissions Requirements," which includes regulation 2.4, "English Language Proficiency".

b) Programme Choices

The department offers the MA in the following areas of specialization:

- Economic Theory
- Econometrics
- Labour Economics
- Public Finance
- Resource Economics
- Monetary Theory
- Industrial Organization
- Regional and Development Economics

Department approval is required for the programme of each student.

c) Interdisciplinary Programmes

The Department of Economics participates with other Departments and Institutions in several such programmes. These include:

- African Studies
- Environmental Studies
- Health Evaluation Studies
- Urban, Rural, and Regional Studies

Graduate students wishing to orient their studies in the direction of these interdisciplinary fields take some classes in the relevant area from offerings outside the Department and do their graduate thesis on related topics. The Department's approval of such a programme is required. Other special interdisciplinary programmes may be devised, with the Department's consent, to meet particular interests.

d) Completion of MA Programme

Students must successfully complete the required and optional classes of their programme. Normally a course of study include:

- ECON 5500.03: Macroeconomic Theory
- ECON 5509.03: Microeconomic Theory
- ECON 5521.03: Math for Economists
- ECON 5575.03: /5576.03: Statistics/Econometrics
- 1 1/2 elective classes
- a thesis which must be submitted and approved by the Department

B. Master of Development Economics (MDE)

a) Admission Requirements

The normal duration of the programme is two years; although applicants with the equivalent of some graduate level training or a professional degree (such as MPA, MBA, LLB or MES) may be eligible for a one-year programme. Also, candidates with first-class undergraduate degrees with a major in Economics or International Development may be considered for a one year programme.

All candidates for admission must satisfy the general requirements for admission to the Faculty of Graduate Studies. The department will consider applications for the two year programme from candidates possessing an undergraduate degree with an academic average of at least 75% (B+) at Dalhousie standards. Because of its interdisciplinary nature, applicants may possess a BA, BSC or BComm degree, but all candidates must have at least two classes in Economics beyond the introductory level including one full class in intermediate theory, plus a basic class in statistics.

Promising students who do not meet these requirements may be considered for admittance to a Qualifying Year. In exceptional circumstances, a highly qualified candidate may be admitted to the two year programme and permitted to take missing classes within the first year of the two year programme (such classes would usually be above the normal course requirement for the graduate programme).

b) Programme Choices

The MDE Programme permits students to follow one of two paths:

- The Canadian Studies Programme concentrates on Canadian economic development, with comparative insights from other countries. Primary emphasis in the programme is placed on exploring problems of development in Canada's less developed regions, with special attention to the Atlantic Provinces. Regional development policy initiatives and strategies are stressed.
- The International Development Studies Programme concentrates both on sectoral themes and on geographic regions. These include urban and rural development, human resource planning, the role of state corporations, international trade and payments, import substitution policies, international and bilateral aid, disaster relief, health and environmental issues, women in development, and the problem of helping those in greatest need in Third World countries. Specific country experiences will be extensively drawn upon through links the University faculty has with West Africa, East Africa, Indonesia, Latin America, the Baltic states, the Caribbean, China, Nepal and India.

For both programme options, students should select classes to achieve a blend of economics and at least one of the disciplines of business/public administration, law, education, environmental studies, history, music, political science, sociology and social anthropology. Class selection should also facilitate skill development in: the ability to think numerically, to interpret data, and to apply economic logic to real issues; computer literacy; and a sensitivity to human behaviour and different cultures. For both programme options, some field exposure is encouraged both through class frameworks and thesis research.

c) Completion of MDE Programme

Students in a full two-year programme must normally complete seven full-credit classes plus thesis. In some cases, this number of classes may be reduced on the basis of advanced standing granted for previous work, but not used for credit towards another degree.

C. Doctor of Philosophy (PhD)

a) Admission Requirements

Applicants for admission to the PhD programme must have academic qualifications superior to those required for entrance into the MA programme. The minimum required for entry is an Honours Degree in Economics with an average of at least 80% (A-) by Dalhousie standards in the classes in economics and related fields. Students entering after completing the required course work for an MA degree in Economics would normally prepare for their PhD Comprehensive Exams in two years; those with only an Honours BA would normally require three years. In addition to the entrance requirements above, students are expected to have completed classes, at a satisfactory level, in Intermediate Calculus, Matrix and Linear Algebra, and Statistics (equivalent to Dalhousie MATH 2000.06, 2030.03, 2040.03, 2060.03 and 2080.03).

Applicants may be required to submit the results of the Graduate Record Examination in Economics with their application. They should also consult regulation 2., "Admissions Requirements," which includes regulation 2.4, "English Language Proficiency."

b) Programme Choices

The department offers the PhD in the following areas of specialization:

- Econometrics
- Economic Theory (Microeconomics) (Macroeconomics)
- Industrial Organization
- Labour Economics
- Resource Economics

Students admitted to a two-year PhD programme may choose any area of specialization. Students admitted to a three-year PhD programme may do so after having satisfactorily completed a prescribed course of study during their first year. Departmental approval is required for the programme of each student.

The structure of the PhD programme is described below.

The PhD Programme is designed to provide students with a strong foundation in economic theory and quantitative methods and intensive work in two applied fields of economics. At the completion of their class work, candidates for the PhD Programme will be examined in:

1. Macroeconomic and Microeconomic theory (at the level of Dalhousie Economics classes 5500.03, 5509.03, 6600.03 and 6609.03, including applications of the economic theory described)
2. Two fields of specialization
3. History of Economic Thought

They are also required to show proficiency in Quantitative Analysis and Economic History in the course of their work. A course of study recommended for the two-year PhD Programme would include:

Year 1

1. ECON 5500.03 (Macroeconomic theory)
2. ECON 5509.03 (Microeconomic theory)
3. ECON 5506.06 (Economic History as available)
4. Two elective classes

Year 2

1. ECON 6600.03 (Macroeconomic theory)
2. ECON 6609.03 (Microeconomic theory)
3. ECON 5533.06 (Econometrics)
4. Two elective classes

c) Examination and Thesis

Comprehensive examinations consisting of written papers in economic theory and two fields, and oral examinations in the same three subjects, are required at the end of the required period of course work.

A suitable thesis must be submitted and defended. Students are required to make a public presentation of a thesis proposal no later than six months after completion of the comprehensives and preferably at some point prior to the comprehensives.

II. Classes Offered

Classes other than those listed may be offered. Not all classes listed are necessarily offered in any given year. Students should consult the graduate timetable for information on classes offered in a given year.

ECON 5000.03: Economic Theory for MDE.

The aim of this class is to introduce students to the analytical concepts and tools in modern microeconomics. The lectures will focus on the theory of consumer, the theory of firm, the theory of market, and welfare economics. Although the materials covered in Microeconomics are sometimes analytical and abstract, the concepts and tools can be applied to problems in the real world including both developed and developing economies.

INSTRUCTOR: J. Dayton-Johnson

FORMAT: Lecture 3 hours

PREREQUISITES: ECON 2200 and ECON 2201

ECON 5001.03: Economic Theory for MDE.

The purpose of this class is to provide an understanding of the recent macroeconomic theories as applied to relevant international macroeconomic issues. The first goal is to provide non-technical but a formal exposition of the theoretical models in modern intertemporal macroeconomics. The second objective, in line with the current globalization of world commodity and financial markets, is to emphasize the importance of international macroeconomics. Special attention is devoted to consumption, saving and investment decisions and macroeconomic stabilization in open economies.

FORMAT: T. Iscan

FORMAT: Lecture 3 hours

PREREQUISITE: ECON 2200 and ECON 2201

ECON 5250.08: Applied Development Economics.

This class traces how and why post-World War II theories of, and approaches to, economic development have broadened from a somewhat narrow emphasis on growth to increased concern for meeting the basic needs of the poor, entitlements, and environmental sustainability. In the first term the main focus is on development project planning, analysis and execution; in the second term the main focus is on national and regional level policy and programming - including foreign aid, disaster relief and regional development theory and practice. An international case study approach is used during the class and fieldwork in the Atlantic region provides a comparative component. The importance of insights from a number of disciplines is emphasized and a cross-section of faculty and officials participate as guest speakers at key stages.

INSTRUCTOR: Ian Mcallister

FORMAT: Seminar 2 1/2 hours

ECON 5251.03: Seminar in Development Studies.

This class is required for MDE students in their final year of study. It is intended to serve as an integrating vehicle for the programme. Thus the emphasis of the class is not so much on introducing new material as providing a forum for discussion of previously learned lessons in a shared context, hopefully leading towards a synthesizing of these various learning experiences in the field of development studies. Emphasis is placed on both Canadian regional development and international development issues, in keeping with the two streams of the programme. A secondary objective of the class is to help students in the selection of a thesis topic and/or in making progress on their actual thesis work. To these ends, students are encouraged to do their major writing assignments for the class in areas relevant to or part of their thesis work.

INSTRUCTOR: B. Lesser

FORMAT: Seminar 2 hours

ECON 5252.03: From Disaster Relief to Development.

This class exposes students to the growing economic literature built around comparative experiences of disaster prevention, relief and economic development. Analytical frameworks for better understanding the reasons behind a cross-section of disasters are explored - as aids to improving development planning at both project and broader policy levels. Main themes include food security, distribution and drought reduction; refugees, asylum seekers and settlements for sustainable development; early warning systems for cyclones and famines - their integration into national development planning; emergency programming in the context of military, political and economic instability; issues of humanitarian law and peacekeeping. Case studies are being tested in cooperation with the UN Department of Humanitarian Affairs and the Pearson International Peacekeeping Training Centre, as a routine part of the class's applied orientation.

INSTRUCTOR: I. McAllister

FORMAT: Seminar 2 1/2 hours

ECON 5334.03: Economic Development. Recent Debates, Controversies and Conflicts.**ECON 5350.03: Social Cost Benefit Analysis.**

The methodological base of social cost benefit analysis is developed, demonstrating some practical applications. Social cost benefit analysis and capital budgeting are two approaches to investment decision making. The former is used by public sector agencies; the latter is employed by private sector firms.

Similarities and differences in the two approaches are highlighted. Solving problems which illustrate basic concepts and a paper reporting on an actual application of the methods taught are important requisites.

INSTRUCTOR: T. Pinfold

FORMAT: Lecture 2 hours

PREREQUISITES: ECON 1100.06, ECON 2200.03 and Introductory Statistics are desirable

ECON 5431.03: International Finance.

This class deals with the theory of balance of payments under different arrangements, foreign exchange market, foreign exchange rate dynamics and determination, open economies under fixed and flexible exchange rate systems, the European monetary system, and international policy coordination. Students should have a good background in macroeconomics and econometrics. Final grades are based on research papers and examinations.

INSTRUCTOR: T. Cyrus

FORMAT: Lecture 3 hours

PREREQUISITES: ECON 3338.03 and either ECON 5000.03 OR 5500.03

ECON 5500.03: Macroeconomics.

The first half of the class covers static national income analysis in a general equilibrium macro context. Equilibrium and disequilibrium models of the product and labour markets are studied in order to determine the causes of unemployment. The second half of the class deals with dynamic problems of growth and inflation. Neo-classical and Keynesian models of growth are studied and evaluated in terms of the ability to explain why growth rates differ between countries. Theories of inflation are compared with an aim to discovering some of the causes of the current difficulties. Some knowledge of calculus is required.

INSTRUCTOR: T. Iscan

FORMAT: Seminar 3 hours

ECON 5502.03: Monetary Theory: Microeconomic Aspects.

This class focuses on the financial behaviour of four agents: (a) the central bank, i.e. The Bank of Canada, (b) commercial banks, (c) nonbank financial intermediaries, (d) the household and firm. Four important issues will be discussed: (1) the kinds of financial assets created in a modern economy; (2) the way in which money and credit are supplied in the modern economy, particularly the operations of the central bank and of financial intermediaries which enable these institutions to expand and/or contract the quantity of money and credit; (3) the behaviour of the economic agents who demand and supply financial assets; and (4) the framework in which monetary policy can be analyzed.

INSTRUCTOR: K. Xu

PREREQUISITES: ECON 3338.03, 3326.03 and 4426.03 and either ECON 5001.03 or ECON 5500.03

ECON 5503.03: Public Finance I.

This class deals with the economics of the public sector with major emphasis on the allocative and distributional effects of government policy. The first half of the class examines government spending under the headings of the welfare foundations of public finance, public goods and externalities. Particular attention is paid to how we might assess the distributional implications of government spending programmes. How might we measure poverty or inequality? How should we make interpersonal comparisons?

INSTRUCTOR: S. Phipps

FORMAT: Lecture 3 hours

ECON 5509.03: Microeconomic Theory I.

This class in microeconomic theory is required in the MA programme. Subjects covered include: 1) theory of the firm (technology, cost, profit, maximization, introduction to linear programming, duality, supply); 2) theory of the consumer (utility, expected utility, revealed preferences, demand, integrability); 3) general equilibrium (existence, uniqueness, stability) and welfare economics (classical theorems); 4) theory of the market (pure monopoly, oligopoly, monopolistic competition, game theory).

INSTRUCTOR: S. DasGupta
FORMAT: Lecture 3 hours

ECON 5513.03: Regional Economics: Analysis and Policies.

This class analyzes various theories used to explain regional growth and disparities. This involves examining the assumptions, the strengths and weaknesses, and the implications of each theory. Emphasis is on the impact of market imperfections on regional performance. The discussion includes the application of the theories to actual situations, usually Canadian. Policy discussions focus on capital and labour markets, technological change, and market structures.

INSTRUCTOR: F.M. Bradfield
FORMAT: Lecture 3 hours

ECON 5514.03: Monetary Macroeconomic Aspects.

ECON 5514.03 is a natural continuation of ECON 5502.03. The main concern of this class is the multimarket equilibrium with money and credit. The class will pay attention to the transmission mechanism, i.e., the way in which changes in the quantity of money and credit exert effects upon the activity of the economy as a whole. There are two transmission mechanisms which fundamentally differ: 1) a neoclassical transmission mechanism that in our days goes under the analytically adjusted mantle of Monetarism and the new classical economics; 2) the Keynesian transmission mechanism.

INSTRUCTOR: K. Xu
PREREQUISITES: ECON 3338.03, 3326.03 and 4426.03 and either ECON 5001.03 or ECON 5500.03

ECON 5516.03: Resource and Environmental Economics I (Resources).

This class is designed as an introduction to the theory and application of resource economics. Topics include: 1) interpersonal and intertemporal decision-making criteria; 2) the basic theory of nonrenewable resource exploitation (including Hotelling's theory of the mine); 3) a basic forestry model (i.e., the Faustmann model) including extensions which allow for benefits that arise from standing forests; and 4) the Gordon-Schaefer model of the fishery and optimal dynamic harvesting. Empirical applications of these models (from the current economic literature) will also be presented.

INSTRUCTOR: P. Burton or M.L. Cross
FORMAT: Lecture 3 hours
PREREQUISITES: Students must be very comfortable with calculus

ECON 5517.03: Resource and Environmental Economics II (The Environment).

This class is designed as an introduction to the theory and application of environmental economics. It includes the theoretical analysis of 1) interpersonal and intertemporal decision-making criteria; 2) public goods and externalities (such as pollution) and the advantages/disadvantages of regulatory mechanisms; 3) valuation of environmental benefits or damages (e.g., compensating and equivalent variations); 4) preference revelation (e.g., surveys, hedonic pricing, and travel-cost methods); and 5) anthropocentric valuation of the environment (e.g., existence value, access value, option value and quasi-option value) and the possibility of nonanthropocentric decision making. Empirical analyses will be discussed where the above approaches have been implemented.

INSTRUCTOR: P. Burton or M.L. Cross
FORMAT: Lecture 3 hours
PREREQUISITES: Students must be very comfortable with calculus

ECON 5518.03: Antitrust Economics.

In an era of LBOs hostile bids, and globalization of economic and corporate activities antitrust assumes a new role. To what extent can and should antitrust interfere at the domestic base of multinational corporations? Should it be just domestic or should international "cooperative" activity be included? The class will deal with existing antitrust laws and their administration in the contemporary environment.

INSTRUCTOR: C. Marfels
FORMAT: Lecture 3 hours

ECON 5520.03: Economic Applications of Game Theory.

Game theory and information theory are now used in most aspects of economic analysis and a proper understanding of these approaches has become a necessary condition for accessing much of the current literature. The class includes the study of Static/dynamic games of complete information, Static/dynamic games of incomplete information, moral hazard, adverse selection and mechanism design.

INSTRUCTORS: P. Burton or S. Dasgupta
FORMAT: Lecture 3 hours
PREREQUISITES: ECON 5509.03, 5521.03 or permission of instructor

ECON 5521.03: Mathematics for Economists.

This class is designed to provide the required preparation in mathematics for the study of graduate economic theory. Topics to be covered include linear algebra (linear dependence, determinants, quadratic forms, characteristic roots), analysis (limits and continuity, multi-variate differential calculus), convex functions, constrained optimization, difference equations.

INSTRUCTOR: S. DasGupta
FORMAT: Lecture 3 hours
PREREQUISITES: MATH 1000.03, MATH 2030.03, or permission of instructor

ECON 5522.03: Labour Economics I.

This class provides an in-depth survey of modern Labour Economics, focusing on the supply of labour and trends in labour supply, the demand for labour, topics in human capital theory, structural change in labour markets, labour market segmentation; information and job search, search unemployment and inflation, and unemployment and unemployment insurance. Most of the discussion is based on recent journal articles. Students are graded on the basis of essays and a final exam.

INSTRUCTOR: L. Osberg or S. Phipps
FORMAT: Lecture 3 hours

ECON 5533.06: Econometrics.

This class attempts to introduce Econometric theory at a fairly advanced level and is designed mainly for one who likes to work in theory and model-building. A review of the general linear model will be made. Violations of the assumptions crucial for least squares estimation breeds in various problems. The following problems will be discussed in detail: generalized least squares, autocorrelation, heteroscedasticity, distributed lags, dummy variables and stochastic regressors. In addition, time series analysis, unit roots and cointegration will also be discussed. Simultaneous equations occupy an important place in econometric model-building. A critical analysis of the problem of identification will be made. Limited information methods and full information methods of estimation will be discussed. Monte Carlo methods as alternatives to analytical techniques will also be discussed. This class is open to graduate students as well as advanced undergraduate students.

INSTRUCTOR: U.L.G. Rao
FORMAT: Lecture 3 hours
PREREQUISITES: ECON 2228.03, 2220.03, and 2221.03, or their equivalents

ECON 5534.03: Econometrics.

In this class the single models-specification, parametric estimation, and inferential procedures - will be discussed. Emphasis is placed on formal proving of various propositions concerning the properties

of estimators of those models. The topics covered will include the theory of least squares estimator, generalized least squares estimator, and the maximum likelihood estimator.

INSTRUCTOR: U.L.G. Rao

FORMAT: Lecture 3 hours

PREREQUISITE: One semester class in mathematical statistics which includes distribution theory and statistical inference, one semester class in linear algebra, and one semester class in introductory econometrics

ECON 5535.03: Econometrics.

In this class multi-equation models - specification, parametric estimation, and inferential procedures - will be discussed. Emphases are placed on the formal derivations of suitable estimators, their properties, and tests of hypotheses. Asymptotic distribution theory and its use in applied econometrics will be discussed in detail.

INSTRUCTOR: U.L.G. Rao

FORMAT: Lecture 3 hours

PREREQUISITE: ECON 5534.03

ECON 5563.06: Special Topics in Regional Economics.

INSTRUCTOR: F.M. Bradfield

ECON 5575.03: Applied Statistics and Econometrics I.

This class is designed to introduce the student to the practical problems encountered in estimating econometric models. Violations of the assumptions of the classical linear model are frequently found in economic data. Procedures for estimation and forecasting under these conditions (heteroscedasticity, autocorrelation, multicollinearity) are discussed and used in class projects. An important aim of this class is to give the student a working knowledge of estimation techniques commonly used by economists. The Dalhousie computer is used for assigned problems. (No previous computer experience is required.)

INSTRUCTOR: U.L.G. Rao or K. Xu

FORMAT: Lecture 3 hours

PREREQUISITES: ECON 2228.03 (or equivalent) and intermediate economic theory classes

ECON 5576.03: Applied Statistics and Econometrics ii.

This class builds on the material learned in ECON 5575.03. Its primary objective is to extend the student's capabilities to conduct quantitative work in Economics, and to examine critically the results of such work. The topics include problems of specification and measurement, and some special models are introduced. These include distributed lag models, autoregressive models, and limited dependent variable models. Additional topics are simultaneous-equation models and time series models.

INSTRUCTOR: U.L.G. Rao or K. Xu

FORMAT: Lecture 3 hours

PREREQUISITE: ECON 5575.03

ECON 5601.03: Special Topics in Macroeconomics.

INSTRUCTOR: T. Iscan

ECON 5659.03: Special Topics in Labour Economics.

INSTRUCTOR: L. Osberg

ECON 5670.03: Special Topics in Econometrics.

INSTRUCTOR: G. Rao

ECON 6600.03: Macroeconomics II.

The class evaluates recent theories of growth, inflation and unemployment with the aim of understanding the deterioration in macro performance over the past two decades. The role of the new institutional analysis in macroeconomic theory is considered. Institutions, viewed as constraints on market behaviour, are given special emphasis, as well as the longer-run effects of macro performance on the institutional framework. Static and dynamic models incorporating hysteresis and more conventional equilibrium models are studied and evaluated.

INSTRUCTORS: T. Iscan

FORMAT: Seminar 3 hours

ECON 6609.03: Microeconomic Theory II.

This class in microeconomic theory is required in the general PhD programme. Its list of subjects includes: 1) General Equilibrium (existence, determinateness, stability) and Welfare Economics (classical theorems); 2) special topics in General Equilibrium Theory (intertemporal economies, equilibrium over time, uncertainty, temporary equilibrium, theory of the core and other solution concepts); 3) special topics in Welfare Economics (public goods, externalities, consumer surplus, fair allocations); 4) economics of information (signals and prices, moral hazard, equilibrium configurations).

INSTRUCTORS: S. Dasgupta

FORMAT: Seminar 3 hours

ECON 6680.06: Directed Reading.

ECON 9000.00: MA Thesis.

ECON 9530.00: PhD Thesis.

Special Topics classes, not separately listed, will be arranged to provide for advanced work in the areas of specialization chosen by PhD students. MA students with the appropriate backgrounds will also be admissible to such classes. Other classes than those listed may also be offered and certain of the classes listed are not necessarily offered on an annual basis.

Education

Location: Room 433A Killam Basement
Halifax, NS B3H 3J5
Telephone: (902) 494-3724
Fax: (902) 494-2847

Acting Director, School of Education

Kimmins, W., Dean of Science

Professor Emeritus

Friedenberg, E.Z., BA (Centenary), MA (Stanford), PhD (Chicago)

Professors

Ricker, E.W., BA, MEd (UBC), PhD (UofT), major appointment in School of Public Administration

Adjunct Professors

Akbari, A.H., BSc, MBA (Karachi), MA, PhD (Simon Fraser); Saint Mary's University

Auger, J., BA, MA, PhD (UBC), Acadia University

Barton, A., BA, MA (Trinity)

Bérard, R.N., BA (Antioch), MA (McM), BEd (Dal), PhD (McM), Mount Saint Vincent University

Crowley, M., BA (Miami), MAT (Johns Hopkins), PhD (Maryland), Mount Saint Vincent University

French, F., BA, MEd (Memorial), PhD (Alta); Mount Saint Vincent University

Gamberg, R., BA (Brandeis), MA (Ill)

Hare, W., BA (London), MA (Leicester), PhD (Tor)

Kienapple, K., BA (Waterloo), MSc, PhD (Purdue); Mount Saint Vincent University

Laidlaw, T., BA, MEd (Calgary), PhD (Alta), major appointment in Medicine

MacCleave, A., BSc (Acadia), MA (MSVU), PhD (Penn State); Mount Saint Vincent University

MacCuspie, P.A., BA (Dal), MEd (Boston), PhD (Dal)

Manicom, D.A., BEd (McG), MEd (AIE), PhD (UofT), Mount Saint Vincent University

Manos, J., BA, BEd (StFX), MEd (Calgary), PhD (Alta), Mount Saint Vincent University

McGee, H., BA, MA (Florida State), PhD (Southern Illinois); Saint Mary's University

Murphy, H.J., BSc (St.Dunstan's), BEd (UPEI), MEd, EdD (Virginia), major appointment in Dentistry

Piomb, D., BA (Alta), MCEd (Sask), PhD (Alta), Mount Saint Vincent University

Porteill, J., BA (Malta), MA, PhD (McG); Mount Saint Vincent University

Road, J., BEd (UBC), MA (Wash), EdD (UBC)

Semple, S., BA, DipEd (Sid), MEd, EdD (UofT)

Sullivan, K.C., BSc, BEd (Dal), MEd, PhD (Alta), major appointment in School of Public Administration

Welton, M., BA, MA, PhD (UBC), Mount Saint Vincent University

Wright, W.A., BA (MtA), MA (McG), PhD (Montreal), major appointment in Office of Instructional Development

There will be no new admission to the MEd or MA or PhD in Education. All graduate students currently enrolled in Masters and Doctoral programmes should refer to the 1995/96 Graduate Studies calendar for programme regulations and class descriptions.

Engineering

Location: Office of the Dean of Engineering
Ira MacNab Building, Room A109
Sexton Campus
DalTech
1360 Barrington Street
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Telephone: 902-494-3267

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Dean

Bell, A., BSc (Dal), BEng (TUNS); AM, ME, ScD (MIT), PEng

Assistant Dean

Robertson, W., BSc (Hons), MSc (Aberdeen), PhD (TUNS)

Administrative Assistant

Parker, F., BA (MSVU)

I. Introduction

Dalhousie University offers programmes leading to Master's and Doctoral degrees in various branches of Engineering, Applied Mathematics, Food Science and Naval Architecture and Marine Engineering. These graduate programmes are offered through the Faculty of Engineering at DalTech in accordance with the regulations of the Faculty of Graduate Studies.

A. Areas of Study

Graduate programmes are offered in Biological Engineering, Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, Engineering Mathematics, Fisheries Engineering, Food Science, Industrial Engineering, Mechanical Engineering, Metallurgical Engineering and Mining Engineering, Naval Architecture and Marine Engineering, and Internetworking.

Biological Engineering

Programmes offered are MEng, MASc, and PhD: Animal Waste Management, Agricultural Systems Analysis, Agricultural Machinery, Irrigation and Drainage, Instrumentation and Measurements for Plant/Animal Environments, Crop Production Modelling, Alternative Energy Sources, Food Engineering.

Chemical Engineering

The Department graduate programme focuses on chemical process principles applied to environmental and energy resources. Topics include environmental considerations of combustion technology, fuel preparation, control of explosion hazards, development of innovative process control algorithms and treatment of industrial waste. Fundamental studies are done in mass transfer and rheology, Membrane Separation, Flotation, Coagulation, Gas-liquid System, Emulsification. Programmes offered are MEng, MASc, and PhD.

Civil Engineering

Programmes offered are MEng, MASc, and PhD: Geotechnical Foundation Engineering, Structural Plastics, Wind Power Engineering, Timber Structures, Wood Engineering, Concrete Research, Geometric Design of Highways, Traffic Systems, Steel Structures, Structural Analysis, Wastewater Treatment, Water Pollution Control, Highway Materials, Environmental Engineering Hydraulics, Water Resources Engineering.

Electrical and Computer Engineering

Programmes offered are MEng, MASC, and PhD: Control Systems, Robotics, Instrumentation; Electric Power Systems; Electrical Machines, High-Voltage Engineering, Photovoltaic Solar Power Systems, Active and Switched-Capacitor Networks; Digital Communication Systems; Cardiovascular Dynamics, Medical Instrumentation, Medical Applications of Computers, Bioelectromagnetics; Ultrasonic Telemetry, Design of Integrated Circuits, Microprocessor-Based Systems.

Engineering Mathematics

This is an interdisciplinary programme between Engineering and Applied Mathematics, enabling mathematics and physics majors to carry out theoretical and numerical analysis of applied problems and engineering students to prepare mathematical models of engineering problems. Programmes offered are MSc and PhD.

Fisheries Engineering

Programmes offered are MEng, MASC, and PhD in the following areas: fishing machinery, seafood processing, aquaculture, fishery systems analysis, instrumentation and controls.

Food Science

Research studies are offered on a wide range of topics in food processing, food chemistry, food rheology, microstructure, food engineering and fats and oils. Special emphasis is placed on seafood preservation, storage and handling. Programmes offered are MSc and PhD.

Industrial Engineering

Key areas of research interest in the Department are operations research modelling, mathematical optimization, production planning and control, modelling of economic systems, queueing theory, vehicle and crew scheduling, industrial ergonomics and work place design. Applications are primarily selected in the resource base industries of forestry, fishing and mining as well as the smaller sized local business. Programmes offered are MEng, MASC, and PhD.

Internetworking

The full fee Internetworking programme has been designed in consultation with industry leaders to ensure that the graduates will have the core knowledge base for a rewarding career in the internetworking industry. There are ten courses, one per month from September to June, and a project. Each course has a significant hands on component in a modern internetworking laboratory.

The two week per course teaching format is intended to enable students from industry to participate, and to return to industry to apply their new knowledge. Each student is expected to secure an internship to undertake an industrial based project. This is offered as an MEng programme.

Mechanical Engineering

Fluid Power Systems, Energy Conversion Systems, Fluidized Bed Combustion, Computational Fluid Dynamics, Vibration, CAD/CAM, CAE, Biomedical Engineering, Finite-Element Techniques, Machine and Rotor Dynamics, Machine Design, Robotics, Solar Energy Systems, Ship and Marine Hydrodynamics, Composites, Energy Management, Turbulence Modeling, Two-Phase Flow. Programmes offered are MEng, MASC, and PhD.

Metallurgical Engineering

Graduate studies at the Master's and Ph.D. levels are offered; students should apply for these programmes in the usual manner. Graduate studies at the Master's level are also offered as a co-operative, combined BEng. - MASC. programme which is described in detail in the Undergraduate section of this Calendar. Present areas of study are in the chemical, physical and mechanical processing of metals, ceramics and materials, corrosion in marine and high temperature environments, mineral beneficiation, high temperature electrochemical processing and growth of opto-electronic materials. Programmes offered are MEng, MASC, and PhD.

Mining Engineering

The programme offers research opportunities in the areas of geostatics, mine mechanization, coal mine support, computer applications in mining, mine waste management, ocean mining,

mineral beneficiation, solid/liquid separation, mineral economics, reservoir engineering, horizontal drilling, petroleum drilling fluids, and oil shale studies. Programmes offered are MEng, MASC, and PhD.

Naval Architecture and Marine Engineering

The programme is to provide well trained engineers for various important roles related to the sea, ships and maritime operations, and ocean structures. Research topics include mathematical and physical modelling. Programmes offered are MEng, MASC, and PhD.

II. General Information

A. Fees

Information pertaining to fees and expenses is given in the "Fees" section of this Calendar.

B. Financial Assistance

Information pertaining to financial assistance and scholarships is given in the "Awards" section of this Calendar.

C. Health Insurance Requirement

Information pertaining to health insurance requirements is given in the "Fees" section of this Calendar.

D. Application Forms

Application forms may be obtained from the Office of the Registrar, Dalhousie University, Halifax, Nova Scotia, B3H 4H6, or through the university's web site on the Internet.

E. English Language Proficiency Requirement

Information pertaining to the English language proficiency requirements is given in the Faculty of Graduate Studies Regulations section of this Calendar.

F. Master's Degrees

A student's programme of study for the Master's degree may be either a research programme or a class work programme. A Master's degree taken according to either programme represents an equivalent standard of academic achievement. Note that a research Master's degree is normally required to gain admission into the Ph.D. programme.

G. Class Requirement

At least three-quarters (75%) of the total class requirement must be taken at the University. The graduate student's programme submitted by the appropriate department will be reviewed by the Graduate Studies Committee (GSC) and must be approved by the Graduate Studies Office at DalTech. Class requirements are given under the programme requirements of the specific degrees.

H. Thesis/Project Requirement

A master's candidate will be required to submit a thesis/project satisfactory to the Faculties of Graduate Studies and Engineering and to make an oral presentation of the work. Doctoral candidates must complete a thesis and oral defence in accordance with Faculty of Graduate Studies procedures.

I. Leave of Absence

Students may formally apply for a leave of absence in accordance with Faculty of Graduate Studies regulations (see Faculty Regulations in this Calendar).

J. Admissions Criteria

All candidates must meet the admissions requirements of the Faculty of Graduate Studies, and any specific admissions requirements as listed under each programme.

K. Procedures and Guidelines for Master's Theses and Projects

1. The Department is to ensure that supervisors are assigned to students within eight months of a student's registration. The Department must submit the name of the supervisor to the

DalTech Graduate Studies Office and the name will be officially recorded in the student's permanent file. If the supervisor is not a full-time member of the Department a co-supervisor will be appointed from the Department.

2. Granting of credits to a student's programme of studies for classes taken prior to commencement of the programme requires the recommendation of the Department and approval of the DalTech Graduate Studies Office in advance of registration. Note that some classes from local universities have been given "blanket" approval by the Graduate Studies Council. Students should contact their departmental Graduate Co-ordinator for details.
3. The Department is to appoint a Supervisory Committee, within eight months of the first registration, to be responsible for the Candidate's programme and thesis preparation. The membership of the Supervisory Committee is to be conveyed to the DalTech Graduate Studies Council for approval and recorded in the student's permanent file. The Supervisory Committee will normally consist of the thesis/project supervisor, at least one other member of the department, and at least one other member from outside the department with special interests in the proposed area of study. The supervisor will be the chair of the Supervisory Committee.
4. The Supervisory Committee is required to submit a title for the student's thesis/project report, on the prescribed form, to the Graduate Studies Office at least four months prior to the formal submission of the thesis/project. On approval by the Graduate Studies Office the title will be recorded in the student's permanent file.
5. A clean copy of the thesis/project report accompanied by the form "Appointment in an Oral Examination" must be submitted to the DalTech Graduate Studies Office at least 10 working days prior to the date of the oral defence. The Graduate Studies Office will co-ordinate the scheduling of the presentation and examination. The oral presentation and examination will not be scheduled until the following requirements for the student's programme of studies have been met:
 - (i) Course work completed;
 - (ii) Supervisory committee approved;
 - (iii) Thesis/project title approved; and
 - (iv) Moderator appointed.
6. The thesis/project report is to be prepared to conform with the standards of the DalTech Manual of Form "The Preparation of Graduate Theses" issued by the Office of Graduate Studies.
7. The Department Head or his/her appointee (someone not involved as a member of the Supervisory Committee) shall be a moderator of the oral examination.
8. The student shall be advised by the Graduate Studies Office of the approval of programmes and the approval of thesis titles.
9. The student is responsible to see that all members of the Supervisory Committee receive copies of the thesis to be defended at least two weeks prior to the examination.

III. Master of Applied Science (MASc)

A. Admissions Requirements

A candidate to be considered to the Master of Applied Science research programme must have obtained, with a high scholastic standing, an undergraduate degree in engineering or a degree in science with honours, or the equivalent, from a recognized university.

Candidates for the above degree may be required to take additional undergraduate subjects as a preparation for advanced classes or to give the candidate a suitable engineering background, but such subjects are seldom considered as part of the graduate programme.

B. Academic Regulations

Programme Requirements

An MASc graduate programme consists of not less than six half-credit classes or their equivalent and a thesis project selected upon the advice of the thesis supervisor. Not more than two senior level undergraduate classes may be taken as part of the six class requirement.

Examination Requirement

All classes required to meet the degree requirements are considered essential classes and will be so designated by the Supervisory Committee. Essential classes can include any required undergraduate or prerequisite classes. Any classes taken in excess of the requirements are subject to approval by the supervisor. These classes will appear on the student's transcript as regular classes.

All Master's degree candidates must pass all graduate level classes with a grade of at least B-. Any approved undergraduate class taken by a Master's candidate must be passed with a grade of at least B-. Graduate students are allowed to repeat only one class during their programme at DalTech. Graduate students are not eligible to write supplementary examinations. Transfer credits from other universities will be considered on a case by case basis.

As well, all Master's degree candidates must pass an oral examination of their thesis or project after it has been submitted in satisfactory form.

In addition to meeting the grade requirements, failure to maintain an acceptable academic standing will result in a student being asked to withdraw from the programme. Failure to achieve the minimum mark as noted above shall be considered grounds for dismissal.

Time Requirement

A candidate for a Master's degree will be required to spend at least twelve months' full time work on class work and the thesis. The time requirement for the Naval Architecture and Marine Engineering Programme would normally be twenty months. A student is required to register each session to maintain eligibility to continue a programme of studies. See Faculty of Graduate Studies Regulations for policies regarding the maximum length of time for degree completion and extensions.

IV. Master of Engineering

A. Admission Requirements

A candidate to be considered for the Master of Engineering class work programme must have obtained an undergraduate degree in engineering or its equivalent with high scholastic standing from a recognized university.

B. Academic Requirements

Programme Requirements

The requirements for the class work Master of Engineering degree is ten half-credit classes. Undergraduate classes, in the area of a student's interest, not taken by the student for previous credit, may be included in the programme, subject to prior approval. Not more than two classes may be undergraduate credits.

A project is required as a part of the programme (one or two half-credits out of the required ten half-credits). Projects require the appointment of a supervisor and a supervisory committee.

Individual departments will assess applicants and select students for the programme in their respective departments. Students' programmes will be determined by the department in which the student is registered. All programmes must have the approval of the department.

Entrance to the Master of Engineering Degree Programme in Naval Architecture and Marine Engineering may be through one of two categories. For students who are graduates of an undergraduate degree programme in Mechanical or Civil Engineering with high academic standing, the degree requirement consists of a total of fourteen half-credits, comprising twelve half-credit classes and a one full credit project. For candidates who already hold an undergraduate degree in Naval Architecture or Marine Engineering, the degree requirement consists of ten half-credits, eight half credit classes and a one full credit project, the same credit requirements as other Master of Engineering Degree Programmes.

Candidates who are graduates of an undergraduate programme in Civil Engineering may be required to register for a Qualifying period in additional undergraduate classes in Mechanical Engineering as "make-up" classes in preparation for the Naval Architecture and Marine Engineering postgraduate classes.

Examination Requirement

All classes required to meet the degree requirements are considered essential classes. Essential classes can include any required undergraduate or prerequisite classes. Any classes taken in excess of the requirements are subject to approval by the supervisor. These classes will appear on the student's transcript as regular classes.

All Master's degree candidates must pass all graduate level classes with a grade of at least B-. Any approved undergraduate class taken by a Master's candidate must be passed with a grade of at least B-. Graduate students are allowed to repeat only one class during their programme at DalTech. Graduate students are not eligible to write supplementary examinations. Transfer credits from other universities will be considered on a case by case basis.

As well, all MEng degree candidates must pass an oral examination of their project after it has been submitted in satisfactory form.

In addition to meeting the grade requirements, failure to maintain an acceptable academic standing will result in a student being asked to withdraw from the programme. Failure to achieve the minimum mark as noted above shall be considered grounds for dismissal.

Time Requirement

The minimum time requirement for completing the programme is twelve months. A student is required to register each session to maintain eligibility to continue his/her programme of studies. See Faculty of Graduate Studies Regulations for policies regarding the maximum length of time for degree completion and extensions.

V. Master of Applied Science/Master of Urban and Rural Planning; Master of Engineering/Master of Urban and Rural Planning

The Department of Urban and Rural Planning (Faculty of Architecture), in co-operation with the Department of Civil Engineering (Faculty of Engineering), offers two joint degrees in water resources engineering and planning (MEng/MURP) and MASc/MURP). (A "joint" degree is defined as one where a single parchment is awarded, containing the names of both degrees.)

A. Admission Requirements

(a) MEng/MURP: a candidate, to be considered for the MEng/MURP programme, must have obtained an undergraduate degree in engineering with a high scholastic standing from a recognized university.

(b) MASc/MURP: to be considered for admission, a candidate requires an engineering degree with high scholastic standing, a science degree with honours and a high scholastic standing, or the equivalent of one of these through a combination of educational attainment and career experience.

B. Academic Regulations

MEng/MURP Programme Requirements

To receive the joint MASc/MURP degree a student must:

1. Satisfy all mandatory class requirements for the MURP programme;
2. Satisfy all elective class requirements, as approved jointly by the Department of Urban and Rural Planning and the Department of Civil Engineering;
3. Complete and defend a thesis guided by a thesis committee consisting of at least one instructor from the Department of Civil Engineering and one instructor from the Department of Urban and Rural Planning. The thesis must be accepted by the thesis committee and an external examiner approved by the two departments.

MASMRP Programme Requirements

To receive the joint MASMRP degree a student must:

1. Satisfy all MURP mandatory requirements, including the work period, with the exception of Class 2551.03, Water Resource Planning and Control, which will be replaced by an equivalent MEng class;

2. Choose, with the joint approval of the Department of Urban and Rural Planning and the Department of Civil Engineering, from the following list of classes (in preference to classes listed as electives under the MURP programme) eight or nine electives:

- IDIS 6032.03 Limnology
- CIVL 4440.03 Water and Waste Treatment
- CIVL 6115.03 Design of Water Treatment Plants
- CIVL 6116.03 Biological Waste Treatment
- CIVL 6117.03 Water Quality Management
- CIVL 6135.03 Groundwater Chemical Quality
- CIVL 6158.03 Groundwater Supply Protection
- CIVL 6159.03 River Engineering
- CIVL 6144.03 Geotechnical Aspects of Waste Management
- CIVL 4430.03 Water Distribution and Sewerage System.

3. Complete a thesis of one or two full credits, under the guidance of an Examining Supervisory Committee that meets University regulations.

Note: Classes taken under Item 2 above must total 18 half-credits for the MEng/MURP or 6 half-credits for the MASc/MURP.

Time Requirements

The minimum period of attendance is two years but in cases where previous academic preparation specifically overlaps the class content of the degree programme, credit may be given for those classes. It is unlikely that advance class credit will shorten attendance below two years.

The programme is organized as follows:

Fall Term	Winter Term	Summer Term
P1 (Study)	P2 (Study)	P3 (Work Period)
P3 (Study)	P4 (Study)	

VI. Master of Science (Engineering Mathematics)

A. Admission Requirements

For admission into the Master of Science programme in Engineering Mathematics, a student must have completed with high standing, a Bachelor's degree in Engineering or an honours (i.e. 4 year with research project or dissertation) Bachelor's degree with at least two full year mathematics classes at the third year level, one of them in differential equations.

Applicants who do not meet the above requirements may be admitted to a Qualifying Programme in which they would take additional classes which will raise their total preparation to the level of an honours degree. These additional classes and completion of the Qualifying Programme will be considered a prerequisite to admission to the Master of Science programme.

B. Academic Regulations

Programme Requirements

Thesis Option

A candidate will be required to submit a proposed course of study, to be approved by the Department and the Faculty of Graduate Studies.

The programme will consist of at least 6 half-credit classes and a thesis related to the proposed course of study (equivalent to two full credits). The class requirement will consist of 6 classes, at least four of which shall be graduate classes offered by the Department of Applied Mathematics. Not more than two classes shall be at the final year undergraduate level and may be chosen from the offerings of the other Departments of the Faculty of Engineering and the Faculty of Computer Science.

Examination Requirement

All classes required to meet the degree requirements are considered essential classes and will be so designated by the Supervisory Committee. Essential classes can include any required undergraduate or prerequisite classes. Any classes taken in excess of the requirements are subject to approval by the supervisor. These classes will appear on the student's transcript as regular classes.

All Master's degree candidates must pass all graduate level classes with a grade of at least B-. Any approved undergraduate class taken by a Master's candidate must be passed with a grade of at least B-. Graduate students are allowed to repeat only one class during their programme at DalTech. Graduate students are not eligible to write supplementary examinations. Transfer credits from other universities will be considered on a case by case basis.

As well, all Master's degree candidates must pass an oral examination of their thesis or project after it has been submitted in satisfactory form.

In addition to meeting the grade requirements, failure to maintain an acceptable academic standing will result in a student being asked to withdraw from the programme. Failure to achieve the minimum mark as noted above shall be considered grounds for dismissal.

Time Requirement

A candidate for the degree of Master of Science in Engineering Mathematics will normally require at least twelve months to complete the degree. A student is required to register each session to maintain eligibility to continue his/her programme of studies. See Faculty of Graduate Studies Regulations for policies regarding the maximum length of time for degree completion and extensions.

VII. Master of Engineering (Internetworking)

A. Admission Requirements

A candidate to be considered for the Master of Engineering in Internetworking programme must have obtained an undergraduate degree in engineering or its equivalent with high scholastic standing. Applicants with industrial experience are encouraged to apply.

B. Academic Requirements

Programme Requirements

The course requirement for the Master of Engineering in Internetworking is ten half-credit courses. An applicant may request credit for a maximum of up to two courses.

A project is required in addition to the ten courses. It is preferred that the students go on a three to four month internship to undertake an industrial project. The project report will be examined by a committee consisting of the programme director, or designate, and up to two other professors or industrial examiners.

The programme director or designates will assess applicants and select students for the limited number of seats available in the programme. The programme of study of each student will consist of the ten programme courses and a project.

Examination Requirements

The ten programme courses are considered required courses. All degree candidates must pass all classes with a grade of at least B-. Students are allowed to repeat only one course during their enrolment in the programme. Failure to maintain the minimum mark as outlined here shall be considered grounds for dismissal.

Candidates will be required to pass an oral examination of their project after the report has been submitted in a satisfactory form.

Course Scheduling

The courses are scheduled one per month from September to June. Each course requires 14 days on-site at DalTech. This intensive delivery method has been chosen to allow students holding positions in industry to attend classes on a part-time basis.

VIII. Master of Science (Food Science)

A. Admission Requirements

For admission into the Master of Science Programme in Food Science, students must have a BSc degree from any recognized university in any of the following disciplines:

- Food Science;
- Dairy Science;
- Chemistry/Biochemistry;

- Microbiology;
- Nutrition or Home Economics with suitable background; or
- Bachelor of Engineering

Students will be considered for the programme on the basis of undergraduate academic standing and background. Candidates without Food Science training at the undergraduate level will likely be required to attend appropriate undergraduate classes offered in the programme. All candidates must meet the minimum admission requirements for the Faculty of Graduate Studies.

B. Academic Regulations

Programme Requirements

The graduate programme consists of not less than six half-credit classes (or their equivalent) and a thesis will be selected upon the advice of the thesis supervisor. The graduate student's programme will be submitted by the Department of Food Science and Technology for review by the Graduate Studies Committee. A minimum of ten half-credits or equivalent is required for the Master's degree.

Examination Requirement

All classes required to meet the degree requirements are considered essential classes and will be so designated by the Supervisory Committee. Essential classes can include any required undergraduate or prerequisite classes. Any classes taken in excess of the requirements are subject to approval by the supervisor. These classes will appear on the student's transcript as regular classes.

All Master's degree candidates must pass all graduate level classes with a grade of at least B-. Any approved undergraduate class taken by a Master's candidate must be passed with a grade of at least B-. Graduate students are allowed to repeat only one class during their programme at DalTech. Graduate students are not eligible to write supplementary examinations. Transfer credits from other universities will be considered on a case by case basis.

As well, all Master's degree candidates must pass an oral examination of their thesis or project after it has been submitted in satisfactory form.

In addition to meeting the grade requirements, failure to maintain an acceptable academic standing will result in a student being asked to withdraw from the programme. Failure to achieve the minimum mark as noted above shall be considered grounds for dismissal.

Time Requirement

A candidate for a Master of Science in Food Science degree will be required to spend at least twelve months' full-time work on class work and the thesis. A student is required to register each session to maintain eligibility to continue his/her programme of studies. See Faculty of Graduate Studies Regulations for policies regarding the maximum length of time for degree completion and extensions.

IX. Doctor of Philosophy

A. Admission Requirements and Procedures

A candidate to be considered for entrance into the PhD programme must meet the admission requirements of the Faculty of Graduate Studies and must have:

- A research Master's Degree in engineering from Dalhousie University or any other recognized engineering school, or a Master of Science Degree or its equivalent from a recognized university, acceptable to the Faculty of Engineering (in which case, a candidate may be required to take extra subjects to give him a suitable engineering background); or,
- Acceptance for registration as a candidate for a research Master's degree at this University.

A candidate registered for a Master's Degree may be transferred to a Doctoral Degree on the recommendation of his/her department. The recommendation will be reviewed by the DalTech Graduate Studies Council.

An application for admission to the graduate programme leading to the degree of Doctor of Philosophy should have a superior academic record and previous training or experience which indicates that the candidate should be able to do independent research.

Doctoral candidates are not admitted without appropriate funding to support the student and the programme of research.

B. Health Insurance Requirement

Information pertaining to health insurance requirements is given in the "Fees" section of this calendar.

C. Academic Regulations

All doctoral programmes are developed under the regulations and procedures of the Faculty of Graduate Studies (see Faculty of Graduate Studies Regulations in this Calendar) and each programme must be approved by the Faculty.

Class Requirements

Doctoral programmes in Engineering normally require a minimum of six classes (i.e. Six half-credits) plus a thesis. No undergraduate classes are allowed for credit in a Doctoral Degree programme.

Thesis Subject Matter and Supervision

The thesis shall consist of an original investigation or design carried out under the immediate supervision of a member of the Faculty of Engineering who is also a member of the Faculty of Graduate Studies.

Admission from Master's Degree

Based on starting from a Master of Applied Science Degree, a candidate must take not less than six classes (i.e. six half-credits). These classes will normally be selected in consultation with the research supervisor and supervisory committee, and must be approved by the Faculty of Graduate Studies.

Thesis Requirement

A candidate will be required, as a major part of the programme, to submit a satisfactory thesis embodying the results of original scholarship and independent research. See Faculty of Graduate Studies Regulations for information pertaining to doctoral theses.

Examination Requirements

All classes required to meet the degree requirements are considered essential classes and will be so designated by the Supervisory Committee. Essential classes can include any required undergraduate or prerequisite classes. Any classes taken in excess of the requirements are subject to approval by the supervisor. These classes will appear on the student's transcript as regular classes.

A PhD degree candidate must pass all graduate level classes with a grade of at least B. Graduate students are allowed to repeat only one class during their programme at DalTech. Graduate students are not eligible to write supplementary examinations. Transfer credits from other universities will be considered on a case by case basis.

As well, all PhD degree candidates must pass an oral examination of his/her thesis project after it has been submitted in satisfactory form, and in accordance with the Faculty of Graduate Studies regulations.

In addition to meeting the grade requirements, failure to maintain an acceptable academic standing will result in a student being asked to withdraw from the programme. Failure to achieve the minimum mark as noted above shall be considered grounds for dismissal.

PhD candidates are also required to pass comprehensive examinations which normally take place within the fourth study term. Students who receive a "fail" on the comprehensive examination will be asked to withdraw. Students who receive a marginal fail may be permitted to rewrite once.

Time and Residence Requirements

A candidate for the PhD degree must spend the equivalent of three calendar years of full time work on lectures and the thesis. However, credit for one calendar year may be granted for a Master's degree or its equivalent. A student is required to register each session to maintain eligibility to continue his/her programme of studies. A PhD candidate shall spend at least two years in full time attendance of his/her research work at the University. See Faculty of Graduate Studies Regulations for policies regarding the maximum length of time for degree completion and extensions.

Procedures and Guidelines

1. The Department must ensure that supervisors are normally assigned to students prior to their registration. If the supervisor is not a full time member of the Department, a co-supervisor will be appointed from the Department. The Department is to submit the name of the supervisor to the Graduate Studies Committee and the name will be officially recorded in the student's file.
2. Granting of credits to a student's programme of studies for classes taken prior to commencement of the programme requires the recommendation of the Department and approval of the DalTech Graduate Studies Council. A request for this transfer of credits must be made to the Department before the student's first registration.
3. The supervisor is to appoint a Supervisory committee, within four months of the first registration, to be responsible for the Candidate's programme and thesis preparation. The membership of the Supervisory Committee is to be conveyed for approval to the DalTech Graduate Studies Office and recorded in the student's file. The Supervisory Committee will normally consist of the thesis supervisor, at least one other member from the department and at least one other member from outside the department with special interests in the proposed area of study. The supervisor will be the chair of the Supervisory Committee. The Supervisory Committee is encouraged to submit progress reports once every six months to the Department's Graduate Co-ordinator.
4. The Supervisory Committee is required to submit a title for the student's thesis report, on the prescribed form, to the DalTech Graduate Studies Office at least four months prior to the formal submission of the thesis. On approval by Graduate Studies, the title will be recorded in the student's file.
5. The Supervisory Committee shall be responsible for conducting the comprehensive examinations. The purpose of these examinations are to ensure that the student has a thorough understanding of the fundamentals in the student's area of study and that the student has attained knowledge to an adequate level in the discipline. The comprehensive examination consists of at least two written examination papers and may include an oral examination conducted to meet the above objective. The written papers are to be set and assessed by examiners recommended by the Supervisory committee. The comprehensive examination shall normally be completed within the fourth session of study from first registration. A student shall be given at least three months notice of the examination. The topics and results of the examination will be conveyed to the DalTech Graduate Studies Office on the prescribed form and will indicate "pass", "fail", or "re-examination". Recommendation of the examining committee to re-examine shall only be permitted if the failure was marginal. Students receiving a recommendation of "fail" shall be required to withdraw from the programme by the Registrar's office. Re-examination of marginal students must be carried out within six months of the initial examination. Students requiring re-examination shall not necessarily be required to rewrite both written examinations. Students given the opportunity to rewrite shall only be permitted to rewrite once.
6. An Examining Committee is appointed in accordance with Faculty of Graduate Studies procedures prior to the formal submission of the thesis report. The Examining Committee will normally consist of the Supervisory Committee and an external examiner. At least two members of the Examining Committee must be from the candidate's Department. The Department will submit the names of the Examining Committee members to the Graduate Studies Committee for approval. The composition of the committee is to be recorded in the student's file. The names of three external examiners will be recommended to the Faculty of Graduate Studies in accordance with Faculty of Graduate Studies procedures. The External Examiner will be approached and appointed by the Faculty according to Faculty procedures.
7. Copies of the thesis must be submitted to the Graduate Studies Office at least one month prior to the date of the oral defence. One copy will be sent to the External Examiner, the second will be retained by the Graduate Studies Office. The copies must be accompanied by the appropriate form. The Graduate Studies

Office will co-ordinate the scheduling of the presentation and examination according to Faculty procedures. It is the student's responsibility to ensure that all members of the examining committee have been given clean copies of the thesis at least two weeks before the defence.

The oral presentation and examination will not be scheduled until the following requirements for the student's programme of studies have been met:

- (i) Class work completed;
 - (ii) Thesis title approved;
 - (iii) Examining Committee established;
 - (iv) Comprehensive examination passed;
 - (v) A written report has been received by the Graduate Studies Office from an external examiner with a recommendation that the thesis proceed to defence.
8. The thesis is to be prepared to conform with the standards of the DalTech Manual for the Preparation of Graduate Theses, available at the Office of Graduate Studies.
9. The Associate Principal (Graduate Studies and Research) shall be the Chair of the Examination or shall appoint someone from the Faculty's Panel of PhD Chairs. The Oral Defence and examination shall be carried out according to Faculty of Graduate Studies procedures.
10. The student shall be advised by the Graduate Studies Office of the approval of programmes, the results of comprehensive examinations, and the approval of the thesis title.

Award of Degree

A candidate will not be awarded the PhD degree unless they have satisfied all the foregoing requirements.

IX. Class Descriptions

Not all subjects will be offered in any one year.

IDES Series: Interdisciplinary Classes

IDES 6003.03: Materials Science.

Advanced topics on the physical and thermal properties of representative materials (metals, ceramics, composites and plastics) are discussed in relation to thermodynamics and kinetics of phase transformations. The electrical properties of metals, semiconductors and insulators are reviewed in terms of the modification of these properties by chemical substitution. The relation of mechanical properties of the materials to the proper selection process for materials for a specific application is discussed. Case studies are used to illustrate integration of the above topics.
EXCLUSION: ID6003

IDIS 6004.03: Solid State Engineering.

An interdisciplinary class covering: selected topics in crystallography, including space groups and space lattices, bonding forces and the mechanism of crystal growth; imperfections in solids-vacancies, interstitial, dislocations and the properties of defects; the preparation of materials-metals, semiconductors, ceramics, ferrites, polymers, vapour deposition technique, growth of single crystals from solution, metal and vapour, the mechanical, electrical and magnetic properties of materials; the design of electronic devices, e.g., microwave devices such as ferrite isolators and parametric amplifiers and semiconductor devices, which utilize the special properties of materials prepared by the student. The experimental work will involve the synthesis of ferrites, semiconductors, etc., their examination by X-ray powder photographs and measurements of their properties such as Hall effect, etc.
EXCLUSION: ID6004

IDIS 6010.03: Industrial Waste Management.

Industrial processes that generate solid, liquid and gaseous wastes will be reviewed and methods of control will be discussed. Waste management systems that include recycling, recovery and reuse will be considered. Examples will be drawn from Nova Scotia industry and students will be required to undertake case studies of selected industries.
EXCLUSION: ID6010

IDIS 6011.03: Water Resources Management and Planning.

This class will cover planning and management considerations that are important in water-related engineering decisions. Topics to be considered are: constitutional and legal frameworks for water management in Canada and Nova Scotia; conceptual approaches to water management; water use and management issues; nature and purpose of water management; water management frameworks and functions; and institutional arrangements for water management.
EXCLUSION: ID6011

IDIS 6013.03: Environmental Health Engineering.

Radiological health, air pollution control, solid waste treatment, vector control, milk and food sanitation, industrial hygiene.
EXCLUSION: ID6013

IDIS 6030.03: Energy Resources and Utilization.

This class surveys world energy resources and examines the technical feasibility for utilization. The class will attempt to evaluate elements for the Canadian energy policy.
EXCLUSION: ID6030

IDIS 6031.03 Energy and the Environment.

This class examines the physical nature of energy resources and the impact of their development on environmental quality. Technological options to alleviate impact will be examined.
EXCLUSION: ID6031

IDIS 6032.03: Limnology.

A review of the basic principles of the chemical, physical and biological nature of surface waters will be followed by an examination of advanced topics related to water management.
EXCLUSION: ID6032

IDIS 6034.03: Solar Energy Utilization.

This class covers in details the following topics: Solar radiation measurement and methods of estimating the availability of solar energy for flat-plate solar collectors; flat-plate solar collectors design and methods of testing the performance of solar collectors; analysis of sensible and latent heat for thermal energy storage; procedures for solar heating systems design including computer simulations; and design of monitoring systems for the evaluation of the performance of the solar heating systems and their components.
EXCLUSION: ID6034

IDIS 6110.03: Open Channel Hydraulics.

This advanced class will begin with a review of basic concepts of fluid flow. The class will deal with the energy principle and the momentum principle in respect to open channel flow; flow resistance in uniform and nonuniform flow computations; channel controls; channel transitions; and sediment transport.
EXCLUSION: ID6110

Biological Engineering

Location: "N" building
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E-mail: Bio.Engineering@dal.ca

Department Head

Ben-Abdallah, N., B.Sc., M.A.Sc., Ph.D. P.Eng. P.Ag. Thermal energy storage, desiccant dehumidification, HVAC/ indoor air quality, solar energy

Professors

Burney, J.R., B.Sc. Eng., M.Sc. Eng., Ph.D., P.Eng. Watershed modelling, hydrology, soil and water conservation, environmental engineering.
Ghaly, A.E., B.Sc. Eng., M.Sc. Eng., Ph.D. P.Eng. Energy, waste management, environmental engineering, post harvest technology, biotechnology, bioremediation.
Watts, K.C., B.S.A., M.Sc., Ph.D., P.Eng. Biodiesel fuel, aquacultural engineering, agricultural machinery design, blood flow modeling.

Associate Professors

Correia, L.R., B.Tech.(Hons.), M.S., Ph.D., P.Eng. Heat and mass transfer in foods, food engineering, biosensors.
Wilkie, K.I., B.Eng. M.Eng., Ph.D., P.Eng. Bio-robotics, instrumentation.

Adjunct Professors

The following local researchers are also eligible to supervise graduate students in the Biological Engineering Department.

Edwards, L.M., B.Sc., M.Sc., Ph.D., P.Ag. Agriculture Canada Research Station, Charlottetown. Soil erosion under conditions of freezing and thawing.
Hellenbrand, K., Ph.D. Plant fungus relationships (micorrhizae), microbial air pollution, biofilms in terrestrial and ocean environments
Stratton, G., B.Sc., M.Sc., Ph.D. Biology, Nova Scotia Agricultural College. Bioremediation, environmental microbiology, waste management.

Adjunct Associate Professors

Adsett, J.F., B.Sc., M.Sc. Eng., Ph.D. Nova Scotia Agricultural College. Continuous nitrate monitoring, aquifer heat storage.
Madani, S.D., B.Sc., M.Sc., Ph.D. Agricultural Engineering, Nova Scotia Agricultural College.
Water quality, watertable management, subsurface drainage systems, irrigation scheduling.
Mann, H., Ph.D. Biology, St Mary's University. Biomineralization, biodegradation, biotransformation, biofouling

I. Introduction

Biological Engineering occupies a unique position in the engineering professions in applying the physical principles of engineering to the biological world, including agriculture. As such, Biological Engineering is an especially challenging and varied profession in which engineering solutions are required for the efficient production of food and fibre under a wide range of environmental conditions and production practices.

The traditional fields of biological engineering are those of power and machinery (tractors, field implements); structures (livestock housing, green houses, crop storage and processing facilities) and soil and water (irrigation, drainage, soil erosion control). In recent

times, Biological Engineers have become involved in many other areas in which the principles of engineering are applied to bio-systems, such as: aquacultural engineering, environmental engineering, food engineering (processing and packaging), biological waste management and pollution control, and energy sources (solar and biomass).

II. Classes Offered

BIOE 6000.03: Agricultural Watershed Hydrology.

Following an overview of the nature of hydrological data and models, emphasis is placed on deterministic mathematical modelling of component processes and the synthesis of complete hydrographs. Components examined include precipitation, infiltration, evapotranspiration, surface and subsurface flow. The structure and application of selected current models are presented. **PREREQUISITE:** A first class in engineering hydrology and microcomputer experience
EXCLUSION: AE6000

BIOE 6010.03: Soil Erosion.

The USLE is presented in terms of evaluation of its component parameters from natural and simulated rainfall data. Modifications to the USLE and the use of its erosivity and erodibility parameters in quasi-process models (ANSWERS and CREAMS) is followed by theoretical considerations of detachment, transport and deposition processes in interrill and rill erosion. Techniques for parameter evaluations and use in the WEPP process model are presented. **PREREQUISITE:** At least one credit in engineering hydrology and microcomputer experience.
EXCLUSION: AE6010

BIOE 6200.03: Handling and Disposal of Agricultural Wastes.

Current methods of handling and disposal of agricultural and food processing wastes are discussed. Physical, chemical and biological properties of various types of waste materials as related to practical design problems are studied. Technological advances in manure holding tanks, lagoon design, pumping and agitation equipment, solid-liquid separation systems and land disposal equipment are introduced.
EXCLUSION: AE6200

BIOE 6210.03: Advanced Biochemical Engineering.

This class deals with advances in microbial fermentation and enzymatic reactions in biological reactors. Topics covered include: microbial and enzyme kinetics, system parameters, reactor design and scale-up, media and air sterilization, measurements and control, and recovery of fermentation products. **PREREQUISITES:** Principles of Biochemical Engineering (BIOE 3400.03) or equivalent
EXCLUSION: AE6210

BIOE 6220.03: Advanced Farmstead Planning.

The objective of this class is to provide information on farmstead planning as a quantitative and qualitative process. The analytical approach to ideas and quantitative procedures will be applied to planning of farmsteads. The legal tools used to regulate the use of land for livestock and crop production and the social and cultural structures as they reflect themselves in farmstead planning theory will be examined. The process of establishing and implementing master plans will be discussed. Environmental problems and dilemmas associated with agricultural production systems will be addressed. **PREREQUISITE:** BIOE 4211.03 or equivalent
EXCLUSION: AE6220

BIOE 6230.03: Biological Treatment of Agricultural Wastes.

The physical, chemical and biological properties of agricultural and food processing wastes as related to the design of biological treatment processes are discussed. Fundamental principles of microbiology and factors affecting the growth and survival of microorganism are studied. Treatment systems such as aerobic and

anaerobic lagoons, oxidation ponds, oxidizing ditches and composting are introduced. Biological processes for the production of biogas, alcohol and single cell protein are presented.

PREREQUISITES: BIOE 5220.03 or equivalent

EXCLUSION: AE6230

BIOE 6240.03: Biomass Energy.

The source and amount of energy consumed in various agricultural operations will be studied. Renewable energy sources will be identified and their technical feasibility will be investigated. Technological advances in biochemical and thermochemical conversion systems will be included and the impact of these conversion systems on the environment will be studied.

EXCLUSION: AE6240

BIOE 6300.03: Instrumentation for Agricultural Engineering Research.

The objective of this class is to integrate basic instrumentation and control components with a microcomputer. Primary elements which sense parameters of interest to Agricultural Engineers (e.g. humidity, temperature, pressure, flow, displacement, velocity and acceleration) are discussed with emphasis on the interfacing to a microcomputer. Topics covered in lectures and weekly laboratories include signal conditioning, digital to analog conversion, analog to digital conversion, voltage to frequency conversion, on-off control, and PID control. Students study the fundamentals through the breadboarding of a basic data acquisition and control system and by applying it to practical problems.

EXCLUSION: AE6300

BIOE 6350.03: Advanced Instrumentation.

This class covers topics in microprocessor based measurement, computation, communications and control. Subject matter is covered in relation to the use of embedded microcontrollers. Development systems for both hardware and software emulation are utilized in weekly laboratory exercises and a term project. Topics covered include: assembly language programming, C programming using a "small C" environment, high speed data acquisition and data storage, computer to computer communications and interfacing of various sensor types and control hardware.

EXCLUSION: AE6350

BIOE 6410.03: Advanced Food Engineering I.

The theoretical and practical aspects of food rheology and separation processes will be studied. These include: rheological characteristics of fluid and powdered foods, psychorheology, food extrusion, drying, freeze concentration, evaporation, membrane separation, and extraction. Emphasis will be placed on recent research in these areas. The principles of process design will be incorporated in the design of various food processing plants.

Prerequisites: Approval of instructor.

EXCLUSION: AE6410

BIOE 6420.03: Advanced Food Engineering II.

This class will deal with the concept of reaction kinetics in foods, thermal processing, and production/processing of food products. The concept of reaction kinetics will be applied to problems of storage stability and thermal processing calculations. Detailed coverage will be given to topics such as aseptic packaging, microwave sterilization, food irradiation, fouling of heat transfer equipment by fluid foods. Emphasis will be given on recent research in these areas.

EXCLUSION: AE6420

BIOE 6510.03: Analytical Modelling in Farm Machinery.

This class investigates existing models that relate to some aspects of the operation or use of machinery on the farm. These models describe: material flow into, through, and out of farm machinery; forces on implements as they interact with the soil, etc.; heat and mass flow in grain dryers; optimum planning models, etc.

EXCLUSION: AE6510

BIOE 6610.03: Solar Energy Utilization.

The class covers the following topics: solar radiation measurement and methods of estimating the availability of solar energy for flat-plate solar collectors; flat-plate solar collectors design and methods of testing their performance; energy storage; procedures for solar heating systems design including computer simulations; and design of monitoring systems for the evaluation of the performance of solar heating systems and their components.

EXCLUSION: AE6610

BIOE 6700.03: Directed Studies I.

A project will be assigned in the student's field of research interest, but not directly involving his research work. This will include both directed studies and analysis, the emphasis depending on the specific needs of the student's overall programme. The work involved will be between 90 and 120 hours and is to be presented in a report in an organized publication format. Only one directed studies class can be used for credit for each degree.

EXCLUSION: AE6700

BIOE 6710.03: Graduate Seminar I.

All graduate students pursuing a MASC. or an MENG. in Agricultural Engineering will be required to participate in this class for at least two terms and to make a minimum of two oral presentations based on their research projects. Guest lecturers and faculty will, from time to time, present special seminars of interest to the Agricultural Engineering profession.

EXCLUSION: AE6710

BIOE 7610.03: Graduate Seminar II.

All graduate students pursuing a doctorate degree in Agricultural Engineering will be required to participate in this class for at least two terms and to make a minimum of two oral presentations based on their research projects. Guest lecturers and faculty will, from time to time, present special seminars of interest to the Agricultural Engineering profession.

EXCLUSION: AE7610

BIOE 7700.03: Directed Studies II.

This class will be made available to graduate students enrolled in Agricultural Engineering wishing to gain knowledge in a specific area for which no graduate level class is offered. The students will be involved in tutorials, laboratory studies and individual studies for at least 90 hours. The studies will be presented in a report which uses conventional publication format. Only one directed studies class can be used for credit for each degree.

EXCLUSION: AE7700

BIOE 9000.00: MASC Thesis.

BIOE 9530.00: PhD Thesis.

Chemical Engineering

Location: "F" Building
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Department Head

Gupta, Y.P., BSc (BHU), MEng (TUNS), PhD (Calgary), PEng.
Graduate Coordinator. Process Control and Optimization.

Professor Emeritus

Chen, B.H., BSc (Nat. Taiwan), M.Eng, PhD (McG), P.Eng.

Professors

Al Taweel, A.M., BSc (Alexandria), MSc, PhD (Colorado), PEng.
Pollution Prevention, Mixing and Separation.
Amyotte, P.R., BEng (RMC), MSc (Eng) (QU), PhD (TUNS), PEng.
Safety & Loss Prevention, Dust Explosions, Venting.
Fels, M., BEng, MEng (McG), PhD (Wat), PEng. Air & Water
Pollution Control, Solar Energy.
Pegg, M.J., BSc (Hons), PhD (Leeds), C.Eng. Combustion, Safety and
Loss Prevention.
Rhodes, E., Multi-phase flow, Heat Transfer.

Assistant Professor

Kuzak, S., BEng, MEng (McG), PhD (TUNS). Composites, Polymer
Toughening.

Adjunct Professors

Greenblatt, J.H., BSc, MSc (Dal), PhD (McG). Air pollution,
prevention and monitoring combustion phenomena.

I. Introduction

The Chemical Engineering program prepares students for careers in the chemical and process industries and in a variety of related fields. These encompass, among others, the traditional areas of environmental control, plastics and polymers, pulp and paper, instrumentation and process control, petrochemicals, petroleum and natural gas processing, and energy conversion and utilization, as well as the growing fields of biotechnology, food processing, composite materials, corrosion and protective coatings, and manufacture of microelectronic components.

The responsibilities assumed by Chemical Engineers include a wide range of activities such as research and development of novel products and processes, the design, development and operation of process plants, and management of technical operations and sales.

Research opportunities leading to the Master's and Doctorate degrees are offered in a wide range of topics within the Department as well as in conjunction with other departments and a number of research centres on the campus. Detailed information regarding the graduate program can be obtained from the Department.

II. Classes Offered

CHEE 6000.03: Special Topics In Chemical Engineering I.

This class is available to graduate students (pursuing a MASC Degree) wishing to gain knowledge in a specific area for which no graduate level classes are offered. The proposed class would involve a directed study for which the student(s) would be given credit. Students wishing to take the class would be assigned a suitable class advisor most familiar with the specific area of interest.

Students would be required to present the work of one term (not less than 90 hours in the form of directed research, tutorials and individual study), in an organized publication format.
EXCLUSION: ChE6000

CHEE 6701.03: Loss prevention and Risk Assessment.

Loss prevention and risk assessment techniques applicable to the process industries are covered in this class. The concepts of management control of loss and inherently safer plant design are introduced. Key elements of a successful fire and explosion loss control programme are identified. Risk assessment is addressed by examining the steps required to proceed from the setting of risk assessment objectives to risk monitoring. The hazard identification step is emphasized.

PREQUISITES: Graduate or final-year undergraduate students in Faculty of Engineering
EXCLUSION: ChE6701

CHEE 6707.03: Applied Thermodynamics.

An analytical study of Chemical Engineering processes from the standpoint of quantitative chemical thermodynamics will be made. The approach to the main problem of reactions and phase equilibria and the treatment of non-ideal solutions is based on Gibb's methods and the chemical potential. Most of the student's time spent on this class will be used solving both theoretical and numerical problems.
EXCLUSION: ChE6707

CHEE 6714.03: Polymer Science.

This class examines the fundamental concepts of polymer science: mechanism and kinetics of polymerization reactions, rheological and mechanical properties of polymers, correlation of physical properties with molecular structure, molecular weight distribution, solution properties of polymers, polymer chain configuration, thermodynamics of polymer solutions, amorphous and crystalline state and viscoelasticity.
EXCLUSION: ChE6714

CHEE 6726.03: Mass Transfer Topics I.

Topics are to be selected from the following fields: diffusion in both reacting and non-reacting systems, the equation of change, mass transfer with laminar or turbulent flow, unsteady-state diffusion, and mass transfer in packed beds.
EXCLUSION: ChE6726

CHEE 6727.03: Mass Transfer Topics II.

Topics are to be selected from the following field: vapour-liquid equilibria, prediction of equilibria for binary and multi-component systems, including use of Wilson's Equation, hydraulics and efficiency of vapour-liquid contacting devices, design of complex distillation columns.
EXCLUSION: ChE6727

CHEE 6730.03: Kinetics and Catalyses.

A general study of the current ideas of homogeneous and heterogeneous catalyses of chemical reactions will be made. In the field of homogeneous catalyses reactions: acid base catalyses, ion catalyses, enzyme catalyses, chain reactions and polymerization will be considered. In the field of heterogeneous catalysis, a study of the rates and extent of chemisorption will be made leading to an examination of the rate determining steps for gaseous reactions. Studies of some important industrial reactions will be made.
EXCLUSION: ChE6730

CHEE 6732.03: Transport Phenomena.

Mechanisms of transport processes, differential balances, equations of change for isothermal and non-isothermal systems, use of the equations of change to set up flow problems of interest to Chemical Engineers, interphase transport in isothermal systems, analogies.
EXCLUSION: ChE6732

CHEE 6733.03: Transport Phenomena II.

A continuation of Class CHEE6732. Shell energy and mass balances, equations of change for multicomponent systems, use of the equation of change to set up heat and mass transfer problems. Interphase transport in non-isothermal and multicomponent systems. Dimensional analysis of the equations of change.
EXCLUSION: CHE6733

CHEE 6734.03: Chemical Reactor Design.

The effect of non-ideal flow on the design of tubular, packed bed and continuous-stirred tank reactors, combined mass and energy transfer in chemical reactor analysis and design. Design of heterogeneous catalytic and non-catalytic reactors will be investigated using industrial case studies.
EXCLUSION: CHE6734

CHEE 6735.03: Coal Processing and Utilization.

Topics to be discussed in this class are origin, formation and distribution of coal. Composition, classification and the most important physical and chemical properties of coal. Behaviour at elevated temperature and action of solvents. Technical and economical analysis of coal beneficiation processes with a special emphasis on the use of computer simulation programmes (USBM). Combustion, carbonization, gasification and liquefaction of coal. Environmental aspects of coal utilization.
EXCLUSION: CHE6735

CHEE 6736.03: Computer Application In Chemical Engineering.

Mathematical modeling of steady and unsteady chemical process operations and the use of digital computers for the design and simulation of individual processing units. Synthesis of units into a combined processing plant. (It is recommended that students take ENGM 6653.03 Numerical Analysis 1 prior to this class.)
EXCLUSION: CHE6736

CHEE 6737.03: Chemical Process Control.

Dynamics modeling of chemical processes. Analysis and simulation of analog and digital control systems.
EXCLUSION: CHE6737

CHEE 6739.00: Graduate Research Seminar I.

Graduate students are required to participate in this class for at least two terms and make presentations based on their research projects. Guest lecturers will present special seminars on topics of current interest to the Chemical Engineering Profession.
EXCLUSION: CHE6739

CHEE 6742.03: Chemical Process Optimization.

The class deals with the study and application of optimization techniques to chemical engineering problems. Topics include: problem formulation, analytical and numerical techniques for optimization, linear programming, non-linear programming and dynamic programming. Application areas include: heat transfer and energy conservation, separation processes, fluid flow systems, chemical reactors, and process plants.
FORMAT: Lecture 2 hours, lab 3 hours
EXCLUSION: CHE6742

CHEE 6743.03: Process Synthesis.

This class aims at developing abilities in the design and modification of process plants (e.g. chemical, biochemical, utilities, pulp and paper, petroleum, petrochemical, metals, and food processing) in order to render them more cost effective, energy-efficient and environmentally friendly. Systematic procedures are used for the analysis of processing stages and their integration into efficient plants. Heavy emphasis is placed on the use of computer-aided techniques for evaluating the interaction between processing requirements, utility needs and associated capital and operating costs.
FORMAT: Lecture 2 hours, lab 3 hours
EXCLUSION: CHE6743

CHEE 6744.03: Radiative Heat Transfer.

The principles of thermal radiation are explained and the concepts of view factors and exchange areas are introduced by examining direct radiative transfer. Radiative exchange within enclosures, containing either non-absorbing or absorbing media are examined. Various radiative heat transfer applications are discussed in detail. These include: electric furnaces, fuel-fired furnaces and solar radiation. The methods of measurements of radiation and temperature are studied.
FORMAT: Lecture 2 hours, lab 2 hour
PREREQUISITES: Background in heat transfer and mathematics
EXCLUSION: CHE6744

CHEE 6750.03: Combustion Phenomena.

Mathematical formulations of combustion phenomena and their physical significance will be emphasized. Application of the conservation equations for multicomponent reacting flows by means of the Schwab-Zeldovich formulation will be demonstrated. The general Rankine-Hugoniot relations will be developed to calculate properties across a shock front. Laminar and diffusion flames will be studied. Chemical reactions in boundary layers will be examined and turbulent combustion phenomena will be analyzed.
FORMAT: Lecture 1 hour, lab 3 hours
EXCLUSION: CHE6750

CHEE 7000.03: Special Topics In Chemical Engineering II.

This class is available to Graduate Students (pursuing a Ph.D. Degree) wishing to gain knowledge in a specific area for which no graduate level class is offered. Students will be assigned a class supervisor most familiar with the specific area of interest. Students will be required to present the work of one term, consisting of at least 90 hours in the form of directed research, tutorials and individual study, in an organized publication format.
EXCLUSION: CHE7000

CHEE 7739.00: Graduate Research Seminar II.

Graduate Students are required to participate in either this class or CHEE 6739.03 every term and make presentations based on their research projects. Additional lectures will be given by faculty and by outside speakers.
EXCLUSION: CHE7739

CHEE 9000.00: Masters Thesis.**CHEE 9530.00: PhD Thesis.**

Civil Engineering

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Department Head

Vaziri, H.H., B.Sc., D.I.C./M.Sc., Ph.D., P.Eng. MASCE, MCGS, MSPB, MICE. Numerical modelling of geotechnical and reservoir engineering problems, soil and rock testing.

Professors Emeritus

Jaeger, L.G., B.A., M.A., (Cantab), PhD (Lond.), DSc (Lond.), D.Eng (Carleton, Memorial, TUNS), P.Eng. F.R.S.E., F.E.I.C., F.C.S.C.E.
Meyeroff, G.G., BSc, MSc, PhD, DSc (Lond), Dr.Eng.h.c. (Aachen), DSc h.c. (Ghent), DEng (TUNS), DSc h.c. (McM and Queens), LLD h.c. (C'ria), FEIC, FRSC, PEng

Professors

Baikle, L.D., B.Eng., M.Eng., Ph.D. - M.C.G.S., F.C.S.C.E., P.Eng. Buried flexible structures, foundations, geotechnical engineering.
Mufti, A.A., B.Eng., M.Eng., Ph.D. - F.C.S.C.E., F.E.I.C., P.Eng. Fibre reinforced plastic, fibre reinforced concrete, innovative structures, intelligent sensing steel free deck, structures systems.
Sattah, M. G., B.Eng., B.E. Civ.Eng., M.Eng., Ph.D., P.Eng. Water resources engineering, numerical modeling of flows, system optimization, open channel flow.

Associate Professors

Ali, N.A., B.Sc., M.Sc., PhD, P.Eng. Flexible pavement, highways, pavement design and performance, transportation.
Hansen, D., B.Sc.E., M.Sc.E., PhD, P.Eng. Hydrology - hydrogeology - deterministic, hydraulics - rivers - municipal systems.
Taheri, F., B.Eng., M.A.Sc., PhD, M.ASCE, M.ASME, M.AAM, P.Eng. Graduate Coordinator. Advanced composite materials, finite element methods (elastic, plastic), Fracture mechanics.
Trotter, J.F., B.Eng., PhD, P.Eng. High performance concrete, durability of civil engineering structures, nondestructive testing (ground penetrating radar).

Assistant Professors

Gaguon, G.A.
Thorburn, J.

Adjunct Professor

Bakht, B.
Erki, M.
Gilke, R.C., BSc (Dal), BEng, MEng (TUNS), PhD (London), FRSA, FCSCE, PEng
Waller, D.H., BEng, DIC, PhD, PEng

Adjunct Associate Professors

Hart, B., BA, PhD (Biology)
Pegg, N., PhD

Adjunct Assistant Professors

Cross, H., MSc
Oguejofor, E.C., MSc, PhD (U. of Sask.)

I. Introduction

Civil Engineering is concerned with the engineering (planning, design and construction) of systems of constructed facilities related to the needs of society. The scope and complexity as well as the interdisciplinary involvements of Civil Engineering continues to increase rapidly with the development of modern science and technology and the population growth with its spiraling demands upon the air-land-water environment. The preparation of the Civil Engineering student is aimed toward meeting these challenges through innovative application of known principles, creative research to discover new approaches, and imaginative design to fulfill society's needs.

Civil Engineering graduates are found in responsible engineering and administrative positions in industry and government. Some become consultants in planning, design or construction of engineering projects or in specialized fields where the application of research to the solution of practical problems is important. The professional practice of a Civil Engineer includes the conception, design, construction, operation, and maintenance of private and public projects. Included in this are bridges, buildings, highways, airports, railroads, harbors, docks, subways, tunnels, water supply and purification systems, sewage collection and treatment facilities and water power developments.

II. Classes Offered

CIVL 6000.03: Directed Studies in Civil Engineering I.

This class offers the Graduate Student an opportunity to undertake a study in a specific area of interest that is not covered in the regular class offerings. The student chooses to work under the supervision of a Faculty Member in the Civil Engineering Department. This class is normally available to a Graduate Student enrolled in a Master's Degree Programme.

EXCLUSION: CE6000

CIVL 6101.03: Advanced Strength of Materials.

The class introduces tensor mathematics. The governing equations of an elastic solid are developed in various coordinate systems. Engineering problems such as plane problem, St. Venant, bending, torsion, and extension of bars are treated. Displacement, stress field and Airy function and some numerical methods for obtaining solutions are other methods that are covered. The class explores various failure criteria and their application. Theory of anisotropic elastic continuum concludes the class.

PREREQUISITES: Undergraduate level Strength of Materials or equivalent

EXCLUSION: CE6101

CIVL 6104.03: Advanced Hydraulics.

An advanced study of hydraulics in relation to engineering problems. Flow principles; surface and form resistance; turbulence, boundary layer concepts. Model similitude; tidal power plants; gas-lift pumps.

EXCLUSION: CE6104

CIVL 6105.03: Open Channel Hydraulics.

Basic concepts of fluid flow; the energy principle in open channel flow; the momentum principle in open channel flow; flow resistance; flow resistance in nonuniform flow computations; channel controls; channel transitions; and sediment transport.

EXCLUSION: CE6105

CIVL 6106.03: Coastal Hydraulics.

Review of water waves. Translatory; tsunamis; tidal waves; gravity waves; wave diffraction and refraction and focusing; littoral currents and drift; cusps; winter and summer beaches; rip tides; sand by-passes; beach feeding; sand pumping; groynes; jetties and breakwaters.

EXCLUSION: CE6106

CIVL 6115.03: Design of Water Treatment Plants.

Evaluation of water quality characteristics and synthesis of unit operations into plants designed to modify those characteristics. Design aspects of flocculation, coagulation, precipitation, sedimentation, filtration and disinfection are included.
PREREQUISITE: CIVL 1473.03 or equivalent
EXCLUSION: CB6115

CIVL 6116.03: Biological Waste Treatment.

A study of fundamental principles of microbiology as applicable to domestic waste treatment. Activated sludge processes, trickling filters, aerated lagoon, stabilization ponds, disinfection and anaerobic treatment.
PREREQUISITE: CIVL 1473.03 or equivalent
EXCLUSION: CB6116

CIVL 6117.03: Water Quality Management.

Water quality requirements for various uses; factors affecting water quality; behaviors and fate of pollutants in treatment plants and receiving waters and considerations involved in selection from alternative methods of water quality control.
EXCLUSION: CB6117

CIVL 6119.03: Highway Materials.

A study is made of the properties of subgrades and of how they influence the performance of pavements. The purpose and properties of base and sub-base will be considered. Bituminous materials and aggregates are tested and combined to give desirable mixes.
EXCLUSION: CB6119

CIVL 6120.03: Advanced Traffic Engineering.

Principles of planning and advanced traffic engineering with special reference to criteria for optimum cycle length; geometric design of highways and interchange design principles; benefit-cost considerations. This class will involve a term problem on interchange design and preparation of working drawings.
EXCLUSION: CB6120

CIVL 6126.03: Foundation Engineering I.

The class includes a review of methods and procedures for subsoil investigations for foundations of structures, and a review of the strength and deformation characteristics of soils. The bearing capacity and settlement of shallow foundation is discussed with both the working stress method and the method of partial factors of safety being considered. Other design considerations for shallow foundations are discussed.
EXCLUSION: CB6126

CIVL 6127.03: Foundation Engineering II.

The class deals with the design and construction of deep foundations. Design considerations such as, bearing capacity and settlement, are considered. The use of total and partial factors of safety are discussed. Field load tests and their interpretation are included as well as a review of inspection procedures for deep foundations.
EXCLUSION: CB6127

CIVL 6134.03: Advanced Highway Geometric Design.

This class deals with the principles of Geometric design controls and criteria with special reference to capacity controlled designs. Grade separated intersections and fully developed interchanges will be discussed in relation to traffic volumes. Computer-based design of freeway and ramp junctions will be considered in detail.
EXCLUSION: CB6134

CIVL 6135.03: Groundwater Chemical Quality.

This class provides an in-depth study into the chemical quality of groundwater. As water passes through the various stages of the hydrologic cycle, its composition changes. This class will explore these changes with particular reference to: (1) the types of inorganic and organic constituents dissolved in water and their significance; (2) the suitability of water quality data and its presentation; (3) the various processes that control the behaviour of dissolved substances in groundwater; (4) the evolution of groundwater quality; (5) the

more commonly used groundwater quality models; (6) basic chemical properties, transport mechanisms, retardation and restoration of organic contaminants in water; and (7) point of use water treatment.

PREREQUISITE: CIVL 1473.03 or University First Year Chemistry Class.

COREQUISITE: CB1027.03 - WHAT IS NEW NUMBER FOR THIS?
EXCLUSION: CB6135

CIVL 6137.03: Advanced Soil Mechanics.

This class deals with the stress-strain behaviour and its mathematical representation. The aspects considered include nonlinear elastic and elasto-plastic behaviour of soils with particular reference to the critical state theory. Application of several well-established soil models for solving practical problems are discussed.
EXCLUSION: CB6137

CIVL 6139.03: Transport Operations.

This class is an introduction to the operation of transportation services at the urban and regional levels. Surveys and data collection, development of computerized data bases, and elements of travel forecasting; trip generation, trip distribution, modal split, trip assignment are covered. Operational characteristics of public transportation, airports and freight distribution systems, and performance evaluation are discussed. Environmental, energy and safety implications of transportation systems, and existing policies are reviewed.
EXCLUSION: CB6139

CIVL 6141.03: Modeling of Groundwater Systems.

Basic concepts in analytical and numerical modeling of groundwater systems are introduced. Fundamental equations for flow in aquifers and mathematical statement of the groundwater forecasting problems are studied. The hydraulic approach to flow in aquifers and the continuum approach to flow through porous media are discussed. Modeling techniques for groundwater quality problems dealing with pollutant movement due to hydrodynamic dispersion are also studied.
PREREQUISITE: CIVL 0725.03 or CIVL 6132.03
EXCLUSION: CB6141

CIVL 6142.03: Pavement Design and Management.

This class covers all aspects of flexible, (asphalt concrete) and rigid (portland cement concrete) pavements design methods. It includes structural pavement design of new pavements and overlay, including mechanistic. (i.e., shell, Asphalt Institute, PCA), empirical, (i.e., AASHTO, Ontario) and performance prediction - oriented, (i.e., VESYS, DAMA, LTPP - observation) methods. It also includes the recent research efforts in monitoring pavement performance.
EXCLUSION: CB6142

CIVL 6143.03: Modelling of Groundwater Systems II.

This class builds on the fundamental concepts introduced in Modelling of Groundwater I. Emphasis will be placed on numerical techniques for studying contraminant transport in groundwater.

Numerical aspects of modelling, parameter identification and optimization will be discussed along with modelling of chemistry coupled to transport, dispersion theory and transport in fractured media.

PREREQUISITES: CIVL 6141.03
EXCLUSION: CB6143

CIVL 6144.03: Geotechnical Aspects of Waste Management.

This class deals with the assessment and remediation of hazardous waste sites. The topics covered include an introduction to remediation of hazardous waste sites, purpose and execution of field investigations, regulations governing solid waste disposal, analysis of hydrogeological conditions and groundwater models, site selection and characterization, feasibility study for selecting remedial alternatives, site-closure, related activities, insitu treatment of contaminated groundwater and soils, design of covers and landfills, and case studies.
EXCLUSION: CB6144

CIVL 6145.03: Probability Concepts in Civil Engineering Planning & Design.

This class introduces concepts related to the role of probability in civil engineering, uncertainty in real-world information, design and decision making under uncertainty.

Examples will be derived from planning and design of airport pavements, hydrologic design, of structures and machines, geotechnical design, construction planning and management, photogrammetric and geodetic surveying measurements.

The class will discuss analytical models of random phenomena, functions of random variables, estimating parameters from observation data, empirical determination of distribution models, regression and correlation analyses, elements of quality assurance and acceptance sampling.

EXCLUSION: CE6145

CIVL 6147.03: Advanced Theory of Structures.

This class provides graduate students and practicing engineers with a knowledge necessary to make safe and efficient use of computer programmes designed to analyze frame type structures. The displacement method is studied in detail with applications to trusses, continuous beams, complex rigid frames, grillages and space frames. The theoretical knowledge gained is put into practice through commercially available codes. Throughout the class, practical 'real-life' problems constitute the assignments and projects.

EXCLUSION: CE6147

CIVL 6148.03: Application of Finite Element Method I (Linear Systems)

This class introduces the theory and implementation of the analysis procedures used in the linear, static, and dynamic finite element analysis systems. First, the continuum mechanics formulation is presented. For finite element discretization, one-, two-, and three-dimensional elements are described. Finally, a selected number of equation and eigenvalue solvers are compared.

PREREQUISITE: CIVL 3700.03 or equivalent

EXCLUSION: CE6148

CIVL 6149.03: Application of Finite Element Method II (Nonlinear Systems).

This class introduces the theory and implementation of the analysis procedures used in geometric and material nonlinear finite element analysis systems. Problems in plasticity, impact, contact and viscoelasticity are treated. Numerical solutions pertinent to nonlinear systems are explored. Various topics and algorithms such as the reduce integration, hour-glass and Arc Length Automatic Stepping method are also reviewed. The students examine the above concepts by exploring a set of industrial applications.

PREREQUISITES: CIVL 6148.03 Application of Finite Element Method I (Linear Systems)

EXCLUSION: CE6149

CIVL 6150.03: Dynamics of Structures.

This class covers fundamental analysis methods for the behavior of structures and structural elements subjected to dynamic loading. Comprehensive study of single-degree-of-freedom systems followed by solution of multi-degree-of-freedom systems with particular reference to response of multi-story structures to earthquake loading is covered. An introduction to random response and stochastic analysis of structural dynamics problems are also given.

EXCLUSION: CE6150

CIVL 6151.03: Bridge Engineering.

This class provides an introduction to bridge engineering, specifically discussing the aspects of loading, analysis and design relevant to short and medium span bridges. Reference is made to current Canadian bridge design codes. Analytical methods appropriate for bridge superstructures is presented, including computer methods. The structural design of steel, reinforced concrete and prestressed concrete bridge systems are discussed.

EXCLUSION: CE6151

CIVL 6152.03: Behaviour and Design of Steel Structures.

Advanced concepts of the behaviour and design of steel members and frameworks are presented, emphasizing the rationale for current steel code design criteria. Topics include torsion, plate stability, connection design, fatigue and frame behaviour.

PREREQUISITES: CIVL 1457.03 or equivalent

EXCLUSION: CE6152

CIVL 6153.03: Fibre Reinforced Plastics (FRP).

This class begins with a review of test methods, properties and production methods of the fibre and polymer components of fibre-reinforced laminates and of fabricated composite laminates. This is followed by the development of the macro-mechanical and micro-mechanical analysis techniques for the design of composite laminates and a study of the strength criteria used in design procedures.

EXCLUSION: CE6153

CIVL 6155.03: Advanced Concrete Technology.

This class provides an in-depth study of the various factors affecting the behavior and performance of concrete. Strength of concrete, permeability and durability, deformation and cracking, curing, admixtures, temperature effects and specialized testing procedures are among the topics presented. High performance concrete, polymer concrete and roller compacted concrete are also studied.

EXCLUSION: CE6155

CIVL 6156.03: Fibre Reinforced Cement Composites.

The purpose of this class is to introduce the student to various portland cement-based fibre composites and to provide information on their constituent materials, fabrication, mechanical performance and applications. Interaction between fibres and matrix, behaviour under tensile, flexure, fatigue and impact loading, properties of freshly mixed and hardened fibre reinforced concrete are studied.

Special fibre reinforced cementitious systems like SIFCON and different application procedures like shotcreting are also covered.

EXCLUSION: CE6156

CIVL 6157.03: Advanced Reinforced Concrete Structures.

A study of principles of reinforced and prestressed concrete design and the application of prestressed concrete to buildings, bridges and prefabricated structures. Yield line theory of concrete slabs, design of structures for earthquake loads, structural failure and methods of repair are covered.

PREREQUISITES: CIVL 1050.03, CIVL 1451.03

EXCLUSION: CE6157

CIVL 6159.03: River Engineering.

This class begins with various aspects of fluid geomorphology from a civil engineering point-of-view. It then moves on to discussion of hydraulic resistance based on quantitative estimates of channel roughness, regime concepts for artificial and natural rivers, uses of boundary shear stress and unit stream power in bed-load estimations, the hydraulics and statistics of suspended sediment, numerical versus physical modelling, and a review of case histories of responses of rivers to human activity.

PREREQUISITES: CIVL 0825.03, CIVL 1070.03, CIVL 1426.03

(preferable)

EXCLUSION: CE6159

CIVL 6160.03: Energy Methods and Stability in Elastic Structures.

Energy methods are an important tool in elastic structural analysis and design. Many traditional methods, as well as more advanced finite element analyses for determining displacements and stresses, are based on energy principles. This class will introduce energy methods and look at several applications in structural engineering, including determination of the elastic stability limits of structures and the development of displacement matrix methods of analysis.

EXCLUSION: CE6160

CIVL 6161.03: Marine Geotechnics.

This class presents the basic principles of soil mechanics for the marine setting. The class provides a basic overview of marine geology and oceanography as applied to problems in ocean engineering, presents special marine geotechnical measurements and techniques, reviews geotechnical properties and soil mechanics techniques required for marine investigations, and introduces the student to marine geophysical methods.

PREREQUISITES: CIVL 1035.03 or CIVL 1041.03

EXCLUSION: CE6161

CIVL 6162.03: Groundwater and Wells.

This class deals with those aspects of groundwater resource assessment, development and protection pertaining to the design of water wells intended to function as reliable sources of potable water in the long-term. It includes detailed consideration of drilling methods, well design, aquifer testing, field-data interpretation, strategies for well-head protection, and the essentials of site assessment.

PREREQUISITES: CIVL 1027.03

EXCLUSION: CE6121

CIVL 6860.03: Introduction to Geographic Information Systems (GIS).

This class is an introduction to the fundamentals of the Geographic Information Systems (GIS) and its general applications. The topics covered include: 1) the concept and components of a GIS, its general application, hardware and software, etc.; 2) Geographic Data (vector, raster and attribute data): structure, inputs, acquisitions, and conversion, and operations; 3) Digital Elevation Models (DEM) and its applications. The class emphasizes the engineering applications.

CIVL 6861.03: Advanced Geographic Information Systems (GIS).

This class deals with the advanced techniques of GIS in civil engineering application, covering the following topics for civil and environmental engineering planning and construction: 1) Selections of optimal site, routine, and area with multi-criteria; 2) Determinations of the closest facility from any location, the shortest path between different points, the service areas around any location; 3) Techniques for Terrain Analysis, Spatial Analysis, and Spatial Modeling.

CIVL 7000.03: Directed Studies in Civil Engineering II.

This class is designed for a Doctoral Candidate pursuing graduate studies leading to a Ph.D. degree in Civil Engineering. It offers the graduate student an opportunity to complete an advanced study in a specific topic of interest that is not included in the regular classes offered. The student works under the supervision of a faculty member in the Civil Engineering Department.

EXCLUSION: CE7000

CIVL 7101.03: Advanced Theoretical Soil Mechanics.

Advanced analysis of strength and deformation of soils in two and three dimensions. Applications to problems of earth pressure, the stability of slopes and earth dams, the stability and movement of foundations, interaction between structures and foundations, bearing capacity and deformation of pavement, mechanics of soil-vehicle systems.

PREREQUISITES: CIVL 6102.03, CIVL 6126.03 or CIVL 6127.03

EXCLUSION: CE7101

CIVL 9000.00: Masters Thesis.**CIVL 9530.00: PhD Thesis.**

Electrical and Computer Engineering

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Department Head

Nugent, S.T., BSc (Nfld), B.Eng (TUNS), MAsc (UofT), PhD (UNB).
DSP of physiological signals, image processing.

Professors

- Cada, M., MSc, PhD (Prague), P.Eng. Photonics, optical fibre communications, electro optical and all optical switching, multiple quantum well devices. Quantum-well lasers, nonlinear optical waveguide devices, optical interconnections, optical computing, optical image processing.
- El-Hawary, M.E., BEng (Alexandria), PhD (Alta), PEng. Power systems, environmental and underwater signal applications. Modelling and optimization of dynamic systems, environmental impacts and underwater activities. System and computer applications in power system planning and operations.
- El-Masry, E.I., BEng, MSc (Alexandria), PhD (Man), PEng. Analog microelectronics; analog integrated circuits (IC's) for high speed data transmission, low-voltage and low-power current-mode circuits for audio frequency, IF and RF signal processing, switched-capacitor circuits.
- Gregson, P.H., BEng, MEng, PhD (TUNS), PEng. Developing theory, algorithms and architectures for automated medical image processing and industry.
- Robertson, W., BSc (Hons), MSc (Aberdeen), PhD (TUNS), P.Eng. Real time DSP, digital signal processing of speech signals, and algorithms.

Associate Professor

Chen, Z., BEng (Fuzhou), MSc (Southeast), PhD (Ottawa), PEng. Electromagnetic modelling and simulation, RF/microwave electronics, radio-wave scattering and propagation, antennas, wireless communications and technology.

Assistant Professors

- Ilow, J., BEng (Wroclaw, Poland), MAsc, PhD (Tor). Statistical communication theory and wireless networks.
- Little, T.A., BSc. Eng. (UNB), M.Eng (Memorial), PhD (UNB). Alternate energy generation, electric machines, energy storage systems.

Adjunct Professors

Marble, A.E., B.Eng., M.Eng, PhD (TUNS), P.Eng.
Stergiopoulous, S., BSc (Athens), MSc, PhD (York).

Adjunct Associate Professors

Periyalwar, S., B.Eng. (Bangalore), M.A.Sc, PhD (TUNS), P.Eng.

I. Introduction

Of all the various disciplines, perhaps no other branch of engineering can claim to have such an impact on modern society as Electrical Engineering. The ease, speed and precision by which electrical energy and electrical signals can be transmitted, transformed and controlled has influenced not only the everyday life of people, but has also changed the course of many other disciplines. Over the short span of only a few decades, Electrical Engineering has grown from a study of abstract phenomena to a

multi-branch discipline with significant applications in the areas of power systems, communication systems, control systems, computers and electronics. This rapid growth, coupled with major advances in technology and material science, has made the field a very dynamic one, and poses a challenge to the student, to the educator and to the practicing Electrical Engineer.

II. Classes Offered

ECED 6010.03: Linear System Theory.

The main thrust of the class is to introduce an algebraic unification of finite-dimensional linear systems with emphasis on continuous and discrete dynamic systems, using an operator theoretic approach. Topics covered include transition matrices, functions of matrices, adjoint systems, weighing patterns, realizability; canonical forms; stability, minimal realization; minimum norm, and approximation problems.

EXCLUSION: EE6010

ECED 6020.03: Non-Linear System Analysis.

A presentation of well developed techniques for analyzing non-linear systems, including phase-portrait method and the sinusoidal describing function and correlation concept. Liapunov's stability criterion is derived and applied to control system examples. Introduction to the analysis of statistical systems with Gaussian input describing functions. Application of digital simulation procedures are emphasized.

EXCLUSION: EE6020

ECED 6070.03: Analogue and Sampled-Data Filters.

This class is designed to teach the theory and design procedure of the conventional as well as the state-of-the-art of analog and sampled-data filters. It will cover design techniques of the multiple-loop feedback switched-capacitor filters.

EXCLUSION: EE6070

ECED 6110.03: Computer Methods In Power System Analysis.

Advanced topics in load flow analysis; Decoupled Load Flow, inclusion of High-Voltage direct current links in load flow. Parameter estimation for power systems. Static state estimation. Load modeling.

EXCLUSION: EE6110

ECED 6130.03: Advanced Topics In Power Systems.

Basic concepts. Review of optimization techniques. Linear and non-linear programming. Pontryagin's maximum principle. Fletcher-Powell method, etc. Systems security monitoring. State estimation. Optimal power flow. Real and reactive power optimization. On-line optimization. Load dispatching. Generator scheduling, maintenance scheduling in hydro, thermal and hydrothermal systems. Some case studies.

EXCLUSION: EE6130

ECED 6140.03: Advanced Topics In Electrical Machinery.

Some of the following topics will be covered: dynamics of synchronous machines; hunting; asynchronous running; short circuit calculations with symmetric and asymmetric faults. Unbalanced operation of induction motors. Linear induction motors. Winding unbalance. Physical problems in electrical machines.

EXCLUSION: EE6140

ECED 6150.03: Power System Operation and Control.

The hierarchy of controls in interconnected systems; station, area and tie-line controls. Economics and security related factors. Implementation of overall automatic control. Protective systems; relay schemes.

EXCLUSION: EE6150

ECED 6210.03: Electronic Instrumentation.

This class concentrates on providing a firm grounding in the requirements for analog processing and interface subsystems as well as design fundamentals and performance limits for the major building blocks. Major topics covered include: Operational Amplifier circuits and limitations, active filters, data acquisition systems, sampling processes and codes, transducers and signal conditioning.

EXCLUSION: EE6210

ECED 6220.03: Introduction to VLSI Systems.

This class uses the Mead Conway approach to introduce students to integrated circuit design. Topics covered include: devices and fabrication, IC technologies, layout of simple circuit elements, computer design aids, testing and testability, digital design considerations. Through the University's membership in the Canadian Microelectronics Corporation, students are given the opportunity to submit designs for fabrication.

EXCLUSION: EE6220

ECED 6221.03: Analog MOS Design.

The class deals with providing a detailed description of the MOS (Metal-oxide-semiconductor) transistor in conjunction with analog MOS circuitry. Major topics that will be covered are: introduction to semiconductor physics, pn junctions, MOS capacitors, DC and AC characteristics of MOSFET, analysis of analog MOS elements (current mirrors, amplifiers, and biasing circuitry), noise and RF using MOS transistors will also be addressed.

PREQUISITES: IC Design or by permission of instructor.

EXCLUSION: EE6221

ECED 6230.03: Advanced Topics in Electronic Systems Design.

This class is intended to give an overview of modern trends in the design of Microelectronic systems. Particular emphasis is placed on Computer aided Design tools for analysis, simulation, layout and interface to manufacturing. Other major areas include: semi-custom IC design (gates arrays, standard cells), data communication and automated testing.

EXCLUSION: EE6230

ECED 6260.03: Computer Vision.

The class will discuss early vision processing including image formation, early processing, edge detection, range determination, determination of surface orientation, optical flow, resolution pyramids for grey-level consolidation, correlation and context dependent edge detection. Scene segmentation, edgel aggregation, the Hough transform edge following, and contour following, region growing and split-and-merge algorithms will be discussed. Motion determination will be covered, including optical flow, motion-based surface orientation and edge detection, and zero-motion motion-based segment.

EXCLUSION: EE6260

ECED 6265.03: Advanced Computer Vision and Image Processing.

The class will cover modern techniques in computer vision and image processing, including but not limited to statistical pattern recognition, determination of pose from multiple views, velocity-based scene segmentation, determination of depth from monocular and both space and time diversity stereo, uni-modal and multi-modal image registration, feature detection using feature-space clustering, and segmentation and recognition by invariants. Students will be required to prepare papers for presentation in a weekly seminar. This class will meet once weekly for 3 hours. Enrollment is restricted to 7 students.

EXCLUSION: EE6265

ECED 6320.03: Microwave Radio Systems.

This class deals with both analog and digital microwave radio systems. Major topics include: Devices and circuits for microwave generation, amplification, frequency conversion, modulation and detection techniques, phase-locked loops, microwave propagation

characteristics, design considerations of terrestrial and satellite communication systems, and interference problems in microwave radio systems.

EXCLUSION: EE6320

ECED 6324.03: RF/Microwave System Design for Telecommunications.

The class provides essential design techniques for radio/microwave links in telecommunication systems. Major topics include: review of general radio propagation in free space, over obstacles and in the Earth's atmosphere; the design principles of broadband radio/microwave communication links; design and sizing of satellite earth stations; development of hardware configurations for line-of-sight radio links.

PREQUISITES: Permission of the instructor.

EXCLUSION: EE6324

ECED 6330.03: Computational Electromagnetics.

This class introduces the theory and applications of numerical techniques employed to solve various electromagnetic structure problems in both time and frequency-domains. Major topics include: review of electromagnetic theory, variational approach, finite-difference time-domain (FDTD) method, transmission line matrix (TLM) method, finite element method (FEM), method of moment (MoM), method of line (MoL) and boundary element method (BEM). Projects include applications of different computational techniques to solve electromagnetic problems.

EXCLUSION: EE6330

ECED 6340.03: Antenna Theory and Design.

This class deals with the theory and design of antennas. Major topics include: Radiation from wire-type and operative-type antennas, antenna arrays, scanning antennae, signal processing antennae, ground effects on antennas characteristics, design considerations and measurements, and special topics in antenna systems.

EXCLUSION: EE6340

ECED 6360.03: Fiber and Integrated Optics I.

This class introduces the principles of fiber-optic components and systems. Major topics include: Preview of fiber-optic communications, optic waveguides and fibers, light sources, modulation and detection techniques, transmitter and receiver, repeater technology, integrated optics and sensors.

EXCLUSION: EE6360

ECED 6520.03: Signal Detection Theory.

Classical detection theory (statistical decision theory), multiple hypotheses, composite hypotheses, sequential analysis. Classical estimation theory. Representation of random processes. Detection of signals (white noise, coloured noise, signals with unknown parameters). Estimation of signal parameters. Linear filtering theory, estimation of continuous waveforms, Wiener and Kalman filtering.

EXCLUSION: EE6520

ECED 6530.03: Random Processes.

Probability theory: mathematical model, conditional probabilities, random variables, pdf, transformation of random variables, conditional densities, statistical averages. Random processes concept; ensemble, stationarity, ergodicity, correlation and covariance, power spectral density, calculation and measurement of AVF and PSD, Gaussian random processes, noise. Transmission of random processes through linear systems: time-invariant systems, multiple terminals, gaussian processes, non-stationary processes.

ECED6540 Introduction to Adaptive Signal Processing

An introduction to adaptive signal processing is provided. The class begins with a brief review of linear signals and systems and Wiener filter theory. Next, linear prediction and lattice filter structures are presented. Adaptive transversal filters are introduced and the least-mean-square algorithm is discussed in detail. Recursive least-squares based adaptive filters and their implementation are covered in the remainder of the class. Assignments and projects are computer oriented.

EXCLUSION: EE6530

ECED 6550.03: Digital Signal Processing.

The class provides an introductory treatment of the theory and principles of digital signal processing, with suitable supporting work in linear system concepts and digital filter design. More specifically, the class deals with the following topics: General concepts of digital signal processing, continuous-time system analysis, Fourier analysis and sampled-data signals, discrete-time system analysis, realization and frequency response of, discrete-time systems, infinite impulse response digital filter design, discrete and fast Fourier transforms, and general properties of the discrete Fourier transform.

EXCLUSION: EE6550

ECED 6570.03: Digital Communications.

The class is intended to introduce the student to the concepts and theory of digital communications. The concepts of information, channel capacity, error probability, intersymbol interference, pulse shaping and spectrum shaping and optimum filtering are discussed. Digital multiplexing and bit stuffing, encoding, scrambling, equalization and synchronization problems are studied.

Regenerative repeaters, M-ary signaling systems, basic modulation techniques - ASK, PSK and QPSK; and performance characteristics of digital transmission systems are considered.

EXCLUSION: EE6570

ECED 6581.03: Digital Transmission Theory.

The class covers the theory and techniques of modern carrier digital communications. The mathematical tools necessary to analyze and design transmission are reviewed. Classical results, as well as recent developments in modulation/demodulation and coding techniques for various channels and their performance evaluation are studied. Ideal AWGN, bandlimited, fading, and nonlinear channels are discussed.

EXCLUSION: EE6581

ECED 6585.03: Telecommunications Systems.

This class provides an overview of the current telecommunication systems and their future evolution. Topics will include: the history of the telephone network, the current infrastructure, switching techniques, high speed transport systems Asynchronous Transfer Mode, satellite communications, high bandwidth access technologies, mobile cellular systems, personal communication systems.

EXCLUSION: EE6585

ECED 6590.03: Mobile Communication Systems.

This class provides an overview of mobile communications systems. The class introduces channel characterization for propagation losses, fading, delay spread, and interference. Coding, modulation, and receiver design issues are examined. Cellular mobile system issues such as frequency planning channel access methods and handoff are discussed. Mobile communication system applications are reviewed.

EXCLUSION: EE6590

ECED 6595.03: Coding Techniques for Digital Communications.

Source and channel coding techniques to improve the performance of digital communication systems are examined. The source coding methods to be studied include prediction, block coding, redundancy reduction, and synthesis/analysis coding. Emphasis is placed on channel coding techniques. Waveform coding and error control concepts are covered. Parity check codes, block codes, cyclic codes, convolutional coding and decoding algorithms, concatenated codes and interleaving are studied. Coded modulation techniques are discussed. Applications of coding techniques are presented.

PREQUISITES: ECED 5530.03, ECED 5540.03 or equivalent

EXCLUSION: EE6595

ECED 6610.03: Sampled Data Control Systems.

Sampling a continuous signal; hardware; discrete time, signals and systems; numerical integration, difference equations; properties of linear discrete systems; Z-transforms, transfer functions; state space representations digital simulation.

EXCLUSION: EE610

ECED 6620.03: Optimal Control Systems.

This class introduces three facets of optimal control-dynamic programming, Pontryagin's Minimum Principle and numerical techniques for trajectory optimization. In all cases, the objective is to determine the optimal controller or algorithm with respect to a specified design index. Digital simulation techniques are widely utilized.

EXCLUSION: EE6620

ECED 6630.03: Introduction to Estimation, Identification and Stochastic Control.

Stochastic processes, Gauss-Markov sequence model, Gauss-Markov process model, optimal estimation for discrete systems, optimal prediction for discrete linear systems, optimal filtering in the presence of time-correlated disturbances and measurement errors, problem formulation and equivalent discrete-time problem.

EXCLUSION: EE6630

ECED 6660.03: Fuzzy Systems.

Fuzzy sets and their membership functions, support and alpha level sets are introduced. Basic set-theoretical operations of intersection and union and the concept of compensation are discussed in the context of the algebraic operations including t-norms and s-norms. Fuzzy measures and the extension principle are discussed as the basis for operations on fuzzy numbers. Fuzzy relations, graphs, extrema, integration, and differentiation are treated. Decision theory, linear regression, linear programming applications are discussed.

EXCLUSION: EE6660

ECED 6710.03: Biomedical Engineering.

A review of the basic physiology, anatomy and pathophysiology of the cardiovascular, respiratory and neurophysiological system with emphasis on areas of interest to Biomedical Engineering research. The project portion deals with topics chosen from current biomedical applications and includes a written report and formal presentation.

EXCLUSION: EE6710

ECED 6720.03: Medical Instrumentation.

A general survey of the quantities which are measured to describe the electrophysiological, biochemical, respiratory, and hemodynamic characteristics of the human patient. An in-depth study of the specifications of measurement equipment which can adequately transduce, condition, and record the dynamic events which are characteristic of both healthy and diseased physiological systems. A familiarity with state of the art diagnostic and therapeutic medical instrumentation as to its cost, accuracy, reliability, limitations, and safety.

EXCLUSION: EE6720

ECED 6810.03: Neural Networks.

The class deals with preliminaries of artificial neural systems including fundamental concepts and models. Single layer perception classifiers and multi-layer feed forward networks, single-layer feedback networks, and associative memories are covered.

EXCLUSION: EE6810

ECED 6910.03: Directed Studies in Electrical Engineering.

This class is available to graduate students enrolled in a Master's Degree programme in Electrical Engineering, who wish to gain knowledge in a specific area for which no graduate-level classes are offered. Students are assigned an advisor and are required to present a formal report, or take a formal examination, at the end of the class.

EXCLUSION: EE6910

ECED 7610.03: Semiconductor Integrated Optoelectronics.

In this class, physical fundamentals and principles of operation of semiconductor optoelectronic devices and integrated structures based on the Gallium Arsenide (GaAs) and the Indium Phosphide (InP) material systems are introduced.

Structures for optical radiation generation and detection, such as light-emitting diodes, laser, high-speed photodiodes, nonlinear and bistable devices, etc., are studied.

Integration of these components onto a common substrate for implementing optoelectronic functions like modulation, switching, multiplexing, etc., is described.

Applications in super fast optical signal processing devices and optical computers are addressed.

EXCLUSION: EE7610

ECED 7710.03: Biomedical Engineering II.

A seminar class involving the presentation by each student of two selected papers; one each from the classical and current literature. The topics discussed include cardiovascular dynamics, diagnostic and therapeutic radiology, musculo-skeletal dynamics, neurone physiology, cardiac pacemakers, and image processing.

The class aims to give an appreciation of the origins of present biomedical research, the class of advancement in selected topics, areas of limited progress, areas of impressive advancement, and promising areas of future research and development.

EXCLUSION: EE7710

ECED 7910.03: Directed Studies In Electrical Engineering II.

This class is available to graduate students enrolled in a Ph.D. programme in Electrical Engineering who wish to gain knowledge in a specific area for which no graduate-level classes are offered. Students are assigned an advisor and are required to present a formal report, or take a formal examination, at the end of the class.

EXCLUSION: EE7910

ECED 9000.00: Master's Thesis.

ECED 9530.00: PhD Thesis.

Engineering Mathematics

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Department Head

Phillips, W.J., B.Sc.(Eng.), M.Sc.(Qu.), Ph.D.(UBC). Digital Signal Processing algorithms and implementations

Professor

Rahman, M., B.Sc.(Hons.), M.Sc.(Gauh.), D.I.C.(Imp. Coll.), M.Phil.(London), Ph.D.(Windsor). Computational Fluid Dynamics, Hydrodynamics, Wave Loads on Offshore Structures, Wave-ice-current interactions: its implications on ice-loads.

Associate Professors

Fenton, G.A., B.Eng., M.Eng. (Carleton), M.A., Ph.D.(Princeton). Random Field Theory with Applications to Engineering Problems

Assistant Professors

Dupuis, D.J.P., B.Sc. (Moncton), M.Sc.(Queen's), Ph.D.(UNB). Piecewise Regression and Robust Statistics.

Kember, G., B.Sc., M.Sc., Ph.D.(UWO). Dynamical Systems and the Analysis of Geophysical and Medical TimeSeries Data.

Adjunct Professors

Chehil, O.S., M.S. (Panji), M. Tech (Kharagpur), PhD McGill
Sarwal, S.N., B.A., M.A.(Pun.)

I. Introduction

The Department provides the Applied Mathematics classes required to support the engineering programs offered by the other departments. It also provides a specialized graduate program in Engineering Mathematics with several specializations offered with the co-operation of Engineering Departments and Faculty of Computer Science.

The technical subjects offered by the Engineering Departments depends upon a sound knowledge of mathematical principles. Classes in Engineering Mathematics are therefore offered to students in each of the Engineering Departments. The class content is chosen to meet the needs of each department. For students of Civil, Mining and Agricultural Engineering the emphasis is on probability, statistics and differential equations. For students of Electrical and Mechanical Engineering the emphasis is on differential equations, integral transforms and random variables. For Chemical and Metallurgical Engineering students the class content includes topics in probability, statistics, differential equations and numerical methods.

Emphasis is placed on the application of mathematical techniques to the description and solution of engineering problems. The lectures are supplemented by tutorial sessions and, when appropriate, are illustrated by application of techniques that require use of the available computing facilities.

Elective classes in more specialized branches of Engineering Mathematics are available as electives to students in the senior year of the Engineering Programs. These classes relate to finite mathematics, complex function theory, functional analysis, elasticity, and numerical analysis.

II. Classes Offered

ENGM 6000.03: Directed Studies In Applied Mathematics.

This class is offered to graduate students enrolled in Applied Mathematics who wish to gain knowledge in a specific area for which no appropriate graduate level classes are offered. Each student taking this class will be assigned a suitable class advisor familiar with the specific area of interest. The student will be required to present the work of one term (not less than 90 hours in the form of directed research, and individual study) in an organized publication format.

EXCLUSION: AM6000

ENGM 6600.03: Finite Mathematics.

Introduction to the theory of sets, numbers, groups, rings, field, vector spaces, lattices, Boolean algebra and graphs with emphasis on finite structures. Algorithms for the solution of optimization problems. Applications in the fields of computer design, automata theory, and combinational analysis.

EXCLUSION: AM6600

ENGM 6610.03: Wavelets and Filter Banks.

This class explains wavelets and filter banks using both the language of filters and the language of linear algebra. The class concentrates on the underpinnings of this relatively young (1980's) subject which has now stabilized. Applications to the areas of image and video compression, speech, audio and ECG compression and denoising are presented.

EXCLUSION: AM6610

ENGM 6611.03: Functions of Complex Variables.

This class is concerned with the theory of functions of complex variables and its applications in various branches of science and engineering. Topics included are: analytic functions, Cauchy-Riemann conditions, elementary functions, simple mappings, complex integrations, Taylor's and Laurent's expansions; the calculus of residues and its applications in computing integrals; the use of Bromwich contour and Nyquist stability criterion; the application of conformal mappings i.e. Schwartz-Christoffel transformation to the solution of fluid-flow, heat transfer and electrical potential problems; and the integral form of Poisson's equation.

EXCLUSION: AM6611

ENGM 6612.03: Methods of Applied Mathematics I.

Laplace transformations and initial value problems, two point boundary value problems, Green's functions, eigenvalues and eigenfunctions, eigenfunction transforms. General integral transforms, finite Fourier transforms. Hankel transforms, Bessel's functions.

PREQUISITES: ENGM 3311.03, ENGM 3322.03

EXCLUSION: AM6612

ENGM 6613.03: Methods of Applied Mathematics.

Linear partial differential equations. Derivation of classical equations, classification and boundary condition, separation of variable technique, integral transform method of solving partial differential equations.

PREQUISITES: ENGM6612

EXCLUSION: AM6613

ENGM 6615.03 Perturbation Techniques.

Introduction. Parametric perturbation. The method of strained coordinates, Lighthill and Temple's techniques, matched and composite asymptotic expansions. Multiple scale methods, asymptotic solution of linear equations.

EXCLUSION: AM6615

ENGM 6616.03: Mathematical Programming I.

Linear programming problems, primal and dual simplex algorithms, duality theory. Integer programming, Gomory algorithms. Dynamics programming.

EXCLUSION: AM6616

ENGM 6617.03: Mathematical Programming II.

Transportation and transshipment algorithms with emphasis on modern compute codes. General network models. Optimization problems defined on graphs. Kuhn-Tucker theory. Non-linear programming methods.

EXCLUSION: AM6617

ENGM 6620.03: Functional Analysis.

Metric spaces and elementary topology, completeness, contraction mapping, fixed point theorem with applications to linear systems and differential and integral equations. Linear spaces (vector space) and linear operators. Normed linear spaces. Banach spaces. LP spaces with an introduction to Lebesgue integrals. Hilbert spaces orthonormal sets, Fourier expansion. Linear functionals on normed linear spaces, conjugate spaces, adjoint operator, theorem of Hahn-Banach.

EXCLUSION: AM6620

ENGM 6621.03: Vibrations and Waves.

Vibrations and transient response of linear lumped-parameter physical systems. Analogies between electric circuits, mechanical systems and acoustics. Systems with one degree of freedom. Systems with non-linear and variable spring characteristics. Method of successive approximations and Ritz method of non-linear vibrations.

Vibratory systems with several degrees of freedom. Approximate methods of calculating frequencies of natural vibrations. Solution of eigenvalue problems by matrix iteration. Vibration of elastic bodies. Wave equation. Applications of rods, plates and shells. Plane waves and spherical waves in unbounded homogeneous elastic media.

Elements of harmonic wave phenomenon; reflection, resonance, relaxation and reverberation. Wave propagation through fluid and solid layers.

EXCLUSION: AM6621

ENGM 6631.03: Mathematical Theory of Elasticity.

The mathematical theory of elasticity in two and three dimensions. General differential equations in cartesian, polar coordinates, compatibility equation and boundary conditions. Fourier series and general Fourier solution of elasticity problems. Plane elasticity problems using non-orthogonal functions. Energy principles and variational technique. Torsion of various-shaped bars.

EXCLUSION: AM6631

ENGM 6632.03: Theory of Plates and Shells.

Differential equation of plates. Boundary conditions. Rigorous solution of the governing differential equation for various kinds of edge supports and different kinds of loading. Solutions by single and double trigonometric series. Bending of plates on elastic foundations and continuous rectangular slabs. Approximate methods in the theory of plates. Membrane theory of thin shells. Bending theory of cylindrical and spherical shells.

EXCLUSION: AM6632

ENGM 6633.03: Dynamics of Elastic Systems.

General differential equations of elastic systems. Longitudinal, transverse, and torsional vibrations of rods. Free and forced vibrations of continuous beams. Transverse vibrations of plates. Transverse vibrations of shells. Propagation of elastic waves. Approximate methods.

EXCLUSION: AM6633

ENGM 6634.03: Theory of Elastic Stability.

Differential equations of beam-column under transverse and axial loads. Elastic buckling of bars and frames. Torsional and lateral buckling of beams. Buckling of rings and curved bars. Buckling of thin plates under various loads and having different edge supports. Buckling of thin cylindrical shells.

EXCLUSION: AM6634

ENGM 6656.03: Splines and Variational Methods.

In this class, the variational formulation of partial differential equations is introduced. Emphasis is placed on the application of spline functions to the solution of initial and boundary value problems.

The minimum energy property of spline and its relationship to the beam bending theory is studied.

Students will be required to write some computer programmes to become familiar with the computer implementation of these ideas.

EXCLUSION: AM6656

ENGM 6657.03: Numerical Linear Algebra.

The topics covered in this class include: matrix and vector norms, condition number, singular value decomposition, LU decomposition, QR decomposition, Cholesky decomposition, error analysis and complexity of matrix algorithms, Toeplitz matrix algorithms, orthogonalization and least squares methods, the symmetric and unsymmetric eigenvalue problems, and iterative methods. The student is expected to code most of the algorithms on the computer.

PREREQUISITES: Ability to programme in C or Fortran.

EXCLUSION: AM6657

ENGM 6658.03: Numerical Solution of Differential Equations.

This class begin with a study of solution techniques of ordinary differential equations. Then a review of the basic partial differential equations of engineering mathematics is undertaken. The finite difference method is used to discretize these equations and concepts of stability, consistency, and convergence in the solutions are introduced. The student is expected to write several computer programmes.

PREREQUISITES: Ability to programme in C or Fortran.

EXCLUSION: AM6658

ENGM 6659.03: Finite Element Solution of Linear Partial Differential Equations.

This class covers aspects of the solution of linear static and dynamic partial differential equations through the use of finite element models derived from the Galerkin approximation. Emphasis is placed on the derivation of the approximate matrix equations from the strong form of the boundary value problem and on issues concerning the accuracy of the solution, on integration techniques, completeness, and element tests. Students are expected to code and validate an element appropriate to their specific research interests.

Prerequisites: Familiarity with partial differential equations and numerical linear algebra.

EXCLUSION: AM6659

ENGM 6660.03: Finite Element Solution of Non-Linear Partial Differential Equations.

This class covers aspects of the solution of non-linear partial differential equations through the use of finite element models. Emphasis is placed on the modeling of engineering materials. The class addresses such topics as common plasticity relationships, numerical implementation of various yield models, finite deformations, consistent linearization schemes, and theorems dealing with existence, uniqueness and stability. Students are expected to implement a non-linear finite element algorithm on the computer.

PREREQUISITES: ENGM 6659.03 is recommended

EXCLUSION: AM6660

ENGM 6661.03: Theory of Waves In Potential Flow.

This class deals with the theory of water waves and its use in advanced engineering applications. Topics covered include: the fundamental equations of motions in fluids; the developments of Euler's equations of motion for inviscid fluids; Bernoulli's equation; various analytical techniques for solving partial differential equations arising in water wave theory; small amplitude theory and propagation of surface waves in deep, shallow and intermediate depth water; dispersion relation of wave propagation, phase-velocity, group-velocity; linear and non-linear concepts of diffraction; and one-dimensional tides in canals.

PREQUISITES: ENGM 3211.03, ENGM 3222.03
EXCLUSION: AM6661

ENGM 6662.03: Dynamics of Ocean Fluids.

This class is concerned with the dynamics of ocean fluids. Topics included are: dynamics of progressive and standing waves (long waves) in two-dimensional basins, tidal dynamics; Kelvin and Poincare waves; Stokes nonlinear wave theory; regular, irregular and random waves; wave statistics, wave energy and spectrum; wave forces on fixed/floating offshore structures; solution techniques such as the Morison equation, Froude-Krylov and diffraction/potential theory; numerical methods such as Green's function and BEM; long waves in shallow water; Cnoidal, solitary waves and inverse scattering.

PREQUISITES: ENGM 6661.03
EXCLUSION: AM6662.03

ENGM 6671.03: Applied Regression Analysis.

This class will emphasize practical rather than theoretical considerations and will make extensive use of computer packages. The topics to be covered include: simple linear regression, analysis of residuals and remedial measures, transformation of data, multiple, polynomial and weighted regression, model selection techniques, joint confidence regions, single factor analysis of variance, analysis of factor effects, multifactor analysis of variance, use of indicator variables, analysis of covariance and an introduction to non-linear regression.

EXCLUSION: AM6671

ENGM 6672.03: Experimental Design in Statistics.

This class deals with both practical and theoretical considerations, but emphasis will be put on practical situations. The following topics will be covered: Analysis of variance, analysis of covariance, optimality of designs, experimental designs and their analysis factorial experiments and non-parametric analysis of variance.

PREREQUISITE: A first class in Probability and Statistics.
CO-REQUISITES: Class ENGM 6671.03 is a complimentary class of ENGM 6672.03

ENGM 6673.03: Nonparametric Statistical Methods.

Alternative to the standard parametric methods are covered in this class. Topics to be discussed are: The general theory of rank based tests; tests based on ranks for two treatments; testing of randomness, symmetry and independence; and finally estimation based on ranks. Existing statistical packages will be used.

EXCLUSION: AM6673

ENGM 6674.03: Theory of Random Fields.

This class is an introduction to the theory of multidimensional random processes which serve as models of natural phenomena, for example engineering materials, loads, and other distributed disordered systems. Topics covered include classical probability concepts and methods in a random field context, level excursions and extremes, spectral moments and associated measures of disorder, and simulation techniques. Applications to Monte Carlo simulations models are introduced.

PREQUISITES: A working knowledge of basic probability theory and some statistics
EXCLUSION: AM6674

ENGM 9000.00: Master's Thesis.

ENGM 9530.00: PhD Thesis.

Food Science and Technology

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Department Head

Gill, T.A., BSc, MSc (Guelph), Ph.D (UBC). Food Proteins & Enzymes, Seafood Quality, Safety & Preservation.

Professor Emeritus

Arkman, R.G., BA (U of T), MSc (Dal), PhD (Lond). Head of the Marine Oils Group at CIFT. Edible fats and oils, particularly fish oils, omega-3 fatty acids & the uptake of hydrocarbon pollutants into fish tissue.

Professor

Paulson, A.T., BSc, MSc, Ph.D (UBC). Food chemistry, physico-chemical properties, polymers, emulsions and gels, dielectric methods, thermal processing, packaging & HACCP.

Associate Professor

Speers, R.A., BSc, MSc, PhD (UBC). Brewing Science, Food Fermentation, Rheology, Colloid Science

Adjunct Professors

Lall, S.P., MSc, PhD (Guelph). Nutrition, Aquaculture.

Merritt, J.H., BEng (TUNS), MSc (Birm), PEng, CEng. Process engineering, refrigeration.

Pink, D.A.H., BSc (Hons StFX), PhD (UBC). Physics.

Quilliam, M.A., BSc, PhD (U of Man). Analytical chemistry of seafood toxins.

Stewart, J.E., BSc, MSc (Agr) (UBC), PhD (Iowa State). Microbial oxidation of hydrocarbons, Infectious diseases of crustaceans. Physiology of production of marine algal toxins and the roles of associated bacteria.

Singhvirf, K.L., BSc (StFX), MSc, PhD (McGill). Chemistry.

Wisner, W.V., BSc (Alta), MSc, PhD (Guelph). Food Science.

I. Introduction

Food science programs in North America largely evolved from the dairy science programs that were common, particularly in agricultural colleges, during the early to mid portion of the 20th century. Food science emerged as a discipline including not only dairy science, but also meat science, cereal science, seafood science, the study of fruit and vegetable products, and the like. The classes offered during the final two years of a bachelor's program in food science usually include: food chemistry, food microbiology, food processing, food product development, food engineering, and quality control in the food industry. Food science students at the undergraduate level usually have training in basic sciences such as physics, mathematics, physical chemistry, organic chemistry, biochemistry, biology, microbiology, etc. Food science, then, is the application of principles derived from these basic sciences to food systems.

Food scientists and engineers may become involved in food research, quality assurance, process, or product development within the food industry. Alternatively, they may be employed by governmental agencies such as Agriculture Canada, the Health Protection Branch of Health Canada, Fisheries and Oceans or

provincial agencies which serve the public and industries related to food. These are only a few examples of the many opportunities available for food science graduates.

The graduate degree programs are associated with the Canadian Institute of Fisheries Technology, a specialized resource center for graduate education and research in food science and food process engineering with emphasis on seafoods. Graduate degrees are awarded in Food Science and Engineering at the Master and Doctoral levels. The Department offers graduate level class work and research opportunities related to food process technology, edible oils, engineering design, post-mortem biochemistry of muscle foods, proteins and enzymes, food rheology, and beverage science. A wide range of food processing equipment, a pilot plant, and well equipped laboratories offer unique opportunities for graduate training and research. Students with degrees in food science, engineering, chemistry/biochemistry, microbiology or biology are invited to apply. Details of the academic programs are given in the section "Graduate Programs in Engineering". Research programs and equipment are described under "Canadian Institute of Fisheries Technology".

II. Classes Offered

FOSC 6324.03: Fish/Food Processing I.

This class will consist of lectures, labs and pilot plant experiments emphasizing the chemistry of seafoods particularly in processing and handling. Postmortem biochemistry and spoilage as related to species differences will be dealt with in detail as well as low temperature preservation. Effects of processing on fat, protein and edibility will be examined. Other topics will include seafood toxins, heavy metals, chemistry of seafood colours, and enzymes as related to quality.

EXCLUSION: FST6324

FOSC 6325.03: Fish/Food Processing II.

Physical aspects of food preservation are studied with some emphasis on seafood products. Process operations include refrigeration, freezing, thermal pasteurization and sterilization, dehydration, radiation processes and packaging.

EXCLUSION: FST6325

FOSC 6328.03: Advanced Food Chemistry.

This class is designed to cover advanced topics in food chemistry with emphasis on their relationships to fundamental principles. The class will consist of lectures and laboratory projects, and will incorporate the following topics: water relations, carbohydrates, amino acids, peptides, proteins, lipids, additives, colloids, photosystems and post-harvest physiology.

EXCLUSION: FST6328

FOSC 6329.03: Chemistry of Fats, Oils and Lipids.

The differences in physical and chemical properties of natural fatty acids will be correlated with the physical nature of fats, oils and lipids, and the chemical combinations of fatty acids with glycerol, amino acids, fatty alcohols, sterols and other chemical materials. Methods of separation such as chromatography, solubility and crystallization will be explained in terms of the molecular properties. Important industrial processes and products will be included.

EXCLUSION: FST6329

FOSC 6330.03: Fish/Food Process Engineering.

Emphasis is placed on sound principles in the design and operation of equipment commonly used in factories for the manufacture of food products and by-products. The main elements are thermal principles, psychrometry, steam utilization, refrigeration, fans and ducts, and pumps and piping. Measures to reduce waste and pollution and especially the abatement of odour nuisance from the food processing factory are reviewed.

EXCLUSION: FST6330

FOSC 6331.03: Food Proteins and Enzymes.

This class is designed to provide a comprehensive overview of the significance and function of proteins as structural and biochemical entities within food systems. The first component of this class will

center on the identification and biochemical significance of protein systems in food, the physico-chemical and degradative interaction of proteins with other food components and their overall impact on nutritive properties. The second component will focus on the fundamental properties of enzymes in food systems. In addition, mechanisms and roles of enzymes in food processing operations, and the utilization of enzymes in the food industry, will be presented.

EXCLUSION: FST6331

FOSC 6332.03: Industrial Biotechnology.

This class deals with biotechnological and engineering principles employed in the fermentation industry. Unit operations of traditional fermentation and dairy industries will be examined from a Food Science and Chemical Engineering perspective. Other topics covered will include: enzyme and fermentation kinetics, reactor design, oxygen transfer, production of food ingredients such as xanthan and gellan gums, citric acid and enzymes.

PREREQUISITES: permission of the instructor.

EXCLUSION: FST6332

FOSC 6333.03: Industrial Rheology.

This class deals with rheological principles of fluid materials employed in the food, mineral and chemical process industries. Rheometric techniques including co-axial, cone and plate, capillary and in-line rheometers will be examined. The behaviour of flocculent and non-flocculent suspensions will be discussed in light of present rheological theories. The viscoelastic properties of selected colloidal, polymer and biological systems will also be examined.

EXCLUSION: FST6333

FOSC 6334.03: Food Microbiology.

This class is intended for students with an interest in aspects of the microbiological quality and safety of the food supply. Topics will include the occurrence and significance of food borne pathogens and spoilage organisms, the control of microorganisms in foods and the industrial use of microorganisms for the manufacture of foods, beverages and food ingredients. Material will be covered with both a theoretical and practical approach.

EXCLUSION: FST6334

FOSC 6350.03: Graduate Seminar I.

This seminar class is designed to provide students pursuing a MSc degree with the opportunity to search the literature for information on current topics related to food science, fisheries or food engineering and to offer their findings orally in one-hour presentations to faculty and students. Students will also submit a written version of the seminar. All MSc students are expected to take the seminar class every academic term for the duration of their programme.

EXCLUSION: FST6350

FOSC 6351.03: Directed Studies I.

This class is designed for students pursuing an MSc degree wishing to gain knowledge in a specific area in which no graduate level classes are offered. The class will involve a directed research or design project for which the student will be given credit. Students wishing to take the class will be assigned a suitable area of interest. Students are required to present the work of one term (not less than 90 hours in the form of directed research, tutorials and individual study), in a written report.

EXCLUSION: FST6351

FOSC 7350.03: Graduate Seminar II.

This seminar class is designed to provide students pursuing a Ph.D. degree with the opportunity to search the literature for information on current topics related to food science, fisheries or food engineering and to offer their findings orally in one-hour presentations to faculty and students. Students will also submit a written version of the seminar. All Ph.D. students are expected to take the seminar class every academic term for the duration of their programme.

EXCLUSION: FST7350

FOSC 7351.03: Directed Studies II.

This class is designed for students pursuing an Ph.D. degree wishing to gain knowledge in a specific area in which no graduate level classes are offered. The class will involve a directed research or design project for which the student will be given credit. Students wishing to take the class will be assigned a suitable area of interest. Students are required to present the work of one term (not less than 90 hours in the form of directed research, tutorials and individual study), in a written report.

EXCLUSION: FST7351

FOSC 9000.00: Master's Thesis.

FOSC 9530.00: PhD Thesis.

Industrial Engineering

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Department Head

Gunn, E.A., BS (Mt.A), MA (Dal.), PhD (Tor). Industrial engineering, Production planning, Forestry Optimization, simulation, modelling

Professors

- Barzilai, J., BSc, MSc, DSc, (Technion), Decision analysis, optimization.
Das, B., BScEng (Banaras), MSc, PhD (North Carolina State), FIRE, CEng, PEng, Industrial Ergonomics, Workstation Design, Human Strength Measurement
Sandblom, C.L., Fil.Kand., Fil.Mag. (Lund), PhD (Birm). Graduate Coordinator, Modelling & Optimization of Linear, nonlinear & Stochastic systems
Yang, T., BEng (Tsinghua), MAsc, PhD (Tor), PEng

Associate Professors

- Cyrus, J.P., BSc (ENG) (UWI), MAsc, PhD (TUNS), PEng. Vehicle routing & scheduling, Production Scheduling, Employee Scheduling, Scheduling Interfaces.
G.P. Wilson, BEng (TUNS), MSc (Birm), PEng

Assistant Professors

- Blake, J., BAsc, PhD (Tor), Operational Research, Health Applications.
He, Q., BSc (China University of Science and Technology), PhD (Chinese Academy of Sciences), PhD (Waterloo)
Pelot, R.P., BAsc (Ottawa), MAsc (Alberta), PhD (Waterloo), PEng

Adjunct Professors

- Chaudry, M.L., BS, MA (Panjab), PhD (Kurukshetra). Stochastic processes, queues, numerical probability.
Eiselt, H., (Faculty of Administration, University of New Brunswick, Fredericton, New Brunswick)
Li, H., Queuing Theory
MacKay, K., (Faculty of Business Administration, Memorial University, St. John's, Newfoundland)
Mackay, K., B.Math, MSc, PhD (Waterloo). Production Management, information systems.
Millar, H., BSc (UWI) MAsc, PhD (TUNS), PEng. Disaster Recovery Planning, Fisheries Operations, Manpower Scheduling, Vessel Routing, Production Operations.
Kosa-Hatko, W., (Northern Telecom, Ottawa, Ontario) MSc (Leningrad), PhD (TUNS)
Worrall, B.M., BSc, PhD (Hull), PEng

Lecturer

- MacDonald, C., BEng, PEng, Engineering Economics, Work Design, Ergonomics.

I. Classes Offered

IENTG 6900.03: Industrial Engineering Methodologies.

This class gives an overview of the industrial engineering methodologies with particular reference to classical industrial engineering and ergonomics. The subject areas covered include: work methods and measurement, engineering economics, plant

layout and material handling and industrial ergonomics. Due emphasis will be given to the application of the methodologies in an industrial environment.

PREREQUISITE: This class is not intended for graduates of an Industrial Engineering Undergraduate Programme.

EXCLUSION: IE6900

IENTG 6904.03: Industrial Work Systems Design.

This class deals with the improvement of work productivity and quality of industrial working life through optimum design of the job, workplace, work organization and work environment. Due emphasis will be given to integrate the essentials of classical industrial engineering, ergonomic, safety and socio-psychophysiological factors in developing such systems.

EXCLUSION: IE6904

IENTG 6906.03: Occupational Ergonomics.

Consideration is given to human's anatomical, physiological and psychological capabilities and limitations for systematic analysis, identification and evaluation of human-machine-environment systems to design consumer products, equipment, tools, and the workstation. Due emphasis will be given to the application of ergonomics principles and data at the human-machine interface in industrial and other occupational settings.

EXCLUSION: IE6906

IENTG 6908.03: Advanced Production I.

This class deals with planning the production system and covers the following areas: scale and size of production, plant location, plant layout, and materials handling.

EXCLUSION: IE6908

IENTG 6909.03: Advanced Production II.

This class deals with the operation and control of the production system and covers the following areas: quality control and inspection systems, scheduling and inventory control and location of warehouses.

EXCLUSION: IE6909

IENTG 6912.03: Introduction to Operations Research.

This class is a graduate level introduction to the fundamental ideas of operations research. The class focuses on mathematical modelling in deterministic and non-deterministic settings. The class covers topics in the theory and application of mathematical optimization, network analysis, decision theory, inventory theory, and stochastic processes including queuing processes. The class requires background in probability theory and linear algebra as well as some skills in computer programming.

EXCLUSION: IE6912, IE4303, IE4304, IENG 4303.03, IENG 4304.03

IENTG 6916.03: Stochastic Processes

This class is an introduction to the fundamentals of stochastic processes. Emphasis is placed on the analysis of the probability structure of stochastic models. Topics discussed include renewal processes, counting processes, Markov chains, Markov decision processes, birth and death processes. Stationary processes and their spectral analysis may also be discussed. Applications of stochastic processes in operations research, quality and reliability engineering are presented.

EXCLUSION: IE6916

IENTG 6917.03: Simulation of Industrial Systems.

Computer simulation of industrial systems, the design of discrete simulation models, and the generation of random variables are all covered by this class. Also included is the design of simulation languages such as GPSS, SIMSCRIPT, SIMULA and SLAM. Network models, using the SLAM language, and applications of simulation models in decision making situations arising in production, distribution and economic systems are studied.

EXCLUSION: IE6917

IENTG 6918.03: Decision Analysis.

This class is an introduction to the fundamentals of rational decision-making, starting with a review of payoff and regret tables, as well as different decision-making situations and criteria. Topics

discussed include the value of perfect and imperfect information, decision trees, utility theory, game theory, and Markovian decision models. Applications of decision analysis in Operational Research, production systems, quality engineering, insurance and financial planning are presented.
EXCLUSION: IE6918

IENG 6920.03: Advanced Topics in Linear and Integer Programming.

The following topics comprise this class: goal programming, decomposition methods, integer programmes, Gomory's algorithms, implicit enumeration, branch and bound, sequencing problem. Graphs and algorithms: Extensions of shortest path problems, their algebra. General flow problems including flows with gain and loss and multicommodity flow. Eulerian paths and Hamiltonian cycles. The Chinese Postman problem. Covering problems. Complexity of algorithms.
PREREQUISITES: IENG 4304.03 or equivalent.
EXCLUSION: IE6920

IENG 6921.03: Nonlinear Optimization.

Key issues in engineering design are the optimization of the design parameters and optimization of overall system performance. The objective of this class is to expose the student to modern techniques in finite dimensional optimization. Topics in unconstrained optimization will include steepest descent, conjugate gradient and quasi-Newton methods. In the field of constrained optimization, topics will include Kuhn-Tucker theory and algorithmic methods such as reduced gradients, gradient projection, penalty and barrier methods. The use of constructive dual methods may also be included. Throughout the class, students will be encouraged to apply the theory to engineering decision problems.
EXCLUSION: IE6921

IENG 6922.03: Sequencing and Scheduling.

The class is concerned with analysis of the following sequencing problems: single-machine, parallel identical and different machines, general jobshop and special cases of the jobshop and flow shop under various objective functions and assumptions. Models and algorithms for the basic sequencing problem are formulated.
EXCLUSION: IE6922

IENG 6923.03: Distribution Management.

The class will explore the mathematical models in distribution management, and the relationship between theoretical advances and useful applications. The following topics will be covered: location problems, vehicle routing and scheduling with multiple constraints, Dynamic routing & scheduling, Implementation strategies. Students will be required to undertake a project in solving a distribution management problem.
PREREQUISITE: IENG 4304.03 or equivalent
EXCLUSION: IE6923

IENG 6924.03: Capital Investment and Capacity Expansion Planning.

This class involves the use of appropriate decision models to examine problems of capital investment and capacity expansion planning. Single projects under various deterministic criteria, multiple projects with budgetary and non-budgeting constraints, and project selection under uncertainty are all considered. Various aspects of capacity expansion with growing markets and with economics of scale will be examined. Attention will be paid to the role of system operating cost models in making the capacity expansion decision.
EXCLUSION: IE6924

IENG 6925.03: Queuing Theory and Its Applications.

This class deals with basic issues in queuing theory. The emphasis is on classical and modern queuing techniques as well as their applications. Besides elementary queuing systems, it also covers special queuing models which are widely applied in areas such as telecommunication networks, flexible manufacturing systems, computer performance evaluation and stochastic service systems. These models include priority queues, retrial queues, assembly line queues, and queuing networks.

PREREQUISITES: IENG 6916.03 or equivalent
EXCLUSION: IE6925

IENG 6948.03: Modelling and Design of Flexible Manufacturing Systems.

This class provides an overview of the problems of Flexible Manufacturing Systems (FMS). The basic architecture of FMS, which includes machining and gauging stations, robots, transport systems and computers, is introduced. Scheduling, loading, part selection, planning and monitoring problems are considered. Mathematical models of these problems are formulated and solution algorithms are presented. Various aspects of the design of the FMS information system is also considered.
EXCLUSION: IE6946

IENG 6990.03: Directed Studies in Industrial Engineering I.

This class is offered to students enrolled in a Masters programme in Industrial Engineering who wish to gain knowledge in a specific area for which no appropriate graduate level classes are offered. Each student taking this class will be assigned a suitable class advisor. The student will be required to present the work of one term (not less than 90 hours in the form of directed research, and individual study) in an organized publication format and may, at the discretion of the advisor, be required to take a formal examination.
EXCLUSION: IE6990

IENG 7990.03: Directed Studies in Industrial Engineering II.

This class is offered to students enrolled in a Ph.D. programme in Industrial Engineering who wish to gain knowledge in a specific area for which no appropriate graduate level classes are offered. Each student taking this class will be assigned a suitable class advisor. The student will be required to present the work of one term (not less than 90 hours in the form of directed research, and individual study) in an organized publication format and may, at the discretion of the advisor, be required to take a formal examination.
EXCLUSION: IE7990

IENG 9000.00: Master's Thesis/Project.

IENG 9530.00: PhD Thesis.

Internetworking

Location: DalTech Internetworking Laboratory
Telecomm Applications Research Alliance
5562 Sackville Street
HALIFAX, NS

Mailing Address: Internetworking Programme
Dalhousie University
Office A109B
1360 Barrington Street
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E-mail: internet.eng@dal.ca
Website: <http://www.dal.ca/internetworking>

Programme Director

Robertson, W., BSc (Hons), MSc (Aberdeen), PhD (TUNS), PEng

Instructors

Bodorik, P., BSc (Calgary), MEng, PhD (Carleton)
Cyrus, J.P., BSc (Eng) (UWI), MAsC, PhD (TUNS), PEng
Dupuis, D.J.P., BSc (Moncton), MSc (Queen's), PhD (UNB)
Fenton, G.A., BEng, MEng (Carleton), MA, PhD (Princeton)
Hitchcock, P., MA (Oxford), PhD (Warwick)
Hughes, F.L.K., BSc (CompSci) (Carleton), MSc, PhD (Newcastle upon Tyne)
Illow, J., Bsc (Poland), MASc, PhD (Toronto)
Phillips, W.J., BSc (Eng), MSc (Queen's), PhD (UBC)
Sivakumar, S.C., BSc (Bangalore), MASc, PhD (TUNS)
Srinivas, BEng (Bangalore), PhD (Inst.of Science, Bangalore)

I. Introduction

Internetworking is an area of growing significance and importance in today's world. It is a truly multidisciplinary area which requires knowledge of, and skills in, the related areas of engineering, communications, mathematics and modelling, computer and network architectures, and computer software. The programme at DalTech is truly unique being the result of a partnership between DalTech, Cisco Systems Inc., Maritime Tel and Tel (MT&T), and with the support of the Telecomm Applications Research Alliance (TARA). The programme was designed in collaboration with industry and was launched in September 1997. The laboratories are also unique and are probably the most up-to-date internetworking laboratories available anywhere for a Master level degree. The laboratory and the classroom are on site at the TARA location and are adjacent to the Cisco Certified Cisco Internetworking Expert (CCIE) testing laboratory (of which there are only three in North America). The location of the laboratory provides unique benefits to the programme. The programme is the first full fee paying programme at the Master level at DalTech.

ii. Programme Classes

The classes and their order of presentation are continually under review and are shown here as they were at the time of going to press. The latest content and order of presentation are updated regularly on the web page. The project commences in Term 3 and will normally require continuation into at least a fourth term.

Term I

EINE 5101.03: Introduction to Computer Networks.

This class offers a general introduction to computer networks. It explores the structure, goals, services and problems of computer networks. The structure of computer communications is examined

using the Open Systems Interconnection (OSI) seven layer protocol model. The purpose of each layer is discussed from both conceptual and practical aspects, and data communication standards are examined in terms of their layered structures. The distinction between circuit and packet switching is highlighted, and client server distance applications are discussed.

EINE 5201.03: Mathematics for Internetworking.

This class includes a review of Probability and Statistics, data collection and distribution fitting. Markov chains, reliability, Markov Chains, stochastic processes and queuing systems, random number generators, sampling from various probability distributions, Monte Carlo simulation.

EINE 5102.03: Physical and Datalink Standards and Protocols.

This class covers issues relating to the physical and datalink layers of data communications networks. A review of basic digital communication theory is given, including modulation and demodulation techniques and their performance in noise and under bandwidth constraints. Physical layer standards of several wireline-based protocols are examined, and optical and wireless channels are also considered. Media access control techniques, framing structures, and error control procedures of several protocols are investigated.

EINE 5104.03: Internet Communication Protocols.

This course provides an in-depth coverage of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol stack suite, including IP and protocols for address resolution, internet control, routing, broadcasting and multicasting. End-to-end communication issues associated with TCP will be discussed. Network management and domain name systems will be covered. Applications including telnet, file transfer, and simple mail transfer protocols will be covered in detail.

Term 2

EINE 5202.03: Simulation Modeling and Analysis.

This class includes discrete event simulation, continuous simulation modeling complex systems, simulation software, comparing alternative system configurations, variance reduction techniques, experimental design and optimization, simulation of data networks.

EINE 5103.03: Telecommunication and Wide-Area Networks.

This class presents an overview of the technologies used in present telecommunications systems and wide area networks. Standard telecommunication transport and signalling standards are introduced. The Integrated Services Digital Network and broadband access alternatives are discussed. Wireless standards for cellular and satellite systems are considered, and emerging personal communication services are introduced.

EINE 5402.03: Software Engineering and Operating System Design.

Large-scale software development, stages of software development, management issues, programmer issues, design strategies, programming languages and methodology, examples of programme design, design of single language multi-programming system, and design of large scale application software in engineering and science are covered. The design of applications and/or NO's for inter-networking will be used as examples.

EINE 5401.03: Real-time OS & Platform Architectures.

Real time operating systems (RTOS) requirements are covered. Topics include message queuing, resource sharing, priority assignments, event flags interrupts, memory allocation, and typical RTOS configurations. Examples in engineering and networking will be discussed. Internetworking platform architectures will be covered (caching, hardware/software performance measurement). A significant implementation-design and implementation project will be undertaken.

EINE 5105.03: Network Architecture.

This class covers the design of network architecture protocols the placement of servers and monitors, and firewalls. Internetworking, bridging, routing, and encapsulation are covered. Algorithms for bridging and routing are examined.

EINE 5106.03: ATM Traffic Management and Internetworking.

This is an introductory class to the Synchronous Transfer Mode (ATM) technology. It covers the status of various ATM standards, including basic functions of the physical layer, the ATM layer, and the ATM Adaption layer; basic functions of ATM traffic management; and various techniques to Internetwork existing LAN and network layer protocols with ATM.

EINE 5901.03: Project/Case Study.

The student will be required to analyze the performance of a network and either design a new network or an upgrade to an existing network. The project should preferably be undertaken with an industrial company.

Mechanical Engineering

Location: "C1" Building
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E-mail: mechanical.engineering@dal.ca

Department Head

Kujath, M.R., MSc (Warsaw Tech Univ.), PhD (Polish Academy of Sciences), PEng. Mechanisms and Machinery, Stochastic Dynamics of Manipulators Micro-gravity Simulation Mechanisms, Rotor Orbit Fluctuation.

Professors

Allen, P.L., BSc (Mt.A), BEng (TUNS), MEng (UWO), PhD (TUNS), PEng. Solar Thermal Energy Utilization, Heat Exchangers
Basu, P., BE (Cal), PhD (Burd), PhD (Aston), PEng. Air Pollution Control, Recycling, Heat Transfer, Boiler Design & Expert System, Fluidized Bed Combustion.
Bell, A.C., BSc (Dal), BEng (TUNS), AM, ME, ScD (MIT), PEng, Dean of Engineering. Tolerances as Constraints on Design.
Hamdullahpur, F., BSc, MSc (Tech Univ of Istanbul), PhD (TUNS), PEng, Associate Principal of Graduate Studies and Research. Application of Swirl Flow in Fluidized Beds and Cyclones, Turbulence Modelling, Dynamics of Reactive and Non-reactive Two-Phase flow Systems.
Hsiung, C.C., BSc (Taiwan Cheng-Kung), MSE (Mich), PhD (Calif.), CEng, FRINA, SNAME, PEng (Naval Architecture). Ship/Marine Hydrodynamics and Computer Aided Ship Design.
Kalamkarov, A.L., BSc, MAsC, PhD (Moscow State), DSc (Acad Sci., USSR). Stresses and Strength Analysis, Modelling Design and Optimization of Composite Materials and smart-Structures.
MacKinnon, J., History of Professional Engineering, Information Technology for Teaching.
Miltzer, J., BSc (EEM Brazil), Msc (USP Brazil); PhD (Wat), PEng. Hydrodynamics of Circulating Fluidized Bed Boilers, Computational Fluid Dynamics.
Ugursal, V.L., BSc (Bogazici), MEng, PhD (TUNS), PEng, Director of Canadian Residential Energy End-Use Data and Analysis Centre. Technoeconomic Evaluation of Advanced Electric Power generation Systems Heat Pump Applications, Residential Energy Consumption.
Watts, K.C., BSA, MSc (Guelph), PhD (Wat), PEng, PAg, joint appointment with Biological Engineering.

Professors Emeriti

Cochkanoff, O., BAsC (UBC), MAsC (Tor), PhD (Iowa State), FCASI, FEIC, FC, SME, PEng, CD.
Russell, L.T., BEng (TUNS), MSc (Qu), PhD (Car), PEng.

Associate Professors

Chuang, J.M., BSc (Nat. Taiwan Oceanic), MEng (Memorial), PhD (TUNS), SNAME, PEng (Naval Architecture). Numerical Modelling of Nonlinear Free-Surface Flow, Optimal Hull Form for a SWATH Ship, Low-Cost Unix System for Computational Mechanics.
Retallack, D., Process Simulation and Design, Design and Implementation of MIMO Control Systems.

Assistant Professors

Bauer, R.J., BSc (Waterloo), PhD (Tor).
Hubbard, T., BSc (Dal), BEng (TUNS), PhD (CalTech), PEng, MEMS - Micro Electro Mechanical Systems, MEMS CAD.

Adjunct Professors

Liu, K., BEng (CSUT, China), MAsc (CSUT), PhD (TUNS).

Vibrations, Dynamics and Control of Robotics, Parameter Identification of Time-Varying Systems.

Mitchell, A.K., BEng, MAsc, PhD (TUNS), PEng.

Orlansolu, Bsc (U of Lagos), MSc, PhD (U of Calgary), PEng.

Quinn, W.R., Ing. (Hamburg), Ing. (Tech Univ. Berlin), MSc, PhD (Qu). Turbulence, low-speed aerodynamics, convective heat transfer.

Tarnawski, MSc, PhD (Tech Univ of Lodz), PEng.

I. Introduction

Mechanical Engineering covers a very broad field of professional activity in such areas as land, sea, air, and space transportation; primary and secondary manufacturing industries; power generation, utilization and control; environmental control; and industrial management. In these areas, the Mechanical Engineer may become involved with design, construction, operation, development, research, planning, sales and management. The curriculum is designed to develop an understanding of the fundamental principles of Mechanical Engineering through lecture, tutorial, and laboratory activities. Modern well-instrumented laboratories in thermofluids, energy conversion, stress analysis, vibrations, and control systems provide experience in measurements and applications to ensure a thorough understanding and appreciation of the subject matter. Classes in mathematics, engineering management and various non-technical subjects are offered to broaden the student's outlook and understanding of this profession.

Postgraduate studies in the Department are concentrated in the areas of stress analysis, heat transfer, multi-phase flow, fluid and thermal power, dynamics of rotating machines, robotics, vibrations, and computer aided design and manufacturing. Research and project master's degrees as well as the doctoral degree are offered.

Since DalTech is so closely associated with Canada's oceans, the Department of Mechanical Engineering also offers programmes in Naval Architecture, particularly at the post-graduate level. Both research and project master's degrees are available as well as the doctoral degree in Naval Architecture. A small towing tank is used for model experiments and the analytical part of the programme is supported by excellent computer facilities.

II. Classes Offered

NOTE: All graduate classes are not offered every year. Class offerings depend upon faculty availability and student interest.

MECH 6100.03: Boundary Layer Theory.

The derivation of the Navier-Stokes equations and several exact solutions are considered. The boundary layer equations and some solutions for two dimensional axially symmetric flows are treated as well as non steady boundary layers.

The integral method of solution of boundary layer equations is followed by boundary layer control.

An introduction to the theory of turbulence is given.

EXCLUSION: ME6100

MECH 6110.03: Turbulence in Real Fluids.

The first part of this class deals in some detail with the theory of measurements and the analysis of random data. Statistically based functions such as turbulence intensities, correlation functions, energy spectra, are examined in relation to fluid processes.

The second phase of this class examines the present level of knowledge of turbulence of fluids in rigid and visco-elastic ducts, without and with superimposed pressure gradients. Properties of real fluids are stressed and considerable emphasis is laid upon experimental results, applying the methods of measurement and analysis outlined above. Two and three dimensional anemometry techniques are examined applied.

EXCLUSION: ME6110

MECH 6120.03: Computational Fluid Dynamics and Heat Transfer.

The finite difference discretization method is applied to the solution of the partial differential equations arising from the mathematical modelling of fluid flow, heat transfer and combustion processes. The equations can be parabolic, elliptic or hyperbolic. Items like convergence, stability, consistency, numerical diffusion and turbulence modelling will also be presented. The computer code PHOENICS (Copyright CHAM Ltd.) will be used to solve several sample problems.

EXCLUSION: ME6120

MECH 6140.03: Fluidization Phenomena I.

The physical properties of the fluidized state, the behaviour of bubbles, the flow patterns of fluids and heat and mass transfer in a fluidized bed as a chemical reactor are studied.

EXCLUSION: ME6140

MECH 6145.03: Fluidization Phenomena II.

This class deals with the principles of fluidization and fluidized bed heat transfer. It will cover design of fluidized bed reactors, heat exchangers and combustors. Mechanical design of components such as distributor, solid-field system, reactor shell and equipment control will also be covered.

EXCLUSION: ME6145

MECH 6200.03: Advanced Heat Transmission I.

An advanced study of the transmission of heat by conduction and convection. Derivation and application of their equations governing steady and unsteady conduction heat transfer, transient conduction, and numerical solutions are examined with selected topics.

Governing equations for forced and natural convection; dimensional analysis; and similarity transforms are applied.

EXCLUSION: ME6200

MECH 6210.03: Advanced Heat Transmissions II.

An advanced study of the transmission of heat by radiation. Topics covered include: physical properties of radiation, thermal radiation laws, characteristics of real and ideal systems, geometric shape factors, grey and non-grey system analysis, energy transfer in absorbing media and luminous gases, solar radiation.

EXCLUSION: ME6210

MECH 6230.03: Refrigeration Engineering.

This class covers basic refrigeration cycles and concepts. Major refrigeration devices such as compressors, steam ejectors, condensers, and evaporators are discussed, as well as piping and accessories. A major portion of the class is devoted to the design and selection of refrigeration equipment including computer applications in the design of refrigeration systems.

Application of refrigeration to air conditioning, the food industry, as well as the medical, petrochemical and manufacturing industries is covered. The present and future developments of heat pumps are also discussed.

PREREQUISITES: MECH 4810.03 or equivalent

EXCLUSION: ME6230

MECH 6240.03: Engineering Refrigeration II.

This class deals with the computer design and analysis of refrigeration systems. The emphasis is on food processing and refrigeration technology, design and operation of cold stores, design of land and marine transport refrigeration, and mathematical modeling of food refrigeration processes. Other subjects covered include: vapor absorption systems and cryogenic engineering and the impact of CFCs regulations on the refrigeration and air conditioning industry.

PREREQUISITES: MECH 6230.03 and MECH 5636.03

EXCLUSION: ME6240

MECH 6300.03: Finite Element Methods In Engineering Mechanics.

This class deals with the application of the Finite Element Method of stress problems encountered in engineering design. The following topics are treated: matrix algebra, element stiffness matrix for an

assembly of elements, stresses in plates with in-plane loading and with lateral loading, stresses in shells and thick-walled cylinders, elastic-plastic system, dynamic systems.

EXCLUSION: ME6300

MECH 6301.03: Finite Element Method in Engineering.

This class presents formulation and implementation of Finite Element Method (FEM) in engineering applications. The theory of variational and weighted residual methods is introduced. Different types of elements used in FEM for discretization of PDE, such as linear, quadratic, iso-parametric and hybrid elements are covered. The numerical methods selected for spatial integration, solution of linear algebraic equations, evaluation of eigenvalues are addressed.

EXCLUSION: ME6301

MECH 6325.03: Micro-electro-mechanical Systems (MEMS).

This class deals with micro-machining and MEMS (micro-electro-mechanical systems). The following topics will be covered: scaling issues, fabrication technologies and production methods, classification and analysis of MEMS devices (both sensors and actuators). The integration of multiple devices into systems will be addressed including issues of assembly and interfacing. Micro-machining will be compared and contrasted to both micro-electronics and traditional micro-machining. The development and use of MEMS simulation and design tools will be covered.

PREREQUISITES: Approval of instructor.

EXCLUSION: ME6325

MECH 6340.03: Energy Management - I.

The purpose of this class is to introduce the concepts and techniques of energy management and conservation. The subjects that will be discussed are energy supply and demand, energy pricing, scope of the energy problem and approaches to provide solutions; energy auditing; improving energy utilization in space conditioning and steam, hot water and compressed air systems; energy saving opportunities in refrigeration and cooling systems; insulation; and electrical energy conservation. An inter-disciplinary approach will be employed in this class to provide a wider understanding of the subject.

EXCLUSION: ME6340

MECH 6341.03: Energy Management - II.

This class is a continuation of MECH6340. The subjects that will be discussed in this class are computer technology for energy conservation; energy saving opportunities in fired heaters and boilers; cogeneration; waste heat recovery; and synthesis of heat and power networks. Although MECH6340 is not a prerequisite for this class, it is advisable that both classes are taken to have a complete coverage of the subject.

EXCLUSION: ME6341

MECH 6350.03: Advanced Engineering Design.

An undergraduate education necessarily concentrates on analysis. This class focuses on synthesis. Creativity is the engine of design and analysis is the feedback governing design. Through the media of case studies, laboratory exercises, instruction, and practice, this class studies the process of design; the business of translating societal needs into real, manufacturable objects. Lecture topics will include: the hierarchical, iterative nature of design; aids to creativity; the appropriate use of analysis; the transformation from functional space to physical space; prototype design; consumer durable versus capital equipment design; and special lectures on microprocessors in machinery, optimization, and CAD/CAM.

EXCLUSION: ME6350

MECH 6380.03: Mechanical and Structural Reliability.

This class provides the background needed for probabilistic reliability analysis, design, and integrity assessment of mechanical/structural components and systems. Fundamental concepts of applied probability theory, random variables, and stochastic processes are reviewed. Techniques for uncertainty modelling and probabilistic characterization of loads and strength are treated. Theoretical and computational probabilistic reliability

analysis methodologies are extensively covered. Reliability-based design is considered. Selected advanced topics such as time-dependent reliability and stochastic finite element analysis are introduced.

PREQUISITES: ENGM 4233.03 or equivalent

EXCLUSION: ME6380

MECH 6420.03: Advanced Fluid Mechanics.

A general review of principle concepts and methods in fluid dynamics will be conducted. Advanced treatment with mathematical techniques for solving specific classes of fluid-flow problems will be introduced, including: surveys of governing equations and basis theories; two- and three- dimensional potential flows; surface waves; boundary-layer theory; and, shock-wave phenomenon.

PREQUISITES: ENGM 4343.03 and MECH 3420.03 or equivalent.

EXCLUSION: ME6420

MECH 6500.03: Mechanical Vibrations.

Free and forced vibrations of elastic bodies, such as beams, plates, and shells are examined. Response due to shock and random loading is introduced. Vibration measuring instrumentation is described and several laboratory experiments are carried out. Industrial applications are studied including vibration of machinery, ships, and the response of humans to whole body vibration.

EXCLUSION: ME6500

MECH 6510.03: Advanced Mechanics of Solids.

The class provides an introduction to the general equations of the theory of elasticity of an anisotropic solid. Elastic equilibrium and boundary value problem formulations are considered. The theories of thermoelasticity, viscoelasticity and plasticity are introduced. The class also provides an introduction to modeling of inhomogeneous composite solids, the effective moduli theory, and the elasticity of composite laminates. The fundamentals of fracture mechanics and applications to mechanical design are considered.

PREQUISITES: MECH 3310.03, MECH 4320.03

EXCLUSION: ME6510

MECH 6520.03: Chaotic Motion.

This class introduces the concepts of chaotic dynamics and provides the methods for identifying chaotic motions in nonlinear dynamic systems. It covers the following topics: fundamental concepts of chaos, review of analytical and numerical methods in nonlinear oscillation, chaotic motions observed in various physical systems, methods of identifying chaotic motions in experimental measurements and computer simulations, Poincare map, logistic map, bifurcation diagram, fractal dimension and Lyapunov exponent.

PREQUISITES: Permission of the instructor.

EXCLUSION: ME6520

MECH 6550.03: Random Vibrations.

This class will provide students with the theoretical background to study the dynamic behaviour and responses of rigid bodies and elastic structures subjected to random inputs. Topics included in this class are Probability Theory, Stochastic Processes, Input-Output Process, Spectral Analysis of single degree and multiple degree of freedom systems, and Engineering applications. Special topics, such as fatigue estimation, ocean waves, drag force, wind force, ground motion, simulation, linearization techniques, and structural reliability, are also discussed. A term paper on a topic of individual interest is required from each student.

PREQUISITES: MECH 5510.03 or equivalent

EXCLUSION: ME6550

MECH 6610.03: Physical Modelling.

The use of model analysis as a means to predict system behaviour and to obtain a better understanding of the physical basis of engineering analysis is covered.

Topics include: similitude, design of experiments, design of models and procedure for systems with undefined characteristics are introduced.

EXCLUSION: ME6610

MECH 6620.03: Identification of Systems.

The prime objective of this class is to demonstrate the idea of identification, which comprises building an optimal mathematical description by computer for system under test. Topics include basic concepts of identification, basic ideas of mathematical optimization, fundamentals of mathematical description of random signals, methods of linearization, examples of time and frequency domain methods of identification of discrete and distributed systems.

The laboratory portion of the class is devoted to application of an identification technique to a simple system and includes mathematical modeling, running the experiment, collecting measurement data and writing and running an identification computer programme.

EXCLUSION: ME6620

MECH 6630.03: Space Mechanics.

Motion in outer space poses complex engineering problems, the solution of which require a thorough knowledge and understanding of the pertinent principles of mechanics and techniques of analysis.

The class provides an introduction to such topics as astromechanics, satellite orbits, rotating structures with varying configuration and mass, optimization of spacecraft motion, launch dynamics, microgravity, space robotics, large displacement low frequency vibrations, ground-based and in-orbit testing.

EXCLUSION: ME6630

MECH 6640.03: Robot Mechanics.

This class provides a brief introduction to the field of Robotics, a brief review of selected topics from linear algebra, and an introduction to theoretical kinematics. The main part of the class includes such topics as: robot geometry, velocity Jacobians, derivation of equations of motion; force, manipulability, inertia and compliance analysis; position and force control, optimization of kinematic redundancy, multrobot coordination; robot calibration; performance testing and characterization. The class also provides an introduction to space robots, smart structures, and walking machines as well.

PREREQUISITES: MECH 5640.03 or equivalent

EXCLUSION: ME6640

MECH 6910.03: Graduate Seminar I.

MENG and MASC. students in mechanical engineering will prepare and present seminars on research topics related to their thesis project. Master's students shall present a minimum of one seminar. Graduate students are required to attend all graduate seminars. Students will be evaluated on their preparation, presentation skills, ability to field questions and regular attendance. Graded pass/fail.

MECH6990 Directed Studies in Mechanical Engineering I.

This class is available to graduate students enrolled in a Master's Degree Programme in Mechanical Engineering, who wish to gain knowledge in a specific area for which no graduate-level classes are offered. Students are assigned an advisor and are required to present a formal report, or take a formal examination, at the end of the class. Registration approval is required from the Head of the Department of Mechanical Engineering.

EXCLUSION: ME6910

MECH 7400.03: Optimal Control Systems.

This class begins with the applications of the Calculus of Variations to Optimal Control. Topics include: Euler-Lagrange equations. Hamilton-Caronic equations, Pontryagin's maximum principle with application to minimum time problem, energy problem and minimum fuel problem. Singular control problems are included, along with Hamilton-Jacobi equations and dynamic programming. An introduction to optimal control of linear distributed parameter systems is given.

EXCLUSION: ME7400

MECH 7910.03: Graduate Seminar II.

Ph.D. students in mechanical engineering will prepare and present seminars on research topics related to their thesis project. Ph.D. students shall present a minimum of two seminars (one of which

may be the thesis proposal). Graduate students are required to attend all graduate seminars. Students will be evaluated on their preparation, presentation skills, ability to field questions, and regular attendance. Graded pass/fail.

EXCLUSION: ME7910

MECH 7990.03: Directed Studies in Mechanical Engineering II.

This class is available to graduate students enrolled in Ph.D. Programme in Mechanical Engineering who wish to gain knowledge in a specific area for which no graduate-level classes are offered. Students are assigned an advisor and are required to present a formal report, or take a formal examination, at the end of the class. Registration approval is required from the Head of the Department of Mechanical Engineering.

EXCLUSION: ME7790.03

Ocean Engineering and Naval Architecture**MECH 6701.03: Dynamics of Offshore Structures.**

This class deals with methods of analysis of structures in the ocean including deterministic wave loading and the subsequent response of jacket-type structures.

The types of wave loading considered are linear waves, higher order waves and waves based upon the stream function. Matrix stiffness analysis is used in the computer analysis of structures. The static responses of structures to wave loads are determined and the deflected shapes and stress levels determined. Dynamic response using normal mode methods are carried out under the action of wave spectra and spectral fatigue analysis is presented.

EXCLUSION: ME701

MECH 6838.03: Dynamics of Marine Vehicles.

This class deals with the dynamics of marine vehicles. Topics to be covered include: water wave theory, undamped motions in still water, coupled motions in waves, and the strip theory of ships. Throughout, the practical importance of seakeeping and wave loads to performance of marine vehicles at sea is stressed. Finally, maneuverability in still water is introduced, both in the practical and theoretical senses.

PREREQUISITES: MECH 5440.03 or Instructor's consent

EXCLUSION: ME6838

MECH 6855.03: Theory of Marine Propellers.

This class begins with the theory of dimensional analysis and correlation. Propeller model design and testing is introduced including potential theory of lifting surfaces, lifting line theory of propellers, lifting surface theories, propeller selection, propeller design and strength calculations, blade vibration analysis, cavitation and its effects, wake adapted propellers, bow thrusters and other propulsion devices.

EXCLUSION: ME6855

MECH 6860.03: Theory of Marine Hydrodynamics I.

This is the first of two classes providing students with an advanced background of theoretical and experimental principles in Marine/Ship Hydrodynamics. Emphasis is laid on applications of potential theory to the free-surface hydrodynamic analysis: Wave phenomena pertinent to problems in naval architectural and ocean engineering are studied. Various theories for unsteady hydrodynamic forces on floating and submerged bodies are considered. Methods for seakeeping and maneuvering analysis for marine vehicles and structures and introduced.

PREREQUISITES: ENGM 4343.03 and MECH 6830.03

EXCLUSION: ME6860

MECH 6865.03: Theory of Marine Hydrodynamics II.

This is the second of two classes providing students with an advanced background of theoretical and experimental principles in Marine/Ship Hydrodynamics. This class mainly deals with boundary layer theory and potential theory for flows past floating and submerged bodies. Theory of fluid similitude is discussed. Methods of theoretical analysis resistance and lift on marine vehicles and structures are detailed. Optimal ship forms for minimum resistance are studied.

PREREQUISITES: MECH 6845.03 or instructor's approval

EXCLUSION: ME6865

MECH 6870.03: Theory of Ship Structure Analysis I.

This class provides students with theoretical methods of structural analysis for ships and ocean structures in various marine environments. It contains: probabilistic descriptions of ocean wave loads acting on ships and ocean structures; the input-output relations; responses in long and short crested seas; extreme value statistics of wave loads; variability on hull-strength modes of failure; reliability concepts and design considerations.

EXCLUSION: ME6870

MECH 6875.03: Theory of Ship Structural Analysis II.

This class provides students with advanced theoretical methods of structural analysis for ships and ocean structures in various marine environments. It deals with hull-structure responses to environmental induced loads; hydroelastic analysis of hull flexibility, slamming and springing; isotropic and orthotropic plate theories; plastic analysis of structures; finite element methods and their applications to ships and ocean structures.

PREREQUISITE: MECH 6870.03

EXCLUSION: ME6875

MECH 7860.03: Numerical Methods in Marine Hydrodynamics.

This class consists of formulation, methodology and techniques of numerical solutions of potential and viscous flow problems. Essentials of finite-difference, finite-element, boundary integral, and body-fitted grid methods are introduced with illustrations of applications to marine hydrodynamics. Emphasis is given treatment of free-surface, open boundaries and body/fluid interactions. Students will be involved in developing computer programmes for various practical problems.

PREREQUISITES: MECH 6860.03 and MECH6865.03

EXCLUSION: ME7860

MECH 9000.00: Master's Thesis/Project.

MECH 9530.00: PhD Thesis.

Mining and Metallurgical Engineering

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Department Head

Kipouros, G.H., Dipl. Eng. (Athena), M.A.Sc., PhD (U of T), P.Eng.
Metal Matrix Composites, Electrolysis in Molten Salt, Rare Earth Magnetic Materials, Light, Refractory and Rare Earth Metals.

Professors

Caley, W.F., B.Sc.(Eng.), M.Sc.(Eng.) (Qu.), Ph.D. (Tor.), P.Eng.
Ceramic and Metal Matrix Composites, Pyrometallurgy, Slag/Refractory Reactions in Steelmaking.

Lee, G. M. C., BSc (Nottingham), PhD (Lond). M.I. MEch.E., M.I.M.
Graduate Coordinator, Metallurgical Engineering. Fracture Mechanics, Fracture Crack Growth, Diffusion Coatings, Cavitation Erosion.

Rockwell, M.C., B.Eng. (Petro), M.Eng., Ph.D. (TUNIS), P.Eng.,
Chairman, Mining Engineering Program. Petroleum Engineering, Reservoir Engineering, Mine Waste Management, Mine Production Engineering, Ocean Mining.

Yemenidjian, N.B., B.Eng., PhD (Concordia). Electronic Materials, Ceramics & Glasses.

Associate Professor

Hill, J.D., B.Sc., M.Sc. (Acad.), Ph.D. (UWO). Mining Geology, Time Domain Reflectometry.

Zou, D.H., B.Sc.(Xuzhou), Ph.D.(U.B.C.), P.Eng. Graduate Coordinator, Mining, Rock Mechanics, Mine Planning and Design, Numerical Modelling, Microseismic Monitoring, Industrial Wastes Treatment.

Assistant Professors

Butt, S.D., B.Eng., P.Eng., M.Sc. (Memorial), PhD (Queens). Mining Technology, Microseismic Monitoring, Rock Bursts, Computer Aided Mine Planning.

Gharghouri, M.A., PhD (McM). Deformation of Hcp Metals, Metal Matrix Composites, Fatigue Failure, Electron Microscopy.

Professors Emeritus

Hancock, H.A., B.A.Sc., M.A.Sc., Ph.D. (Tor.), P.Eng. Corrosion of Superalloys, Slag Additions to Cement, Chemical Desulphurization of Coal.

Adjunct Professors

Adorjan, L.A., BSc, PhD (Birm), P.Eng., C.Eng. Mineral Processing, Coal Separation, Solid-Liquid Separation.

Laufer, E.E., B.Sc., M.Sc. (Dal.), Ph.D. (U. of Virginia)

Whiteway, S.G., B.Sc., Dipl.Chem.Eng., M.Sc. (Dal.), Ph.D. (McG.), F.C.I.C. Chemistry of metallurgical reactions.

I. Classes Offered

METL Series: Metallurgical Engineering

METL 6010.03: Introduction to Transmission Electron Microscopy.

This class will deal with transmission electron microscopy including the basic principles and methods of operation of the electron microscope, the elements of electron optics, and the kinematical theory of electron diffraction and image formation. Replica methods, extraction and thin film techniques and applications of transmission electron microscopy to the study of metallic and non-metallic solids will be discussed. Laboratory work will provide students with a working knowledge of the transmission electron microscope.

EXCLUSION: MET6010

METL 6011.03: Introduction to the SEM and Microprobe.

This class will deal with scanning electron microscopy and with electron microprobe analysis. The electron optics of the scanning electron microscope and of the electron beam microprobe will be discussed. Electron/specimen interactions will be studied including the excitation and absorption of X-rays. Correction techniques necessary for quantitative microanalysis and applications of the microprobe to the solution of materials problems will be discussed. Laboratory work will give students a working familiarity with the scanning electron microscope.

A laboratory fee is applicable to this class.

EXCLUSION: MET6011

METL 6014.03: Welding Metallurgy.

This class will cover the effect of mass and heat flow for the various joining processes on the metallurgical properties of the parent and weld metal. The processes will include brazing, soldering, solid phase welding and fusion welding for the major classifications of metals such as carbon and alloy steels and non-ferrous metals. This class will include laboratory periods designed to reinforce the lecture material.

EXCLUSION: MET6014

METL 6015.03: High Temperature Metallurgical Operations Part I.

The class will consist of a review of metallurgical thermodynamics, with reference to various metallurgical operations. It will also include reference to slag theory, as well as experimental techniques used in high temperature metallurgical research.

EXCLUSION: MET6015

METL 6016.03: High Temperature Metallurgical Operations Part II.

The class will consist of a survey of the factors which affect the kinetics of high temperature heterogeneous processes and their effect on the rate of various pyrometallurgical operations.

EXCLUSION: MET6016

METL 6017.03: Hydrometallurgical Operations.

New developments in the leaching, solution purification, and recovery of metals will be studied as they apply to the extraction of metals from various feed materials by hydrometallurgical processes.

EXCLUSION: MET6017

METL 6018.03: Structural Physical Metallurgy.

An advanced study of certain topics such as solidification, imperfections in crystals, recovery, recrystallization and grain growth, and solid state transformations. The class content will be adapted to the interest of the student as far as possible. Weekly seminars will be held.

EXCLUSION: MET6018

*METL 6019.03: Selected Topics In Extractive Metallurgy.

This class is given by a visiting professor. The topic of the lectures is in the field of specialization of the lecturer.

EXCLUSION: MET6019

***METL 6020.03: Selected Topics in Physical Metallurgy.**

This class is given by a visiting professor. The topics of the lectures is in the field of specialization of the lecturer.
EXCLUSION: MET6020

***METL 6021.03: Selected Topics in Mineral Processing.**

This class is given by a visiting professor. The topic of the lectures is in the field of specialization of the lecturer.
EXCLUSION: MET6021

METL 6022.03: Directed Studies in Metallurgical Engineering.

This class is available to graduate students enrolled in a Masters programme in Metallurgical Engineering wishing to gain knowledge in a specific area for which no graduate level class is offered. Students are assigned an advisor and are required to present a formal report at the end of the class.
A maximum of one Directed Studies class may be taken for credit in a Masters degree programme.
EXCLUSION: MET6022

METL 6030.03: Fracture of Metallic Materials.

This class will cover the failure of metals under ductile and brittle fracture, creep rupture and fatigue conditions. Fracture mechanics concepts will be used to quantify fracture parameters in the presence of pre-existing flaws or propagating cracks. The interaction between the various failure mechanisms, including high temperature oxidation and sulphidation, will also be discussed.
PREREQUISITES: METL 0700.03 or METL 0820.03 or equivalent
EXCLUSION: MET6030

METL 6040.03: Advanced Process Metallurgy.

Chemical and electrochemical processes for the extraction and refining of materials are examined in terms of chemical thermodynamics and kinetics. Selected topics will be discussed related to the behaviour of metallic, ceramic, glass and metal slag systems at high temperatures. The thermodynamic and transport properties will be discussed for a number of systems such as alloys, oxides, carbides and silicides.
EXCLUSION: MET6040

METL 7022.03: Directed Studies in Metallurgical Engineering.

This class is available to graduate students enrolled in a Ph.D. Programme in Metallurgical Engineering wishing to gain knowledge in a specific area for which no graduate level class is offered. Students are assigned an advisor and are required to present a formal report at the end of the class.
A maximum of two Directed Studies classes may be taken for credit in a Ph.D. Programme.
EXCLUSION: MET7022

Metallurgy Seminar

Weekly seminars are held, with speakers both from within the department and from outside. All students are encouraged to attend, and all candidates for graduate degrees including combined BENG./MASC. Co-op students from Term 6 on are required to participate in the seminars by attending for at least three terms, and by presenting at least one seminar during this period.

MINE Series: Mining Engineering

MINE 6001.03: Advanced Rock Mechanics.

This class deals with specific rock mechanics problems related to ground stability control in mines. Emphasis is placed on in situ stress measurement, stress change and ground movement monitoring, numerical modelling in mining applications, rockbursting and microseismic monitoring. Theory, state-of-the-art and existing problems of relevant techniques are discussed. Case studies are included to solve practical problems.
PREREQUISITES: Knowledge of differential equations and linear algebra and MINE 1011.03 or equivalent.
EXCLUSION: MIN6001

MINE 6002.03: Mine Excavation.

Advanced technology of excavation with particular emphasis on tunnelling. Analysis of continuous and cyclical excavation methods. Advanced ground support technology. Excavation equipment. Economic analysis. Studies of case histories of excavation projects.
EXCLUSION: MIN6002

MINE 6003.03: Environmental Geology.

This class deals with the relationship between man and his geological habitat. Emphasis is placed on earth processes, earth resources and engineering properties of rocks and surficial deposits insofar as these are important to or in some way affect human activities. Special reference will be made to man and the Earth, composition and structure of the Earth's crust, the significance of land forms, earth processes; engineering properties of soils and rocks; earth resources; man as a geological agent. Conservation and management and the application of environment geologic data to the traditional field of engineering and economic geology.
EXCLUSION: MIN6003

MINE 6004.03: Analysis of Mineral Industries.

Evaluation of mining properties and mineral processing industries. Supply of, and demand for, mineral raw materials, world distribution and trade in minerals, mineral in national/international affairs. Canadian mineral policy, conservation of mineral resources, substitutes, secondary recovery of mineral raw materials, business cycles in the mineral industries, financing of new mining projects and source of funds.
EXCLUSION: MIN6004

MINE 6007.03: Directed Studies In Mining Engineering.

This class is available to graduate students enrolled in a Masters Programme in Mining Engineering wishing to gain knowledge in a specific area for which no graduate level class is offered. Students are assigned an advisor and are required to present a formal report at the end of the class.
EXCLUSION: MIN6007

MINE 6008.03: Advanced Petroleum Engineering.

The class is an advanced study of petroleum reservoir engineering, drilling and development. The emphasis is on topics such as: analysis and prediction of oil and gas reservoir performance under a variety of production methods, theory and practice of well testing and pressure analysis techniques, well planning, drilling optimization, enhanced recovery mechanisms, displacement theory and modelling. The class content will be adapted to the interest of the student as far as possible.
EXCLUSION: MIN6008

MINE 6009.03: Offshore Drilling and Production.

This class is oriented toward the practical applications of offshore drilling, production and completion technology in the ocean environment. Emphasis is placed on the types, applications and limitations of offshore rigs, platforms and subsea production systems. The technical aspects of offshore islands, breakwaters, safety and fire protection, loading and transportation systems are also covered. The decision making process based on economics and developing technology regarding offshore field development and production is presented as a case study.
EXCLUSION: MIN6009

MINE 6010.03: Solid-Liquid Separation.

The class outlines the fundamental principles of solid-liquid separation processes. Based on this theory, scaling-up procedures for the various separators, from laboratory test results are given. Means of improving solid-liquid separation by using coagulants, flocculants or dewatering aids are discussed. Processes considered include: gravitational and centrifugal thickening, flotation, vacuum, pressure and centrifugal filtration and dewatering by screens and electrophoretic methods. Test results obtained in laboratory work will be used in sizing of equipment.
EXCLUSION: MIN6010

MINE 6011.03: Advanced Mine Planning and Design.

This class deals with the application of advanced design principles to the planning, design and optimization of surface and underground mining systems. These principles include the Lerch-Grossman's algorithm, CAD and simulation modelling techniques. Under given geological and geomechanic factors, these techniques will be used for designing and optimizing underground mining methods or open pit layouts for massive, thin, pitching and multi-seam mineral deposits.

PREREQUISITES: MINE 1314.03

EXCLUSION: MIN6011

MINE 6012.03: Advanced Economic Evaluation of Mineral Resources.

This class deals with the application of advanced statistical and probability theory in mineral resource investment risk and uncertainty analyses in random variable states. Numerical modelling of stochastic processes governing complex mineral resource projects will be carried out using derivative mine valuation concepts. Using available simulation and numerical modelling software packages, students will undertake projects on class studies in mineral resources, coal, oil and gas properties.

EXCLUSION: MIN6012

MINE 6021.03?: Pit Slope Stability.

This class deals with slope stability and the associated problems in surface mining. Fundamentals of various analysis techniques for slope stability are reviewed. Risk and uncertainty analysis is introduced. Application of these techniques to optimization of slope design is discussed. Major topics include: geological structure controlled and strength controlled slope failure, slope failure in soft ground, risk and uncertainty analysis, and optimization of slope design.

PREREQUISITE: MINE 3510.03, MINE 3611.03 or permission of instructor

MINE 6900.03: Mining Graduate Seminar I.

All Master's students are required to participate in the seminar every year. Students will prepare and make presentations on topics related to their research projects. This will normally be one presentation per year. Evaluation will be based on preparation, presentation skills, ability to field questions and regular attendance. Graded pass/fail.

EXCLUSION: MIN6900

MINE 7007.03: Directed Studies in Mining Engineering.

This class is available to Graduate Students enrolled in a Ph.D. Programme in Mining Engineering wishing to gain knowledge in a specific area for which no graduate level class is offered. Students are assigned an advisor and are required to present a formal report at the end of the class.

EXCLUSION: MIN7007

MINE 7900.03: Mining Graduate Seminar II.

All Ph.D. students are required to participate in the seminar every year. Students will prepare and make presentations on topics related to their research projects. This will normally be one presentation per year. Evaluation will be based on preparation, presentation skills, ability to field questions and regular attendance. Graded pass/fail.

EXCLUSION: MIN7900

MINE 9000.00: Master's Thesis/Project.**MINE 9530.00: PhD Thesis.**

English

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Chairperson of Department

McNeil, D.

Professors Emeriti

Fraser, J., MA (Oxon), PhD (Minn), FRSC
Gray, J., MA (Aberd), MA (Oxon), PhD (Mont), GRSA, FRSC,
McCulloch Professor of English
Ross, M., OC, BA (UNB), MA (UofT), PhD (Corn), DLitt (UNB), LLD
(St. Thom), LLD (Dal), LLD (Queen's), DLitt (Trent), DLitt
(Edinburgh), DLitt (Windsor), DSL (Trinity College), DLitt
(Acadia), LLD (StFX), DLitt (UWO), FRSC
Sprott, S.E., MA, BD (Melbourne), PhD (Columbia)

Professors

Andrews, A., BA, DipEd, MA (Leeds), PhD (Ill), FRSA, major
appointment in Theatre
Baxter, J.R., BA, BEd, MA, PhD (Alta), Chair of Department.
Renaissance Literature
Furrow, M.M., BA (Dal), MA, MPhil, PhD (Yale). Medieval
Literature
Huebert, R.M., BA (Sask), MA, PhD (Pitt). Renaissance Literature
Monk, P., BA (Reading), MA (Carleton), PhD (Queen's). Canadian
Literature
Tetreault, R.R., BA (UBC), MA, PhD (Cornell). Romantic Literature
Wainwright, J.A., BA (UofT), MA, PhD (Dal). Canadian Literature

Associate Professors

Diepeveen, L., BA (Calvin), MA, PhD (Ill). Modern American
Literature
Greenfield, B.R., BA (York), MA (McG), MPhil, PhD (Columbia).
Colonial and Nineteenth-Century American Literature
Li, V., BA, MA (UBC), PhD (Cantab). Literary theory and Modern
Literature
Luckyj, C., BA, MA, PhD (UofT). Renaissance Literature
McNeil, D., BA (Concordia), MA (UNB), PhD (McM). Restoration
and Eighteenth-Century Literature
Ross, T., BA, MA (Carleton), PhD (UofT). Eighteenth-Century
Literature and History of Criticism
Stone, M., BA (Guelph), MA, MPhil (Waterloo), PhD (UofT).
Feminism and Victorian Literature

Assistant Professors

Gantar, J., BA, MA (Ljubljana), PhD (Tor), major appointment in
Theatre
Maitzen, R., BA (UBC), MA, PhD (Cornell). Nineteenth-Century
Literature
Morgan, H.E., BA (UBC), MA (Wash), BLitt (Oxon), PhD (Wash).
Old English
Stewart, A., BA (Guelph), MA, PhD (Queen's). Twentieth-Century
Literature
Thompson, J., BA (Western), MA, PhD (UofT). Romantic Literature

Adjunct Professors

Bruhm, S., MA (Dal), PhD (McG); Mount Saint Vincent University
Davies, G., BA (Dal), MA (UofT), PhD (York); Acadia University
Davies, R., PhD (Wales), Acadia University
Drain, S., BA (Trent), MA (Leicester, PhD (Lond)); Mount Saint
Vincent University

Esonwanne, U., BA (Nigeria), MA, PhD (UNB); Saint Mary's
University
Ferns, C., BA, PhD (Lond); Mount Saint Vincent University
Glowacka, D., MA (Wroclaw), PhD (SUNY)
Manos, K., BA (Alta), MA (Calgary), PhD (Dal); Nova Scotia College
of Art and Design
Perkin, J.R., BA (Oxford), PhD (UofT); Saint Mary's University
Schwenger, P., PhD (Yale); Mount Saint Vincent University
Smith, D., BA (Man), MA (Carleton), PhD (Man); St. Francis Xavier
University
Smol, A., BA (Concordia), MA, PhD (Queen's); Mount Saint Vincent
University
Whalen, T., MA (Melbourne), PhD (SMU); Saint Mary's University

Applicants should designate the proposed thesis area at the time of application for admission. The Department will entertain research proposals at the MA level in most areas of British, Canadian, or American literature, and at the PhD level in many of these areas. Nonetheless, applicants for the PhD should take care to consult the Graduate Coordinator of the department concerning its strength, in both resources and personnel, in the field of study in which they propose to specialize.

I. Admission Requirements

Candidates must at a minimum satisfy the general requirements for admission to the Faculty of Graduate Studies as spelled out in Section II in the Faculty of Graduate Studies regulations. Since this department accepts full-time graduate students only if it can fund them, standards are very high, currently an A- or better average at least in the last two years. Both MA and PhD programmes presuppose an acquaintance with English literature of different periods and nationalities. Applicants with other strengths but with limited historical coverage might still be accepted, but required to remedy deficiencies with one or even two of their graduate classes.

Only in exceptional circumstances will persons holding a BA and an MA from Dalhousie be allowed to proceed to a PhD programme without study at another institution. If you have a Dalhousie BA and MA and wish to apply to the PhD, please consult the Graduate Coordinator first.

The Department suggests a pragmatic deadline much earlier than the official one. We urge applicants to complete their applications by late January to allow the Department to put forward the best candidates for Killam awards.

II. Degree Programmes

A. Master of Arts (MA)

For minimum time required to complete this programme, see Section 1.3.1 in the Faculty of Graduate Studies regulations.

Course work must include a graduate seminar (half or full-year) in the thesis area; at least one graduate seminar in a field unrelated to the thesis; and additional seminars in English to make up the equivalent of three full-year classes. With the approval of the Department, a graduate class in another department relevant to the candidate's course may take the place of one of the additional seminars, and under certain conditions a reading class may take the place of the seminar in the thesis area.

All students are required to have studied at least one European language other than English and to demonstrate some proficiency in it.

A thesis, equivalent to two classes, is required.

B. Doctor of Philosophy (PhD)

For a minimum time required to complete this programme, see Section 1.3.2 in the Faculty of Graduate Studies regulations.

In the first year, doctoral candidates must take graduate seminars in the pattern described above for the MA.

Candidates must take a qualifying examination, with written and oral portions, in the field (period and national literature) most germane to their intended thesis. The examination is to be taken no later than May of the second year in the programme.

All graduate students in the Department are required to have studied at least one European language other than English, and to demonstrate some proficiency in it.

Preparation and defence of a thesis are required.

Malcolm Ross Award in Canadian Literature

To be awarded at the discretion of the Department of English for an outstanding MA or PhD thesis in the field of Canadian Literature. McClelland and Stewart, publishers of the New Canadian Library series, have funded the award to honour Malcolm Ross, founding editor of the series and Professor Emeritus in the Department of English.

III. Classes Offered

Graduate Seminars

Approximately seven full-year seminars or the equivalent are offered each year. Students should consult the Department about which of the following seminars will be offered.

ENGL 5110X/Y.06: Middle English Literature.

A study of major and minor works in Middle English, including poetry by Chaucer, Langland, and the Pearl-Poet. We will pay particular attention to language, manuscript transmission and cultural context.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTORS: M. Furrow, H. Morgan.

ENGL 5120X/Y.06: Early English Plays.

A survey of the native English dramatic tradition, from liturgical plays, through guild drama, moralities, and saints' plays, to the drama of Marlowe and contemporaries.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

***ENGL 5125.03: The Social Context of Guild Drama.**

A study of cultural production in the late Middle Ages, focused on the plays owned and produced by trade guilds in English towns.

ENGL 5130.03: Gender and Sex in Medieval Literature.

This class examines the representation of gender and sex in Medieval literature, with a study of topics such as constructions of gender, the invention of romance and its relation to misogyny, the role of women in literary production, and the representation of various sexualities.

INSTRUCTOR: A. Smol

ENGL 5226X/Y.06: Re-imagining Shakespeare.

This class looks at creative re-imaginings of Shakespeare's plays - some modern, some his own; it looks at textual debates over whether different editions of a play should be conflated or isolated; and it looks at the angles of approach developed by various theoretical paradigms. The class will attempt to get at such questions as what is the relation between creative and critical reimaginings, and what constitutes the continuing life of Shakespeare's work?

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: J. Baxter

ENGL 5230X/Y.06: Renaissance Poetry and Rhetoric.

The central aim of this class will be to evaluate the achievement of English Poetry during the sixteenth and early seventeenth centuries. We will explore this question primarily through a study of short poems, their relation to the influential rhetorical works, and their relation to each other.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: J. Baxter

ENGL 5231.03: Spenser, Shakespeare, Donne: Eros and Chastity.

How do Renaissance poets organize erotic experience? What forms (genres, styles, methods) do their orderings take, and what are their motives (personal, cultural, religious)? We will explore these and related questions by concentrating on selected works by Donne, Shakespeare, and Spenser.

INSTRUCTOR: J. Baxter

ENGL 5246.03: The Drama from Marlowe to Ford.

An exploration of the diversity of textual and theatrical practice within the canon (and at the margins) of Renaissance drama. Critical strategies will be pluralistic: both detailed analysis of particular scenes and wide-ranging discussion of cultural issues are encouraged. Playwrights to be studied include Marlowe, Heywood, Beaumont, Jonson, Webster, Middleton, and Ford.

INSTRUCTOR: R. Huebert

ENGL 5250X/Y.06: Renaissance Dissident Writers.

A study of writers who don't share one or more of the normative Renaissance positions, or who have strong reasons for believing that the established order is set up in such a way as to exclude them. Some authors (Southwell, Winstanley, Eliza, Osborne) will be obscure; others (Marlowe, Donne) canonical.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: R. Huebert

ENGL 5258.03: Early Modern Privacy.

An exploration of the development of privacy in early modern culture with reference to texts ranging from canonical poetry (by Donne and Marvell) to discursive life-writing (by Montaigne and Browne) to personal letters and diaries (by Dorothy Osborne and Anne Clifford). Is privacy necessarily the preserve of the privileged? Did puritanism promote or inhibit the development of privacy? Did privacy mean the same thing to women as to men? Questions like these will be offered as a provocation to discussion and further enquiry.

INSTRUCTOR: R. Huebert

ENGL 5265.03: Writing Women/Women Writing in Early Modern England 1540-1640.

This half-class explores the context and range of women's writing in Tudor and Stuart England. Adopting a multidisciplinary approach, we will examine a range of works by and about women, from witchcraft trials and medical treatises, to poems, plays, translations and polemical pamphlets in an attempt to determine the relation of early women writers to their culture. Writers to be studied in depth include Mary Wroth, Elizabeth Cary, and Aemilia Lanier.

INSTRUCTOR: C. Luckyj

ENGL 5267.03: Shakespeare's Sister: Lady Mary Wroth.

Mary Wroth, the gifted and prodigious author of a prose romance, sonnet cycle, and pastoral drama, offers us a unique opportunity to study the literary achievements of one who was both (as a member of the Sidney family) heir to cultural privilege and (as an unchaste woman) a marginal and subversive figure. Her work will be studied in the context of early modern notions of gender, class and authorship.

INSTRUCTOR: C. Luckyj

ENGL 5306.03: The Restoration Theatre.

This half-class traces various aspects of the English stage from 1660 to 1700. In addition to approximately a dozen plays, the class will consider the theatrical milieu of the period, including the audience, casts, and spectacular production techniques. Related political events and theoretical controversies will also be surveyed.

INSTRUCTOR: D. McNeil

ENGL 5310X/Y.06: Restoration and Augustan Satire.

"... a sort of Glass, wherein Beholders do generally discover every body's Face but their Own." Along with such definitions of "Satyr", this seminar examines the major satirical texts and events from 1660 to roughly 1750. Among the topics for discussion will be coffeehouse culture, the popular press, and the battle of the sexes.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: D. McNeil

ENGL 5315X/Y.06: The Eighteenth-Century English Novel.

This class is designed to provide a broad survey of the English novel from Behn to Austen. All the major forms will be considered: amatory fiction, the fictional memoir, the adventure narrative, epistolary fiction and the Scarron-like comedy of Henry Fielding. Other subjects that will be considered include the origins of the novel, the novel versus the romance and readership.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: D. McNeil

ENGL 5316.03/5317.03: Studies in the Eighteenth-Century English Novel.

This half-class is devoted to the study of a special subject in the early English novel (e.g. Desire, the image of America, the comic novel, the rise of the female novelist). Students should consult the supplement for a detailed description.

INSTRUCTOR: D. McNeil

ENGL 5335.03: Reading Pope and Swift: Satire, Entrapment, Theory.

This seminar has two aims: to consider the virtues and limitations of reader-response criticism, and to assess the value of this approach in interpreting satiric works by Jonathan Swift and Alexander Pope. Of principal concern is the degree to which satire exerts a rhetorical and affective force upon readers that encourages them to work, to make meanings in negotiating twists and turns in the text, and to revise continually their own assumptions about what they are reading.

INSTRUCTOR: T. Ross

ENGL 5355.03: Eighteenth-Century Popular Literature and History: An Interdisciplinary Approach.

This half-class engages in the interdisciplinary study of popular literature. Various theories of popular culture are considered. Students encounter relevant scholarship outside of literary criticism (e.g., art, legal, and economic history, social psychology, folklore and music) by way of an examination of selected episodes in eighteenth-century English life.

INSTRUCTOR: D. McNeil

ENGL 5405X/Y.06: The Wordworths and Coleridge in Conversation.

A sustained exercise in "intertextual genetics", this class will uncover the dynamics of collaboration, debate and 'joint labour' at work in the production of texts by Coleridge and the two Wordworths (William and Dorothy), and will consider the implications of this exercise for our ideas of literature: nature of poetry, identity, society and gender which these writers have bequeathed to us.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: J. Thompson

ENGL 5410X/Y.06: Innovation and Tradition in Romantic Poetry.

Each of the major Romantic poets experimented with the forms of epic, romance, and drama. This seminar will introduce students to some of these longer works in their entirety, and consider the ways their authors transformed these genres.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: R. Tetreault

ENGL 5411.03/5412X/Y.06: Women and Men in the Romantic Era.

Beginning with a study of the changing roles of women in the Age of Revolution, this seminar will examine how men represented women and how women represented themselves at this time. Connections between gender and genre as well as feminist critiques of Romanticism will guide discussion.

NOTE: Students taking ENGL 5412 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: R. Tetreault

ENGL 5414.03: Romantic Women Writers.

Contributes to ongoing feminist reassessments of "English Romanticism" by surveying key genres and forms to which women made notable contributions (the sonnet, the Jacobin & gothic novel, the heroic epistle) and examining the nature of the influence that writers like Wollstonecraft, Smith Barbauld, Hemans and Baillie had on their contemporaries and are having on current scholarship.

INSTRUCTOR: J. Thompson

ENGL 5415X/Y.06: Wordsworth and Coleridge.

The close literary relations between these Romantic authors often followed the course of a dialogue in which they responded to one another in alternating poems. Their disagreements over the locus of ultimate value and the solace of nature will be explored.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: R. Tetreault

ENGL 5417.03: The 1790s: The Revolutionary Decade.

This class focuses on the discourse of the 1790s, a turbulent transitional period in which vigorous debates about the rights of man and the wrongs of woman, the politics of class and race, reshaped literature even as they rocked the foundations of English society. Reading a range of canonical and non-canonical Romantic writers in their contemporary contexts, students will gain new insight into the origins of romanticism, as well as gaining a new perspective on current debates about the politics of literature.

INSTRUCTOR: J. Thompson

ENGL 5420.03: Keats and Shelley.

Experiments in longer poetic forms by the younger Romantics will be the focus of this seminar. The literary rivalry between the two poets will help to guide discussion. Their disparate views on political action and on the adequacy of language will be explored.

INSTRUCTOR: R. Tetreault

ENGL 5421.03: Keats.

Keats' journey from lyric to epic will be the focus of this seminar. Indeterminacy and the quest for meaning in his poems, his representations of women, and the assimilation of contemporary discourses of love in his work are among the topics to be examined.

INSTRUCTOR: R. Tetreault

ENGL 5422.03: Shelley.

Shelley's journey through epic to drama will be the focus of this seminar. Tensions between skepticism and vision, his representations of women, and the radical social critique evolving in his poetry are among the topics to be examined.

INSTRUCTOR: R. Tetreault

ENGL 5445X/Y.06: Subject Formations: Interdisciplinary Theory and the Bildungsroman.

This class brings an interdisciplinary body of theory to bear in studying representative examples of the Bildungsroman or "novel of formation" produced from the nineteenth century to the post-modern period, ranging from Jane Eyre to Bharati Mukherjee's

Jasme. It draws on generic theories of the novel of development; theories of gender, race and class; theories of the "self" and their transformation into theories of the "subject"; theories of psychological and ethical development; gay and lesbian theory; and postcolonial theories.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: M. Stone

ENGL 5450.03: Studies in the Victorian Novel: George Elliot and History.

A study of George Elliot's novels and essays as contributions to 19th-century debates over historiographical styles and standards.

INSTRUCTOR: R. Maitzen

ENGL 5485.03: Victorian Women Writers.

This class looks at fiction, poetry, and non-fiction prose by 19th-century women writers including Charlotte Brontë, George Eliot, Elizabeth Barrett Browning, Elizabeth Gaskell, and Harriet Martineau, considering their works both as part of the vigorous intellectual environment of Victorian Britain and as part of a burgeoning tradition of women's writing.

INSTRUCTOR: R. Maitzen

ENGL 5545.03: George Orwell and the Politics of the Plain Style.

This class has three primary objectives: 1) to introduce students to the breadth of this well-known author's work, 2) to discuss problems inherent in a "plain style" presentation, and 3) to branch out into broader considerations of Orwell's literary and political contributions.

INSTRUCTOR: A. Stewart

ENGL 5560.03: The Movement Poets.

This class examines The Movement as a cultural and a literary tradition, and explores the work of central figures associated with its name primarily because of their inclusion in given anthologies (e.g. Elizabeth Jennings, Philip Larkin, Thom Gunn, Kingsley Amis, Donald Davie, and Ted Hughes). The Movement anthologies and the politics of anthology production will be examined in some detail.

INSTRUCTOR: T. Whalen

ENGL 5815X/Y.06: Modern Canadian Poetry.

This class studies a selection, which varies from time to time, of major figures in Canadian poetry, from the beginning of the twentieth century to the present day. A mixture of theoretical approaches is encouraged.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: P. Monk

ENGL 5620X/Y.06: Modern Canadian Fiction.

A consideration of canonical and non-canonical works from the 1920s through the 1990s.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: J.A. Wainwright

ENGL 5625.03: Studies in Modern Canadian Poetry.

This class studies a selection, which varies from time to time, of major figures in Canadian poetry, from the beginning of the twentieth century to the present day. A mixture of theoretical approaches is encouraged.

INSTRUCTOR: P. Monk

ENGL 5628X/Y.06: Modern Canadian Literature: Rewriting History.

An examination of the rewriting of history and the relationship between creative expression and social and political realities in works by Native-Canadians and members of other racial minorities.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: J.A. Wainwright

ENGL 5845.03: Intercultural Issues in Canadian Literature.

This class will consider works by several Canadian writers who, through their focus on questions of race, ethnicity, and gender has reinscribed the Canadian cultural landscape and so redefined the politics of cultural experience in Canada.

INSTRUCTOR: A. Wainwright

ENGL 5805.03: Walt Whitman and Emily Dickinson.

A close study of the works and lives of two great American poets of the nineteenth century.

INSTRUCTOR: B. Greenfield

ENGL 5811.03: American Lives.

Drawing on a wide range of experiences and texts from the eighteenth and nineteenth centuries, this class is an exploration of possible lives, of the give and take between literary imagination and the other determining forces of life.

INSTRUCTOR: B. Greenfield

ENGL 5815X/Y.06/5817.03: American Travel/American Literature.

This class explores the connections between the rich archive of travel reportage from the eighteenth and nineteenth centuries and American works of fiction and poetry during the same period. An hypothesis of the class is that travel genres exerted a profound influence on the American literary imagination of the nineteenth century.

NOTE: Students taking ENGL 5815 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: B. Greenfield

ENGL 5830.03: Reading American Modernism.

This course looks at the initial reception of some central works of High Modernism as well as works that have been considered to be at its fringes. In doing so, it considers questions of how the canon was formed.

INSTRUCTOR: L. Diepeveen

ENGL 5835.03: Finding a Centre: Making Literary History In Contemporary American Poetry.

Selecting from a wide range of poetic practices, this course considers the work of five or six contemporary poets. It does so in order to explore the contesting aesthetic principles critics and poets are currently using to construct versions of contemporary poetic history.

INSTRUCTOR: L. Diepeveen

ENGL 5840X/Y.06: Literary Talk: How Modernism was Invented.

This seminar discusses the variety of forms and strategies that were used to invent Anglo-American Modernism as a recognizable moment in literary history; that is, as a literary period, with its own techniques, central and marginal authors, paradigmatic stories, and boundaries.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: L. Diepeveen

ENGL 5845.03: Forms of Modern Literary Production.

This class examines the context in which the texts of modernism were produced. It considers the roles of little magazines, anthologies, manifestos, and the rise of literary criticism as a profession.

INSTRUCTOR: L. Diepeveen

ENGL 5875.03: Twentieth Century African American Intellectual Debate.

This class examines a wide selection from Orwell's documentaries and other non-fiction, as well as his six novels in addition to the significant predecessors to Nineteen Eighty-Four - Yevgeny Zamyatin's *We* and Aldous Huxley's *Brave New World*. We will also evaluate claims recommending and criticizing plainness of literary style.

INSTRUCTOR: A. Stewart

ENGL 5906.03: Problems in Literary History.

Literary historians believe that texts ought to be interpreted in relation to their historical contexts, and that a study of this relation provides a fuller understanding and appreciation of those texts than is otherwise possible. This seminar examines the theoretical principles of literary history as proposed by some representative twentieth-century critics, from the old historicists to the new. Topics might include periodization, genre and generic change, the anxiety of influence, feminist literary history, reception aesthetics, the sociology of literary production, literary history and disciplinaryity, and the problem of mediation.

INSTRUCTOR: T. Ross

ENGL 5918.03: The Politics of Representation.

This class will examine literary works as politically or ideologically charged representations of complex, historically situated events and experiences. We will focus our attention not only on Western representations of non-Western others but also on non-Western resistance to such representations.

INSTRUCTOR: V. Li

ENGL 5922.03: Neo-Primitivism In Contemporary Discourses.

This class will examine critically the continuing Western fascination with the "primitive" in fiction, films, philosophical writings, literary criticism, art exhibitions, and counter-cultural lifestyles.

INSTRUCTOR: V. Li

ENGL 5928X/Y.06: Literary Couples and Collaborators.

This team-taught class questions paradigms of the "solitary genius" by approaching the works of literary couples and collaborators in conjunction with one another. It considers the dynamics of interpersonal and intertextual relationships; the differing trajectories of the "family romance"; mutual differences and difficulties with the muse; mentoring versus "mothering" a partner's creativity; anxieties of authorship and of mutual influence; sexual/textual tensions; playing the role of an implied, ideal or actual reader/listener; and revising or editing a partner's works as a form of co-authorship and/or co-option.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTORS: J. Thompson, M. Stone

ENGL 5935.03: Canonicity.

This seminar is intended as an experiment in "teaching the conflicts" that are currently vexing the profession of English literature about the nature of literary value and the "canon". Readings for the course will include "classic" statements on value by Hume, Johnson, and Arnold, and more recent position papers on the theory of canonicity by such critics as Harold Bloom, Frank Kermode, Pierre Bourdieu, and others. Among the questions that may be addressed are the following: is aesthetic value enduring or relative to specific social formations? What do we mean when we say a work is good or a classic? Is there a test of time and should we abide by it? Is value something that inheres in a text or something assigned to it? How are literary canons formed and for what purpose? What is the relation between the canon and the curriculum?

INSTRUCTOR: T. Ross

ENGL 5940X/Y.06, 5941.03: Queer Theory.

An examination of recent developments in lesbian and gay cultural criticism. Topics to be covered may include identity politics, camp, psychoanalytic theories of identification, pornography, and the representations of AIDS.

NOTE: Students taking ENGL 5940 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: S. Bruhm

ENGL 5945.03: Representations of Slavery: Race, Writing and Gender.

This class focuses on narratives of and about slavery written over 3 centuries in a range of genres on both sides of the Atlantic. The selection of texts is designed to foreground the syncretic hybridity of cultural traditions and to problematize binary oppositions between black and white, and female and male authors, between history and literature, and between traditional and postmodern works.

INSTRUCTOR: M. Stone

ENGL 5965.03: The Book and the Reader.

The immaterial experience of fiction always arises out of a material text. The negotiation between the book as a physical object and what the reader makes of it is here studied primarily through phenomenology and psychoanalysis.

INSTRUCTOR: P. Schwenger

ENGL 5995.03: Freud and Fiction.

This seminar will study writings by Freud that have implications for the psychology of literature; literary works about Freud; and critical essays that extend Freud's ideas.

INSTRUCTOR: P. Schwenger

ENGL 9000.00: MA Thesis.

ENGL 9530.00: PhD Thesis.

Environmental Studies

Location: 1312 Roble Street
Halifax, NS B3H 3E2
Telephone: (902) 494-3632
Fax: (902) 494-3728

Resource and Environmental Studies

Director of School

Duinker, P., BScAgr (Guelph), MES (Dal), PhD (UNB)

Academic Programme Co-ordinator

Beazley, K.F., AA (Fanshawe), BLA (Guelph), MA (Waterloo), PhD (Dal)

Professors

- Apostle, R., BA (SFU), MA, PhD (Calif, Berkeley), major appointment in Sociology and Social Anthropology. Fisheries social science; comparative analysis of small-scale fisheries
- Boardman, R., BSc, PhD (Lond), major appointment in Political Science. Environmental issues & international organizations; environmental spending; forestry & land use, environmental land use in Canada
- Cohen, F., BA, MEd (Harvard), PhD (Minn). Native people & natural resources; fisheries co-management; education & training in environmental management
- Côté, R.P., BSc (Loyola), MSc (Memorial), Industrial Ecology; Marine environmental protection strategies; management of chemical hazards & wastes; environmental policy
- Duinker, P., BScAgr (Guelph), MES (Dal), PhD (UNB)
- Freedman, B., BSc, MSc, PhD (UofT), major appointment in Biology. Ecological effects of pollution, disturbance & other stressors, including: effects of forest harvesting on vegetation, wildlife & site quality. Pollution of surface waters; toxic elements; acidification; arctic ecology, design of ecologically sustainable resource-use systems
- McAllister, I., MA (Oxon), MA (Cantab), major appointment in Economics. Disaster relief, prevention & development; sustainable development & foreign aid; regional development in industrial nations
- Renton, K.W., BSc (Sir Geo. Wms.), PhD (McG), major appointment in Pharmacology. Infection & drug disposition; biochemical monitoring of marine pollution; drug use in renal transplantation
- Ricketts, P.J., BA (Nottingham), PhD (Southampton), Dean of Graduate Studies. Coastal Zone Management; GIS applications in coastal & ocean management, Strategic Environmental Assessment
- Willison, J.H.M., PhD (Nottingham), joint appointment with Biology. Nature Conservation (marine & terrestrial), policy & practice; plant stress physiology
- Wood, K.S., BA, MA (Oregon), Director. Environmental/ecological economics; resource systems & economic instruments for environmental management, environmental education

Associate Professors

- Brown, M.P., BA (Mt.A), MA (Dal), PhD (UofT) major appointment in Public Administration. Environmental policy & administration; dimensions of provincial environmental spending; forestry & land use; environmental industry in Canada
- Cross, M.L., AA (Dawson College), BA (Montana), MA (SFU), PhD (Texas A&M), major appointment in Economics. Economics of fisheries management; history of economic thought

- Newkirk, G.E., PhD (Duke), major appointment in Biology. Community-based coastal resource management in developing countries; integration of fisheries & aquaculture as a food production system.
- Patton, D.J., BA (UNB), MA (UofT), DBA (Indiana), major appointment in Business Administration. Exporting success-small to medium sized firms; international trade problems in the fishery.
- VanderZwaag, D., BA (Calvin), MDiv (Princeton), JD (Arkansas), LL.M. (Dal), joint appointment with Law.

Assistant Professors

- Beazley, K.F., (Academic Program Coordinator) Biodiversity conservatin, protected area systems planning and management, conservation biology and landscape ecology, environmental philosophy/ethics.
- Doyle-Bedwell, P., BA, LLB (Dal) Aboriginal women and justice, environmental issues and aboriginal interests in land, mi'kmaq people and health.
- Guemsey, J.R., BSc (Carleton), MSc, PhD (Iowa), cross appointment in Community Health and Epidemiology.
- McConnell, M.L., BA (Victoria), LLB (Dal), PhD (Sydney) Business and the environment, alternative dispute resolution, international environmental law, law of the sea, feminist theory.
- Saunders, P., BA, MA, LLB (Dal), major appointment in Law. Canadian environmental law, international law; law and development assistance; law of the sea

Research Associates

- Barchard, W., BSc, MSc (Guelph), Environment Canada
- Beach, H., BA (Hons) (Simon Fraser), MSc (McG), Department of Canadian Heritage
- Beanlands, G., E.E., BSc (UNB), PhD (Dal) Environmental impact assessment, computer applications in environmental management, education and training in environmental management.
- Buckley, D.E., BSc (Acadia), MSc (Western), PhD (Alaska), BIO
- Campbell, J.M., BA (Dal), MA, PhD (UC Irvine)
- Chute, J., BA (Dal), MA (MUN), MA (UofT), PhD (McM)
- Crawford, R., MSc, PhD (UofT), NS Dept. of Fisheries
- Howell, G., BSc, MSc (Dal), Environment Canada
- Leith, J., BPhysEd (McM), MA (Guelph)
- Monk, K.A., BSc (Durham), PhD (Lond)
- Reade, J., BA (SMU), MLS (Dal)
- Tomasick, T., BSc (UofT), PhD (McG)

Adjunct Professors

- Babcock, T.G., BA (McG), MA, PhD (Cornell). (ESCDI Project, Indonesia)
- Beasley, K.B., BES, PhD (Waterloo), Nova Scotia Agricultural College
- Bondrup-Nielsen, S., BSc (Guelph), MSc (UofT), PhD (Alta), Acadia University
- Charles, A.T., BSc (Carleton), PhD (UBC), Saint Mary's University
- Cossey, K., MES (York), Heritage Canada
- Dabon, G., BA (Keele), MSc, PhD (Alta), Acadia University
- Gold, E., BA, LLB (Dal), PhD (Wales)
- Grant, J., MA, PhD (Waterloo), Nova Scotia College of Art & Design
- Guppy, S., BSc (Nottingham), MSc, PhD (Wales), MArch (Columbia), DalTech
- Herman, T., MSc, PhD (Alta), Acadia University
- Hood, R., BPE (Calgary), MS, PhD (Ill), jointly appointed in Community Health
- Manuel, P., BA (Carleton), MSc (McG), PhD (Dal). Nova Scotia College of Art and Design
- Martin, R., BA (Carleton), MSc (Carleton), PhD (McG). Nova Scotia Agricultural College
- Munro, N., BSc (UNB), MA (Carleton), Parks Canada
- Pinter, J., MSc (Eotvos), PhD (Moscow State), DalTech
- Rifai, N., MSc, PhD (Nitra), Nova Scotia Agricultural College
- Scarratt, D.J., BSc, PhD (Wales), Bedford Institute of Oceanography
- Shaw, R.W., DEng (RMC), BSc (Queen's), MA (UofT), PhD (McG), Environmental Consultant
- Vigerstad, T., MSc, PhD (Rhode Island), Bio-Response Systems Limited

Waller, D.H., PhD (Dal), DIC(Public Health) (Lond), BEng (TUNS), DalTech
Wells, P.G., BSc (McG), MSc (UofT), PhD (Guelph), Environment Canada

The School is the centre for environmental scholarship and research at Dalhousie. It is a leading institution in environmental management and capacity building in Canada and abroad. It offers a two year Master's programme leading to the Master of Environmental Studies (MES) degree which includes class work and a thesis.

At the core of the School is an interdisciplinary teaching and research programme emphasizing rigorous inquiry and ethical practice as the foundation of responsible environmental and resource management. Efforts are devoted to addressing causes rather than symptoms and learning to predict change. Students take core classes from which they will acquire a broad, interdisciplinary background in environmental studies. There are opportunities for study and research from the points of view of policy, technique and science.

In addition to working partnerships within the Faculty of Management, SRES contributes to many other programmes on the Dalhousie campus, including the Marine Affairs Programme and the Lester Pearson Institute for International Development. The School also assists and collaborates with other institutions such as the Nova Scotia Agricultural College. The School through its many teaching, research and community service initiatives, strengthens the University's capacity in resource and environmental studies.

The core faculty of the School is complemented by cross-appointed faculty whose major appointments are in other units within Dalhousie, at other universities or in government agencies.

I. Admission Requirements

As established by the Faculty of Graduate Studies, the entrance requirement is an Honours Bachelor Degree or the equivalent of honours with at least a B average (3.0 GPA) from a university recognized by the Senate of Dalhousie University. A four year Baccalaureate degree may be considered as the equivalent of honours if there is significant evidence of independent research capacity. Students with a professional degree in law, architecture, medicine or engineering with a concentration in environmental studies, may be considered for the one-year programme.

Deadline for application is February 15.

II. Programme Duration and Minimum Requirements

For most students, the minimum programme will occupy two calendar years. In addition to the thesis requirement, 11 half-credit classes are required. Students whose specialization is in the natural sciences must take at least two classes in the social sciences and vice versa. All students take classes in environmental studies, environmental assessment, environmental economics and environmental law, as well as classes in their particular area of specialization. Class work beyond the minimum load may be required and is specified by the Programme Coordinator after discussion with the student and his/her academic advisors. Students will generally complete the following requirements:

1. ENVI 5000X/Y.06
2. ENVI 5001.03
3. Four approved graduate half-classes
4. ENVI 5110.03, ENVI 5031.03 or appropriate alternative
5. ENVI 5200.03 (or appropriate alternative)
6. A class with an international perspective
7. ENVI 5002.03
8. ENVI 9000.00 (Thesis)

NOTE: It is very strongly recommended that all students take the course in Research Methods (ENVI 5035.03) in preparation for developing a thesis proposal.

In exceptional cases, a student may be admitted to a one-year programme. The requirements for a one-year programme are:

1. ENVI 5000.06 and 5001.03

2. Two graduate level classes related to an environmental theme in the student's area of specialization.
3. ENVI 9000.00 (Thesis)

III. Classes Offered

All classes except ENVI 5002.03 and ENVI 9000.00 are open to students in other programmes by permission of the instructor. Please note that not all classes are offered each year, class content may also vary from year to year.

- ENVI 5000.06: Introduction to Environmental Studies. K. Beazley
ENVI 5001.03: Environmental Assessment. P. Duinker
ENVI 5002.03: Environmental Studies Joint Project.
ENVI 5004.03: Management of Chemicals and Waste. R.P. Côté
ENVI 5006.03: Environmental Toxicology. P. Wells and B. Freedman
ENVI 5008.03: Nature Conservation. M. Willison
ENVI 5010.03: Introduction to Environmental and Occupational Health. J. Guernsey - Cross-listing CH&E 6001.03
ENVI 5020.03: Resource Systems and Economic Development. S. Wood
ENVI 5021.03: Fisheries Management and Development. T. Charles
ENVI 5030.03: Seminar on Management of Sustainable Development. Cross-listing: PUAD 6775.03
ENVI 5031.03: Environmental/Ecological Economics. S. Wood
ENVI 5032.03: Aquatic Toxicology and Water Quality Assessment. P. Wells
ENVI 5035.03: Research Methods. P. Duinker
ENVI 5036.03: Rural Environments. K. Beasley
ENVI 5038.03: Public Involvement in Resource Management.
ENVI 5039.03: Indigenous People and Natural Resources Issues. F. Cohen
ENVI 5041.03: Environmental Education. F. Cohen
ENVI 5044.03: Industrial Ecology Seminar. R.P. Côté
ENVI 5047.03: Protected areas Management. M. Willison
ENVI 5048/49.03: Independent Reading. Faculty
ENVI 5110.03: Resource Economics. P. Burton - Cross-listing: ECON 5516.03
ENVI 5120.03: Environmental Ecology. B. Freedman - Cross-listing: BIOL 5060.03
ENVI 5180.03: Coastal Communities in the North Atlantic. TBA - Cross-listing: SOSA 3220.03/5220.03
ENVI 5200.03: Environmental Law. A: P. Saunders, B: D. Vander Zwagg - Cross-listing: LAWS 2104.03
ENVI 5204.03: Coastal Zone Management. E. Meltzer - Cross-listing LAWS 2041.02
ENVI 5480.03: Environmental Ethics. K. Beazley - Cross-listing PHIL 2480.03
ENVI 5601.03: Management of the Marine Environment. TBA
ENVI 5818.03: Management and the Natural Environment. R.P. Côté and D. Patton
ENVI 9000.00: Master's Thesis

IV. Class Listing

Please note that not all classes are offered every year and that class content may vary slightly from year to year. When a class is cross-listed in another department or school the other number is shown in brackets.

ENVI 5000X/Y.06: Introduction to Environmental Studies.

The first term focuses on the interdisciplinary nature of environmental studies. It begins by exploring broad issues of how people (including ourselves) view our place in nature and then turns to a series of topics currently at the centre of interest in Environmental Studies. These topics, which vary from year to year, may include global population and consumption issues, biodiversity conservation, climate change, sustainability, and pollution. The second term focuses more explicitly on resource management in various sectors such as forestry and mining, as well as roles of native peoples and non-governmental organizations.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

ENVI 5001.03: Environmental Assessment.

This course provides an opportunity for the students to explore all aspects of environmental impact assessment (EIA) as practiced in Canada and in other countries. The course traces the development of EIA over the past 20 years and critically examines the scientific, procedural and political dimensions. Over this period, EIA has become an integral part of project approval in government, the private sector and development agencies.

ENVI 5002.03: Joint Project.

In this course, students work together as an interdisciplinary team on a project which the group selects and carries out in consultation with the course instructor. Some of the projects undertaken by student teams are as follows:

- Taking Responsibility for Water Quality in the Bras d'Or Lakes (1998)
- An Ecological Assessment of the Musquodoboit Trail. A Joint Project with the Musquodoboit Trailway Association (1998)
- McNabs, the Learning Island: A Proposal for an Outdoor Education Centre (1997)
- Folkestone Marine Reserve, Barbados (1998)
- Biological Diversity Plots in Fundy National Park (1997)
- Developing a Framework to Incorporate Traditional and Ecological Knowledge in Nunavut. (1996)

Under exceptional circumstances, joint projects have also been undertaken in the Philippines, Indonesia and Nunavut.

ENVI 5004.03: Management of Chemicals & Wastes.

The fear of exposure to chemicals of undetermined toxicity in food, water, air and the workplace is a major public issue. Lack of knowledge about persistence, toxicity, production and use patterns, economic impacts, and regulation leaves many uncertainties concerning the degree of risk and contributes enormously to the complexity of the management problem. Government policies and programs at all levels are fragmented but major efforts are underway to rationalize the decision-making process. This course reviews the nature and scope of the problem, toxicological and physical-chemical studies, control technology, economic and legal aspects, perceptions of risks and management approaches.

ENVI 5006.03: Environmental Toxicology.

This course presents some of the major principles and concepts of current environmental toxicology, with an emphasis on ecotoxicology. It includes case studies and examples from local, national and international sites, both terrestrial and aquatic. Lectures cover the behavior of chemicals in the environment (chemodynamics) and organism (pharmacokinetics), risk assessment, concepts and applications of ecotoxicology, toxicology and environmental epidemiology, and the integration of chemical, physical and toxicological data into hazard and risk assessments. A number of case studies are covered in detail, including pesticide use in forestry, metals in coastal waters, marine toxins, contaminated harbour sediments, and hydrocarbons in the marine environment. The pivotal role of ecotoxicology in identifying critical environmental problems and aiding in their prevention, control and resolution is emphasized throughout.

ENVI 5008.03: Nature Conservation.

This course traces the development of human economy and the resultant impact on the wild environment. Particular attention is paid to human population dynamics, biotic extinctions and land-use patterns. Having identified the causes of impoverishment of biodiversity the course examines possible cures, including: sustainable development, conservation science and environmental ethics. Special attention is paid to the establishment and management of protected areas.

CROSS-LISTING: BIOL 3601.03

ENVI 5010.03: Introduction to Environmental and Occupational Health

This course will introduce students to many of the principles and concepts underlying environmental and occupational health, focusing on human health. It will review the nature of a variety of agents, including chemical, physical, biological, ergonomic and

radiation hazards, how these agents are dispersed and transformed in the environment, the pathways of human exposure to these agents, and characterization of the health effects resulting from exposure. It will present methods for evaluating and controlling hazards, including occupational hygiene evaluation techniques and risk assessment models used in environmental settings. A number of case studies will be covered in detail, including indoor air quality, heavy metals exposure, and organic dust in workplace environments. Special topics will include risk communication and health promotion in the workplace. The course will conclude with a summary of legislative initiatives and standards which have been implemented to protect human health and an evaluation of their effectiveness.

CROSS-LISTING: CH&E6001.03

ENVI 5020.03: Resource Systems and Economic Development.

Through past mismanagement and heavy exploitation, resources in many parts of the world are being degraded and used in a non-sustainable fashion. Aside from loss of ecological values, the cost is high in economic and social terms particularly for meeting future needs. This course reviews environmental constraints and opportunities for renewable resource development in Canada and selected Third World countries. Rather than treat resources individually, attention is given to resource systems with consideration of their ecological functions. Particular attention is given to integrated management approaches as the basis for sustainable social and economic development.

ENVI 5030.03: Seminar Management of Sustainable Development.

Sustainable development has become a defining concept in public policy debates during the late 20th Century, yet it is widely misunderstood and misused. This seminar explores the various dimensions of the concept, drawing upon a wide variety of disciplinary literature, including that of ecological economics. This course is not just for a disciplinary or even interdisciplinary understanding, but rather for a transdisciplinary framework that will provide a new way of thinking about the future of our globe as we pass into a new millennium. Since the path of inquiry enters incompletely charted territory, the course is experimental and participatory, joining faculty, guest speakers and a small number of students in a creative quest.

PREREQUISITES: A graduate student in any program (submit a curriculum vitae), and an interview with the instructor.

CROSS-LISTING: PUAD 6775.03

ENVI 5031.03: Environmental/Ecological Economics.

This course is designed as a one term introduction to economics for MES students who do not have any undergraduate economics. The course is made up of three parts which operate parallel to one another through the term. The first part provides a brief but intense guided tour of economics. This forms the basis for studying applications of economic analysis to environmental issues.

The second part focuses on key topics in environmental economics, including among others:

- the sustainable economy
- theory of market failure, public goods and externalities
- environmentalist critiques of economic thinking
- environmental and natural resource accounting
- economic valuation of the environment
- economic instruments and pollution control
- time in economic/environmental analysis
- economics and environmental management

The final part explores new directions in the field. This focuses mainly on the movement away from a separate "environmental economics" towards a new discipline which better integrates environmental and economic analysis; namely the field of "ecological economics".

The course is open to students in other parts of the University who are interested in economy and environment, and do not have a background in economics.

ENVI 5032.03: Aquatic Toxicology and Water Quality Assessment.

This course covers the principles, concepts and practice of the science of aquatic toxicology.

Current methods of conducting aquatic toxicity experiments/tests will be discussed, from organism selection and maintenance, to testing and data analysis. Concepts of how different organisms (from algae to fish) respond to aquatic pollutants will be presented; these will include topics such as factors influencing exposures and responses, bioaccumulation and metabolic response, chronic sublethal effects at the subindividual, individual and population levels, and recovery. Case studies where aquatic tests have been deployed will be described, with emphasis on Canadian examples. Throughout the course, the important role of aquatic toxicology in the assessment of water, sediments, effluents and other complex mixtures, priority and in effects monitoring will be emphasized.

Invited speakers will contribute to the course, as will one or more laboratory visits (to demonstrate key concepts and principles in the field). Selected readings will be provided; the text will be *Fundamentals of Aquatic Toxicology* (2nd edition 1994), supplemented by others.

ENVI 5035.03: Research Methods.

This course recognizes that MES graduates will be both practitioners and critical users of research. Interdisciplinary research makes heavy demands on both groups, requiring an extensive knowledge base, familiarity with a wide range of methods and techniques and the ability to make connections and place work in context. How do we initiate such research, and how do we recognize its quality?

Part of the course deals with the practice of research. We attempt to answer questions about the nature of research, the formulation of questions, design of research programs and ethical issues, as well as the business of research. The latter part of the class provides a detailed overview of frequently used research methods and means of data analysis. Exercises and readings are designed to provide students with a sufficient introduction to recognize the strengths and limitations of various methods.

ENVI 5036.03: Rural Environments.

A seminar/project based course focused on contemporary rural environments, including social and land use issues, in the developed world (especially Canada). The course begins with a series of lecture/discussion sessions on selected rural themes and continues with presentations based on student research. Students will participate in discussions, review current research, and prepare and present a research paper. The course offers an opportunity to examine issues of personal interest with some intensity (e.g. loss of agricultural land to urban development, rural recreation resource development problems, social disadvantage in rural areas).

ENVI 5038.03: Public Involvement in Resource Management.

Students will take a learning-community approach to their investigations into the many ways in which the public can become involved in resource management. Considerable attention will be given to rationales for and barriers to public involvement. Assignments will include major literature reviews, oral presentations in class, and group work on major case studies.
INSTRUCTOR: P. Duinker

ENVI 5039.03: Indigenous Peoples and Natural Resource Issues.

This is a special topics course which includes readings, discussion, guest lecturers and videos. Readings will include: Burger, *The Gaia Atlas of First Peoples*; Bodley, *Victims of Progress*; Richardson, *Drumbeats*; and Cohen, *Treaties on Trial*, as well as recent films and videos.

ENVI 5041.03: Environmental Education.

This new course will provide a broad examination of the conceptual bases of learning and understanding the environment. It will consider current educational efforts to promote values, attitudes,

and behaviors protective of environmental integrity. Topics covered will include environmental education in formal school programs, experiential environmental education, environmental literacy initiatives, continuing professional education, and the role of the media in environmental education.

ENVI 5044.03: Industrial Ecology Seminar.

Industrial production systems are economic institutions operating in a physical and biological world; economies are contained within and dependent on ecosystems. Environmental management implies that human requirements can be fulfilled while preserving ecological integrity. It is becoming quite clear, however, that human economies depend on the products and services provided by healthy, functioning ecological systems. Industrial ecology is a framework which analyzes the flows of materials and energy within a web of producers, consumers and decomposers, resulting in the design and operation of industrial infrastructures within the carrying capacity of natural ecosystems.

The course will be a 13-week seminar series in which students will discuss various perspectives and aspects of industrial ecology including waste minimization, pollution prevention, design for environment, total quality environmental management and cleaner production.

ENVI 5047.03: Protected Areas Management.

The course examines the selection, design and management of protected natural areas, such as national parks and provincial nature reserves. The theory and practice of protected areas systems is examined. The primary focus of the course is on natural areas protection for biodiversity conservation, but other uses of protected areas (e.g. tourism, recreation and science) will also be considered. Conflicting uses of protected areas will be examined, as will conflicts between the management objectives of protected areas and those of adjacent lands. Protected areas in both terrestrial and marine environments are considered. In the case of marine protected areas, their use in fisheries management is reviewed. Several texts are used and guest speakers from organizations involved in protected areas management are involved.

ENVI 5048/49.03: Independent Readings.

A reading course must first be approved by the Program Coordinator. After obtaining approval, these courses are available by arrangement with appropriate faculty members. An example of a reading course might be 'Readings in Marine Ecotoxicology' with Dr. Peter Wells (Environment Canada).

ENVI 5110.03: Resource Economics.

This course is designed to be an introduction to the theory and application of resource economics for students with a background in economics and the mathematics of optimization. It includes consideration of interpersonal and intertemporal decision-making criteria, the basic theory of nonrenewable resource exploitation (including Hotelling's theory of the mine), as well as a basic forestry model (i.e., the Faustmann model) including extensions which allow for benefits that arise from standing forests. It also considers the Gordon-Schaefer model of the fishery, common-property problems, and optimal dynamic harvesting decisions.
CROSS-LISTING: ECON 5516.03

ENVI 5120.03: Environmental Ecology.

Each week, a different student is responsible for presenting an introduction of the seminar topic, and for chairing the discussion. There are two major types of source material, from which the seminar topics are derived: (1) The book *Environmental Ecology*, which provides source material for discussion of ecological effects of gaseous air pollution, climate change, toxic elements, acidification, forest decline, oil pollution, eutrophication, pesticides, forestry, extinctions, and warfare; and (2) The annual compendium *State of the World*, which provides source material for discussions of more broadly environmental topics, including human population and reproductive issues, sustainable systems, energy and transportation issues, environmental restoration, environmental economics, and others.
CROSS-LISTING: BIOL 5060.03

ENVI 5180.03: Coastal Communities in the North Atlantic.

Coastal communities as a social/ecological type are examined as populations, and social structures (territorial, economic, occupational, political) as they have developed in response to particular ecological and social circumstances. Various perspectives which have been applied to coastal communities are examined with regard to the contribution they make to understanding the dynamics of these communities.

CROSS-LISTING: SOSA 3220.03

ENVI 5200.03: Environmental Law.

This course is designed to provide students with an overview of substantive and procedural aspects of Canadian environmental law. Material will cover both law and policy for environmental protection and control. The course will involve lectures, guest speakers and class participation. A strong emphasis will be placed on the Canadian legislative and regulatory framework and constitutional dilemmas arising from the unique character of the regulated subject areas such as toxic substances, fisheries, water quality, forests, parks and wildlife. The role of the common law in preventing or redressing environmental degradation will also be considered. Emphasis will also be placed on critical procedural processes, alternative approaches to achieving compliance, burden of proof, alternative dispute resolution, standing and costs.

CROSS-LISTING: LAWS 2104.03

ENVI 5204.03: Coastal Zone Management.

This seminar is designed to introduce students to the concepts, principles, approaches and issues associated with integrated management of coastal zones worldwide. Coastal zones are critical areas of transition between land and sea, involving complex overlaps between resource uses and government jurisdictions. This course will address the legal, policy and administrative frameworks prevailing in Canada, but will do so within the global context of coastal zone management. Case studies and examples from developed and developing countries will be used to present practical approaches to the management of multiple uses in coastal zone, including community-based management models. The seminar will be conducted by lecture, formal student presentations, questioning and discussions of class material.

CROSS-LISTING: LAWS 2041.03, MARA 5009.03

ENVI 5480.03: Environmental Ethics.

Topics include, intrinsic and instrumental value, anthropocentric, biocentric and ecocentric perspectives, individualistic (animal rights) and holistic ethics, deep ecology, social ecology, ecofeminism, spiritual ecology, radical ecology, indigenous perspectives. Issues include endangered species, biodiversity, wilderness, economics, sustainability, factory farming, vegetarianism, health, population/consumption, and climate change.

CROSS-LISTING: PHIL 2480.03

ENVI 5601.03: Management of the Marine Environment.

The marine coastal zone must be seen as a intricate multi-disciplinary structure, with its own principles and resources and with unique requirements. Increasing coastal urbanization and industrialization, plus multi-faceted use of the near-shore oceanic environment, put new and complex pressures on its marine resources. The system will be examined through a series of core lectures linked with expert guest lectures, and readings. Topics include coastal geology and oceanography, fisheries, aquaculture, transportation, coastal conflicts, management plans, legal frameworks and regimes. The course is graduate or senior undergraduate level (with professor's approval) and is open to students from all disciplines.

ENVI 5818.03: Management and the Natural Environment: An International Perspective.

A major public issue on the minds of business executives, politicians, scientists and others is the effects that industrial, agribusiness and other human activities are having on the bio-physical environment. While urgent questions are raised at all

levels - local, regional, national and international - we take the perspective of senior management in large multinational enterprises. A number of questions arise: How serious are the threats to the bio-physical environment now and in the future? Are new products and industries being created to help solve environmental problems - profitably? What new concepts are being developed to help structure thinking about business and the biosphere? How can socially-responsible business decisions be taken within the requirements of a profit-based free enterprise system? What frameworks can help managers make better decisions and take full account of the ethical questions that may arise? Such questions pointedly and forcefully confront multinational enterprises that operate both in the industrially advanced nations and less developed regions. Decision-makers in these firms must make choices within a complex of different economies, markets, cultures, social systems and - perhaps most importantly - regulatory regimes.

CROSS-LISTING: MBA 6813.03

French

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Chairperson of Department
Oore, I.Z.

Professors Emeriti

Chavy, P. Agrégé des Lettres (Paris), Chevalier de la Légion d'Honneur
Kocourek, R., State Examination, PhD, CSC (Charles, Prague), McCulloch Professor, Chevalier dans l'ordre des Palmes Académiques

Professors

Bednarak, H.E., BA (Lond), MA (Dal), PhD (Laval). Quebec literature and culture, literary translation
Bishop, M., BA, BEd (Manchester), MA (Man), PhD (Kent, Canterbury), Graduate Co-ordinator, McCulloch Professor. Poetry and poetics, modern and contemporary literature, contemporary culture, French art, symbolism, nineteenth-century literature
Bonnell, R., Licence (Paris), MA (Essex), Dr. de 3^e cycle (Paris). Eighteenth-century French studies
De Méo, P., BA, MA, PhD (UCLA). Applied linguistics (L2 acquisition/teaching), nineteenth-century literature
Gordon, W.T., BA, MA, PhD (UofT). Semantics, history of linguistics, translation theory, general linguistics, French second-language studies, contrastive studies
Oore, I.Z., BA (Tel-Aviv), MA (Waterloo), PhD (Western). Quebec literature and culture
Runte, H.R., MA, MPh, PhD (Kansas). Paleography, textual criticism, philology, medieval literature, contemporary Acadian literature, comparative literature, translation
Waterson, K., BA (Long Island), MA (NYU), PhD (CUNY). Seventeenth-century literature, theatre, Acadian studies

Associate Professors

Trèves, N., BSc (American U, Cairo), PhD (Rice). Renaissance literature, twentieth-century literature, semiotics, women's studies

Assistant Professor

Eison, C., BA, MA (Dalhousie), Dr de 3^e cycle (Sorbonne)
Frigerio, V., Beaux Arts (Geneva), BA (York), MA, PhD (Toronto)
Lapierre, L., BA, MA, PhD (Dalhousie)
Mopoho, R., BA (Yaounde, Cameroon), MA, PhD (Montreal). Linguistics, lexicology, the science of translation

Adjunct Professors

Besi, J., BA (UWO), MA, PhD (Strasbourg), Acadia University
Bishop, N., BA, BEd, MA (Sask), Dr. de 3^e cycle (d'Aix-Marseille), Memorial University of Newfoundland
Cauville, J., BA (Sorbonne), MA, PhD (UBC), Saint Mary's University
Eygun, F.X., BA (St. Boniface), MA (Calgary), PhD (Manitoba), Mount Saint Vincent University
Filkeid, K., MA (France), PhD (Sherbrooke), Saint Mary's University
Gamble, D.R., BA, MA (UofT), PhD (St. John's, Oxford), Memorial University of Newfoundland
Gann, A.G., PhD (UofT), Mount Allison University
Graham, D., BA (Hons) (Sask), MA, PhD (Western), Memorial University of Newfoundland

Lavoie, L., BA (Laurentian), MA (Laval), PhD (d'Aix-Marseille), University College of Cape Breton
Lemelin, J.-M., BA, MA, PhD (Sherbrooke), Memorial University of Newfoundland
Macdonald, A., MA, MLitt (Aberdeen), PhD (Harvard), Memorial University of Newfoundland
Pugh, A.R., BA, MA, PhD (Cambridge), University of New Brunswick
Rubinger, C., BA (Sorbonne), MA (McG), Mount Saint Vincent University
Thomas, G., BA (Wales), MA, PhD (MUN), Memorial University of Newfoundland

Research Associates

Cormier, Y., BEd (Moncton), MA (Laval), PhD (Sherbrooke), Université Sainte-Anne
Demers, P.J., BA, BPed, MEd, PhD (Montreal), University of New Brunswick
Jacquot, M., Licence d'anglais (Paris-Sorbonne), MA (Acadia), PhD (Dal)
Kocay, V., BA, MA (Man), PhD (UofT), Saint Francis-Xavier University
O'Reilly, M., BA (Carleton), MA, PhD (Ott), Memorial University of Newfoundland
Pearre, A., BA (Dal), MA (McGill), PhD (Dal)

I. Degree Programmes

A. Master of Arts (MA)

For general admission rules, see Section 2.2 in the Faculty of Graduate Studies regulations.

1. Classes and research leading to the MA degree in French are offered in the areas of French literature, linguistics, second language studies and culture. Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies and must show evidence of proficiency in spoken and written French.
2. Students may be accepted on a full-time or a part-time basis. A full-time student must spend a minimum of one year in full-time graduate study. The time normally required to complete the full-time programme is one year for holders of a French Honours degree or equivalent, and two years for holders of a general degree.
3. In a one-year full-time programme, the equivalent of at least five university credits is required. This will consist of thesis (usually equivalent to two credits) plus three 5000-level credits. In a two-year full-time programme, students have to attain the equivalent of Honours status (see Undergraduate Calendar) and to obtain the additional five credits as required in a one-year full-time programme.
4. In addition to the five credits, all MA students are normally expected to take a half-year class in Research Methods. When appropriate, up to one additional undergraduate or graduate credit may be required in order to improve the student's proficiency in French. Part-time students carry no more than two and one-half full-credit classes during one year. A one-year full-time programme corresponds to three years part-time. A two-year full-time programme corresponds to six years part-time.
5. The thesis, written in French, is to be submitted and approved within the time limits set out in Section 5 of this calendar.

B. PhD Programme

For general rules, see Sections 2.3 and 6.3 in the Faculty of Graduate Studies regulations.

The admission requirements are as follows: An MA thesis degree in French, an excellent French oral and written proficiency, a scholarly interest in one of the PhD thesis areas: All periods of French, Québec and Acadian Literature, with certain emphases, and the field of Linguistics, equally with particular emphases. Please consult the Department's PhD document for full details.

The requirements after admission are the following: Two years of Dalhousie residency, four full graduate credits (from the departmental offerings in the years of residency), a second language

examination (within two years after admission), preliminary and comprehensive written and oral examinations (not less than one year prior to submission of thesis), and the PhD thesis (normally written in French) and its oral defence.

II. Selection of Classes and Registration

It is the responsibility of students admitted to one of the graduate programmes to report to the graduate coordinator in the week preceding the beginning of classes, or earlier. The purpose is a briefing interview, the final selection of classes, completion of class selection forms and the drawing up of the programme of graduate studies. All graduate students must be registered before classes begin.

III. Classes Offered

What follows is a list of PhD and MA classes. Classes required in particular cases will be specified in each student's Programme of Graduate Studies. Only a limited number of classes is offered in any given year. Descriptions of the graduate classes offered in a particular year will be made available to students.

FREN 5002.03: Méthodes de recherche/ Research Methods.

Introduction to bibliographical research and styles of presentation geared to individual thesis projects. Includes library workshops on electronic search tools and the establishment of a properly formatted working bibliography in the thesis field.
INSTRUCTOR: H. Runte, Staff

FREN 5006.03: Philologie française: Séminaire de l'histoire du français moderne/French Philology: Seminar on the History of Modern French.

Linguistic study of literary texts from the 16th to 20th century.
INSTRUCTOR: H. Runte

FREN 5016.03: Aspects de la traduction/Topics in the Science of Translating.

This class aims to acquaint students with aspects of the theory and practice of translation. It assumes no prior knowledge of the field and focuses on: the presentation of key principles and concepts in the science of translating, a discussion of major theoretical issues, a description of the methodology and the cognitive process involved in translation, an examination of pertinent approaches and techniques. Class work for evaluation purposes consists of oral presentations, a mid-term and a final exam, a term paper and the translation of a variety of texts from French into English and vice versa.

INSTRUCTOR: R. Mopoho

FREN 5122.03: Créativité Lexicale/Lexical Creativity.

Detailed study of the main forms of lexical unit creation in the French language, namely derivation, compounding, lexicalization, abbreviation, and borrowing. Application to general language, as well as to literary and scientific texts. Class work: article and book reviews; oral presentations relating to word formation in any given special language or area of activity.

INSTRUCTOR: R. Mopoho

FREN 5123.03: Langue et terminologie savantes/Learned Language and Terminology.

Fundamental concepts in terminology theory. Creation of terminological files. Limited and thematic research methodology. Assessment of reference sources. Exploitation of electronic data bases. Oral presentations by students and compilation of a number of files in specific scientific and technical fields or subfields.

INSTRUCTOR: R. Mopoho

FREN 5124.03: Vocabulaire et Culture/Vocabulary and Culture.

Examination of the influence of societal structures, traditions, values, beliefs, ideologies, etc. On language in general, and vocabulary in particular. Texts from specific groups, areas, and eras will be analyzed for illustration. Oral presentations by students.

FREN 5125.03: Sémantique/Semantics.

This class situates contributions to semantics from French scholars during the past 100 years in the broader context of international scholarship on semantics - the study of meaning which is the crossroads of linguistics, philosophy, psychology and anthropology. The class will focus on approaches to the study of meaning as they contrast with each other and as they evolve in the work of various scholars from Arsène Darmesteter (1846-1888) and Michel Bréal (1832-1915) to current practitioners of semantics.

INSTRUCTOR: W.T. Gordon

FREN 5126.03: Aménagement linguistique/Language Planning.

Study of the relationship between languages and society, with a special emphasis on the theoretical issues involved in the concept of language planning, the typology of multilingual settings, the promotion of languages, the design and implementation of language policies, the notion of language rights, and the preservation of endangered languages. Students will be required to make oral and written presentations based on relevant cases in Canada and around the world.

INSTRUCTOR: R. Mopoho

FREN 5130.03: Linguistique saussurienne/Saussurean Linguistics.

An intensive study of Saussure's work, giving equal emphasis to his formative intellectual milieu, his relations with his contemporaries such as Michel Bréal, his thrice-taught course on general linguistics, the manuscript sources of the *Cours de linguistique générale*, critical editions, translations, the influence of Saussure on the formation of European and American structural linguistics, his influence outside linguistics (semiotics, anthropology, literary criticism), and current research into his work. The emphasis throughout will be an assimilation and critical evaluation of the Saussurean canon which students require all branches of linguistics and allied language studies.

INSTRUCTOR: W.T. Gordon

FREN 5140.03 B: Dialectologie acadienne et sociolinguistique/Acadian Dialectology and Sociolinguistics.

Students in this class will critically examine major studies in modern Acadian dialectology with a particular focus on regional variation. They will discuss contributions to this field by Massignon, Ryan, Peronnet, King, Richard and Starets. "Hands on" work with various linguistic atlases will be included. Evaluation will be based on in-class presentations and two major essays.

FREN 5180.03: Linguistique de texte/Linguistics of Texts.

This class is of interest to students specializing in linguistics or in literature, as well as to language teachers who like to work with texts. The first component of the syllabus examines linguistic problems that exceed sentence boundaries and belong to the emerging field of text linguistics. These may include junctive expressions, pro-forms, ellipsis, paraphrase, synonymy, dialogue structure, free indirect speech, and graphical aspects of texts. The second component concentrates on selected concepts and chapters from major contemporary publications on text linguistics. The third component will be devoted to discussions of text linguistic aspects of literary passages selected by students themselves.

FREN 5185.03: Les Métaphores dans les textes/Metaphors in Texts.

Metaphoricity can be seen as a universal capacity to full lexical units (mostly lexemes) to expand, restrict or change their usual meanings in order to reveal a similarity to an otherwise disparate referent. As such, it has played an important role in semantic change (etymological metaphor) and in the expansion of the systemic meanings of units (lexical metaphor). This class will examine several modern linguistic contributions to the analysis of metaphorization and observe metaphors in literary texts (in particular the living metaphor, la métaphore vive).

FREN 5285.03: Sémiotique appliquée/Applied Semiotics.

This class will focus on European semiotic theory (Saussure, Barthes, Greimas et al) especially as it is applied to the literary text and other socio-cultural phenomena: the *bande dessinée*, film criticism, advertising and visual media.

INSTRUCTOR: J. W. Brown

FREN 5295.03/5296.03: Séminaire: Didactique des langues secondes/Seminar: Second-Language Teaching.

This class will provide an introduction to the key issues in French second-language (FSL) teaching. It is primarily intended for French graduate students who are also teaching a first-year class in the French Department. In addition to a discussion of current trends in FSL education, there will be opportunity to practice skills in specific aspects of FSL teaching. As such, there is a strong practical component to this class, which will include peer and faculty classroom visits and critiques as well as micro-teaching during class time.

INSTRUCTOR: P. De Méo

FREN 5300.03: Séminaire de littérature médiévale/Mediaeval Literature Seminar.

In-depth study of the transition from the epic to the romance mode of writing, and of the subsequent emergence of prose as the preferred narrative medium.

INSTRUCTOR: H. Runte

FREN 5301.03: Lectures: littérature médiévale/Readings in Mediaeval Literature.

Individualized reading programmes in selected genres or periods or on specific literary phenomena.

INSTRUCTOR: H. Runte

FREN 5400.03: Rabelais et son temps/Rabelais and His Time.

A study of Rabelais' work (in particular *Gargantua, Pantagruel, Le Tiers Livre, Le Quart Livre*) in the context of the quest(s) and spirit of the Renaissance. Particular emphasis is given to the hidden and symbolic messages present in these texts and the nature of comedy and parody.

INSTRUCTOR: N. Trèves

FREN 5401.03: Montaigne et son temps/Montaigne and His Time.

Through a thorough analysis of the *Essays*, The Renaissance as a turning point in the history of ideas will be studied. Emphasis will be placed on the quest for knowledge, the new modalities for attaining knowledge, the *genre* of the essay; the problematic of the "autoprotrait" and the modernity of Montaigne. Contemporary critics of Montaigne will be read or discussed, (Lejeune, Foucault, Tournon) leading to an appreciation of how Montaigne has been seen through the centuries.

INSTRUCTOR: N. Trèves

FREN 5500.03: L'Aventure Intellectuelle du Grand Siècle/The Intellectual Adventure of French Classicism.

This class examines 17th-century French literature by focusing on a major writer, movement, genre or theme. Please contact the professor for details.

INSTRUCTOR: K. Waterson

FREN 5600.03: Le roman épistolaire du 18e siècle/18th Century Epistolary Novel.

The class will focus on the rise of the epistolary novel as a literary genre and its influence on the development of fiction. The research conducted in the seminar will be an attempt to determine and to assess some elements for a theory of the epistolary novel in 18th century France. This will be done through the study of Letter

manuals and novels. Such as the novels by Madame Riccoboni or *Les Linçons dangereuses* by Laclos. Novels will be studied in the intellectual context of the time

INSTRUCTOR: R. Bonnel

FREN 5610.03: Ethique et esthétique de la nature dans l'art et la littérature du 18e siècle/Ethics and Aesthetics of Nature in 18th Century Art and Literature.

In this seminar students will examine, on the one hand, theoretical writings dealing with the aesthetics of nature, and, on the other hand, the ethics of virtue and the vogue of "sensibilité" as reflected in selected 18th century literary texts (poetry, novel, short stories, "traités") and in art (painting, landscape architecture).

INSTRUCTOR: R. Bonnel

FREN 5700.03: La Révolution romantique/The Romantic Revolution.

Romanticism will be viewed as a rebellious and creative force which greatly contributed to the reshaping of traditional society. The class will attempt to evaluate the French Romantics in their intellectual and cultural significance, by defining the Romantic characteristics, and studying the Romantic aesthetics through their theoretical writings and their literary works. These will include works by Benjamin constant, Mme de Staël, Chateaubriand, Lamartine, Vigny, Musset, Hugo, G. Sand and others.

INSTRUCTOR: P. DeMéo

FREN 5701.03: Le Roman du dix-neuvième siècle/Nineteenth-Century Novel.

The class involves the intensive study of an aspect of the 19th century novel. It may be the study of a major novelist of the 19th century (e.g. Sand, Hugo, Stendhal, Flaubert, Balzac, Zola). Alternatively, the class may be organized around themes common to several novelists.

FREN 5705.03: Le Poème en prose au 19e siècle/The Prose Poem in the 19th Century.

The prose poem is a literary genre that attained pre-eminence in the 19th century due in large measure to a reaction among writers against traditional poetics. The rise of the prose poem coincides with an attempt to find a "new language" that would express the spirit of modernism. Works studies will include Bertrand's *Gaspard de la Nuit*, Baudelaire's *Petits Poèmes en prose* and Rimbaud's *Illuminations*.

FREN 5706.03: Impressionnisme et symbolisme/Impressionism and Symbolism.

A critical assessment of the evolution, the specificities and the interweavings of Impressionist and Symbolist practice and theory from Manet and Mallarmé to Redon and Lagogue, Rodin and Lautréamont.

INSTRUCTOR: M. Bishop

FREN 5801.03: Anti-romans du vingtième siècle/Anti-Novels of the 20th Century.

Textual practice and aesthetic conception in the work of new novelists such as Butor, Robbe-Grillet, Sarraute and Duras, as well as new novelists such as Sallenave, Ndiaye, Toussaint and Echenoz.

INSTRUCTOR: M. Bishop

FREN 5802.03: La Poésie moderne de Char à Bonnefoy/Modern Poetry from Char to Bonnefoy.

The evolution of modern poetic theory and textuality from poets such as Char and Préaud, through Chedid and Bonnefoy, to Du Bouchet, Albaïach, Bancquart and Réda.

INSTRUCTOR: M. Bishop

FREN 5803.03: La Littérature Contemporaine I/Contemporary Literature I.

Analysis, both in-depth and more cursory, of a wide range of contemporary literary oeuvres: from Simon, Roche, Chawaf and Cixous to Deguy, Jaccottet, Zins and Tellermann. Individual aesthetic conception and practice will be related to contemporary theoretical and critical-methodological considerations.

INSTRUCTOR: M. Bishop

FREN 5804.03: Art et Littérature/Art and Literature.

Why write, why paint, Yves Bonnefoy asks. Multiple yet criss-crossing, chiasmic answers to this question will emerge from discussion of the writing and art of nineteenth and twentieth-century creators such as Desbordes-Valmore, Ingres, Flaubert, Corot, Zola, Cézanne, Aragon, Braque, Ponge, Uzac, Bonnefoy, Da Silva.

INSTRUCTOR: M. Bishop

FREN 5805.03: La Stylistique structurale/Structural Stylistics.

Structural stylistics is a contemporary critical approach to literary stylistics that grew largely out of Saussure's semiology and Jakobson's semiotic definition of the poetic function of language. The class will focus on some of the major stylisticians of the century (Bally, Spitzer, Riffaterre) and their theories of style as applied to specific literary texts from the 19th to 20th centuries.

FREN 5806.03: Poétique et théorie de la littérature/Poetics and Theory of Literature.

Various 20th century literary theoreticians and critics in the "Geneva" and "French" schools will comprise the subject matter of this class: Starobinski, Richard, Barthes, Todorov, Greimas et al. Topics might include: thematic and/or phenomenological criticism, Marxist and ideological criticism, structuralism, post-structuralism and semiotics.

FREN 5807.03: Culture contemporaine/Contemporary Culture.

Discussion of contemporary cultural theory and practice in the work of writers, philosophers, artists, etc. Such as Barthes, Baudrillard, Blanchot, Bonnefoy, Derrida, Hyvrard, Irigaray, Jaccottet, Lyotard, Tal Coat, Tapies, Wittig.

INSTRUCTOR: M. Bishop

FREN 5808.03: La Littérature Contemporaine II/Contemporary Literature II.

Further analysis, independent of that FR 5803, of contemporary literature's many modes of meanings: from Dupin, Noël, Le Dantec and Redonnet to Stétié, Djébar, Glissant and Ernaux. Generic, textual and conceptual specificities will be related to theoretical and critical-methodological considerations.

INSTRUCTOR: M. Bishop

FREN 5876.03: Aspects de la littérature du Canada français/Studies in French Canadian Literature.

Major texts will be studied in depth and will be seen in relation to their unique social, historical and political context and, above all, to the problematics of literature itself. Topics will vary from year to year and could involve examination of a single author, period of genre, or equally, of broader issues such as the relationship between literature and language, literature and ideology, or between the oral tradition and the written one.

INSTRUCTOR: B. Bednarski

FREN 5877.03: Analyse de textes littéraires québécois/Analysis of Quebec Literary Texts.

Selected literary Québec texts from the Nineteenth and/or Twentieth Centuries will be closely analyzed (the selection may vary from year to year). Recurring images and myths, central themes, main structures will be discussed and various critical approaches explored.

INSTRUCTOR: I. Oore

FREN 5910.03: Lecture de textes acadiens contemporains/Supervised Readings in Acadian Literature since 1966.

Study of the key texts of the last three decades, from *La Sagouine* to the poets of the 1990s, with special emphasis on the role of literature in the evolution of modern Acadia.

INSTRUCTOR: H. Runte

FREN 5920.03: Femmes écrivains et images de femmes dans la littérature française à travers les siècles/French Women Writers and Images of Women through the Centuries.

Emphasis will be placed each time on a different century. When 20th century French women writers will be studied, emphasis will be given to the works of Colette, Simone de Beauvoir, Marguerite Duras, Nathalie Sarraute, Marie Cardinal, Andrée Chedid, Raphaëlle Billetdoux. The class will center around the literary and poetic "écritures", and when appropriate it will consider contemporary theoretical gender constructs.

INSTRUCTOR: N. Trèves

FREN 5990.06: Projet indépendant/Independent Project (MAT).

Subject to independent completion of study.

FREN 5998.03A/5999.03: Recherches indépendantes/Independent Research.

Subject to approval by graduate coordinator and department chairperson.

FREN 9000.00 MA Thèse/Thesis.

FREN 9530.00 PhD Thèse/Thesis.

IV. Thesis Areas

Literature

- (A) 20th Century: literatures of France, Quebec, Acadia and other francophone regions: poetry, novel, theatre, poetics, structural stylistics, aesthetics, fine arts
- (B) 19th Century: novel, poetry, "conte fantastique", studies in romanticism, realism and symbolism, aesthetics, fine arts
- (C) 18th Century: novel epistolarity, aesthetics, fine arts
- (D) 17th Century: novel, Molière and the theatre, La Bruyère and "les moralistes"
- (E) 16th Century: the work of Montaigne and the philosophical through of his time
- (F) Medieval: Arthurian and courtly romance
- (G) Linguistics: semantics and lexicology and their modern history, contrastive studies and terminology.
- (H) Acadian literature and language.
- (I) Semiotics of Culture: the relationship between contemporary French culture and communication; culture as a sign; cultural ideologies; culture and visual systems.

German

Location: 6225 University Ave.
Halifax, NS B3H 4H8
Telephone: (902) 494-2161
Fax: (902) 494-2719
WWW: <http://www.dalgrad.dal.ca/homepage.htm>

Chairperson of Department

Curran, J.V.

Graduate Studies Coordinator

Gaede, F.W.

Professors

Gaede, F.W., PhD (Freib), FRSC, McCulloch Professor
Schwarz, H.-G., MA (Munich), PhD (McG)

Associate Professors

Curran, J.V., MA, MA (Dal), PhD (Newcastle-upon-Tyne)
Steffen, D.H., PhD (Göttingen)

Graduate classes leading to the degree of MA are offered in the history of German literature and thought. Research in the Department is concerned principally with the Baroque Age, the literary and philosophical tradition of German Idealism, and the culture of the twentieth century.

Graduate students may concentrate on any of the periods or any particular aspect of the history of German literature and thought.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

II. MA Degree Programme

Depending on their level of preparation, students spend either one or two years towards completion of their classes and thesis. Candidates are expected to have a reading knowledge of a third modern or ancient language. A thesis is required.

III. Classes Offered

GERM 5500.06: Literature and Thought from Reformation to Enlightenment.

A study of German literature between the 16th and 17th centuries as a direct reflection of the important religious, social and philosophical developments after the Reformation and during Absolutism.

INSTRUCTOR: F. Gaede

GERM 5520.06: Goethe and the Enlightenment.

A study of German literature and thought of the time which preceded and witnessed the great revolutions of the 18th century.

INSTRUCTOR: D. Steffen

GERM 5530.06: Hegel's Aesthetics and the Ancients.

GERM 5540.06: Kant and the History of German Idealism.

A study of Kant's relation to modern Rationalism and Empiricism, and an inquiry into the principles of Idealism.

INSTRUCTOR: D. Steffen

GERM 5550.06: Hegel: Phenomenology of Spirit.

The Phenomenology of Spirit, published in 1807, was Hegel's first major work. He intended to write an introduction to philosophy by demonstrating the necessity of the advance from the most immediate form of knowledge to absolute knowledge. To achieve this he had to write the *Phenomenology* as an introduction to his own philosophy.

INSTRUCTOR: D. Steffen

GERM 5570.06: Goethe and Romanticism.

A study of Goethe, Hölderlin, Kleist, and Novalis.

INSTRUCTOR: D. Steffen

GERM 5580.06: Goethe's *Faust*.

A close reading of Goethe's *Faust* Part I and II, will give rise to questions about the unity of the work, the theory of drama and the reshaping of a legend. While Goethe's masterpiece stands at the centre, other German versions of the *Faust* legend will also be discussed in detail. Assignments will involve research into later echoes of the *Faust* legend as well.

GERM 5590.06: Studies in German Idealism.

The specific content of the seminar varies from year to year, but is always related to some aspect of Idealism.

GERM 5600.06: Heidegger and German Idealism.

GERM 5610.06: Literature of the 19th Century.

A discussion of essential literary texts which throw a critical light on the growing forces of materialism and positivism.

INSTRUCTOR: F. Gaede

GERM 5620.06: Modern German Literature.

Modern authors as witnesses of the political catastrophes and social changes of our century: a study of the plays of B. Brecht and of selected prose texts of Fr. Kafka, Th. Mann and G. Grass.

INSTRUCTOR: F. Gaede

GERM 5630.06: Aesthetic Theory.

An historical study of the development of literary theory and its foundation on the history of thought.

INSTRUCTOR: G. Gaede

GERM 5640.06: Ancient and Modern Dialectics.

GERM 5660.06: History and Theory of the German Novel.

Representative works from the Baroque Age to the 20th Century are studied and the principles of the genre are discussed.

INSTRUCTOR: F. Gaede

GERM 5670.06: Hegel's Philosophy of Nature.

GERM 5700.03: Special Topics I.

This is an intensive research seminar dealing with selected topics to be announced.

INSTRUCTOR: H.-G. Schwarz

GERM 5701.03: Special Topics II.

This is an intensive research seminar dealing with selected topics to be announced.

INSTRUCTOR: J. Curran

GERM 5800.06: Research Seminar.

Special Research Topics Class. This is an intensive research seminar dealing with selected topics to be announced.

INSTRUCTOR: H.-G. Schwarz

GERM 9000.00: Thesis.

Health Services Administration

Location: 5599 Fenwick Street
Halifax, NS B3H 1R2
Telephone: (902) 494-7097
Fax: (902) 494-6849
E-Mail: Health.Services.Administration@Dal.Ca

Director of School

Rathwell, T., BA (York), MA, PhD (Dunelm). Health care reform, comparative health care systems, primary health care policies.

Professor Emeritus

Ruderman, A.P., BS, MA, PhD (Harvard), MBA (Chicago)

Professors

Cohen Jr., M.M., BA (Mich), DMD (Tufts), MSD, PhD (Minn), MPH (Boston) FCCMG Professor of Oral and Maxillofacial Pathology & Epidemiology, Health Services Administration Anthropology

Nestman, L., BCom (Sask), CA, MHSA (Alta). Health services accounting, health finance, health policy, international health care

Rathwell, T., BA (York), MA, PhD (Dunelm)

Sketris, I., BSc (Pharm) (Tor), PharmD (Minn), MPA (HSA) (Dal), major appointment in College of Pharmacy

Associate Professor

McIntyre, L.L., MD, MHSc (UofT), FRCPC, joint-appointment in the School of Health & Human Performance

Assistant Professors

Hayden, V., BSc (Hons) (LMU), MA, PhD (Bradford) Honorary
Johnston, G., BSc (Hons) (McG), MHSA (Alta), PhD (Western).

Cervical cancer screening, palliative care, breast cancer issues, cancer registries

Fersaud, David D., MSc (Queens), MSA (Central Michigan), PhD (Toronto). Institutional theory, resource dependency theory, information systems, quality of life measurement and health services utilization

Lecturers

Cochrane, W.D., BA (Hons), LLB (Dal)

Ferguson, D., BEd, BSc (Buffalo), Honorary

Hampton, M.J., BA, MHS (pending) (UofT), Honorary

Langille, E., BA, MA (Dal)

Marah, W., BCom (Dal), MBA (SMU)

McKillop, D., BA (York), MIR (UofT)

Maddalena, V., BN, MHSA (Dal)

Maxwell, M., BA (Acadia), BD (Planning) (NSCAD), MES, MHSA (Dal), Honorary

Montgomery, B., BScN (MSVU), MHSA (Dal), Honorary

Moore, C., BScN (MSVU), MScN (UofT), Honorary

Nurse, R., BA (MUN), MHSc (UofT), Honorary

Zed, R., CPA, BA, MHSA (Dal), Honorary

Students seeking further information or help in planning courses of study in the School of Health Services Administration should contact the:

Graduate Co-ordinator
School of Health Services Administration
5599 Fenwick Street
Halifax, NS B3H 1R2
(902) 494-7097

The School has been designated as WHO Collaborating Centre for Health Care System Research and Development.

The MHSA programme is accredited by the Accrediting Commission on Education for Health Administration, and the School is a full member of the Association of University Programmes in Health Administration. The school is also a member of the European Health Care Management Association.

I. Objectives

The School of Health Services Administration offers a Masters degree which meets the needs of those pursuing administrative careers in the Canadian health care delivery system. The programme is designed to prepare individuals for careers in hospital administration, nursing administration, long term care administration, public and community health administration and administration in municipal, provincial and federal governments in health and health-related areas. There are employment opportunities for individuals with an MHSA in policy, planning, evaluation, administration and research.

The programme seeks to provide a conceptual background for the increasingly complex managerial tasks that need to be performed in health institutions and health related governmental departments. Every effort is made to balance political, social, economic, cultural, medical and ethical approaches to understanding the health care delivery system with those of the management sciences.

The emphasis in the programme is on an academic, multidisciplinary and professional education. It is academic in that it emphasizes knowledge of current research findings and treats the practice of health services administration as phenomena subject to social scientific analysis. It is multidisciplinary in that faculty are drawn from traditional social and administrative sciences. It is a professional programme in the sense that it will attempt to broaden the social perspectives of the student emphasizing that a professional has a social responsibility to society and must have an appreciation of the ethical standards appropriate to a career in health services administration.

II. Application Procedure

Application forms are available from the Registrar's Office of Dalhousie University. Application should be submitted as early as possible to the Registrar's Office.

The following supporting documents are to be sent directly to the School:

- Transcripts of all previous work
- At least two academic letters of reference
- Résumé/Curriculum Vitae
- A statement of career interests and reasons for seeking admission to the School
- GMAT (see below)
- TOEFL for Foreign Students (see below)

The application (including all supporting documentation) must be received by June 1.

Candidates are required to sit for the Graduate Management Admission Test (GMAT). This requirement may not be waived without explicit permission of the School of HSA Admissions Committee. GMAT results will be considered with other information submitted by applicants, in deciding on eligibility for admission.

The Test may be taken at conveniently-located computer-based testing centres throughout North America and in many other parts of the world. Candidates in US and Canada may schedule a GMAT CAT (computer-adaptive test) appointment by calling either 1-800-GMAT-NOW or a local testing centre. Local testing centre numbers are provided through the MBA Explorer at <http://www.gmat.org>. Candidates can schedule their test within a few days of actually taking it. However, they should consider admission deadlines and call early to maximize their chances of securing their preferred test date at the centre most convenient to them.

School of Health Services Administration GMAT Number is 0690.

All students are required to demonstrate at an early stage in their studies that they are proficient in writing reports and essays in English. Candidates from countries outside Canada whose mother tongue is not English will be required to take the Test of English as a Foreign Language (TOEFL) as a requirement for admission and a minimum score of 580 must be achieved. Further information may be obtained by writing:

Test of English as a Foreign Language
Box 899
Princeton, N.J., 08540, U.S.A.

CANDIDATES ARE ADVISED TO TAKE THE TEST(S) AT THE EARLIEST POSSIBLE DATE.

The deadline for applying to the School is June 1. For foreign students, it is strongly recommended that all documents (transcripts and references) be submitted prior to January 31 for students who wish to be considered for financial support.

iii. Degree Programmes

A. Part time Study

The Programme offered through the School is available to students on a part time basis. A part-time student may enrol in up to two and one-half credits in any one academic year. In order to ensure that graduate students benefit from a reasonable concentration of their studies, part-time studies must normally be completed within six years.

B. LLB/MHSA

The four year LLB/MHSA programme is a collaborative effort between the Dalhousie Law School and the School of Health Services Administration. The combined LLB/MHSA enables students to select classes leading to degrees of Master of Health Services Administration and Bachelor of Law.

Candidates for the LLB/MHSA programme must satisfy the entrance requirements of both programmes, and may obtain further information about the combined programme by contacting either the School of Health Services Administration or the Faculty of Law. For admission, students must apply to both the School of Health Services Administration and the Law School individually. Students applying for the MHSA programme may submit LSAT results in lieu of GMAT results.

C. MN/MHSA

The combined MN/MHSA programme, a collaborative undertaking between the School of Nursing and the School of Health Services Administration, is a three-year programme which enables students to select classes leading to degrees of Master of Nursing and Master of Health Services Administration.

Candidates for the MN/MHSA programme must satisfy the entrance requirements of both programmes, and may obtain further information about the combined programme by contacting either the School of Health Services Administration or the School of Nursing. For admission, students must apply to both the School of Health Services Administration and the School of Nursing individually. Students applying for the MHSA programme may submit GRE results in lieu of the GMAT results.

iv. General Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. Enrolment in the School is limited. In general successful applicants should have attained at least a "B+" standing in their previous university work.

Admission is based on an assessment of:

- All previous academic work;
- Original, complete transcripts;
- Letters of reference;
- GMAT;
- TOEFL (when required)
- Professional experience and/or promise;

A. Exemption

Applicants wishing to receive exemption from a required class should include class outlines for those classes previously taken which they consider to be equivalent to Dalhousie HEAS classes. Where it is determined at time of admission that a student has the equivalent of a required class but is not granted advanced standing, an exemption may be permitted, so that another class is substituted for the required class.

V. Classes Offered

The two-year programme leading to a Master of Health Services Administration degree features both an academic and results-oriented curriculum. It requires the successful completion of 9-11 credits which must include:

Required Classes

HEAS 5300.03: Introduction to the Canadian Health System.

This class provides a brief introduction to the history, legislation, financing and payment systems, health professionals, health promotion, ethics and values, and trends (e.g. Regionalization, consumerism, primary health care) in the Canadian health care system. The class is designed as an introduction to the health services administration programme. Therefore, the discussion and tasks are directed toward the development of a life long and self-directed learning focus, the importance of networking and interpersonal skills, written and oral communication, and values.

HEAS 5315.03: Management and Design of Health Care Organizations II.

This class is a seminar that builds on its pre-requisite and is aimed at the further acquisition of knowledge and skills needed for the effective management and design of health care organizations. The focus of the class is on the management of health care organizations and systems within the wider social, political, and economic context. Topics examined in this class include: the environment and technology and health care organizations, organizational goals and effectiveness, strategic management of health care organizations and systems, health care organization structure and design, information and control in health care organizations, multi-institutional arrangements, organizational culture, and managing broad-based health systems change. Case analysis, individual and group exercises, as well as the completion and presentation of a field project are used to facilitate participation and learning.

HEAS 5320.03: Managerial Epidemiology.

This class is designed for health services administrators, not researchers. The class has three components: assessing the health status of a population using existing data; designing an evaluation of a programme using a longitudinal non-experimental design (case control and cohort); and using Epi-Info for statistical analysis of associations (relative risk, odds ratio, chi-square test, confidence intervals, Mantel-Haenszel analysis, multiple logistic regression). Throughout the course, reoccurring themes are: understanding the meaning of numbers, assessing validity, and ascertaining causation, including the concepts of confounding and effect modification. A lecture format with some discussion is used.

HEAS 5330.03: Management and Design of Health Care Organizations I.

This class is an introductory seminar on the acquisition of knowledge and skills for the effective management of health care organizations. The focus of the class is on the management of individual and group behaviour in health care organizations with the goal of improving system performance. Topics examined in this class include: the foundations of individual and managerial behaviour, motivation, job design, communication, group behaviour and socialization, leadership, conflict management, and power and politics. Case analysis, individual and group role-playing, skill-building exercises, as well as student presentations and workshops are used extensively to facilitate participation and skills acquisition.

HEAS 5335.03: Information Systems in Health Administration.

The main objective of this class is to prepare health administrators to manage information and to use information technology and systems effectively. The strength of the class is the use of real problems, situations, cases, and experiences as a valuable supplement to the textbook and references. Students are expected to learn about processes and issues related to planning, analysis, design, procurement, implementation and management of information and information technologies in the health system.

HEAS 5339.03: Health Care Economics I.

This required class provides the student with a basic understanding of economic theory and the applicability of this theory to health policy and administration. It is a pre-requisite to Health Care Economics II, which emphasizes economic evaluation of health care programmes and appraisal of economic policies as they related to a broader definition of health. No prior knowledge of economics is assumed; however, students are expected to understand the English language and to possess a basic quantitative skills for economics analysis.

HEAS 5340.03: Health Care Economics II.

This required class builds upon knowledge of economic theory and economic analysis to enable the student to become proficient in the assessment and evaluation of health policies and programmes. Health Care Economics I (HEAS 5339A) or an equivalent background in microeconomic theory is a pre-requisite to this class.

HEAS 5345.03: Health Services Accounting Management and Control.

The purpose of this class is to provide a basic understanding of management control techniques and management accounting decision making techniques and processes that exist for health service administrators. The class will cover the following topics: an introduction to management control; financial statement and analysis; break-even analysis; responsibility accounting; socio-economic aspects of budgeting; financial decisions and relevant costs.

HEAS 5350.03: Health Services Management Accounting and Control.

The purpose of this class is to provide a basic understanding of management control techniques and management accounting decision making techniques and processes that exist for health service administrators. The class will cover the following topics: management control; break-even analysis; performance budgeting; patient classification; work measurement; responsibility accounting; socio-economic aspects of budgeting; cost allocation; multi-year cost; financial decisions; relevant costs; and introduction to funding systems.

HEAS 6330.03: Health Services Planning and Evaluation.

The focus of the class is on the processes, methods, models and techniques of health services planning and evaluation. It explores the role and function of health services planning in a changing health care system, drawing on international experience. Relationships between strategic, and operational planning will be explored, as will the factors that both inhibit or facilitate the planning process. The scope and nature of the programme (service) evaluation will be discussed. The overarching intent of the class is to provide students with a firm grounding in the analytical, political and interpersonal skills necessary to enable them to assess health care needs, plan services accordingly, and to evaluate the effects of agreed services provision on overall levels of health.

HEAS 6365.03: Quality Management.

The purpose of this class is to give students an overview of quality management approaches used in health care organizations. Included are organizational assessment, process improvement, bench marking, medical quality, and the use of teams. Issues related to customer focus, measurement/indicators, accreditation are discussed. Students participate as team members in a hypothetical quality improvement project.

HEAS 6380.03: Senior Seminar in Health Services.

Each student researches, prepares and presents, under supervision, a major analytical paper on a current and significant health care issue. Preparation of the paper is buttressed by classes that focus on current issues for health care administrators. This class is normally taken in the last term of an MHSA student's programme. Senior seminar presentations are usually scheduled during the last week of March and the first week of April. All students must attend, and practitioners from the field, and other interested persons are invited to attend.

The class is intended to provide the student with opportunities to practice analysis, synthesis and strategic planning in relation to significant health care issues.

HEAS 6390.06: Health Services Residency.

An administrative residency is required for all students in the Master of Health Services Administration programme. The objective of the residency is to provide first-hand familiarity with administrative problems and operations of a health service agency. Each student will have an opportunity to receive personal coaching from a qualified and practicing senior health service administrator, to apply and test administrative theories and concepts in a practical setting, and to acquire some administrative skills, techniques, and perspectives through observation and wide contact with a diversity of health services administrators. Residency guidelines and a Preceptor list will be available to students during the first semester.

HEAS 6500.03: Intermediate Statistics for Health Services.

This class introduces a number of techniques for data analysis and inference commonly used in experimental and health sciences. The class begins with an introduction to model building in linear models and develops the techniques required for multiple regression. From here, we consider analysis of variance, factorial design, and analysis of covariance using the general techniques for linear models. The last part of the class includes techniques for contingency tables along with logistic regression. The difference between observational data and designed experiments as well as the criteria for proving causation are discussed. Throughout the class reference is made to experimental design and the assumptions behind the use of various techniques, the emphasis being on choosing an appropriate technique for evaluating a data set. The use of a computer package for graphing data and carrying out computations is an integral part of the class. Students will design and carry out a simple experiment as part of the class.

Elective Classes

HEAS 5200.03: Principles of International Health.

This class focuses on health issues in developing countries from a population perspective. It is an introductory class designed for graduate health science students at Dalhousie. Students from other graduate and undergraduate programmes who have international health interests will be admitted upon approval of the class directors. Units discussed during the first half of the class relate to the basic knowledge required to understand international health concerns such as: population problems; health status assessment; environment, culture, food systems and health; communicable diseases; maternal and infant health; health education and social marketing. In the second half, special emphasis will be placed on conceptual and systematic approaches to problem-solving in international health delivery such as health policy, primary health care, evaluation of health programmes, health sector reform, essential health services, and humanitarian assistance.

HEAS 5400.03: Effective Presentations in Health Administration.

The purpose of this class is provide health care workers in general and health administrators in particular with an opportunity to develop timely and appropriate presentation skills. By the end of the class, students should be able to organize and deliver appealing and informative written and oral presentations using print, audiovisual and computer multimedia technologies.

HEAS 6000.03: Nursing Administration and Leadership.

This class will provide a general overview of organizational theories, and their relationship to nursing administration. The role of the Nurse Administrator and current issues and challenges facing nurse administrators in the nineties will also be examined. Students will compare and contrast selected theories of management and be able to discuss their relationship to administrative theory and nursing practice; examine the changing roles of the nurse administrator; critique existing nursing administrative practices from a multicultural, feminist perspective; analyze an existing nursing management organization; discuss current issues and challenges facing Canadian nurse administrators and, formulate a personal philosophy of administration.

CROSS-LISTING: NURS 6000.03

HEAS 6100.03: Ethics and Decision-Making In Health Services Administration.

This class has three objectives: first, to raise the awareness of students in relation to the ethical implications of decision-making in health care administration. Second, it will assist students in the development of a framework for exploring and resolving ethical dilemmas in the workplace. Third, the class will assist students in examining and developing a greater understanding of their own value system as it relates to the practice of management. The class is a combination of case study analysis, guest speakers and self-directed study. Students will have the opportunity to attend ethics committee meetings.

HEAS 6200.03: International Health Care Management.

This class is based on the belief that comparative health care management can be taught most effectively through enabling the student to communicate directly with colleagues in other countries. Practicing health care managers, doctors, nurses, and paramedics, best understand how health care is really provided in their respective environments. Given this context, the Internet offers an extraordinary tool in which to facilitate comparative learning. The class provides opportunity for joint papers, the debate of issues, the discussion of work-related problems, and hopefully a fun learning experience. The class focuses on four countries -- Canada, Finland, Germany, and Ireland -- which provide an interesting array of approaches to health care. At the same time, they have sufficient commonalities for participants to gain understanding of each system without too much difficulty.

HEAS 6310.03: Health Care Policy.

This class is a seminar whose objective is to introduce the student to the evolution and analysis of Canadian health care policy. Topics in this class include: the emergence of health insurance in Canada; health reform in Canada, the United States, and Nova Scotia; health policy and resource allocation; the role of the bureaucracy, the media, providers, and special interest groups in shaping health policy; political decisionmaking; and public policy analysis. Case analysis, individual and group exercises, as well as the analysis and class presentation of a contemporary health care policy problem are used to facilitate participation and learning.

HEAS 6320.03: Managed Care.

The term "managed care" comes from the American HMO (Health Maintenance Organization) experience and when applied in the Canadian context is interpreted to mean providing quality health care which is comprehensive, seamless, and population (rather than institution) based, while containing cost. Students are to review "managed care" and other literature, and with input from practitioners, propose how managed care concepts might be used to advantage the Atlantic provinces.

HEAS 6325.03: Long Term Care Administration.

This class is designed to enable students to understand and appraise government policies that have shaped the direction of Long Term Care in Canada with particular emphasis on Nova Scotia; organize and contrast a number of current structures that have been put in place to provide care to seniors; explain the concepts of aging, disabilities, dementia, and the social and medical model of care; and

explain, compare, contrast, and critique a variety of issues in Long Term Care including drug utilization, community based care, home care models, and living wills.

HEAS 6340.03: Human Resources In Health Care.

This is a seminar dealing with the study of the principles and practices of strategic human resource management with emphasis on effective human resource adjustments required in response to organizational changes occurring in the health care field. Issues studied will include performance measurement, compensation, "downsizing", mergers and amalgamations, training and development and selection.

HEAS 6341.03: Management Union Relations.

This is a seminar which provides comprehensive coverage of labour relations in the health care system. Particular attention will be placed on amalgamation and mergers. Issues studied include the certification process, the collective bargaining process, the outcomes of collective bargaining, grievance handling and the disciplinary process.

HEAS 6360.03: Health Care Law.

The object of this class is to introduce students to the use and effect of law as it relates to health care administration. It is designed to provide students with an appreciation of, and ability to interpret law, as well as the ability to identify actual or potential legal problems. Topics discussed in the class will include: introduction to law, malpractice in general, including the law relating to consent and to negligent treatment; the legal responsibility of the institution for employees and doctors on staff; special problems, including death and dying, abortion, sterilization, artificial insemination, transplants, venereal and other communicable diseases, mental disabilities, medical experimentation, blood alcohol amplex, and child abuse; basic civil procedure (including subpoena and discovery); medical records, confidentiality and peer review; medical staff privileges; and the corporate structure of hospitals, including hospital bylaws.

HEAS 6370.03: International Comparative Health Care Systems.

This class provides an introduction to selected health care systems - their historical development, current structure, functions and problems, and future prospects. In this regard students should develop analytical and critical insights and skills regarding past, present, and future health service programmes and policies in various countries in a comparative sense. In the class, discussion and talks are directed toward development of a self-directed learning focus and the development of networking and interpersonal skills, written and oral communication.

HEAS 6375.03: Health Care Marketing.

This class is a seminar whose aim is to introduce the student to the knowledge and practice of health care marketing. Health care marketing refers to those activities associated with the analysis, planning, implementation, and control of carefully formulated programmes and services that seek to bring about desired health outcomes in a target population. Topics in this class include: an introduction to the tools and techniques of health care marketing, health care programme design and analysis, social marketing and health promotion, customer service quality, fundraising and public relations, and an introduction to quantitative and qualitative marketing research methods that include the determination and assessment of community health needs. Case analysis, individual and group exercises, as well as the completion and presentation of a marketing plan are used to facilitate participation and learning.

HEAS 6384.03: Directed Project.

In order to obtain credit, students are required to complete a written report based upon research in, or exposure to, a defined problem in health services administration. For some students, this will involve research within a health agency or government department. It may be based upon the consideration of a problem which they have encountered during their actual employment or residency. In both cases, the design of the project and the preparation of the report will be done under the supervision of a member of the faculty.

HEAS 6395.03: Directed Reading.

A special programme of directed reading, with appropriate written assignments, may be arranged with a member of the faculty where the interest in a subject is not sufficiently widespread to warrant offering a regular class.

HEAS 6100.03: Ethics in Decision-Making in Health Administration

Graduate Electives: One full credit

The remaining one-credit requirement may be made up from any of the elective classes offered by the School of Health Services Administration or any other graduate studies programme, subject to approval of a faculty advisor.

NOTE: Not all classes are offered each year; consult the school for current year offerings.

Health and Human Performance

Location: 6230 South Street
Halifax, NS B3H 3H5
Telephone: (902) 494-2152
Fax: (902) 494-5120

Director of School

Maloney, T.L.

Professor Emeritus

Belzer, Jr., E.G.

Professors

Holt, L.E., BS, MS (Springfield), PhD (S Illinois). Analysis of human movement, exercise prescription, sport conditioning, flexibility and strength

Keddy, B., BScN (MSVU), MA, PhD (Dal), RN, major appointment in the School of Nursing.

Lyons, R.F., BA (Dal), MEd (Xavier), PhD (Oregon). Leisure, chronic illness and disability, coping and adjustment, personal relationships, therapeutic recreation

Makrides, L., MCSP, BPT (Sask), MSc (Ottawa), PhD (McM), major appointment in School of Physiotherapy. Cardiac rehabilitation, pulmonary rehabilitation, exercise, aging

Singleton, J.F., BA (Waterloo), MS (Penn State), PhD (Maryland). Therapeutic recreation; therapeutic recreation for persons with Alzheimer's disease, gerontology, pre-retirement planning, therapeutic recreation for persons with disabilities, the use of secondary data in leisure research, cultural diversity of leisure experience, women and leisure

Turnbull, G.L., MCSP, DipTB, BPT (Man), MA (Dal), PhD (Rhodes), major appointment in Physiotherapy

Young, A.J., BS (West Chester State Col), MS, PhD (Maryland). History of sport, history, maritime history, olympics, angling history, fly-fishing; atlantic salmon

Associate Professors

Campagna, P.D., BPHE (Windsor), BEd (Queen's), MEd (SUNY-Buffalo), PhD (Alta). Physical fitness, mental health, cardiovascular risk factors, activity questionnaires, strength

Elder, G.C.B., DipPE Adv (St. Mary's, London), MEd (Georgia Southern), PhD (McM). Cerebral Palsy, neurophysiological mechanisms, treatment for contractures, motor control, computerized biofeedback training

Hood, C.D., BPE (Calgary), MS, PhD (Illinois). Relationship between leisure, addiction and mental health; social psychology of leisure; therapeutic recreation of professional issues

Ipson, N.M., BA, MS, PhD (Brigham Young). Leisure and aging; leisure programming, assessment and evaluation; volunteering as a leisure experience; volunteer and personal management; recreation administration; market segmentation and target marketing of leisure experiences

Kirby, R.L., MD (Dal), FRCP(C), major appointment in Medicine. Rehabilitation; wheelchair, amputation; crutch; cane; assistive technology; disability; handicap

Kozey, C.L., BPE (UNB), BSc (Waterloo), PhD (Dal), major appointment in the School of Physiotherapy. Mechanics and electrophysiology of human movement

Maloney, T.L., BPE, BEd (Alta), MA (Western), PhD (Alta). Injury prevention; safety education

McCabe, J.F., BPE, BA (UNB), MS, EdD (Tenn). Cognitive ergonomics, expertise and skilled performance, systems modelling, occupational stress and performance

McIntyre, L.L., MD, MHSc (UofT), FRCP(C), Dean of the Faculty of Health Professions, joint appointment in Health Services Administration. Child health, programme evaluation, children's nutrition programmes, health policy, health promotion

Putnam, C.A., BPE (Man), MS (Wash), PhD (Iowa), Associate Director (Graduate Studies). Biomechanics; complimentary approaches to health promotion, mind/body health

Savoy, C.A., BPE (UNB), EdM (Boston), PhD (Tenn). Performance enhancement, exercise adherence, team building, psychological skills, goal setting, imagery, manager as coach, mental fitness, group cohesion

Verabioff, L.J., BA, BPHE (Queen's), MS (Mich), PhD (Ohio State). Principles of motor performance, practice variables affecting skill acquisition

Assistant Professors

Barnes, L.J., BPE, MSc (Dal). AIDS education, grieving and loss, rubella screening

Cheung, S., PhD (U of T), MSc (Simon Fraser Univ), BSc Honours (UBC)

Earl, M., BScPT (Western), BSc, MSc, PhD (Waterloo), major appointment in Physiotherapy. Balance, motor control, biomechanics, electrophysical agents

Hood, R.D., BPE (Calgary), MSc (Illinois), PhD (Illinois). Recreation/leisure and health, health promotion

Jackson, L.A., BA, MA, PhD (Tor). Sexual health, gender and health and prevention issues related to women's health

Kozey, J.W. BSc, MSc (Waterloo), PhD (TUN). Clinical and occupational biomechanics; ergonomics - workstation design, anthropology, reach and reach modeling; rehabilitation measures, job accommodation

Adjunct Professor

Beazley, R.P., BA, BEd (Acadia), BPE (McM), MPE (Dal), EdD (Tennessee)

Mangham, C.R., BEd, MA (UBC), PhD (Oregon)

McGuire, D.P., BA (Wright State), MA (Cincinnati)

Richards, A., DipPE (Carnegie School of Phys Ed, England), Teach. Cert. (Trent Park Col), MSc (Dal), EdD (Colorado)

The mission of the School is to develop leaders and scholars who can generate, disseminate, and apply knowledge that helps to maintain and enhance health. It does this by: engaging in research related to well-being; preparing leaders in education, scholarship and social action to maintain and enhance well-being; and playing an educational and advocacy role, with and beyond the University, to affect social change that maintains and enhances well-being.

The School of Health and Human Performance offers master's degree programmes in three areas: Master of Arts in Health Education, Master of Science in Kinesiology and Master of Arts in Leisure Studies. There are ongoing research programmes in each of the areas of health education (basic health-related research and evaluation of health education/health promotion policies, programmes, practices and content), kinesiology (exercise physiology, neuromuscular physiology, ergonomics, motor performance, biomechanics and sport psychology) and leisure studies (leisure and social groups such as older adults, youth or persons with health problems/disabilities; historical analysis of leisure and sport; analysis of sport and recreation administration and cultural services).

For more detailed information on the regulations regarding these programmes, students are referred to the Graduate Student Handbook of the School of Health and Human Performance, which is available from the Associate Director (Graduate Studies).

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

Students seeking admission to any of the master's programmes should have earned an excellent record during four years of undergraduate study. Candidates for the Master of Science in Kinesiology should have an honours or honours equivalent degree which includes the completion of an independent research project.

An honours or honours equivalent degree is recommended for candidates for the Master of Arts in Health Education or Leisure Studies. Those with appropriate qualifications are normally registered in the one-year master's programme. Students from undergraduate programmes in related fields (other than Health Education, Kinesiology, or Leisure Studies) will be considered for graduate study in the School, but may be required to register in the two-year master's programme.

Qualifying work may be required of applicants whose background for advanced studies in Health Education, Kinesiology, or Leisure Studies is judged deficient.

Programme Requirements

One full academic year (12 months) of resident study at Dalhousie University is a minimum requirement for the one-year master's degrees. Although the MA and MSc degree programmes officially have a one-year residency requirement, students should expect to take from 18 to 24 months of full-time work to complete the degree. Ordinarily, for full-time students, the degree must be completed within four years of first registration.

Completion of the degree is also possible through part-time study. However, financial assistance is not available for students undertaking the degree on a part-time basis.

Five credits (30 credit hours) at the graduate level are required in all programmes - 18 credit hours of classes and 12 credit hours of thesis work. Required and elective classes for each programme are listed below. Each class is normally worth 3 credit hours. Electives may be chosen from the lists of classes below, or from graduate classes offered by other departments at Dalhousie University, or, to a limited extent, at other universities.

Students may take a maximum of 6 credit hours of ancillary classes above and beyond the required programme of study.

The thesis topic will be determined by the student in consultation with the thesis advisor. A thesis proposal must be approved by the candidate's thesis supervisory committee, which consists of at least three members (at least two of whom are members of the School's graduate faculty), before the thesis research may be undertaken.

Once the proposal has been approved by the thesis committee, it shall be submitted to the appropriate ethics committee for consideration. Only after approval has been received from both the thesis supervisory committee and the ethics committee, may the student proceed with data collection.

The thesis examination committee is responsible for approving the completed thesis after a final oral presentation by the student covering the nature and findings of the research. This committee is made up of the supervisory committee plus an additional member appointed by the Associate Director (Graduate Studies).

The School holds research-oriented seminars during the academic year. It is expected that students will attend and participate in these seminars as discussants and presenters.

II. Degree Programmes

A. Master of Arts (MA) in Health Education

While the general goal of health education is to promote the health and well-being of individuals and their communities, the Master of Arts (Health Education) focuses on the evaluation of community health education and health promotion policies, programmes, practices and content. Its graduates are prepared to assume major roles and responsibilities in evaluation of and research concerning health education activities.

Required Classes: 24 credit hours

- HEED 5503.03: Intermediate Statistics for Health Sciences
Prerequisite: Before entering HEED 5503.03 students must have completed an introductory course in statistics with at least a "B" grade.
- HEED 5514.03: Trends in Health Education (Jackson) OR HEED 5516.03: Theoretical & Scientific Bases of Health Education.

- HEED 5595.03: Measurement & Evaluation in Health Education and Health Promotion.
- HEED 9000.00: Thesis. 12 credit hours
- LEIS 5501.03: Advanced Research Methods in the Social and Natural Sciences (C. Hood) OR comparable class approved by the thesis advisor

Elective Classes: 6 credit hours

- HEED 5600.06/5601.03/5602.03: Independent Studies. Open to independent completion of study. Interested students should consult the Associate Director (Graduate Studies).
- HEED 5620.03: Topics in Health Psychology. Cross-listed with PSYO 6420.03. (This class is not offered every year.)

Students are encouraged to elect classes outside the School that may help in the development of their research and/or professional interests, as well as courses within Health Education. Electives must be approved by the student's advisor.

B. Master of Science (MSc) In Kinesiology

Required Classes: 21 credit hours

- KINE 5501.03: Advanced Research Methods in the Social and Natural Sciences (C. Hood)
- Two of:
 - KINE 5510.03: Cardiorespiratory Dynamics in Exercise (P.D. Campagna)
 - KINE 5516.03: Neuromuscular Physiology (G.C.B. Elder)
 - KINE 5523.03: Biomechanics of Human Motion (C.A. Putnam)
 - KINE 5530.03: Cognitive Ergonomics (J.F. McCabe)
- KINE 9000.00: Thesis. 12 credit hours

Elective Classes: 9 credit hours

- KINE 5503.03: Intermediate Statistics for Health Sciences
Prerequisite: Students must have completed an introductory class in statistics with at least a "B" grade.
- KINE 5572.03: Topics in Human Performance (J.F. McCabe)
- KINE 5600.06/5601.03/5602.03: Independent Studies. Open to independent completion of study. Interested students should consult with the Associate Director (Graduate Studies).

Elective classes can be taken from within or outside the School. All classes must be approved by the student's advisor.

C. Master of Arts (MA) In Leisure Studies

Required Classes: 21 credit hours

- LEIS 5501.03: Advanced Research Methods in the Social and Natural Sciences. (C. Hood)
- LEIS 5503.03: Intermediate Statistics for Health Sciences. OR another intermediate statistics class approved by the student's advisor. Prerequisite: Students must have completed an introductory class in statistics with at least a "B" grade.
- LEIS 5592.03: Interdisciplinary Basis of Leisure Science. (R.F. Lyons)
- LEIS 9000.00: Thesis. 12 credit hours

Elective Classes: 9 credit hours

PLEASE NOTE: not all classes listed below are offered every year. Please consult the timetable for a current list of classes offered.

Elective classes may also be taken outside the School.

- LEIS 5512.03: Lifestyles of Ill and Disabled Persons.
- LEIS 5550.03: Historical Analysis of Sport and Culture. (A.J. Young)
- LEIS 5561.03: Gender, Leisure and the Family. (C. Hood)
- LEIS 5562.03: Perspectives on Youth.
- LEIS 5563.03: Leisure Behaviour and the Older Adult. (J.F. Singleton)
- LEIS 5600.06/5601.03/5602.03: Independent Studies. Open to independent completion of study. Interested students should consult with the Associate Director (Graduate Studies).

III. Classes Offered

HEED 5503.03: Intermediate Statistics for Health Sciences.

This class is designed as a second class in statistics and is intended to provide the graduate student with a working knowledge of the statistical issues and techniques more commonly used by researchers in the Health Sciences. The focus is on setting up appropriate statistical models and on the interpretation of the results. Statistical packages, including MINITAB and GLIM, will be used to carry out the computations. The topics to be covered include: simple linear regression, correlation, analysis of variance (ANOVA), multiple regression, inference, qualitative variables, multicollinearity, sampling experimental design, analysis of covariance and repeated measure design.

INSTRUCTOR: Math Department

CROSS-LISTING: STAT 5990.03

PREREQUISITE: An introductory statistics class

HEED 5514.03: Trends in Health Education.

To be an effective leader in health promotion/health education, we must be aware of the current trends and issues affecting the field. Students will examine and discuss trends and issues both as identified by the instructor and by themselves. These trends will cover a range of topics related to conceptual, social, and professional issues.

HEED 5514.03 is an opportunity to take stock of the field, to discuss, debate, and critique trends and issues, and to generate ideas helpful in accomplishing our goals more effectively.

INSTRUCTOR: L. Jackson

HEED 5516.03: Theoretical and Scientific Bases of Health Education.

This class provides an opportunity for students to develop and further their expertise in selected areas of health education content. These areas will be examined by an analysis of relevant health-related theories and scientific inquiry. Students will prepare a paper that might serve as background information in the development of a health education programme or programme evaluation, and that is in a form suitable for appearance in a scholarly or popular publication.

HEED 5595.03: Measurement and Evaluation in Health Education and Health Promotion.

The impetus for this class is the conviction that health education and health promotion programmes can be improved through evaluation. Students will be introduced to both quantitative and qualitative approaches to evaluation, in ways that have meaning to health professionals whose primary business is practice. By applying what is learnt to selected health education and health promotion programmes, students are encouraged to become practitioners who evaluate.

HEED 5620.03: Topics in Health Psychology.

This seminar class is an analysis of contemporary theory and research in the field of health psychology. Two primary themes will be examined: psychological processes and health behaviour (e.g. smoking, exercise, AIDS, and addictions); and coping with chronic health stressors (e.g. pain, illness and disability). The class will include a critical analysis of selected interventions for addressing specific health behaviours and stressors such as compliance strategies.

INSTRUCTOR: R. Lyons, P. McGrath

CROSS-LISTING: PSYO 5420.03

KINE 5501.03: Advanced Research Methods in the Social and Natural Sciences.

CROSS-LISTING: LEIS 5501.03

KINE 5503.03: Intermediate Statistics for Health Sciences.

See listing for HEED 5503.03

KINE 5510.03: Cardiorespiratory Dynamics in Exercise.

This class will involve an examination of published research concerning the health related aspects of physical fitness. For the most part, the class will follow a seminar format with practical and/or laboratory demonstrations.

INSTRUCTOR: P. Campagna

KINE 5516.03: Neuromuscular Physiology.

The objectives of this class are to develop an understanding of the neuromuscular system in terms of its structure at both the macro and micro levels, the central and peripheral mechanisms involved in regulating and controlling recruitment of muscles and the properties of the individual motor units. There will be a focus on the adaptability of muscle to altered demands that result from training, disuse, injury and disease. Much of the class focuses on Cerebral Palsy, in terms of changes to the neuro-muscular system and the mechanics responsible for them.

INSTRUCTOR: G. Elder

KINE 5523.03: Biomechanics of Human Motion.

This class is designed to provide an advanced understanding of mechanical principles as they apply to the analysis of human movement. Several major directions being taken in the field of biomechanic research will be covered. This class should provide a solid foundation for students intending to conduct research in Biomechanics. Topics include: kinematics and kinetics of linked systems in two and three dimensions, linear impulse momentum analysis, work-energy analysis, analysis of interactions between linked segments, functional roles of muscles, body segment parameters, data smoothing, modelling and simulation.

INSTRUCTOR: C. Putnam

KINE 5530.03: Cognitive Ergonomics.

This class is designed to provide an in-depth treatment of human information processing capabilities and how this knowledge can be applied in ergonomic settings. The format of the class is a combination of brief lectures, group seminars and individual presentations. Each member of the class will complete a project and present the results to the seminar group.

INSTRUCTOR: J. McCabe

KINE 5572.03: Topics In Human Performance: Motor Control.

This class is intended to be a graduate level seminar which attempts to provide careful examination of published research and other written work in the area of motor control. The first portion of the class will consist of a brief review of the mechanical and physiological foundations of motor control and an illustration of some of the most useful and popular paradigms in the field. The second portion of the class will turn to classic problems and current theoretical and empirical attempts to solve them. The last portion of the class will involve presentations by members of the seminar group. The format of the presentations can vary according to individual and the topic under consideration. Some suggestions would include: 1) a literature review of a specific topic, 2) a grant proposal for a research project and 3) the results of a study conducted during the class.

INSTRUCTOR: J. McCabe

LEIS 5501.03: Advanced Research Methods In the Social and Natural Sciences.

This class is concerned with research methodology in the social and natural sciences. It is designed for graduate students who are embarking on their first, major independent research project and is assumed that students have done some introductory work in methodology during their undergraduate training. The class is designed to allow students to gain a general understanding of issues related to research, such as philosophy of science, the logic of the research process, ethics, measurement, causality, etc. In addition, the students are introduced to the philosophical and epistemological debates surrounding the issues of the applicability of natural science methodology to the social sciences, qualitative versus quantitative research, and the role of theory in research.

The second part of the class provided the students with the opportunity to explore in more detail three major methodologies commonly used in research on human subjects; the class will provide "practical" information relating to the design of research projects and to the different methodological techniques that are commonly used in sociological, psychological, and behavioral research. Students will be expected to design a research proposal which could be used as the first draft of the student's thesis proposal where appropriate.

INSTRUCTOR: C. Hood

CROSS-LISTING: KINE 5501.03

LEIS 5503.03: Intermediate Statistics for Health Sciences.

See listing for HEED 5503.03.

LEIS 5512.03: Lifestyles of Ill and Disabled Persons.

This class involves the identification and critical analysis of issues in the leisure and lifestyle of persons with chronic health problems and disabilities. Students gain a knowledge and understanding of selected issues and research through readings, field experiences, and classroom discussion. Alternative solutions to current problems faced by practitioners and advocates are assessed. Issues include: psycho-social theory of illness/disability, professional preparation, legislation, service development, support services, implementation of the integration process, and research implications.

INSTRUCTOR: R. Lyons

LEIS 5550.03: Historical Analysis of Sport and Culture.

This class stresses historical writing and research. Research centres on historical questions concerned with leisure and sport in North America.

INSTRUCTOR: A.J. Young

LEIS 5551.03: Gender, Leisure and the Family.

The basis of this class is a critical examination of the theories and concepts which have been used to study gender roles and the family in contemporary society. The application of these theories and concepts to leisure is then explored. Particular attention is paid to the relationship between paid employment, household management and leisure for males and females. In addition, the impact of changing patterns of family composition is examined.

INSTRUCTOR: C. Hood

LEIS 5552.03: Perspectives on Youth.

This class reviews some of the current issues facing youth today. Most programmes which provide leisure services to youth are targeted at the majority. There are many young people who would be considered "minority" because of ethnic origin, socio-economic status or employment status. These people are seldom served by recreation services. Unemployment and underemployment pose one of the biggest fears for young people in school. The answer may not rest with job creation programmes alone. It is the purpose of this class to pursue alternatives and through an experiential component be able to interact with young people directly and identify their needs. This will result in a research project.

LEIS 5553.03: Leisure Behaviour and the Older Adult.

The purpose of this class will be to enhance the individual's awareness of the role that leisure plays in an older person's lifestyle. The class emphasizes the effect that crime, housing, health status, fitness level, education and income have on individual's leisure behaviour. The role of organized recreation and leisure delivery systems in institutions and community settings is also elaborated on in this class.

INSTRUCTOR: J. Singleton

LEIS 5552.03: Interdisciplinary Basis of Leisure Science.

Leisure behaviour is determined by a complex multiplicity of factors including socialization, social-economic status, demographics, politics, economics, motives, perceptions, attitudes, personality and situational determinants. This class provides an opportunity to

analyze leisure behaviour including play, sport, cultural activities, by means of an interdisciplinary perspective. The class is based on social science theory applied to the study of leisure, along with historical analyses, and social and cross-cultural comparisons. A critical evaluation of leisure research is presented throughout the class.

INSTRUCTOR: R. Lyons

History

Location: 1411 Seymour Street
Halifax, NS B3H 3M6
Telephone: (902) 494-2011
Fax: (902) 494-3349
e-mail: history@is.dal.ca

Chair of Department

O'Brien, J.T.

Graduate Co-ordinator

Enquire at Department

Professor Emeritus

Waite, P.

Professors

Cross, M.S., BA, MA, PhD (UofT)
Crowley, J.E., AB (Princeton), MA (Mich), PhD (Johns Hopkins)
Parpart, J.L., BA (Brown), MA, PhD (Boston)
Pereira, N.G.O., BA (Williams), MA, PhD (Calif, Berkeley)
Traves, T., BA (Man), MA, PhD (York), President and
Vice-Chancellor, Dalhousie University
Woolf, D.R., BA (Queen's), DPhil (Oxford), FR Hist S

Associate Professors

Hanlon, G., BA, MA (UofT), PhD (Bordeaux)
Neville, C.J., BA, MA (Carleton), PhD (Aberdeen)
O'Brien, J.T., BA (Wisconsin), MA, PhD (Rochester)
Sutherland, D.A., BA (MtA), MA (Dal), PhD (UofT)

Assistant Professors

Cadigan, S., BA (Mem), MA (Queen's), PhD (Mem)
Tillotson, S., BEd (Waterloo), MA, PhD (Queen's)
Vander Meulen, J., BA (UBC), MA, PhD (UofT)
Zachernuk, P., BA, MA (Dal), PhD (UofT)

Adjunct Professors

Conrad, M., BA (Acadia), MA, PhD (UofT), Acadia University
Fingard, J., BA (Hons) (Dalhousie)
Forestall, N., BA (Western), MA (Memorial), PhD (Tor), St. Francis
Xavier
Kirk, J., MA (Queen's), PhD (UBC), Dalhousie University
Lee, J., BA, MA, PhD (Tor)
McOuat, G., BA, MA, PhD (Tor), King's College
McPhil, PhD (London)
Mills, E., BSc (Carleton), MS (Yale), PhD (Yale), Dalhousie
University
Murray, J., MD (Dalhousie), Dalhousie University

I. Admission Requirements

Candidates for the one year MA degree must hold a BA Honours degree in history. Those with general history BA degrees or degrees in fields other than history may be placed in a two year MA programme or in a qualifying year programme. Candidates for doctoral study must hold an MA degree in history or in a cognate field.

II. Degree Programmes

A. Master of Arts (MA)

Students admitted into either a qualifying year or a two year MA programme must in the first year take five upper level undergraduate history classes and secure at least a B+ grade in each. Students in the one year MA programme are required to attend the Graduate Seminar which meets weekly during the academic year.

The MA is a research degree and can be done full-time or part-time. Applicants for the one-year MA will normally have an honours (four-year) BA or equivalent. Students in the programme spend the first term satisfying class requirements and begin their thesis research early in the winter term, under the supervision of a faculty member, or members, in the student's area of interest. The class requirement is normally satisfied by taking two designated advanced classes, or one advanced class and a Directed Reading field with a faculty member. In cases where suitable advanced classes are not offered, a student may, at the discretion of the Graduate committee and on the recommendation of the student's principal supervisor, elect to fulfill his or her class requirements through two Directed Reading fields. Classes and fields may be selected from both departmental and extra-departmental offerings, subject to approval of the Graduate committee (at least one class or field must be taught by a member of the History Department). Directed Reading fields are generally examined in early January following the Christmas vacation. Theses may be orally examined at any time, and topics should be chosen with a view to completion twelve months after commencement of the programme. To complete their degree students must submit and orally defend a thesis of not more than 50,000 words.

Candidates writing theses in Canadian history must demonstrate a competent reading knowledge of French: those writing theses in other fields must demonstrate an adequate reading knowledge of the language required for the successful completion of their research.

B. Doctor of Philosophy (PhD)

For minimum time required to complete the programme, see Section 4 of the Faculty of Graduate Studies Regulations in this calendar.

In order to be considered a candidate for the PhD degree, students must prepare three fields, at least one of which must be outside the student's primary research area, and pass written and oral examinations in all three fields. Students must demonstrate an adequate reading knowledge of the language required for the successful completion of their research. All students engaged in Canadian history research must demonstrate a reading competence in French. A "pass" of the PhD field exams is deemed to be a mark of A- or better in each exam. Passes are recorded only as "P" on transcripts. Students who fail to attain the pass standard in one of three exams will be permitted to rewrite within three (3) months of the exam. Students who fail to attain the pass standard on two or three of the fields (or who fail in a rewrite attempt) will be required to withdraw from the PhD programme.

A thesis is required which shall not exceed 100,000 words in length, excluding footnote references and bibliography. Doctoral theses are usually to be undertaken in the areas of Canadian, British, British Imperial, Russian (mid-19th century to mid-20th century), and African History. Students wishing to do a PhD thesis in areas other than those named above may be recommended for admission providing that resources are available.

To qualify for the award of the PhD degree, the thesis must make a significant and original contribution to historical study by the discovery of new information, or by the original interpretation of known information, or both.

III. Fields of Study by Directed Reading (MA and PhD)

A. Canadian History

The following fields are offered:

History of the Maritimes, with emphasis on the late 18th to mid-20th century; Canadian social history, in particular such areas as poverty and philanthropy, urban and rural social disorder, labour history, and the rise of the city; Canadian political history, particularly the 19th and 20th centuries; Canadian-American relations, particularly since 1867.

B. African History

This field may be studied with special attention to precolonial history during the period of oral tradition, the colonial period since 1800, processes of decolonization in Anglophone Africa, and African social history in the 19th and 20th centuries.

C. British History

The following fields are offered:

Aspects of British history 1250-1730; aspects of political, social and cultural history, 1914-1979; labour and gender history in the 20th century.

D. United States History

Fields are offered in:

Colonial and revolutionary America, 19th century American social, labour, and ethnic history, and 20th century American political and business history.

E. European History

Students may take a field in French or Italian history (1550 to 1789) emphasizing the sources and methods used in social history, but must have a reading knowledge of either of those two languages.

F. German History

Only one field is available in German history: Germany 1870-1945. Within this, students may concentrate upon particular topics or periods especially relevant to their thesis work. A prior reading knowledge of German is required.

G. Medieval History

Fields are available in English and medieval European history.

H. Russian History

Two fields are available one in nineteenth-century Russian history and one in twentieth-century Russian and Soviet history.

I. History of Political and Social Theory

Fields may be offered in the broad history of political and social theory (including historiography) or in more specific areas: Renaissance and Reformation political theory, the Enlightenment, and Marxism (including special reference to the Third World).

J. Caribbean and Latin American History

Fields may be offered in aspects of labour (including slave labour history), the impact of imperialism in the 19th and 20th centuries, and transitions to socialism.

K. Women's History

Fields are offered, both as single units and in combination, on women in developed industrial societies (North America), in developing societies (Africa), and in socialist societies (including Cuba and China).

IV. Senior Undergraduate Classes

These classes are open to Graduate Students for which Graduate Credit is assigned.

HIST 3462.03: Distortion or Development: African Economic History.

An examination of economic change in tropical Africa, with particular attention to the question of economic development and underdevelopment. From the premercantilist period to the current conjuncture.

INSTRUCTOR: J. Parpart

FORMAT: Seminar 2 hours

PREREQUISITE: HIST 2422.03 or 1400.06

CROSS-LISTING: HIST 5462.03

HIST 4320.03: Feminism, Gender and Development.

Feminist scholarship and activism has spawned a number of theoretical explanations for gender inequalities. In the last decade poststructuralist and postmodernist critiques have influenced feminist theories in important ways. Grand theories of the past have been called into question; universals have been overtaken by particularities and difference(s). Feminists have reacted to these critiques in a number of ways. Some reject it outright, while others call for a synthesis. Scholars and activists concerned with international development have frequently rejected these debates as irrelevant to the practical concerns of development. However, some scholars have responded more favourably to these ideas. This class will explore the various feminist theories, particularly postmodernist influences, and assess their importance for both the theory and practice of development, especially the development of women.

INSTRUCTOR: J.L. Parpart

FORMAT: Seminar 2 hours

EXCLUSION: Non-honours undergraduates

CROSS-LISTING: WOST 4320.03, HIST 5320.03

HIST 5000.03: Directed Readings.*

HIST 5001.03: Directed Readings II.*

FORMAT: This is a class of individual instruction.

RESTRICTION: Students may only register for this class with the written permission of a Faculty member and the Undergraduate Coordinator.

HIST 5002X/Y.06: Selected Readings in History.*

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

FORMAT: This is a class of individual instruction.

RESTRICTION: Students may only register for this class with the written permission of a Faculty member and the Undergraduate Coordinator

HIST 5090.03: Russian Society.

Basic institutions of 20th century Russian society are considered in their historical context, with special attention to the former role of the Party, official culture and literature, the workings of the economy, and social stratification.

INSTRUCTOR: N.G.O. Pereira

FORMAT: Seminar 2 hours

PREREQUISITE: Reading knowledge of Russian (at least two years of language study) and some Russian history

RECOMMENDED: RUSS 1000.06, 2000.06

CROSS-LISTING: HIST 3090.03, RUSS 3090.03

HIST 5105.03: The English Civil War: Society, Religion and Politics 1603-1660.

An advanced class on one of the most tumultuous and eventful periods in British history, leading up to and including civil war and revolution 1642 to 1660. Select primary sources will be used in addition to secondary works. Topics to be studied include the social structure of early Stuart England; the Church and its critics; foreign

policy; radical politics; the military course of the war; religious sectarianism; and the impact of the war and its aftermath on the populace.

INSTRUCTOR: D.R. Woolf

FORMAT: Seminar 2 hours

PREREQUISITE: Any second year class in British history

RECOMMENDED: HIST 2105.03, 2106.03, 2005.03, 2008.03

EXCLUSION: HIST 3104.06

CROSS-LISTING: HIST 3105.03

HIST 5116.03: Advanced Seminar in British History: Culture, Class and Society in Twentieth-Century Britain.

How does culture reflect social and political change? This class sets out to explore this question in the context of modern British society. Using a variety of texts, such as films like *My Beautiful Launderette*, the photographs of Bill Brandt and Humphrey Spender, the plays of John Osborne, Howard Brenton, and Caryl Churchill, art, architecture, and popular forms of culture, this seminar will examine how issues such as class tension, social change, the decline of empire and the beginning of a multi-racial society, changes in women's status, and other political and social developments were represented in twentieth-century Britain, from the First World War to the present day.

FORMAT: Seminar 2 hours

PREREQUISITE: As this is an advanced seminar in British history, the instructor's permission is required for registration.

CROSS-LISTING: HIST 5116.03

HIST 5222.03: Topics in Canadian Social History, 19th and 20th Centuries.

This seminar will explore major themes in Canadian social development. The topics discussed will vary from year to year but will emphasize such themes as: changing values in Canadian society; the nature of popular cultures; the relationship of order and disorder; the family; gender relations; and social classes. Approved with Canadian Studies.

INSTRUCTORS: R. Bleasdale, M.S. Cross

FORMAT: Seminar 2 hours

PREREQUISITE: A class in Canadian history

CROSS-LISTING: HIST 3222.03

HIST 5223.03: The Caring Society? - Welfare in Canada Since 1900.

This class examines changes over the twentieth century in the ways Canadians have dealt with people's needs, their own or others', whether for income, housing, personal care, or other matters of survival and well-being. Both private and government forms of welfare provision will be studied, with the overall purpose of understanding why Canada came to have the kind of welfare state it does. Among the topics that may be covered are: changing views on the origins and prevention of dependency; definitions of need; religious and ethnic variations in welfare practices; connections between welfare and women's lives; charitable fundraising; promoters and opponents of government social programmes financing the welfare state; gender, race, constitutionality, and class issues in welfare. Approved with Canadian Studies.

INSTRUCTOR: S. Tilloston

FORMAT: Lecture/tutorial or seminar 2 hours

PREREQUISITE: HIST 1200.06 or HIST 2212.03 or HIST 2230.06

HIST 5261.03: The Rural Experience in Canada.

The rural experience has dominated Canada's past and continues to exert a strong influence in the present. This class explores the contours of Canadian rural life, examining the impact of rural politics, economics, social relations and ideologies upon Canadian development. Specific themes will vary from year to year.

INSTRUCTOR: C. Danyak

FORMAT: Seminar 2 hours

PREREQUISITES: A survey of Canadian history

CROSS-LISTED: HIST 3261.03

HIST 5271.03: The Fisheries of Atlantic Canada.

Popular explanations of recent collapses in many Atlantic Canadian marine species assume that fish, as common-property, open-access resources, have been exploited by people without regard for

conservation. This considers such 'tragedy of the commons' approaches from two perspectives: social and ecological history. It examines how gender, class and ethnic relationships have shaped fishing communities, and how such communities interact with material changes in marine environments. Topics to be covered will include First Nations' use of marine resources, European settler fishing communities, customary regulation of marine resources, possible previous ecological crisis affecting fisheries, changes in harvesting technology, state-defined marine property rights, and fisheries' 'professionalization'.

CROSS-LISTED: HIST 3271.03

HIST 5292.03: Wealth and Power in North America.

Business enterprises have played a major role in shaping the social and political as well as economic development of the United States and Canada over the past 200 years - perhaps more so than in most other modern nations. This class explores the growth and significance of business in the history of these two countries. Among the topics covered are: entrepreneurship, technical innovation and economic growth; the rise of big business and management organization; the convoluted and controversial linkages of business and government; and the emergence of multinational enterprises and their impact on Canadian-American relations. Approved with Canadian Studies.

FORMAT: Lecture/discussion 2 hours

PREREQUISITE: One class in Canadian or U.S. History, or an appropriate class in a related discipline.

RECOMMENDED: A survey class in Canadian or U.S. History

EXCLUSION: HIST 3291.03

HIST 5350.03: People and Things - Material Culture in History.

The class studies the theoretical, cross-cultural, and historical considerations involved in the interdisciplinary study of material culture - economic technology, household comforts, architecture, clothing, even the landscape itself. The chief interpretative issues deal with the relation between consumption patterns and economic, social, and cultural change. The eighteenth-century consumer revolution in Britain and its colonies in North America provide the contexts for this year's examples of empirical research.

INSTRUCTOR: J.E. Crowley

FORMAT: Lecture/discussion 2 hours

PREREQUISITE: One second-year class in American or Canadian history

RECOMMENDED: A class in the sociology or social anthropology family

CROSS-LISTING: WOST 3300.03

HIST 5368.03: The United States Since 1929.

This class traces United States politics, economy, foreign policy and the development of the state during the period from 1929 to 1961. The goal is to develop a fairly advanced sense of the main events of the period, including the Great Depression, the New Deal political order, America and World War II, the cold War, relations with the Third World, the Korean War, McCarthyism, and the civil rights movement. This class is also intended to expose students to the main literature, historiography and theory on American history in the contemporary period. Students taking this class are strongly encouraged to take its complement, HIST 3369.03.

INSTRUCTOR: J. Vander Meulen

FORMAT: Lecture/discussion

PREREQUISITE: HIST 2333.03 or instructor's permission

HIST 5380X/Y.06: Latin American History.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

HIST 5430.03: Making of Colonial Africa (1850-1930).

European colonial rulers and business interests laid out the framework of the sub-Saharan African colonial order from about 1850 to the 1920s, seeking ways to exploit African labour and natural resources. But imperial plans were limited and sometimes frustrated by African interests, and by historical dynamics within Africa, such as the rise of new merchants and Islamic revolution. This class

assesses how the realities of Africa intersected with European imperial ambitions to profoundly change African society during this early colonial period.

INSTRUCTOR: P. Zachernuk

FORMAT: Lecture/discussion 2 hours

HIST 5435.03: Rise and Fall of African Slavery.

Many African societies, like pre-industrial societies elsewhere, used slaves as well as other forms of labour for a variety of purposes. The rise of external slave trades after 1700 - notably across the Atlantic and Sahara - transformed many African societies into specialized slave exporters. As external slave trades declines in the 19th century, many African economies used extensive internal slave labour to produce exports, a pattern colonial governments were slow to change in the 20th century. This class examines these changes in African slavery, and how they affected such issues as gender relations and class structure.

INSTRUCTOR: P. Zachernuk

FORMAT: Lecture/discussion 2 hours

HIST 5452.03: South Africa Since 1860.

The class examines not only the changes in race relations and politics, but also the effects of mining and other industries on rural and urban societies after the discoveries of diamonds and gold. Themes will include British policies and the "imperial factor", the growth of Afrikaner and African nationalism, the Boer War and unification, the development of apartheid and South Africa's relations with the wider world.

INSTRUCTOR: J. Parpart

FORMAT: Lecture/discussion 2 hours

PREREQUISITE: HIST 2421.03 or 2422.03 or 3451.03 or 3461.03 or 3462.03

RECOMMENDED: HIST 3451.03, 2131.03, 2132.03

EXCLUSION: HIST 3450.06

HIST 5461.03: Gender and Development in Africa.

This class examines the economic, political and social roles of women and men in Africa from precolonial to modern times. It analyzes the way women and men construct their lives, participate in political and economic processes and contest and reinforce the definitions of womanhood and manliness in various African societies. The class will examine development and feminist/gender theory in the light of recent debates over gender and development issues.

INSTRUCTOR: J.L. Parpart

FORMAT: Seminar 2 hours

PREREQUISITE: HIST 2422.03

CROSS-LISTING: WOST 3310.03, HIST 5461.03

HIST 5462.03: African Economic History.

HIST 5470.03: Wars and Revolutions in Nineteenth Century Africa.

Africa in the nineteenth century was profoundly reshaped by a complex set of events. Muhammed Ali undertook to modernize Egypt. New Islamic states founded in the west developed plantation economies of unrivaled size. On the Atlantic coast, merchant princes made their fortunes supplying tropical goods for Europe's Industrial Revolution. In Central Africa the search for slaves and ivory both wreaked havoc and stimulated new states. In the south, the rise of Zulu power generated waves of conquest and consolidation. This class assesses the extent to which Africa was reshaped in the revolutionary century before colonial partition.

INSTRUCTOR: P.S. Zachernuk

FORMAT: Lecture/discussion

PREREQUISITE: Any 2000-level African history class or permission of the instructor

HIST 5475.03: African Intellectuals and the Modern Experience.

African thinkers have long pondered the challenges of the modern era, and have established lines of thought with which African intellectuals now address Africa's profound problems. But this engagement with the modern world has moved through different phases, just as the social location of the African intelligentsia has changed over time. This class will explore this intellectual history by

setting specific writers in context, and then examining their original writings to ponder such questions as: What were the roots of "African Christianity"? How did African intellectuals respond to "scientific racism"? What was the appeal of Pan-Africanism? What was Negritude? How socialist was African socialism? How do postmodern insights about the invention of identity affect the idea of being "African"?

INSTRUCTOR: P.S. Zacherunk

FORMAT: Lecture/discussion

PREREQUISITE: Any 2000-level African History class or permission of the instructor

HIST 5500.03: Topics in Modern History.

This seminar is specifically intended for students in the Advanced Major and Honours degree programmes in History. The specific content of the seminar varies from year to year, but generally involves examination of a subject in history in some depth, and may include an historiographical, comparative or interdisciplinary dimension.

FORMAT: Seminar 2 hours

PREREQUISITE: Inquire at Department

CROSS-LISTING: HIST 5500.03

HIST 5600.03: Topics in Late 19th and 20th-Century American and British History.

This class will, depending upon the staffing in any particular year, examine a selection of themes in late 19th and 20th century British and American history, including, for instance, labour/labour history, political history (including state formation), cultural history, and history of race and national identity. Depending upon staffing, this class may concentrate upon the history of one country or may offer a comparative aspect. It will be intended for graduate or senior undergraduate students with some background in either British, American or Canadian history. Evaluation will be through research papers and, possibly, a final exam.

INSTRUCTORS: J.T. O'Brien

FORMAT: Seminar 2 hours

PREREQUISITE: 3000-level class in modern British, American or Canadian history

CROSS-LISTING: HIST 5600.03

HIST 5610.03: Women in North America.

An examination of the impact of industrialization and urbanization on "women's sphere" in society and of the emergence of various strains of feminism in the nineteenth and twentieth centuries.

CROSS-LISTING: HIST 3610.03

HIST 5704.03: Crime and Society.

This class explores the development of the criminal law in England between 1066 and 1500. After some introductory lectures by the instructor on the legacy of Anglo-Saxon legal notions and the creation of the royal system of justice known as the "eyre", attention is given to a study of the development of a more sophisticated hierarchy of courts: the local tribunals presided over by justices of the peace and sheriffs, itinerant sessions headed by the justices of assize, and the central court of King's Bench. The origins and elaboration of particular offences, including treason, felony (murder, rape, arson, burglary and larceny) and trespass are examined. Emphasis is placed in the social aspects of crime in medieval England, and extensive use is made of recent periodical literature dealing with crime and its effect in this period.

INSTRUCTOR: C.J. Neville

FORMAT: HIST 2101.03 or 2001.03 or 2002.03

RECOMMENDED: HIST 1100.03, 2104.03

EXCLUSIONS: HIST 3009.03, 3007.03, and 3010.06

CROSS-LISTING: HIST 3004.03

HIST 5985.03: The Varieties of History - Historiography in the 20th Century.

This class will begin with a brief survey of the writing of history from the Middle Ages to the 19th century, and then proceed to an examination of the major schools, approaches, and sub-disciplines within the historical profession in the 20th century. Topics to be covered include the following: the nature of historical knowledge, historical "relativism", Marxism, the "Annales" school, oral history, psychohistory, quantitative history, Feminism and others. No

background in statistics is required. Classes will meet weekly to discuss assigned readings and each student will investigate an historian or historical school of his/her choice for a term paper.

INSTRUCTOR: D.R. Woolf

FORMAT: Seminar 2 hours

PREREQUISITE: Concurrent enrolment in HIST 4990.06 or instructor's consent

RECOMMENDED: A class in modern intellectual history of PHIL 2540.06

CROSS-LISTING: HIST 5985.03

*Non-History MA or PhD students only; history students must take regular classes or one of the Directed Reading fields listed above.

Candidates for the full-time MA in History must take graduate classes in the A (fall) term.

Students from other disciplines may apply for admission to such classes in either A or B term (as offered) by seeking the permission of the instructor, and obtaining the approval of their own department and the Faculty of Graduate Studies.

Graduate classes are offered on a rotating basis and students should check with the History Department as to its offerings in a given academic year.

Human Communication Disorders

Location: 5599 Fenwick Street
Halifax, NS B3H 1R2
Telephone: (902) 494-7052
Fax: (902) 494-5151

Director of the School

Armson, J.

Professors

Green, W.B., BS, MA, PhD (Syracuse). Aural immittance measures, auditory physiology/pathophysiology, audiometry
Yang, E., MD, MCD, PhD (Texas). Auditory electrophysiology, pediatric audiological assessment, infant hearing screening

Associate Professors

Armson, J., BA, MS, PhD (Temple). Stuttering, speech motor control, treatment efficacy
Cassie, R., BPs, MSc, PhD (McG). Audiological rehabilitation of adults, hearing aids, hearing loss and aging
Kay-Raining Bird, E., BA, MA, PhD (Wisc). Child language development/disorders, Down syndrome, autism, assessment, intervention

Assistant Professors

Belanger, S.A., BSc, MA, PhD (Conn). Apraxia, nonverbal communication, Broca's aphasia, right-hemisphere communication deficits, treatment efficacy
Campbell, M., BSc, MSc, MA (CUNY). Speech/voice characteristics associated with hearing impairment, normal speech development
Cleave, P., BA, MSW, MSc, PhD (Kansas). Specific language impairment, treatment efficacy, phonological disorders
Trudeau, N., BSc, MOA, PhD (Montréal)

Clinical Coordinators

Carey, L., BA, MA (CUNY)
Fisher, S., RN, BSc, MSc (Dal)
Tompkins, C., BA, MSc (Dal)

Adjunct Professors

Mencher, G.T., BA, MA, PhD (Mich), FASHA
Stach, B., BA, MA, PhD (Baylor) (Adjunct). Hearing aids, hearing loss, aging, presbycusis, infant hearing, pediatric audiology

Adjunct Clinical Professors

Anvar, B., MSc (Dal)
Comeau, M., BSc, MSc (Dal)
Dobbelsteyn, C., BSc, MSc (Dal)
Ellis, P., BSc, MSc (Dal)
Evans, R., BSc, MSc (Dal)
Farrell-Walker, T., BA, MSc (McGill)
Fortier, S.C., BSc, MSc (Dal)
Foster-MacDonald, L., BSc, MSc (Dal)
Granmyre, A., BSc, MSc (Dal)
Gulliver, M., BSc, MSc (Dal)
Hollett, S., BSc, MSc (Dal)
Jiang, T., BA, MSc (Lamar)
Johnson, S., BSc, MSc (Dal)
Jozsa, S., BA, BEd, MSc (Dal)
MacDonald, A., BSc, MSc (Dal)
MacKay, J., BA, MSc (Dal)
MacLean, H., BSc, MSc (Dal)

Maessen, H., BA, MSc (Dal)
Martin, J., BSc, MSc (Dal)
Maxwell, S., BSc, MSc (Dal)
McNeil, S., BA, MA (State U of NY at Buffalo)
Merchant, M., BA, MSc (Dal)
Ough, D., BCom, MA (N. Colorado)
Pugsley, S., BSc, MSc (Dal)
Santilli, C., BChildStudy, MSc (Dal)
Schmidbauer, J., BA, MA (SUNY at Buffalo)
Sloan, C., BSc, MA, PhD (Minn)
Smith, K., BS, MS (Syracuse)
Smith-Lamothe, J., BSc, MSc (Dal)
Stuttard, S., BSc, MSc (Dal)
Tabor, E., BChildStudies, MSc (Dal)
Whitehead, G., BS, MA (Northern Illinois)
Williams, M., BSc, MSc (Dal)

The School of Human Communication Disorders provides a three year programme of studies and clinical experiences leading to a MSc degree in either speech language pathology or audiology.

I. Admission Requirements

All applicants must possess a minimum of a baccalaureate degree from a recognized institution of higher education. This programme is designed for students with either minimal or no previous academic experience in the area of speech language pathology or audiology. The School invites applications from students possessing a baccalaureate degree in psychology, educational psychology, linguistics, special education, natural science, nursing, health sciences and other behavioural or health related disciplines. Students whose undergraduate degree is in either speech language pathology or audiology may be considered for entrance into the programme at a more advanced level under exceptional circumstances only.

Preference will be shown to students whose academic background includes at least one class in each of the following five categories:

1. Research Methods, e.g., Statistics, Research Design
2. Physical and Biological Sciences, e.g., Anatomy, Physiology, Physiological Psychology, Human Biology, Neurophysiology, Physics, Acoustics
3. Linguistics, e.g., Language Development, Phonetics, Psycholinguistics, Neurolinguistics, Sociolinguistics
4. Psychology, e.g., Developmental Psychology, Abnormal Psychology, Learning Theory, Motivation
5. Perception and Psychophysics, e.g., Sensation, Perception, Speech Perception, Psychoacoustics

Undergraduate grade requirements should exceed the equivalent of a "B" in the student's major and be at least the "B" level overall. Two academic letters of recommendation, from professors in the student's undergraduate major, will be required as well as a statement from the applicant indicating personal reasons for pursuing graduate work in speech-language pathology or audiology. Applications must indicate the student's preference for either audiology or speech language pathology.

II. MSc Degree Programme

This degree programme is a full time three year course with summer practicum experiences at the end of the first and second years of study. Currently the School does not offer any part time studies.

Students will be required to attain a minimum of 13 credits (10 academic, 1 project or thesis and 2 clinical practicums) over a three year period.

Extensive supervised clinical practice is required throughout the three year programme. Much of this requirement is met by attending a practicum held during the summer months. Students also complete a clinical externship during the winter term of the third year of study.

Students are required to undertake a project in an area of special interest during the second and third years of the programme. Projects provide students with the opportunity to develop specialized skills and are intended to make a contribution to the academic discipline or profession.

A maximum of three students per year may undertake a thesis in place of a project. The objective is to provide students with an opportunity to develop independence in conceptualizing and conducting research in the field of human communication disorders. A supervisory committee consisting of three members will oversee the thesis research. Students in the thesis-track have the option of reducing their course load by a maximum of two courses during the second and/or third year of study.

Core Curriculum

While students pursue a course of study that leads to specialization in either speech-language pathology or audiology, they will be required to take classes that contain information that is basic to both professions. These classes will be described under "core curriculum" in the class listings that follow.

III. Classes Offered

Core Curriculum

HUCD 5020.03: Phonetics.

This course considers the articulatory, linguistic, and acoustic aspects of phonetics. The application of phonetics to communication disorders, and training in broad phonetic transcription are included.

HUCD 5060.06: Practicum I.

This initial practicum period is designed to provide students with the opportunity to observe and become directly involved in varied clinical activities.

HUCD 5110.03: Anatomy and Physiology of the Speech Mechanism.

This course covers the anatomical and physiological bases of normal speech production, including respiration, phonation, articulation and resonance. Issues in speech motor control and an introduction to neuroanatomy and neurophysiology are included.

HUCD 5120.03: Hearing Measurement.

This course deals with an overview of the basic audiological test battery including pure tone air/bone conduction, speech audiometry, and immittance measurements. The principles and techniques for audiometric/immittance screening are presented.

HUCD 5130.03: Introduction to Speech-Language Pathology.

This course is designed to provide an overview of the discipline of speech-language pathology. A description of various pathologies and their management are presented.

HUCD 5140.03: Aural Habilitation with Children.

This course is designed to familiarize students with the general principles and features of comprehensive communication management programs for preschool and school-age children with hearing losses. Emphasis is placed on the role and appropriate use of audition in the habilitative process.

HUCD 5150.03: Speech - Language Acquisition.

This course covers the acquisition of language, (i.e., semantics, syntax, morphology, phonology and pragmatics) from a cognitive-linguistic-social framework. Cognitive and social development are addressed as are theory and methodology in child language research. The development periods from infancy through adolescence are emphasized.

HUCD 5230.03: Human Communication Processes.

This course considers the components of the human communication process including the linguistic, nonlinguistic, physical and situational contexts.

HUCD 5260.03: Hearing Disorders.

This course considers diseases, disorders and dysfunction of the auditory system which may be encountered by speech-language pathologists and audiologists. Pathologies of the peripheral and central mechanisms are included.

HUCD 6060.03: Topics in Clinical Procedures.

Issues related to the clinical practice of speech-language pathology and audiology are discussed. These may include development of programs of service and their administration, management of client data, supervision of student clinicians, private practice, counselling, behaviour management, and the changing roles and responsibilities of professionals.

HUCD 6310.03: Audition I.

This course covers the structure and function of the peripheral hearing mechanism. Principles of acoustics and the physiological processes of audition are included.

HUCD 6600.03: Seminars in Communication Disorders.

This seminar is designed to accommodate the special interests of students. Significant active student participation is required.

HUCD 6980.03: Research Design.

This course addresses both the evaluation and implementation of research methods in speech, language and hearing disorders. It focuses on the importance of research to the clinical setting and on the development of skills to evaluate the quality of research findings. It also aims to develop skills to design and implement theoretical and applied research: searching the literature, focusing it upon a research problem, reflecting upon models or theories and applying hypotheses, constructing internally valid methodology, analysing and interpreting results, and drawing accurate and useful conclusions.

HUCD 7060.06: Practicum.

This 12-week period is the culmination of clinical training, in which the students have an opportunity to integrate their academic and clinical knowledge. At the end of this practicum they will be expected to function independently. For this externship, students will be placed in sites outside of the greater metropolitan area.

Speech-Language Pathology Curriculum (above and beyond core)

HUCD 5210.03: Speech-Language Analysis.

This course covers assessment procedures used to evaluate speech, language and related processes in infants through adolescents. Observational and descriptive techniques are emphasized. In addition, standardized clinical measurement is addressed.

HUCD 5250.03: Speech Disorders - Children.

This course considers speech disorders in children, their development, phonological, perceptual, and neuromotor aspects. Included in the course are the assessment, differential diagnosis, and management approaches related to these disorders.

HUCD 5270.03: Language Disorders - Children.

This course deals with the nature and management of language disorders in preschool children across clinical etiologies (i.e., mental retardation, autism, hearing impairment, specific language impairment). Theories of language impairments and contemporary treatment approaches are presented.

HUCD 6350.03: Language Disorders - Adults.

This course covers the description and classification of language disorders of neurologic origin in the adult population. The primary focus is on aphasia but cognitive-linguistic deficits associated with traumatic brain injuries are also reviewed. Clinical diagnosis and management is emphasized.

HUCD 6370.03: Fluency Disorders.

This course covers the nature and treatment of fluency disorders. A review of the literature concerning the symptomatology of stuttering, theories about the disorder, and the treatment of disfluent children and adults are included.

HUCD 6390.03: Voice/Resonance Disorders.

This course addresses the contribution of voice and resonance to speech production. It explores the use of clinical measurement tools to assess each and stresses the application of such information to the assessment, diagnosis and treatment of voice/resonance disorders in children and adults. It covers signs and symptoms used in voice description and differential diagnosis. Treatment approaches are addressed for voice disorders, postlaryngectomy speech, alaryngeal speech, and resonance disorders associated with craniofacial anomaly and neurological deficit.

HUCD 6450.03: Speech Disorders - Adults.

This course considers speech disorders of neurologic origin in the adult population. The neurophysiologic basis of these disorders, their effect on the motor control of speech, and their clinical diagnosis and management are reviewed. The final third of the course focuses on evaluation and management of neurologic swallowing disorders.

HUCD 6470.03: Language Disorders in School Age Children.

This course considers the nature of language impairments in school age children across clinical etiologies. The impact of language impairments on literacy and academic performance are discussed and contemporary treatment approaches are presented.

Audiology Curriculum (above and beyond core)**HUCD 5220.03: Diagnostic Audiology.**

This course considers the principles and methods of advanced audiological diagnostic investigation. Emphasis is placed on speech audiometry, clinical masking, and aural immittance measures. A laboratory component provides experience with measurement techniques and exposure to the instrumentation used in these measures.

HUCD 5240.03: Aural Rehabilitation with Adults.

The first part of this course is a follow-up from HC636 Amplification and covers advanced amplification issues. The second part addresses the rehabilitative needs of individuals with hearing losses, with special consideration given to older adults. Emphasis is placed on communication assessment and management approaches.

HUCD 5280.03: Audition II.

This course deals with the structure and function of the central auditory nervous system. Special emphasis is placed on the electrophysiological aspects of the mechanism. Methodological considerations of auditory electrophysiology are presented.

HUCD 6320.03: Pediatric Audiology.

This course considers the appropriate audiological assessment and management procedures used with the pediatric population. The course prepares the audiology student to work with children in a clinical setting.

HUCD 6360.03: Amplification.

This course provides students with an overview and understanding of the electroacoustic characteristics and various types of amplification systems. Current methods for selecting and verifying amplification systems for hearing-impaired individuals of all ages are examined.

HUCD 6380.03: Electrophysiological Audiometric Measures.

This course considers the theory, technique, clinical application and interpretation of electrophysiological measures including the auditory brainstem response (ABR), middle components, cortical responses, otoacoustic emissions and electronystagmography (ENG).

HUCD 6420.03: Advanced Diagnostic Audiology.

This course presents advanced concepts dealing with measures sensitive to disorders of the central auditory nervous system.

HUCD 6440.03: Noise In Industry and the Community.

This course covers a wide range of issues in industrial audiology. It acquaints students with principles of noise measurement and analysis, updated studies on noise-induced hearing loss, and hearing conservation programs. Various national and international standards, legislation, and workers' compensation will be addressed in conjunction with community noise. Laboratory experiences in industrial settings and the community are included.

Additional Classes Available**HUCD 6500.03: Tutorial Readings.****HUCD 6700.03: Research.****HUCD 7000.06: Project.**

The student is expected to choose an area of interest and to carry out a research project under the direction of a faculty member. Project proposals must be approved by a School committee. End products of projects may include a paper, videotape, handbook, computer software program, as well as other options. All products are formally presented, within a conference format, to other students, faculty, and members of the local professional community.

HUCD 9000.00: Thesis.

The student is expected to formulate an original question related to human communication disorders or sciences, and with guidance from a faculty supervisor and two other members of a supervisory committee, implement a plan to answer the question.

Information Technology Education

Location: Henson College
6100 University Avenue
Halifax, NS B3H 3J5

Telephone: 1-888-285-8868

Faculty

Holmes, S., BSA, MEd (Continuing Education)
MacDonald, G., BBA, BA, MPA
McEachern, A., MEd
Williams, P., BA, MSc (Extension Education)
Willment, J., BA, MA, EdD (Continuing Education)

Master of Information Technology Education

Anyone interested in teaching in an information technology environment could benefit from the Master of Information Technology Education (MITE), offered by Henson College, Dalhousie University, in cooperation with Information Technology Institute (ITI). Blending educational theory with practice, students who successfully complete the MITE will be fully prepared for roles as educators in information technology environments. This twelve-month program achieves its goals by attending to three specific educational needs:

- the need for a sound knowledge base regarding educational design, delivery and evaluation;
- the need for a thorough technical knowledge base in information technology; and
- the need for expert teaching and facilitation skills.

Program Goals

The MITE is designed to meet a current need in the market for educators who possess not only the necessary technical expertise, but also strong teaching skills. Accordingly, the MITE is designed to support students in their ability to:

- critically reflect on the IT industry and the role of an IT educator;
- deal with educational issues presented by information technology teaching environments;
- design technical curriculum using sound principles of educational design;
- deliver information technology curriculum using a variety of teaching/learning methodologies;
- identify learning issues and intervene in collaborative learning environments;
- create learning environments that address the learning and cultural needs of students;
- evaluate students' progress; and
- develop a variety of methods and tools to evaluate learning.

Programme Delivery

Henson's MITE program and ITI's Applied Information Technology (AIT) program feature a unique method of program delivery that emphasizes problem-based collaborative learning and includes:

- An instructor-led classroom environment (two hours per day)
- Team-based activities facilitated by an instructor (three hours per day)
- Problem-based learning designed to simulate real-life workplace problems
- Methodologies for analyzing problems and designing solutions for today's complex IT classroom.

The program emphasizes the development of critical thinking, professionalism, problem-solving, and lifelong learning skills.

Students are encouraged to draw on their own resources as they meet challenges, while receiving feedback from team members and facilitators on a regular basis.

I. Admission Requirements

- Bachelor's degree. Minimum GPA 3.0 in the final two years.
- passing grade in the Computer Programmer's Aptitude Battery (CPAB)
- three letters of reference: from professional/academic referees who can comment on aptitude for graduate study and teaching. If degree was completed in last 5 years, one reference must be academic.
- a brief proposal outlining how previous experience provides preparation for role of educator in IT education environment.
- a resume outlining education and work experience
- personal interview
- teaching aptitude demonstration
- official transcripts from all postsecondary institutions

II. Program Requirements

Program Structure

The Master of Information Technology Education is delivered in three phases:

Phase One

Prepares students for their role as student teachers by introducing key educational theories and practical skills that can be applied in their practicum.

Phase Two

Students will focus on three aspects of their education: the Applied Information Technology program offered at the ITI Information Technology Institute; the practicum, or practice teaching; and the certification process required by industry.

Phase Three

Serves as an intensive preparation for teaching, and provides students with a final opportunity to design and deliver information technology curriculum.

Each phase is outlined in greater detail below.

III. Classes Offered

Phase One—Six Weeks

As mentioned above, this portion of the program prepares students for their roles as student teachers. It does so by providing them with a sound theoretical foundation and some practical skills in the design, delivery and evaluation of teaching/learning experiences. The course work in this Phase consists of:

EDUC 7010.03: Theoretical Foundations in Information Technology Education.

Educators in information technology environments are presented with learning issues that are unique to the teaching field. The two most obvious distinctions are that content related to IT changes very rapidly, and that there are significant amounts of technical content and skills to convey in any given IT course. This has two important implications for the technical educator. First, their primary role is in helping students develop sound problem solving skills so that they are able to solve IT problems and learn IT skills fairly independently. Second, facilitators must convey this technical information in a way that does not foster dependence on the facilitator, so students become self-directed, lifelong learners. IT educators should be not only content experts, but also skilled facilitators. Students will progress from an analysis of how learning occurs, to an understanding of how to facilitate learning effectively. (40 hours)

EDUC 7020.03: Instructional Methodologies.

Given the volumes of technical information most IT courses must convey, special attention must be given to the methods chosen to deliver that information. While lectures are a common means of delivery, this method is limited to only 'covering' IT information. Information technology educators must use a variety of methods to appeal to different learning styles. This provides students with an

opportunity to explore alternatives to lecturing, or methods of making lectures more interactive. Students will learn how to incorporate those methods into their instructional design. (40 hours)

EDUC 7030.03: Facilitation in Collaborative Learning Environments.

This course provides an in-depth study of methods for diagnosing group learning needs, as well as designing interventions to address these needs. Students will study principles of small group dynamics, and they will have an opportunity to learn several group facilitation models. These concepts will be applied in their work with teams throughout the practicum. (40 hours)

Phase Two—Nine Months

As outlined earlier, Phase Two addresses three specific areas: the AIT program, the practicum, and the technical certification process. Each of these elements are described below:

ITI's Applied Information Technology (AIT) Program

AIT is a nine-month team-based program dedicated to providing graduates with the cutting edge IT skills required in today's competitive market.

See AIT course and project descriptions for complete details.

Technical Certification Requirements

Students are expected to achieve a specialty in one of the following areas, or equivalent: Object-oriented development using Visual Basic, Oracle or Java; or design and implementation of a client's server operating system. Students must achieve industry level certification for a level of expertise as defined by the ITI Information Technology Institute.

EDUC 7040X/Y.06: Practicum.

A key component of MITE is the practicum. It provides students with an opportunity to apply their knowledge of instructional design, delivery and evaluation to actual teaching and facilitating in the teamroom and classroom setting. Supported by a faculty member and a mentor working in the IT environment, the student will have opportunities to develop initiatives for use in the team room, and to prepare and lead instructional activities in the classroom setting. Based on individual interests and needs, faculty approval may be granted for students to work on special projects. Students will receive feedback from a variety of sources throughout the practicum, including their mentor, faculty advisor, and their students. Students will discover gaps in their skills, which will serve to focus their learning during the remaining courses. (Total time 100 hrs.)

Phase Three—Six Weeks

Viewed as the final preparation for teaching, this component provides students with an opportunity to further hone their instructional skills. With the emphasis on information technology behind them, participants will focus on advanced instructional methods.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

EDUC 7050.03: Advanced Instructional Techniques.

Effective teaching in any learning environment requires several basic skill sets: the ability to identify desired learning outcomes, sound instructional design, and the means to evaluate the quality of instruction as well as student performance. In this module, students will focus on the design of instructional events and evaluation tools appropriate to a collaborative learning environment. In addition, the use of distance education technology will be introduced, and its application to IT education will be explored. (40 hours)

EDUC 7060.03: Special Topics in Teaching and Learning IT.

This module provides students with an opportunity to explore selected topics in the field of information technology education. Consideration of the learning needs of mature students, and students from a variety of cultural backgrounds, will help to develop the skills required to create learning environments sensitive to those needs. The transition to collaborative learning for the adult

learner will be examined. Students will also discuss the future of IT education, and critically examine the role of IT educators. (40 hours)

EDUC 7070.03: Advanced Facilitation in Collaborative Learning Environments.

This module will focus on advanced theory and skills used to facilitate collaborative learning. It will include diagnosing team issues, conflict resolution, and other intervention skills toward building a high performance learning or project team. At this stage, students will be expected to perform at a high level in their own teams and be able to intervene to assist in the performance of their fellow MITE teams. Students will practice giving and receiving feedback on instructional design, delivery, and facilitation skills.

Interdisciplinary PhD Programme

Location: Faculty of Graduate Studies, Third Floor
Arts & Administration Building
Halifax, NS B3H 4H6
Telephone: (902) 494-2485
Fax: (902) 494-8797

Programme Coordinator: Assistant Dean Interdisciplinary Studies,
Faculty of Graduate Studies

Interdisciplinary PhD

The Interdisciplinary Ph.D. programme is designed to meet the needs of an increasing number of mature, experienced students for research opportunities which cut across disciplinary boundaries. In some cases, the research incorporates the insights of two or three traditional disciplines; in others the research itself is in an interdisciplinary field focused on the environment, health, education, administration, information, etc. Each programme is customized to meet the needs of the student. Students take graduate classes across the Faculty and work with faculty members in existing PhD disciplines and in other areas. The programme requires at least two years of full-time study at Dalhousie. Candidates for the programme must have achieved prior academic excellence before making application.

Before making application, prospective students should consult the Assistant Dean of Interdisciplinary Studies in the Faculty of Graduate Studies Office. In addition to transcripts, applications must include three letters of reference, a c.v., a research proposal, verification of the availability of suitable library and other resources, and letters of interest from at least two Dalhousie faculty members. Because the application process is a lengthy one, prospective students are advised to plan a year in advance. Visa students may need even longer. Application for external funding by all eligible applicants is a precondition for consideration. Limited university funding may be available but it is restricted to the first year.

Students considering such a programme must pay particular attention to the following aspects of interdisciplinary doctoral study:

- 1) The responsibility largely lies with the student to "organize" a unique programme of studies with appropriate faculty members and the Dean of Graduate Studies.
- 2) The students must hold a first-class honours undergraduate degree and a research Master's degree, or acceptable equivalents.
- 3) The Interdisciplinary PhD is typically heavier in course work than other PhD programmes and may take longer to complete.
- 4) The student should plan such studies in the context of an overall career goal to ensure that, as far as possible, the programme will constitute a proper qualification for desired employment upon graduation.

Anyone wishing to pursue the programme should plan it within the framework of the following requirements:

- 1) The student should develop a tentative programme of proposed study, reviewing its various features and ramifications, and making sure that it (a) clearly focuses on career goals, (b) is truly interdisciplinary, and (c) cannot be completed within the framework of an existing programme.
- 2) The student should discuss the proposed programme with appropriate faculty members and identify the chair of the committee and the potential supervisor.
- 3) By the end of the first year in the programme, a committee of five faculty members must be established. A student who is a Dalhousie faculty member must have a 6th (external) member

on the committee. The committee will be responsible for supervising the student's overall programme of study, including advice on funding, the setting and scheduling of comprehensive examinations, the development of a thesis proposal, the research, and the thesis-writing and defense.

- 4) **Application and admission procedures:**
After initial contact with the Assistant Dean of Interdisciplinary Studies, application forms are available from the Office of the Registrar. Once transcripts and a research proposal have been received in the Faculty of Graduate Studies, a letter from the Assistant Dean will follow indicating whether the student should proceed with their application. Once the supporting documentation has been assembled in Graduate Studies, the file is considered by the Graduate Faculty Interdisciplinary PhD Committee which may require additional information or an interview. Prospective applicants are advised that the application success rate is low. Successful applicants should meet with the Assistant Dean of Interdisciplinary Studies at an early date.

Deadline for completed application is January 31.

Programme Requirements

Preliminary course work will consist of a minimum of 5 half-classes chosen from the graduate offerings of the Faculty and may include directed reading classes. During the second year or no later than the beginning of the third year of the programme, comprehensive examinations must be written in fields appropriate to the topic of research. The number (nor more than 3) and nature (written, oral, combination of written and oral, or project-based) are decided by the supervisory committee. The research proposal must also be presented to and approved by the supervisory committee.

For more information contact the Assistant Dean of Interdisciplinary Studies, Office of the Faculty of Graduate Studies, Dalhousie University, Halifax, Nova Scotia, Canada B3H 4H6. Telephone (902) 494-2485; Fax: (902) 494-8797; E-mail: Graduate.Studies@Dal.Ca.

International Development Studies

Being interdisciplinary in nature and structure, the programme draws on a wide selection of faculty who teach and research in development studies and related fields. The following is a list of faculty who contribute to the programme.

Please consult individual departmental/school entries for faculty member research interests.

Faculty

Barkow, J.H. (Sociology & Social Anthropology)
Benoit, J.L. (Henson College)
Binkley, M.E. (Sociology & Social Anthropology)
Bishop, M. (French)
Black, D. (Political Science)
Boardman, R. (Political Science)
Brooks, M. (Business Administration)
Brown, P. (Public Admin)
Cadagan, S. (History/Marine Affairs)
Casein, M. (Public Administration)
Cherry, D.C. (Business Administration)
Chircop, A. (Law/Marine Affairs)
Cohen, F. (Environmental Studies)
Faulkner, C.T. (Comparative Religion)
Fierbeck, K. (Political Science)
Finbow, R.G. (Political Science)
Fraser-Davey, H.D. (Nursing)
Gardiner Barber, P. (Sociology & Social Anthropology)
Guppy, S., (DalTech-Planning)
Harvey, F. (Political Science)
Kindred, H. (Law)
Kirk, J. (Spanish)
Lesser, B. (Economics)
Li, T.J. (Sociology & Social Anthropology)
Li, V. (English)
MacLean, D. (Community Health & Epidemiology)
McAllister, R.L. (Economics)
McIntyre, L. (Health Services Administration)
McNiven, J. (Business Administration)
Newkirk, G. (Biology/Lester Pearson Institute)
Palermo, F., (DalTech-Planning)
Parpart, J.L. (History/Women's Studies)
Patton, D. (Business Administration)
Pereira, N.G.O. (History & Russian Studies)
Poel, D. (Public Administration)
Poulton, M. (DalTech-Planning)
Ravindra, R. (Comparative Religion)
Ricketts, P. (Environmental Studies/Marine Affairs)
Russell, B. (Business Administration)
Russell, D. (Law)
Sagebien, J. (Business Administration)
Saunders, P. (Law)
Shaw, T.M. (Political Science)
Sullivan, K. (Public Administration)
Thlessen, V. (Sociology & Social Anthropology)
VanderZwagg, D. (Law)
Wainwright, J.A. (English)
Willison, M. (Biology)
Winham, G.R. (Political Science)
Wood, S. (Resource & Environmental Studies)
Zachernuk, P. (History)

Professor Emeritus

Kamra, O.P. (Biology)
Mann Borgese, E., (International Ocean Institute)

Adjunct Professors

Dwire, A. (Resource & Environmental Studies)
Gardner, M.
Kamra, S.
MacLean, S.J.
Pachai, B.
Sinclair, A.M.
Williams, R.
Zurbrigg, S.

I. Master of Arts

Graduate Coordinator: Timothy M. Shaw (Political Science)

An interdisciplinary masters degree by course work and thesis which focuses on problems of and prospects for development in the countries and communities of the South.

The programme brings together Dalhousie's considerable resources – individual, institutional and informational – in this area in cooperation with compatible offerings at Saint Mary's University (SMU). We offer an innovative degree program based on established graduate courses in cooperation with the activities of development studies centres on campus, particularly the undergraduate International Development Studies program and the Lester Pearson International Institute. The degree draws heavily, though not exclusively on classes and supervisors in Economics, History, Political Science and Sociology and Social Anthropology. It is offered by the Faculty of Graduate Studies through the International Development Studies Programme and has a limited enrolment of six students per annum.

This new degree exists as an interdisciplinary offering with the following requirements:

- i) One-half credit in theory
- ii) One-half credit in methods
- iii) One-half credit in practice
- iv) Out of the six half-classes at least two half-credits should be taken in different disciplines
- v) The masters thesis normally counts as two full-year courses;
- vi) Thesis readers are normally drawn from at least two departments; one of the three members committee may come from the SMU programme in IDS or elsewhere.

The degree is available on a full and part-time basis. Students are also encouraged to participate actively in the non-credit seminar programs of the Lester Pearson International Institute and IDS/IDA and other development studies centres on campus and in Halifax. Saint Mary's University is offering a similar MA, so permitting students from both campuses to take a broader range of offerings. In particular, IDS MA students on both campuses are expected to participate in the weekly Friday noon IDS seminar at SMU. The MA at Dalhousie is designed to be complementary to and require the same standards as related degrees, such as the masters in History, Political Science, and Sociology & Social Anthropology, Development Economics, International Business, Marine Management and Environmental Studies.

A. Application and Admission

Candidates for admission to the masters degree in International Development Studies should hold an honours degree or equivalent, from a university of recognized standing, in either International Development Studies or a relevant discipline (normally, but not exclusively, business, economics, environmental studies, history, law, political science, public administration, or comparative sociology) or have completed at least four senior undergraduate classes in one of these disciplines. All candidates for admission must meet the requirements of the Faculty of Graduate Studies.

Only candidates with honours or equivalent in IDS may complete the requirements in a 12-month period of full-time study; he be required to pay only one year of programme fees. However, in most cases completion of the thesis will take more than the 12 month period and will involve payment of thesis – only fees for any additional years of registration. Candidates who do not meet the minimum admission requirements may be admitted to a preliminary Qualifying Year of study based on the established honours year in the undergraduate IDS program, after which they

must reapply for admission. Courses taken during such a qualifying year do not count towards the master's degree requirements. Both undergraduate and graduate IDS classes are available in the annual Halifax Summer School in International Development.

Application forms, obtainable from the Registrar's Office, should be returned along with supporting documents, including an example of written work and a statement of educational and professional goals, by April 1 for overseas applicants and June 1 for North American applicants. Early application is especially recommended for foreign candidates who will need to arrange student visas; i.e. by January 31.

Candidates from outside Canada whose native language is other than English must demonstrate their capacity to pursue a masters program in English. They should submit the results of a TOEFL or other standard English competency test at the time of application. The minimum TOEFL score required is 580.

B. Graduate Student Funding

As a new programme, the MA in IDS is not eligible for a scholarship allocation for the first three years of its operation. However, students admitted will be eligible to apply for other competitive scholarships, such as the Killam and James Robinson Johnston scholarships.

C. Programme Requirements

Candidates for the Master's Degree in International Development Studies are expected to complete a course of study beyond the honours undergraduate level worth at least five full credits; normally three by course work and two by thesis. At least one full course and one thesis reader must come from a discipline other than the primary one and every student must take appropriate half-courses in theory, in methods and in practice. Candidates are encouraged to take appropriate graduate courses in the Halifax Summer School in International Development towards the end of their year in residence. Full-time students with appropriate interdisciplinary and development studies backgrounds may complete the degree through a one-year residency; part-time students may complete the requirements over a three-year period. The thesis will conform to graduate studies regulations and will normally be presented and examined orally in public.

D. Administration

The interdisciplinary MA in International Development Studies is administered by a committee of faculty who teach and research in the area of development studies chaired by a coordinator who acts as the graduate admissions/advising officer for the program. Normally, major participating departments will be represented on the committee, which will liaise with the undergraduate IDS committee at Dalhousie and the Saint Mary's University IDS committee.

II. Classes

NOTE: Some of these classes may require prerequisites: see departmental rules. Not all classes are offered every year. Please consult individual department/school entries for class descriptions.

Business Administration

- BUSI 6803.03: International Transportation
- BUSI 6807.03: International Financial Management
- BUSI 6808.03: International Banking
- BUSI 6815.03: Doing Business Effectively in Asia

Community Health & Epidemiology

- CH&E 6050.03: Political Economy of Health and Development

Economics

- ECON 5250.06: Applied Development Economics
- ECON 5251.03: Seminar in Development Studies
- ECON 5252.03: From Disaster Relief to Development
- ECON 5431.03: International Finance
- ECON 5516.03: Resource and Environmental Economics
- ECON 5522.03: Labour I
- ECON 5523.03: Labour II
- ECON 5582.03: Applied Class in Development Policy & Practice

English

- ENGL 5918.03: The Politics of Representation

Environmental Studies

- ENVI 5000.06: Introduction to Environmental Studies
- ENVI 5020.03: Resource Systems and Economic Development
- ENVI 5030.03: Seminar on Managing for Sustainable Development
- ENVI 5031.03: Environmental/Ecological Economics
- ENVI 5035.03: Research Methods
- ENVI 5120.03: Environmental Ecology

Health Services Administration

- HEAS 6370.03: International Comparative Health Care Systems
- HEAS 5200.03: Principles of International Health

History

- HIST 5430.03: The Making of Colonial Africa
- HIST 5452.03: South Africa since the Mineral Revolution
- HIST 5462.03: African Economic History
- HIST 5461.03: Gender and Development in Africa
- HIST 5470.03: Wars & Revolutions in 19th Century Africa
- HIST 5475.03: African Intellectuals and the Modern Experience

International Development Studies

INTD 3101.03: Special Topics in International Development Studies.

A half-year reading class on a particular aspect of international development taught only by special arrangement between individual IDS students and individual instructors associated with the programme. Available in summers as well as regular sessions. FORMAT: Individual tutorial

INTD 3203X/Y.06/4001.03/4002.03/4003.06/4106.06: Special Topics in International Development Studies.

See class descriptions for INTD 3101.03, above.
NOTE: Students taking INTD 3203 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INTD 4010X/Y.06: Honours Essay Practicum in International Development Studies.

Advanced seminar in theory and methodology leading to preparation and defence of thesis.
NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.
FORMAT: Seminar

*INTD 4010X/Y.06: Honours Essay Practicum.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

*INTD 4001.03/4002.03/4100X/Y.06: Topics in Development Studies.

NOTE: Students taking INTD 4100 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

*INTD 4211.03: Gender & Development I.

The first seminar will discuss the interrelationship of various development and feminist theories. It will provide a conceptual overview and practical tools for understanding the problems faced by women in developing countries and Canada. Students taking this class at a graduate level will be expected to attain a higher level of achievement and may be required to do additional assignments.
FORMAT: Seminar
EXCLUSION: INTD 4210.06

*INTD 4212.03: Gender & Development II.

The second semester will provide an analysis of the gender dimensions of programmes and policies that affect women. Case studies will focus on issues such as education, work, health, the role

of the state, and empowerment. Students taking this class at a graduate level will be expected to attain a higher level of achievement and may be required to do additional assignments.

FORMAT: Seminar

EXCLUSION: INTD 4210.06

***INTD 5000.03: Advanced Topics in Development Studies.**

***INTD 5800.03: Gender and Development.**

(*Normally for qualifying year students only.)

Law

LAWS 5022.03: Law of the Sea

LAWS 5051.03: International Environmental Law

LAWS 5056.03: International Trade Law

LAWS 5068.03: Ocean Law & Policy: International Fisheries

LAWS 5200.03: Environmental Law

Marine Affairs

MARA 5001.06: Contemporary Issues in Ocean Management & Development

MARA 5003.03: Marine Science & Technology

MARA 5008.03: Integrated Maritime Enforcement

Political Science

POLI 5302.03: Comparative Development Administration

POLI 5315.03: African Politics

POLI 5316.03: Politics in South Africa

POLI 5340.03: Approaches to Development

POLI 5360.03: Politics of Latin America

POLI 5475.03: Democratic Theory

POLI 5531.03: UN in World Politics

POLI 5535.03: New International Division of Labour

POLI 5537.06: Management and Conservation of Marine Resources (Summer Only)

POLI 5540.03: Third World Foreign Policy

POLI 5585.03: Politics of the Environment

Public Administration

PUAD 6500.03: Business & Government

PUAD 6520.03: Program Evaluation Seminar

PUAD 6521.03: Program Evaluation Practicum

PUAD 6550.03: Design & Use of Projects

PUAD 6555.03: Technology & Public Administration

PUAD 6620.03: Women, Men & Management

Social Work

SLWK 6365.03: Community Socio-Economic Development

SLWK 6385.03: Community and Social Change Analysis

SLWK 6390.09: The Theory and Practice of Community Work

Sociology & Social Anthropology

SOSA 5001.03: Survey Methods

SOSA 5002.03: Social Statistics

SOSA 5530.06: IDS through Shastri Summer Institute in India

Urban & Rural Planning

PLAN 5101.03: History and Theory of Planning

PLAN 5102.03: Planning Practice

PLAN 5103.03: Qualitative Methods

PLAN 6101.03: Urban Design

PLAN 6102.03: Urban Economics

PLAN 6103.03: Urban Ecology

PLAN 6104.03: Comparative Urbanization

PLAN 6106.03: Transportation Planning

PLAN 6107.03: Regional Planning

PLAN 6110.03: Environmental Impact Assessment in Social and Environmental Policy

Women's Studies

WOST 6010.03: Theories of Feminism

WOST 6020.03: Feminist Methodologies

Law (Graduate Programmes)

Location: Weldon Law Building
6061 University Avenue
Halifax, NS B3H 4H9
Telephone: (902) 494-3495
Fax: (902) 494-1316

Dean

Russell, D.A., BA (St. Thomas), MA, LLB (Dal), LLM (Cambridge)

Associate Dean

Yogis, J.A., QC, BA (SMU), LLB, LLM (Dal), LLM (Mich)

Professors Emeriti

Charles, William H., Q.C., BA (Sir Geo Wms), LLB (Dal), LLM (Harvard), LLM (Mich)
Hutchins, C., QC, BA, LLB (Dal)
MacDonald, R.St.J., QC, BA (StFX), LLB (Dal), LLM (London), LLM (Harvard), LLD (McG)

Professors

Archibald, B.P., BA (King's), MA, LLB (Dal), LLM (Col). Criminal Law and Procedure, Evidence, Comparative Law, Prosecutions Policy, Labour Relations Law
Black, V., BA, MA (Carleton), LLB (UofT), LLM (Calif, Berkeley). Private International Law, Torts, Commercial Law.
Christie, I.M., BA, LLB (Dal), LLB (Cantab), LLM (Yale). Law, Labour Relations, Arbitration, Occupational Safety, Worker's Compensation, Legal Ethics
Devlin, R.F., LLB (Queen's, Ireland), LLM (Queen's, Ont). Jurisprudence, Legal Ethics, Judicial Education, Judicial Ethics, Socio-legal
Girard, P.V., BA (Brock), LLB (McG), LLM (Cal, Berkeley). Legal History, Comparative Law, Property Law
Kaiser, H.A., BA, LLB (Dal), LLM (LSE). Criminal Law and Procedure, Mental Disability Law
Kindred, H.M., LLB (Bristol), LLM (London), LLM (Illinois). Public International Law and Maritime Law (Carriage of Goods by Sea)
MacKay, A.W., BA (MtA), MA (Florida), BEd (MtA), LLB (Dal). Human Rights, Administrative Law, Constitutional Law, Civil Liberties
McConnell, M.L., BA (Victoria), LLB (Dal), PhD (Sydney). Business and Environment, Feminist theory, International and Environmental Law
Thomas, P., LLB (Wales), LLM (Yale). Family, Divorce, Fostering, Separation, Children, Contracts, Banking, Instruments, Mediation and Negotiation
Thompson, D.A., BA (McG), LLB (Dal). Family Law, Evidence, Children and the Law, Clinical Law
Thornhill, E.M.A., BA (McG), LLB (UQAM), MA (U. DeMont), Hon. Doctoral Laws (City University New York), James Robinson Johnston Chair in Black Canadian Studies. Critical Race Theory, Human Rights, International Law
Trakman, L.E., BCom, LLB (Cape Town), LLM, SJD (Hawaii). NAFTA, Legal Philosophy, International Business Law
VanderZwaag, D., BA (Calvin), MDiv (Princeton), JD (Arkansas), LLM (Dal). Environmental Law
Wildsmith, B.H., BSc (Guelph), LLB (Dal), LLM (Harvard). Indian Treaty Rights, Aboriginal Rights, Constitutional Law, Administrative Law
Woodman, F.L., BA (Dal), LLB (Queen's). Tax and Social Policy, especially regarding Women and Children, Estates and Trusts

Yogis, J.A., QC, BA (SMU), LLB, LLM (Dal), LLM (Mich). Contracts, Law of Succession (Wills), Human Rights Law, Sexual Orientation matters

Associate Professors

Bankier, J.K., BA (Uof T), LLB (Osgoode). Women and the Law, Law and Technology, Intellectual Property
Chircop, A.E., BA, LLB, LLM (Malta), JSD (Dal). Marine and Environmental Law and Policy, Coastal and marine Management, Education and Training
Evans, R.L., BA (U of T), LLB (York)
Gibson, E., LLB (Sask.), LLM (Uof T). Family Law, Tort Law, Dalhousie Legal Aid Service
Macklin, A.M., BSc (Atia), LLB (Uof T), LLM (Yale). Immigration, Refugee Law, Administrative Law, Criminal Law, Multiculturalism, Feminist Jurisprudence
Pothier, D., BA (Dal), MA (Carleton), LLB (Queen's). Constitutional, Labour, Human Rights, Equality and Disability Issues
Russell, D., BA (St. Thomas), MA, LLB (Dal), LLM (Cambridge). International Law, Law of Sea, Maritime Boundary Delimitation, High Seas Fishing
Saunders, P.M., BA, MA, LLB (Dal). Environmental Law, Law of the Sea, International
Scassa, T., BCL, LLB (McG), LLM, JSD (Mich.). Violence against Women, Human Rights, Intellectual Property

Assistant Professors

Aylward, C., BA, LLB, LLM (Dal). Criminal Law, Critical Race Theory, Litigation, Legal Ethics
Beaulac, Stephane, DEC (Champlain), LLL (Ottawa), LLB (Dal), DES (Ottawa), LLM (Cambridge)
Bergin, Fiona, BA (Dal), LLB (Queen's), MD, LLM (Dal)
Deturbide, M., BSc (Dal), BJ (King's), LLB (Dal). Corporate Law, Commercial Law, Media Issues, Entertainment Law, Environment and Business
Downie, J.G., BA, MA (Queen's), MLITT (Cambridge), LLB (Uof T). Health Law; Policy & Ethics; Legal Ethics; Constitutional Law
Flood, C., BA/LLB (Hons) (Auckland), LLM (U of T), SJD (Uof T). Health Reform, Law and Policy; Law and Economics, Privatization; Telecommunications; Contract; Tort
Ginn, D., BA (Mt.A), LLB (Queen's), LLM (Osgoode). Property Law, Administrative Law, Gender, Health Law
Nicholls, Christopher, BA (Ottawa), LLB, LLM (Osgoode), MPA (Harvard)

Adjunct Professors

Gold, Edgar, Q.C., BA, LLB (Dal), PhD (Wales), Dipl h.c. (CCGC), MCTI, FNI, FOI, Master Mariner FG (UK & Canada)
Harris, Edwin C., Q.C., BCom, LIB (Dal), LLM (Harvard), RIA, CA
Johnston, Douglas M., LLB (St. Andrews, Scotland), LLM, JSD (Yale)
Mann Borgesse, Elisabeth, O.C., BA (Freis), Hon. PhD (MSV), Hon. PhD (Dal)

I. Degree Programmes

A. Master of Laws (LLM)

A graduate programme in law leading to the Master of Laws degree is offered to well-qualified candidates by the Faculty of Law of the University. The programme is primarily intended for prospective law teachers and professional specialists. The programme may consist of either a combination of course work, seminars and a thesis, or a combination of course work and seminars involving substantial written papers. In either case taken on a full-time basis over one full academic year, or on a part-time basis over two full academic years. Applicants who plan to take the degree on the basis of course work, seminars and a thesis are required to submit outlines of their proposed thesis topic at the time of the application. Thesis topics may concentrate on any area of law in which faculty supervisors and library resources will support substantial and useful work. In recent years, thesis supervision has been provided in the following fields, among others: international law, administrative law, labour law, constitutional law, commercial law, tax law, tort law, criminal law and criminology, family law, health law, law of the sea, maritime law, and environmental law. The Law faculty's academic plan recognizes the Law School's particular

research capacity in the areas of public law and feminist legal scholarship. A particular interest has been developed in marine and environmental law which has been designated as a field of special emphasis in the Faculty of Law. The Sir James Dunn Law Library collection for the Marine and Environmental Law Programme is now one of the best in North America. In addition graduate work is being done under the aegis of the Health Law Institute which is a joint initiative of the Faculties of Law, Medicine, Health Professions and Dentistry. Moreover, the Faculty of Law has a specialized programme for graduate students in the area of Family Law.

1. Admission Requirements

Applicants for admission to the LLM programme should hold a first degree in law equivalent to the Dalhousie LLB, passed with at least a "B" average (or Upper Second Class Honours). The ability to conduct independent research and to work easily in the English language is a prerequisite for admission. Candidates from outside Canada whose native language is other than English will be required to pass an English language proficiency test.

2. Residency Requirements

The degree may be taken on the basis of either one academic year (September 1 to August 31) of full-time residence at Dalhousie, or two academic years of part-time residence at Dalhousie, after registration for the LLM degree. (It should be noted that the two year residence requirement for part-time candidates differs from that required elsewhere in the calendar of the Faculty of Graduate Studies.)

3. Class Requirements

The degree may be taken on the basis of either class work, seminars and a thesis, or class work and seminars only. Applicants are required to indicate at the time of formal application on which basis they would prefer to take the degree, but the Graduate Studies Committee of the Faculty of Law, at the time an offer of a place is made, will decide on which of the two alternative bases a place is offered. The availability of places for the thesis alternative is governed by the availability of adequate faculty supervision and library resources. All class work for the degree, whichever of the two alternative bases is decided upon, must be completed at an average of not less than B, with no grade below B-. Graduate students taking classes which are evaluated by a "major paper" must submit a paper of appropriate scholarly quality which will normally be between 40 and 50 pages in length (including text, and endnotes or footnotes).

All candidates for the degree are required to take a graduate seminar especially designed for our graduate students in law. This seminar, which is led by a senior teacher in the Faculty of Law, is given in the fall term (and early part of the spring term) and requires from the student a comprehensive class presentation based on a substantial written paper. Some students who have not had previous exposure to jurisprudence may be advised to take a graduate jurisprudence course.

If the degree is taken by course work, seminars and thesis, a candidate is required to (a) in addition to the graduate seminar, complete at least two additional one-term classes from the course and seminar offerings of the Faculty of Law (the choice of classes to be determined by the Law School's Graduate Studies Committee), and (b) present a well-researched substantial thesis of scholarly quality produced under the continuous supervision of a member or members of the law faculty.

Such a thesis would normally be 150-300 typescript pages in length (double-spaced). Six copies of the thesis must be submitted to the supervisor on or before the dates given in the Law School's "Guidelines for Supervision and Evaluation of Graduate Students" (normally August 10 to meet deadlines for fall convocation). The thesis requirements and regulations of the Faculty of Graduate Studies must be met. Theses are usually supervised by a two person committee comprised of a supervisor and a reader or, in certain circumstances, two co-supervisors. Theses are examined by an examination committee comprised of the supervisory committee, an "arm's length" examiner and a chairperson, who is normally the Chair of the Graduate Studies Committee/Graduate Co-ordinator. A thesis may be graded as falling within one of the following

categories: approved as submitted; approved upon specified corrections being made; failed, but with permission to submit a revised thesis; or failed outright.

If the degree is taken by class work and seminars without thesis, in addition to the graduate seminar, candidates are required to take at least an additional five one-term classes from the advanced class work and seminar offerings of the Law Faculty considered to be suitable as graduate classes and seminars by the Law Graduate Studies Committee. Of those five classes, at least three must be designated as "major paper courses" by the Faculty of Law, or be approved by the Graduate Studies Committee as having a substantial written component.

At the discretion of the Graduate Studies Committee of the Faculty of Law, a candidate may be required to submit to an oral examination by the Committee or its nominees in the field of the thesis or that of any written paper presented by the candidate. The Graduate Studies Committee of the Faculty of Law may recommend the substitution of not more than two seminars or graduate level classes in a discipline other than law, which may be highly relevant to the candidate's thesis topic or area of specialization, provided that any such substituted course or seminar has, in the opinion of the Committee and the Dean of Graduate Studies, equivalence to the law classes being substituted.

Before deciding on the course work and seminars, or course work, seminars and thesis option, candidates who are contemplating future doctoral studies should note that some doctoral programmes may require the completion of a Master of Laws degree which includes a thesis.

4. General

The Graduate Studies Committee of the Faculty of Law may at any time require any candidate for the degree to show cause, in such manner as it may determine, why such candidate should be permitted to continue his or her candidacy.

It should be noted that candidates taking the degree on a part-time basis are not eligible for graduate scholarships.

A student is required to comply with the directions of the supervisor and the decisions of the Graduate Studies Committee of the Faculty of Law, as well as the rules and regulations of the Faculty of Graduate Studies.

A full description of programmes available in the Law School which may be of relevance to graduate students can be found in the general Law School Calendar and in its course selection materials.

B. Combined LLB and MBA Programme

See "Business Administration" entry in this calendar.

C. Combined LLB and MLIS Programme

See "Library and Information Studies" entry in this calendar.

D. Combined LLB/MPA Programme

See "Public Administration" entry in this calendar.

E. Doctor in the Science of Law Degree (JSD)

An advanced graduate programme in law leading to the JSD (Juris Scientiae Doctor) degree is offered to a very limited number of highly qualified candidates by the Faculty of Law of the University. Applicants who meet the admission requirements are invited to submit a detailed outline of their proposed thesis and a detailed description of their research plans with their application forms. Such topics will have to be limited to those areas of law for which faculty and library resources will support original and useful work. It is expected that such resources will normally be available in four subject areas:

- (i) Marine Law
- (ii) Environmental Law

These areas of the curriculum have been designated as a priority development by the Faculty of Law since 1974. As a result, considerable faculty expertise, library holdings, research projects and course offerings in these areas has been created. Consequently, the Faculty's Marine and Environmental Law Programme has achieved international prominence.

- (iii) International Law
- (iv) Comparative Law

These areas of specialization have grown with seminars in comparative criminal law, comparative constitutional law, international human rights law and European Community law.

1. Admission Requirements

Applicants for admission to the JSD programme must have demonstrated superior academic ability during their previous legal education. Normally it will be necessary to have (i) attained at least the equivalent of a Dalhousie A- average grade at the LLB level and (ii) completed successfully a Master's degree in law. Preference will be given to applicants with established credentials in published scholarship of a professional calibre. The ability to conduct independent research and work easily in the English language is a prerequisite for admission. Foreign candidates are required to pass the TOEFL (Test of English as a Foreign Language) to the satisfaction of the Graduate Studies Committee of the Faculty of Law prior to admission. Applicants seeking JSD funding from Dalhousie University should ensure that their completed applications are received by the University no later than January 1 of the year in which they intend to commence their studies.

2. Residency Requirements

Applicants must be prepared to spend at least one full academic year (12 months) in continuous residence at Dalhousie after registration for the JSD programme. The Graduate Studies Committee of the Law School reserves the right in certain cases to require the completion of a second year of residency. It is to be noted, however, that consistent with other doctoral programmes at Dalhousie University, JSD candidates must pay fees at the full-time rate for two years regardless of whether they have been required to spend a second year in residence at Dalhousie.

3. Class Requirements

Candidates for the JSD degree may be required by the Graduate Studies Committee of the Faculty of Law, on the recommendation of their thesis committee, to carry out advanced class work in the area of their thesis, or in a cognate area of a more general field of law, or in a discipline other than law, which is deemed to be highly relevant to their thesis topic. When undertaking such course work, JSD candidates must obtain an average standing of at least B⁺ in all classes designated as "required by the thesis committee", with no grade falling below B. A student who fails to meet these requirements is automatically dropped from the programme, but may apply for readmission immediately.

4. Preliminary Examination Requirements

Each candidate will also be required to pass a preliminary examination normally at the end of their first year of residence, and not less than 1 year before submitting the thesis. The preliminary examination may be oral, written, or both, at the discretion of the Graduate Studies Committee, and will cover the subjects relevant to the general area of the candidate's research. Failure to pass this examination may result in dismissal. However, the student may be permitted to repeat the examination within the subsequent 12 (twelve) months. (For greater detail see the Dalhousie Law School "Guidelines for Preliminary Examinations - JSD Candidates).

5. Special Skill Examination Requirements

A candidate may, at the discretion of the thesis committee, be required to pass a special examination designed to demonstrate the examinee's proficiency in a foreign language, statistical method, computer analysis, or other skill deemed to be important for successful completion of the candidate's thesis in the chosen area.

6. Thesis Requirements

The primary requirement for the JSD degree is the completion of a substantial thesis which should not only display original scholarship of high standard, but also represent a significant and professional contribution to the literature of the chosen subject. In applying for admission, an applicant is required to satisfy the Graduate Studies Committee of the Faculty of Law that the suggested topic is suitable for development as a doctoral thesis. Normally, a JSD thesis should be between 350 and 500 typescript pages in length (double-spaced). After an applicant has been accepted, a thesis committee consisting of a supervisor and two advisors will be appointed by the Graduate Studies Committee of the Faculty of Law. All candidates are

required to comply with the decisions of their thesis committees. In normal circumstances, the completed JSD thesis must be submitted to the Graduate Studies Committee of the Faculty of Law within five years of the date of original registration in the programme. Submission of the thesis must follow the rules and regulations laid down by the Faculty of Graduate Studies.

7. Thesis Defence Requirements

Each JSD candidate is required to defend the completed thesis in an oral examination. This defence shall be conducted in accordance with the Faculty of Graduate Studies Regulations for Oral Examination of a Doctoral Candidate.

8. Teaching Activities

The Graduate Studies Committee of the Faculty of Law may give permission to a JSD candidate to engage in teaching activities during the period of residency, if such activities are deemed to fall within the field of the candidate's thesis topic. Under no circumstances shall any JSD candidate be permitted to spend more than six hours per week in teaching activities and related preparations.

F. Classes

For a description of classes offered in Law, see page 50 in this calendar.

Library & Information Studies

Location: Killam Library
6225 University Avenue
Halifax, NS B3H 4H8

Telephone: (902) 494-3656
Fax: (902) 494-2451
E-mail: slis@is.dal.ca
WWW: <http://www.mgmt.dal.ca/slis>

Director of School

MacDonald, B.H.

Administrative Staff

Dunn, J., Graduate Coordinator
Balogh, S., Administrative Assistant
Dehmel, L., Secretary

Professors Emeritus

Dykstra Lynch, M., BA (Calvin), MLS (Dal), PhD (Sheffield)
Eitlinger, J.R.T., MA (Oxon), BLS (McG)
Horrocks, N., BA (Western Australia), MLS, PhD (Pittsburgh),
Fellow of the Library Association (UK), Associate of the Library
Association of Australia

Associate Professors

MacDonald, B.H., BSc (Acadia), MA, MLS, PhD (Western). Diffusion
and use of information by scientists/engineers; history of print
culture; research methodology; bibliography of
scientific/technical information

Toms, E., BA, BEd (Mem), MLS (Dal), PhD (Western). Information
retrieval; human-computer interaction; browsing behaviours;
conceptual database design; interface design

Assistant Professors

Julien, H., BEd (Alberta), MLIS (Alberta), PhD (Western).
Information behaviour; information literacy; information policy;
major appointment in School of Business

Grisé, M.L., BCom (Queen's), PhD (Queen's)

Spiteri, L., BA, MA (York), BEd (Toronto), MLIS (Western), PhD
(Toronto). Thesaurus construction; classification; indexing.

Wicks, D.A., BA (Winnipeg), MA (Guelph), MBS (London Baptist
Seminary), PhD (Western). Information seeking behaviour;
information resources and reference services

Adjunct Professors

Beaumont, J., BSc (Carleton), Associate of the Library Association
(UK)

Carroll, C., BA (StFX), MA (UNB)

Farmer, L., BA (McGill), MLS (Toronto)

Leggott, M., BSc (SMU), MSc (Calgary), MLS (Dal)

Rosenthal, E., BA (Queen's College of CUNY), MSc (Syracuse)

Vagianos, L.G., BA (Hiram College), MA (Suffolk), MSL (Western
Reserve), LLD (UPED)

Weaver, M., BA (Exeter), DipIS (CityU, London)

Associated Instructional Staff

Dunn, J., B Math (Waterloo), MLS (Dal)
Howard, V., BA, MA (UBC), MLIS (Dal)
Speirs, W., Brian, BA, MA (Windsor)

Students seeking further information or help in planning courses of
study in the School of Library and Information Studies should
address themselves to:

Graduate Coordinator

School of Library and Information Studies
Room 3621, Killam Library
Dalhousie University
Halifax, NS B3H 4H8

The goal of the School of Library and Information Studies is to
provide graduate education within the Atlantic Provinces to
qualified candidates which equips them for their first and
subsequent positions as information professionals. This will be
accomplished by exposing students to the theories, technologies and
practices which comprise library and information studies. Within
the programme, the local professional community is provided with
opportunities to acquire new skills and career directions.

The student, therefore, is introduced to the development and
significance of librarianship and related information fields, to the
underlying principles of the profession, and to the techniques of
information organization, analysis, retrieval, and use. Each student
is challenged to explore and question through a curriculum which
attempts to balance professional studies with supervised practical
experience and advanced academic study or individual research.

I. Admission Requirements

Candidates must hold a Bachelor's Degree with at least a second
class standing from a university recognized by the Senate of
Dalhousie University.

All applicants are urged to submit completed documentation early
in the year as this is a limited enrolment programme; many more
applications are received than there are places to be allotted.

Students are admitted *only* in September. Students whose native
language is English must have the equivalent of two years of
university study in a major language other than English or be
prepared to demonstrate a reading knowledge of such a language
before graduating from the School's programme.

Candidates whose native language is not English must submit a
TOEFL score according to the regulations set out in Section 2.4 of
this calendar. The School's booklet, *Information for Prospective
Students*, which describes the programme in detail, is distributed to
all applicants by the Registrar's Office. Write for a copy if one is not
received with the application form.

A. Structure

The School operates on a 4-term system, which may be varied as
follows:

Two-Year Programme

Full-time attendance during the Fall and Winter terms of two years.

Part-Time Programme

The degree is to be completed within six years. The School requires
that a part time student take a minimum of two "required" classes
during the Fall term at the beginning of the programme.

B. Field Trip

During some academic years the School of Library and Information
Studies schedules a field trip to a city of major importance with
regard to library activity. Students are urged to take this field trip.
Consult *Information for Prospective Students*.

II. Degree Programmes

A. Master of Library and Information Studies (MLIS)

The degree of Master of Library and Information Studies is awarded
upon satisfactory completion of:

1. Sixteen half credit classes (8 required, 8 electives)
2. Work experience of 100 hours in a selected library or other
information agency under the supervision of a qualified
information professional. This experience is designed to
provide the student with exposure to everyday routines and
problems as well as the opportunity to test and evaluate class
theory, to contribute by actual participation, and to discover
and explore areas of particular interest for course specialization
and future employment. Students may also elect to meet this

requirement by 500 hours of relevant employment prior to graduation. Further details are available in *Information for Prospective Students*.

In addition, students are required to:

1. Attend the scheduled lectures series given by visiting experts in library, information and publishing fields;
2. Participate in the scheduled trips to relevant institutions within or near the Halifax Regional Municipality.

B. Master of Library and Information Studies/Bachelor of Laws (LLB/MLIS)

This is a four-year programme leading to the degrees of Bachelor of Laws and Master of Library and Information Studies. The usual order of the programme is:

- Year 1: first year classes of the MLIS programme (7 required, 1 elective)
Year 2: First year classes of the LLB programme
Year 3: Two MLIS classes (1 required, 1 elective); 25 hours of LLB classes
Year 4: 1 MLIS class each term; 23 hours of LLB classes

Candidates for the combined MLIS/LLB programme must also satisfy the entrance requirements of the Faculty of Law. For further information, contact the Director, School of Library and Information Studies.

C. One Year Master of Library and Information Studies (MLIS)

Applicants will be considered for a special programme, if they meet the requirement of the Faculty of Graduate Studies by possessing "an honours undergraduate degree in the same field as their graduate programme," i.e. BLS (Honours) or, in the opinion of Faculty, an equivalent qualification.

III. Classes Offered

In the following list the required classes are numbered 5505.03-5580.03. 6000 and 0600 classes are electives. All classes with the 'O' prefix are non-credit; 7000 classes are experimental or occasional classes. Not all 6000 and 7000 level classes are offered each year. The curriculum has been organized with sufficient flexibility to allow students to pursue an individual research project, or to develop a subject specialty through reading classes or the thesis option.

If a student chooses as an elective a class offered by a department other than the School of Library and Information Studies, approval must be obtained from the head of the relevant department and the School.

LIBS 0600.00: Letterpress Printing.

LIBS 0640.00: Handbound Books I.

LIBS 0650.00: Handbound Books II.

Provides a foundation in information technologies, both hardware and software, and their application in contemporary organizations. Additionally, it examines some of the key ethical and social issues of societal use of information technologies.

INSTRUCTOR: E. Toms

CROSS-LISTING: BUSI 5511.03

LIBS 5510.03: Information Organization & Access.

Introduces the various processes and skills involved in document identification, description and classification, and an appreciation of their role in information retrieval. Through a combination of lectures and practical work, students gain an understanding of how to use and apply cataloguing rules, classification schemes, and standards for bibliographic format.

INSTRUCTORS: L. Spiteri, J. Dunn

LIBS 5520.03: Research Methods.

Covers the principles of social science research as applied to library and information management problems. We will discuss the fundamentals of identifying and investigating perceived problems, and of understanding and evaluating published research.

INSTRUCTOR: H. Julien

LIBS 5530.03: Information Sources & Retrieval.

An introduction to the basic philosophy and techniques of reference work. Focuses on the information function served, the tools of reference, and electronic sources.

INSTRUCTOR: D. Wicks

LIBS 5540.03: Database Management Systems.

An introduction to the analysis of data requirements and implementation of systems by means of a database management system. Provides an understanding of data modelling and file structures.

INSTRUCTOR: E. Toms

CROSS-LISTING: BUSI 6516.03

LIBS 5560.03: Collections Management.

Examines the principles and methods of building library collections in all types of libraries, including the formulation of selection policy, criteria for evaluating materials, and the relationship of the selection process to user requirements and to other library procedures. Includes the problem of censorship, the art of the book review, and the relationship of the publishing industry to collection development.

INSTRUCTOR: D. Wicks

LIBS 5570.03: Organizational Management & Strategy.

Provides students with the opportunity to study methods of effective and efficient management of libraries and information centres, by examining organizational theory and design, organizational environments and cultures, organizational communications, group and individual behaviour and motivation, decision making, planning, leadership, organizational effectiveness and control, and change management.

INSTRUCTOR: H. Julien

LIBS 5580.03: Systems Analysis.

Introduces knowledge skills and techniques necessary for describing, analysing requirements, and designing the user-oriented aspects of information-technology-supported systems in libraries, businesses and similar organizations.

INSTRUCTOR: E. Rosenthal

CROSS-LISTING: BUSI 6514.03

LIBS 6050.03: International Perspectives.

A study of the nature of library and information science from a global point of view. Analyzes library/information services and systems in various countries and regions of the world, and explores information needs of different cultural or ethnic groups.

LIBS 6150.03: History of the Book.

Explores the history of the book from its early beginnings to its present manifestations. While greatest emphasis will be placed upon the history of the book from the mid-15th century to the present, the course will also discuss the history of important precursors of mechanical printing, and literacy, books, and manuscripts in the ancient and medieval periods.

INSTRUCTOR: L. Spiteri

LIBS 6250.03: Young Adult Literature and Media Interests.

Introduces the social, intellectual and psychological nature of adolescence, with respect to reading, listening and viewing interests.

INSTRUCTOR: V. Howard

LIBS 6300.03: Government Information Resources.

Examines the structures of governments and the ways in which they produce information for their own use and for the general public. Emphasis is placed on the nature and scope of Canadian and

America, and British government information as well as information of intergovernmental agencies such as that of the United Nations. Acquisition, organization, access, use and evaluation of government information are considered.

INSTRUCTORS: B. MacDonald

LIBS 6350.03: Classification and Indexing Systems.

The principles of subject analysis will be applied through the analysis and development of classification, indexing, and abstracting systems. Emphasis will be placed upon the role of classification, indexing, and abstracting in the role of information retrieval. Provides practice in the principles and methodologies used in thesaurus construction, periodical indexing, back-of-the-book indexing, abstracting, and automatic indexing and abstracting.

INSTRUCTOR: L. Spiteri

LIBS 6370.03: Records Management.

A comprehensive introduction to the field of records and information management. Topics covered include: records creation, evaluation, maintenance and control; issues relating to the maintenance, storage and disposition of records; and electronic records management.

INSTRUCTOR: L. Spiteri

LIBS 6450.03: Children's Literature and Media Interests.

An introduction to books and other materials for children. An attempt is made to relate these materials to the social, intellectual and psychological nature of childhood.

LIBS 6500.03: Users and Services.

Examines the ways in which services can be developed in response to user needs and preferences.

INSTRUCTOR: D. Wicks

LIBS 6550.03: Bibliography.

An introduction to the various types of bibliographical scholarship including: enumerative/systematic, historical, descriptive, analytical, textual, and universal.

LIBS 6590.03: Information Sources in Science and Technology.

Examines Canadian and international scientific and technical information, and considers the production, dissemination, access, organization, and use of the two types of information.

INSTRUCTOR: B. MacDonald

LIBS 6600.03: Information Sources in the Humanities/Social Sciences.

Examines the information requirements of the various disciplines in the humanities and the social sciences, and discusses the relevant information sources for each subject area.

INSTRUCTOR: D. Wicks

LIBS 6650.03-6680.03: Academic Courses.

These are available by arrangement with the Director.

LIBS 6700.03-6710.03: Reading Courses.

These are available by arrangement with the Director.

LIBS 6750.03: Health Sciences Literature & Information Sources.

Introduces students to the concepts and practice of health science librarianship with particular emphasis on the various print and electronic reference sources in the health sciences. Although the emphasis tools available in academic health science libraries, coverage also includes materials of particular relevance to hospital libraries and to consumer health and patient education libraries.

INSTRUCTORS: Staff of Kellogg Health Sciences Library

LIBS 6800.03: Archives.

Provides an overview of the issues and practices of archival science, with emphasis on Canadian approaches. Considers principles of acquisition, arrangement, description, reference and use of archival

records, along with the management of archives and the relationship between archival work and other divisions of the information professions.

INSTRUCTOR: B. Speirs

LIBS 6810.03: Information Literacy.

Prepares students for the theoretical and practical aspects of educating clients in information research skills. Concepts covered will relate to the design, implementation, and evaluation of instructional programmes.

INSTRUCTOR: H. Julien

LIBS 6820.03: Marketing and Public Relations.

Focuses on the theory and techniques of marketing and public relations, paying particular attention to non-profit and services marketing. The general marketing literature as well as published material in our own field will be used to introduce marketing concepts, and identify examples of best practice.

INSTRUCTOR: H. Julien

LIBS 6830.03: Information Retrieval.

An overview of information retrieval emphasizing current research and current developments. Both search engines and the interface are explored with an emphasis on evaluation and user testing.

INSTRUCTOR: E. Toms

LIBS 6840.03: Automation and Networking.

An introduction to the requirements for technologies used in automated library systems; the functional capabilities of various components of automated systems; the evolution of library and information networks in North America and their convergence into networked information; and the concept of a digital library.

INSTRUCTOR: E. Toms

LIBS 7070.03: Library Management and Current Problems in Librarianship.

Seminar class to examine selected current problems in management and librarianship.

LIBS 7320.03: Legal Literature and Librarianship.

Familiarizes the student with major sources of Canadian legal information, and furthers the student's awareness of the fundamental principles, issues, and practices in law librarianship.

INSTRUCTOR: D. Wicks

LIBS 7340.03: Sources for Business Intelligence.

Examines the value of information in a competitive environment from the perspectives of various types of business information, cost and management of information, developments on the Internet, and the role of governments. In addition, discerning client needs and packaging of information for client use are considered.

INSTRUCTOR: M. Weaver

LIBS 7390.03: Quantitative Methods.

Different statistical techniques are taught from the perspective of their application to decision-making and problem-solving in libraries and information centres.

LIBS 7400.03: Hypermedia and the Net.

Explores a variety of topics on the development and management of hypermedia information resources.

INSTRUCTOR: M. Leggott

LIBS 7600.03: Entrepreneurship.

Explores the possibilities for information services as entrepreneurial activities, and conveys the practical aspects and personal characteristics of entrepreneurship.

INSTRUCTOR: M. Weaver

LIBS 7610.03: Information Policy.

Provides students with the opportunity to critically analyze a number of issues facing information professionals in the information society. We will examine the roles of the public, private, and not-for-profit sectors in developing information policy, and we will explore the problems that give rise to information policies.

INSTRUCTOR: H. Julien

LIBS 7620.03: Electronic Text Design.

Examines the techniques and processes used to create, structure, and deliver electronic text and the implications of the resulting product for the future role of libraries. Aspects covered include analysis of the electronic information environment, the preparation of source material, and methods of adding value to electronic text, such as automatic indexing and outlining, the addition of hypertext links, the organization of structural units and the incorporation of mechanisms for browsing and navigation.

LIBS 7630.03: Human Computer Interaction.

Examines how computer interfaces can be designed to minimize user difficulties and maximize the acceptability, effectiveness and efficiency of the application. Although this may apply to a range of computer application and manufacturing devices, the emphasis will be placed on information-based applications.

INSTRUCTOR: E. Toms

LIBS 7650.03: Electronic Access to Information.

Explores the principles and methods involved in the retrieval of information from online databases. Topics discussed include the organization and structure of online databases, the formulation of search strategies, the evaluation of the content and search interfaces of online databases, and the management of online search services.

INSTRUCTOR: L. Spiteri

LIBS 9000.00: Thesis.

Available by arrangement with the Director. The Thesis Option replaces four of the School's electives.

School Publications

- *Information for Prospective Students* (annual)
- *Newsletter* (annual)
- Occasional Papers Series (Write to the Director for a list)
- *Y-A Hotline* (Irregular)
- Checklist of Canadian Copyright Deposits in the British Museum. Vols. I-III now available
- Monographic series with Scarecrow Press, Metuchen, NJ

Marine Affairs Programme

Location: 1234 Seymour Street
Halifax, NS B3H 3J5
Telephone: 902-494-3555
Fax: 902-494-1001
E-mail: Patricia.Roberts@dal.ca
Website: <http://www.dal.ca/mmm>

Coordinator

Chircop, A., LL.D. (Malta), LL.M., J.S.D. (Dal)

Teaching Faculty

Brooks, M., BOT (McG), MBA (Dal), PhD (Wales), Major appointment with the School of Business Administration. International marketing, international transportation & distribution, strategic management of international operations

Cadigan, S., BA, MA, PhD (MUN), Junior Chair (Social Science) Ocean Studies, Assistant Professor, Department of History. Coastal communities' society and ecology; Atlantic Canadian fisheries; maritime labour

Côté, R., BSc (Loyola), MSc (Memorial), Major appointment with Resource & Environmental Studies. Marine environmental protection strategies; management of chemical hazards; industrial ecology

Lane, P.A., MSc (SUNY Binghamton), PhD (SUNY Albany), Major appointment with Biology. Environmental impact/risk assessment; qualitative structure of perturbed communities; bioremediation

Mann Borgese, E., OC, DipMus (Zurich), LHD (MSVU), Professor Emeritus, Department of Political Science

McAllister, R.I., MA (Oxon), MA (Cantab), Major appointment with Economics. Disaster relief, prevention & development; sustainable development & foreign aid; regional development in industrial nations

McConnell, M.L., BA (Victoria), LLB (Dal), PhD (Sydney), Major appointment with Law. Corporate governance; international, environment; feminist theory; trade; law of the sea; reproductive control

Newkirk, G.F., PhD (Duke), Major appointment with Biology. Community-based coastal resource management in developing countries; integration of fisheries & aquaculture as a food production system

Ricketts, P.J., BA (Nottingham), PhD (Southampton), Dean, Graduate Studies. Coastal zone management; GIS applications in coastal & ocean management, Strategic Environmental Assessment

Saunders, P.M., BA, MA, LLB (Dal), Major appointment with Law. Canadian environmental law, international law; law & development assistance; law of the sea

Taggart, C.T., BSc, MSc, PhD (McG), Major appointment with Oceanography. Fisheries oceanography (field and lab), physical, ecological, biochemical and genetic influences on early life history and recruitment in fish, molecular genetic applications to fish population structure, physiological cycles in fish, predictive relationships between water mass structure and zooplankton and ichthyoplankton fields, physical/biological relationships at oceanic fronts

VanderZwaag, D., BA (Calvin), MDiv (Princeton), JD (Arkansas), LL.M. (Dal), Major appointment with Law. International Environmental Law, Marine Law, Pollution Control, Fisheries Management, Law of the Sea

Willison, J.H.M., PhD (Nottingham), Major appointment with Biology. Nature Conservation (marine & terrestrial) policy & practice; plant stress physiology

Wood, K.S., BA, MA (Oregon), Director, School for Resource and Environmental Studies. Environmental/ecological economics; resource systems & economic instruments for environmental management, environmental education

Adjunct Professors

Day, D., BA, Dip Ed, PhD, Professor of Geography, Saint Mary's University

Dwire, A., BA, MA (Dal), Aquaculture development in Maritime Canada; coastal & ocean management, Strategic Environmental Assessment

Hatcher, B.G., BScH, MSc (Dal), PhD (Sydney)

Hertzman, O., B.A.Sc., MSc, PhD (Wash), Adjunct Professor, Department of Oceanography

Hildebrand, L.P., BScH, MSc (Dal)

Meltzer, E., BA, LLB, LL.M. (Wash)

Wells, P.G., BSc (McG), MSc (UofT), PhD (Guelph), Adjunct Professor, Resource and Environmental Studies

Williamson, H., BSc, BEd, LLB, MBA (Dal)

Associate Faculty

MacLellan, D.P., BA (Dal), APR

Marine Affairs is an interdisciplinary programme examining all aspects of the uses of the coasts and seas. The Master of Marine Management provides a theoretical and practical interdisciplinary basis for understanding coastal and ocean development, planning and regulatory issues affecting the optimal use of the seas and marine industries.

I. Master of Marine Management

The Master of Marine Management (MMM) is a one-year, professional, non-thesis, interdisciplinary degree. Students are expected to take required classes covering the marine and social sciences, as well as a number of electives from approved marine-related classes. Students are also required to prepare a graduate project.

Admission Requirements

Enrolment is limited. Applicants must satisfy general requirements for admission to the Faculty of Graduate Studies. These include a Bachelor's Degree from a university of recognized standing with honours or its equivalent with a minimum average of B (72%, GPA of 3.0 or second class honours, Upper Division). Selection criteria include relevant work experience and career objectives. Applicants from outside Canada whose native language is not English must also submit a Test of English as a Foreign Language (TOEFL) score, its equivalent, or have completed a university degree in English. Dalhousie sets a minimum acceptable TOEFL score of 580. Deadlines for applications are January 31st for applicants requesting financial assistance, and March 31st for all other applicants.

II. Classes Offered

A. Required Classes

MARA 5001X/Y.06: Contemporary Issues in Ocean Management and Development.

This class offers an introduction to coastal and ocean management. Subject areas addressed include coastal area management, sea use planning, fisheries management, marine law and policy, maritime transport, development of non-living resources, protection and preservation of the coastal and marine environment, coastal tourism, maritime enforcement and conflict management. Instructors for the various subjects come from Halifax universities, federal and provincial government agencies and the private sector. NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: A. Chircop

MARA 5002X/Y.06: Graduate Project.

Students are required to apply the knowledge gained through class work to a specific planning and management problem or issue. The project contains both a written and a practical component. The written portion is completed under the supervision of an appropriate academic advisor. The practical component allows students to participate in internship programmes with local public or private sector agencies of relevance to the project topic.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

MARA 5003.03: Marine Science and Technology.

This class provides a general introduction to the marine sciences and technology. Subject areas addressed include physical, chemical, and biological oceanography, coastal zone, aquaculture, climate and ocean weather, remote sensing, toxins, fisheries, and ocean technology and management. Instructors come from Halifax universities, government agencies and the private sector.

INSTRUCTORS: O. Hertzman, C.T. Taggart

MARA 5004.00: Communications Management. (non-credit)

This class develops skills of marine managers for handling information and communications, including crisis management, with decision-makers and various stakeholders in ocean development and management processes such as special interest groups, the media, business interests (shareholders), and the public at large.

INSTRUCTOR: D.P. MacLellan

B. Electives

Students select the remaining complement of classes from the broad range offered in the marine field at Dalhousie, St. Mary's University and DalTech.

MARA 5005.03: Independent Readings.

This class is an option for MMM students who wish to pursue independent research into a specific topic not covered in another class. The topic and area of research must be approved by the MAP Coordinator and the research supervisor.

MARA 5008.03: Integrated Maritime Enforcement.

The aim of this class is to sensitize students to the complexities of maritime enforcement within a coastal and ocean management framework by building an understanding of the roles of maritime enforcement in integrated planning and management. In doing so, students are introduced to concepts, tools, techniques and procedures of enforcement.

MARA 5009.03: Coastal Zone Management.

This seminar is designed to introduce students to the concepts, principles, approaches, and issues associated with integrated management of coastal zones worldwide. This class addresses the legal, policy, and administrative frameworks prevailing in Canada, but will do so within the global context of coastal zone management. Case studies and examples from developed and developing countries are used to present practical approaches to the management of multiple uses in the coastal zone, including community-based management models.

INSTRUCTOR: E. Meltzer

CROSS-LISTING: ENVI 5204.03, LAWS 2041.03

MARA 5012.03: Community-Based Co-Management.

This class will critically examine the extent to which community-based co-management provides a viable approach to marine resource management in terms of its costs and benefits, opportunities for and barriers to its implementation, and conditions necessary for its long-term survival as a practical management tool.

INSTRUCTOR: A. Dwire

MARA 5013.03: Marine Protected Areas.

The creation of refugia from human exploitation in the marine environment for the purposes of conservation and sustainable resource usage is a fast-growing application of ecological theory and

ecosystem-based management practice. The holistic approach marries fundamental ecological research, fisheries science, park management and social policy. Most applications have been in the tropics where effective tools for conservation of marine resources are urgently needed, but MPAs are planned for virtually every maritime country. Criteria and information requirements for the selection, establishment and adaptive management of MPAs are evolving on many fronts. Broadly interdisciplinary approaches are required. Professionals in marine affairs need to be aware of the state of the art in MPA theory, design and operation. That is the goal of this course.

INSTRUCTOR: B.G. Hatcher

PREREQUISITES: ENVI 5047.03 or equivalent background or experience

Mathematics and Statistics

Location: Chase Building
Halifax, NS B3H 3J5
Telephone: (902) 494-2572
Fax: (902) 494-5130
e-mail: mscs@mscs.dal.ca

Chairperson of the Department
Nowakowski, R.J.

Professors Emeriti

Edelstein, M., MSc (Jerusalem), DSc (Technion-Haifa)
Swaminathan, S., MA, MSc, PhD (Madras)
Tingley, A.J., MA, PhD (Minnesota)

Professors

Clements, J.C., MA (UBC), PhD (UofT)
Coley, A.A., PhD (Lond), Killam Professor
Field, C.A., MSc, PhD (Northwestern)
Gabor, G., MSc, PhD (Eotvos)
Grunenfelder, L., PhD (ETH Zurich)
Gupta, R.P., MSc (Agra), PhD (Delhi)
Hamilton, D., MA, PhD (Queen's)
Janssen, J., MSc (Eindhoven), PhD (Lehigh)
Keast, P., PhD (St. Andrews)
Milson, R., MSc, PhD (McGill)
Moriarty, K., MSc (Dal), PhD (Imp. Coll.)
Nowakowski, R.J., MSc, PhD (Calgary)
Paré, R., MSc, PhD (McG)
Stewart, P.N., MA (Berk), PhD (UBC)
Suako, E.A., MSc (UBC), PhD (Waterloo)
Sutherland, W.R.S., MSc, PhD (Brown)
Tan, K.K., PhD (UBC)
Thompson, A.C., PhD (Newcastle upon Tyne)
Wood, R.J., MSc (McM), PhD (Dal)

Associate Professors

Birget, J.C., DEng (Paris), MS, PhD (Berkeley), Major appointment in
Computer Science
Dilcher, K., MSc, PhD (Queen's)
Johnson, K.P., MSc (UofT), PhD (Brandels)
Sastri, C.C.A., MSc (Andhra), PhD (NY)
Smith, B., MA (Calgary), PhD (Berk)
Thompson, K.R., MSc (Manchester), PhD (Liverpool)

Assistant Professors

Bowen, K., PhD (California)
Brown, J., MSc, PhD (UofT)
Ruan, S., PhD (Alta)

Postdoctoral Fellows

Butler, K., PhD (Simon Fraser)

Honorary Adjunct Professors

Astatke, T., PhD (Queens), NS Agricultural College
Beattie, M.A., PhD (Queen's), Mount Allison University
Dawson, R., PhD (Dal), Saint Mary's University
Fillmore, P.A., MSc, PhD (Minn), FRSC
Gupta, R., PhD (Dal), University of New Brunswick
Hartnell, B., PhD (Wat), Saint Mary's University
Muir, F., PhD (UofT), Saint Mary's University
Piccinini, R., PhD (Wisconsin), University of Milan
Radjavi, H., MA, PhD (Minn)

Rahman, M., PhD (Windsor), DalTech
Rosebrugh, R., PhD (Dal), Mount Allison University
Van den Hoogen, R., PhD (Dal), St. Francis Xavier University

Information concerning programmes and classes in Mathematics follows immediately. For information on programmes and classes in Statistics and Computer Science (including Computing Science) please refer to these sections of this calendar.

Mathematics

Location: Chase Building
Halifax, NS B3H 3J5
Telephone: (902) 494-2572
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Chair of Department

Nowakowski, R.J.

Director of Division

Thompson, A.C.

Graduate Co-ordinator

Keast, P.

The department offers programmes leading to the degrees of MSc and PhD in the following areas: algebra, approximation theory, category theory, convex geometry, differential equations, functional analysis, graph theory, number theory, numerical analysis, operator theory, optimization, general relativity theory, stochastic modelling, topology.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. Candidates will normally be expected to hold a degree recognized by Dalhousie University as the equivalent of a Bachelor's degree with Honours in one of its own faculties.

GRE Aptitude and Advanced Mathematics scores are recommended for all applicants for graduate studies whose undergraduate work has been completed outside of Canada, and TOEFL scores are required for applicants whose native language is not English. Valid score reports must be received directly from the Educational Testing Service. To ensure consideration for scholarship funds, application should be made by January 31.

II. Degree Programmes

A. Masters

Requirements

1. At least three full-credit classes, not including seminar classes, at the graduate level to be chosen in consultation with a department adviser. In addition, students whose preparation in a particular area of mathematics is deficient will be required to complete appropriate classes which will be designated by the adviser.
2. Attendance and participation in seminars.
3. A satisfactory thesis.
4. Students are required to give an oral presentation of their thesis and at that time to answer questions about the thesis. This presentation will be made after the thesis is in the hands of the student's committee and will be taken into account when the committee makes its decision.

B. Doctor of Philosophy (PhD)

Requirements

NOTE: The minimum and maximum time required to complete this programme are set out in section 5 of the Faculty Regulations.

1. At least one full-credit class during each of the first two years of the programme.

2. Comprehensive examinations which must be taken for the first time within 12 months and successfully completed within 16 months of registration in the programme.
3. Attendance and participation in an appropriate seminar.
4. A demonstration of reading competence in one of the following languages: French, German, Russian.
5. Preparation and defence of a satisfactory research thesis.

NOTE: Students interested in pursuing a degree programme in Applied and Computational Mathematics designed to prepare them for the work environment should consider the following classes:

- MATH 5190.03
- MATH 5200.03
- MATH 5220.03
- MATH 5230.03
- MATH 5270.03
- MATH 5290.03
- MATH 5300.03
- MATH 5310.03
- MATH 5350.03
- MATH 5400.03
- MATH 7400.03
- One of STAT 5080.03, STAT 5370.03, or STAT 5620.03

III. Classes Offered

A selection of the following graduate classes will be offered subject to demand:

MATH 5010.03/4010.03: Introduction to Measure Theory and Integration.

A discussion of Lebesgue's theory of measure and integration on the real line. The topics include: the extended real number system and its basic properties; the definition of measurable sets, Lebesgue measure and the existence of non-measurable sets; the Lebesgue integral; differentiation of monotonic functions (e.g. The Cantor function), absolute continuity, the classical Lebesgue spaces, Fourier series.

FORMAT: Lecture 3 hours

PREREQUISITE: MATH 3500.06

CROSS-LISTING: MATH 4010.03

MATH 5015.03/4015.03: Advanced Linear Algebra.

*MATH 5025.03/4025.03: Commutative Algebra I.

This introduction to commutative algebra includes a selection of the following topics: prime and maximal ideals, primary decomposition, Noetherian rings, Hilbert's Basis Theorem and the Nullstellensatz.

FORMAT: Lecture 3 hours

PREREQUISITE: MATH 3030.06 or equivalent

CROSS-LISTING: MATH 4025.03

MATH 5040.03: Homological Algebra

**MATH 5045.03/4045.03: Advanced Algebra I.

Topics may include: structure of groups, rings, fields, and modules; Galois theory. Other topics of special interest may be covered.

FORMAT: Lecture 3 hours

PREREQUISITE: MATH 3030.06

CROSS-LISTING: MATH 4045.03

*MATH 5055.03/4055.03: Advanced Algebra II.

Topics may include: Algebras over a field, classical representation theory of groups and algebras, lattices, Boolean algebra. Additional topics may be covered at the discretion of the instructor.

FORMAT: Lecture 3 hours

PREREQUISITE: MATH 3030.06

CROSS-LISTING: MATH 4055.03

MATH 5065.03/4065.03: Algebraic Geometry.

*MATH 5070.03/4070.03: Topics in Number Theory.

The class is intended to give an introduction to both analytic and algebraic number theory.

Following a short review of basic notions from elementary number theory, there will be a detailed discussion of quadratic reciprocity and some of its applications and extensions. The main topics from analytic number theory will be arithmetic functions a Dirichlet L-series, resulting in a proof of Dirichlet's theorem on primes in arithmetic progressions. Finally, some fundamental properties of algebraic number fields will be discussed, with some emphasis on quadratic and cyclotomic fields.

FORMAT: Lecture 3 hours
PREREQUISITE: MATH 3070.03
CROSS-LISTING: MATH 4070.03

***MATH 5090.03/4090.03: Probability.**

A mathematically rigorous treatment of probability theory in Euclidean space. Topics include the definitions and properties of random variables and their distribution functions, various convergence concepts, the Borel-Cantelli lemma, weak and strong laws of large numbers, characteristic functions, central limit theorems. Although the necessary measure theory is introduced, a previous analysis class is an asset.

FORMAT: Lecture 3 hours
PREREQUISITE: MATH 3360.03 and a third year analysis class
CROSS-LISTING: MATH 4090.03, STAT 4090.03/5090.03

MATH 5130.03/4130.03: Analysis of Algorithms.

***MATH 5135.03/4135.03: Introduction to Category Theory.**

Categories, functors, natural transformations and adjointness are introduced with emphasis on examples drawn from undergraduate Mathematics and theoretical Computer Science. The calculus of diagram chasing, limits, colimits and Kan Extensions is explored in detail to provide a thorough foundation for subsequent specialized classes.

FORMAT: Lecture 3 hours
PREREQUISITE: MATH 3030.06 or permission of the instructor
CROSS-LISTING: MATH 4135.03

***MATH 5140.03/4140.03: Introduction to Functional Analysis.**

An introduction to the basic principles of functional analysis including the following topics: infinite dimensional vector spaces, normed spaces, inner-product spaces, Banach and Hilbert spaces, linear and continuous linear functionals, the Hahn-Banach Theorem, the principle of uniform boundedness, dual spaces, weak* topology, and the Alaoglu theorem, the open mapping and closed graph theorems, and consequences and applications.

FORMAT: Lecture 3 hours
PREREQUISITES: MATH 2135.03 and 3040.03 or 3500.06
CROSS-LISTING: MATH 4140.03

***MATH 5160.03/4160.03: Operator Theory.**

An introduction to the theory and applications of continuous linear operators on Hilbert spaces, culminating with the spectral theorem, and including such topics as spectrum; adjoint; symmetric, self-adjoint, unitary, and normal operators; polar decomposition; differential and integral operators; C^* algebras; Gelfand's Theorem; and the spectral theorem.

FORMAT: Lecture 3 hours
PREREQUISITES: MATH 4010.03 and 4140.03
CROSS-LISTING: MATH 4160.03

***MATH 5170.03/4170.03: General Topology.**

An introduction to topological spaces, and includes the following topics: classification in terms of cardinality of bases, separation, etc., product spaces, Tychonoff theorem, compactness, compactifications, Tychonoff spaces, metrization.

FORMAT: Lecture 3 hours
PREREQUISITE: MATH 3040.03 or 3500.06
CROSS-LISTING: MATH 4170.03

***MATH 5180.03/4180.03: Introduction to Algebraic Topology.**

An introduction to algebraic topology and including the following topics: homotopy type and the fundamental group, geometry of simplicial complexes, homology theory of complexes, chain complexes, homology groups for complexes, subdivision, induced homomorphisms, axioms for algebraic topology, singular homology, the singular complex, properties of cell complexes.

FORMAT: Lecture 3 hours
PREREQUISITE: MATH 4170.03
CROSS-LISTING: MATH 5180.03

***MATH 5190.03/4190.03: Differential Equations.**

MATH 3120.03 is recommended. Topics covers include existence and uniqueness theorems, continuity of solutions, Floquet theory, autonomous differential equations and their relation to dynamical systems and flows, periodic solutions and the Poincaré-Bendixson theorem.

FORMAT: Lecture 3 hours
PREREQUISITES: MATH 3500.06 (3090.03 and 3100.03) and 2030.03/2040.03 or 2135.03
CROSS-LISTING: MATH 5190.03

MATH 5195.03: Topics In Topology and Functional Analysis.

MATH 5200.03/4200.03: Differential Equations - Qualitative Theory.

MATH 5220.03/4220.03: Introduction to Partial Differential Equations.

MATH 5230.03/4230.03: Partial Differential Equations.

MATH 5235.03: Topics in Operator Theory.

MATH 5270.03/4270.03: Numerical Software.

MATH 5290.03/4290.03: Mathematical Analysis of Dynamic Biological Systems.

This class is concerned with the construction, analysis and interpretation of mathematical models of dynamical biological systems. Topics covered will include neural networks, electro-biology, epidemiology and the transmission of HIV; the morphology of complex biological and chemical systems and pattern formation in morphogenesis.

FORMAT: Lectures 3 per week; seminars 1 per week
PREREQUISITE: MATH 3110.03 and MATH 3120.03 or their equivalent
CROSS-LISTING: MATH 4290.03, BMEN 5220.03

MATH 5300.03/4300.03: Optimal Control Theory.

MATH 5310.03/4310.03: Nonlinear Programming.

MATH 5330.03/4330.03: Topics in Graph Theory.

MATH 5400.03/4400.03: Applied Mathematics in Science and Industry.

MATH 5410.03/4410.03: Topics in Cosmology.

MATH 5650.03/4650.03: Relativity and Cosmology.

MATH 5660.03/4660.03: Automata and Computability.

MATH 5670.03/4670.03: Computer Algebra.

MATH 5800.03/4800.03: Introduction to Mathematical Research.

MATH 5900.03/4900.03: Game Theory.

MATH 6000.03-6990.03: Reading Classes for Advanced Graduate Students.

Microbiology and Immunology

Location: Sir Charles Tupper Medical Building
Seventh and Tenth Floors
Halifax, NS B3H 4H7
Telephone: (902) 494-3587
Fax: (902) 494 5125

Head of Department
Johnston, G.C.

Professors

Anderson, R., Ph.D. (Cologne)(Viral Pathogenesis)
Hoffman, P.S., Ph.D. (Virginia Polytech)(Microbial Pathogenesis)
issekutz, T., M.D. (Dal) Pediatrics (Inflammation and Leukocyte Traffic)
Johnston, G.C., Ph.D. (York)(Molecular Genetics: Regulation of Proliferation)
Lee, S.H.S., Ph.D. (Dal) (Virology; Interferon)
Lee, T.D.G., Ph.D.(Glasgow) (Immunoregulation, Transplantation Immunology and Herbal Medicine)
Mahony, D.E., Ph.D. (McGill)(Bacteriology; Clostridia)
Stoltz, D.B., Ph.D. (McMaster) (Insect Virology)
Stuttard, C., Ph.D. (Dublin) (Microbial Genetics; Streptomyces)

Associate Professors

Bortolussi, R.A., MD (UofT), FRCP(C), Pediatrics (Neonatal Infection)
Carr, R.I., MD (UofT), Ph.D. (Rockefeller), Medicine (Rheumatology)
Duncan, R., Ph.D. (Guelph) (Molecular Virology)
Hoskin, D.W., Ph.D. (McGill) (Tumour Immunology; MHC-unrestricted killer cells) Graduate Studies Coordinator
issekutz, A.C., MD (Dal), FRCP(C), Pediatrics (Inflammation)
Lee, S.F., Ph.D. (Guelph) (Oral Microbiology)
Marrie, T., MD (Dal), FRCP(C), Medicine (Infection; Pneumonia Disease)
Marshall, J.S., Ph.D. (Manchester). (The role and regulation of mast cells in immune responses to bacteria, viruses and tumours. Regulation of cytokines in inflammatory bowel diseases and asthma).
Rajaraman, R., PhD (Dal), Medicine (Programmed Cell Death in Neoplasia)

Assistant Professors

Barnes, C., PhD (Dal) (Molecular Genetics)
Carpenter, M.S., PhD (Manitoba) (Enterovirus Replication and Evolution)
Faulkner, G., PhD (Dal) (Ultrastructure)
Carduno, R.A., PhD (Victoria) (Intracellular Pathogens)
Schlech, W.F., MD (Cornell), FRCP(C), Medicine (Listeria; HIV Infection)
Stadnyk, A.W., Ph.D. (McMaster) (Intestinal Inflammation; Cytokines)

I. Disciplines Within Microbiology and Immunology

Graduate degrees can be pursued in the areas of Virology, Bacteriology, Molecular Pathogenesis, Microbial Genetics, Molecular Genetics and Immunology. Graduate students are expected to acquire a conceptual understanding of the disciplines in microbiology and immunology and an in depth knowledge of their particular area of specialization. Notwithstanding this, the existence of specified streams in Immunology, Virology, Microbial

Pathogenesis and Molecular Genetics in the Department may allow well-qualified students, with at least minimal training in Microbiology and Immunology, but a strong background in the appropriate subject area, to concentrate their studies.

II. Admission Requirements

In conjunction with the general requirements for admission, candidates must have received sound basic instruction in Chemistry and Cell Biology and four credits in a relevant discipline or disciplines with a B average or better.

III. Degree Programmes

A. Master of Science (MSc)

For minimum time required to complete this programme, see Section 1.3.2 of the Faculty of Graduate Studies Regulations in this calendar. Normally, study equivalent to five credits at the graduate level is required. Participation in seminars and journal clubs (one of MICR 5001.06, 5006.06 or 5007.06) is required. The class requirements for each MSc candidate are determined by consultation between the student and the supervisory committee, and must be approved by the departmental Graduate Studies Committee. A research project must be completed, the result of which will be embodied in a thesis.

B. Doctor of Philosophy (PhD)

For minimum time required to complete this programme, see Section 1.3.2 of the Faculty of Graduate Studies Regulations in this calendar. Participation in seminars and journal clubs (one of MICR 5001.06, 5006.06 or 5007.06) is required. The class requirements for each PhD candidate are determined by consultation between the student and the supervisory committee, and must be approved by the departmental Graduate Studies Committee. Comprehensive knowledge of the area of specialization must be demonstrated and will be assessed by written and oral examination.

Research of a high calibre is required, the results of which must be embodied in a thesis which makes a significant contribution to knowledge in the chosen field. An oral defense of the thesis before an external examiner is required.

C. Combined MD/PhD

For information on the combined MD/PhD programme see "Interdisciplinary and Joint Programmes".

IV. Classes Offered

MICR 5001.06: Molecular Biology Seminars.

A seminar based course in which students prepare and present papers from the recent molecular biology literature. Each student presents one paper per term and submits a written one-page summary and critique. Following each presentation, active discussion of the paper and relevant issues is encouraged from all participants, so as to discuss the merits, strengths and weaknesses and scientific importance of the paper presented.
INSTRUCTOR: G. Johnston

MICR 5006.06: Topics in Advanced Immunology.

The course is seminar based with weekly presentations of a recent paper in a selected area of Immunology. The course will cover aspects of cellular and molecular immunology in areas such as (but not restricted to) cancer, transplantation, auto-immunity, immunological tolerance and infectious diseases. The papers are representative of recent important discoveries in Immunology or papers which raise particularly controversial areas in the field. The student presentations take up approximately one half of the session and a discussion period takes up the other half. All students present two papers in the academic session. The students are expected to introduce the paper giving the reasons why this particular paper is of sufficient importance to be presented in this forum. The paper is put in the appropriate scientific context and previous papers by the same authors, or others, on the same topic are reviewed if necessary. The student then reviews the data presented and gives a critical analysis of the experimentation and the interpretation. The

discussion following assesses the extent to which the authors interpret their data in an appropriate manner and examines the implications of this work to immunology as a whole. This is a pass/fail course with the grading dependent on the quality of the student presentations and their contributions during discussion periods.

INSTRUCTORS: T. Lee and R. Carr

MICR 5007.06: Advanced Topics in Molecular Pathogenesis.

A seminar-based course in which students prepare and present papers from the recent literature. Papers are selected from topical and sometimes controversial areas in bacterial and viral pathogenesis. Each student presents one paper per term and submits a written one-page summary and critique. Following each presentation, active discussion of the paper and relevant topics is encouraged from all participants, so as to evaluate the merits, strengths and weaknesses and scientific importance of the paper presented. Evaluation is a pass/fail based on the quality of student presentations, written critiques and contributions to discussion.

INSTRUCTOR: P. Hoffman

MICR 5026.03: The Mammalian Cell as a Microorganism.

This class consists of lectures and student participation by way of giving seminars on recent development and by writing term papers on emerging concepts. The lectures deal with recent advances and developing concepts in cellular and molecular biology with reference to the mammalian cell cultured in vitro. The following general areas are discussed in detail: the mammalian cell as a microorganism, nuclear matrix, cytomatrix, extracellular matrix, cell adhesion receptors, growth factors, signal transduction, replicative senescence in vitro and aging in vivo, gene expression, cell cycle and differentiation, selection systems, hybridoma technology, experimental mutagenesis, somatic cellular and molecular genetics, gene mapping, gene therapy, molecular biology in diagnosis and therapy. Students will also be required to write two term papers on current topics.

INSTRUCTORS: R. Rajaraman, L. Fernandez

FORMAT: Lecture 3 hours

MICR 5027.03: Molecular Mechanisms of Cancer.

The class considers recent advances in cellular and molecular biology of cancer cells viewed as microorganisms in vivo. Students participate by giving seminars on recent articles and by writing two term papers on developing concepts. The following areas are discussed: properties of a cancer cell and types of tumours, chemical carcinogens, mechanisms of chemical, radiation and viral induced carcinogenesis, chemoprevention of cancer, oncogenes and protooncogenes, oncogenes and signal transduction, cytogenetics and genetics of cancer, tumor suppressor genes, tumor susceptibility genes, multistep carcinogenesis, apoptosis in cancer, hematopoietic malignancies, diagnostic uses of oncogenes, tumor immunology, and immunotherapy, chemotherapy, radiation therapy, cytokine therapy and gene therapy of cancer and the cellular basis of metastasis.

INSTRUCTORS: R. Rajaraman, D. Guernsey, W. Greer, C. Riddell, L. Fernandez and M. Rajaraman

FORMAT: Lecture/seminar 3 hours

MICR 5038.03: Molecular Biology of Yeast.

A seminar-based course in which students prepare and present papers from the recent molecular biology literature. Each student presents one paper per term and submits a written one-page summary and critique. Following each presentation, active discussion of the paper and relevant issues is encouraged from all participants, so as to discuss the merits, strengths and scientific importance of the paper presented. This is a pass/fail course based on the quality of student presentations, written critiques and contributions to discussion.

INSTRUCTORS: G. Johnston, C. Barnes

FORMAT: Seminar

MICR 5100.03: Processes and Mediators of Inflammation.

To provide students with an in-depth understanding of the major mechanisms of inflammation at a molecular and cellular level; to introduce students to the current research questions and emerging methods of treatment for inflammation; to develop student critical appraisal skills as they relate to the current scientific literature in this area.

INSTRUCTOR: J. Marshall

FORMAT: Lecture/presentation/discussion

MICR 5103.03: Infectious Diseases of Aquatic Organisms.

Please refer to the Biology section for a description of this class.

MICR 5114.03: Advanced Topics in Molecular and Medical Virology.

A class designed to look in detail at selected aspects of molecular and medical virology. The class is based on student presentation of current literature, in combination with introductory lectures and paper discussions. This class, in combination with the virology lab module from MICR 5601.03, offers students a look at the leading edge of virus research.

INSTRUCTORS: R. Duncan, D. Stoltz, R. Anderson, M. Carpenter

FORMAT: Lecture/presentation/discussion

MICR 5115.03: Immunology of Host Resistance.

Students read and discuss research papers taken from the current literature in immunology. While all major areas of immunology are discussed, particular emphasis is placed on mechanisms involved in the host immune response to pathogens and tumour cells.

INSTRUCTORS: D.W. Hoskin and T. Issekutz

FORMAT: Lectures, student presentations, discussions

MICR 5118.03: Molecular Pathogenesis.

This class studies the molecular basis of bacterial pathogenesis. The class will use selected bacterial pathogens to develop basic principles regarding genes, regulatory mechanisms and the molecular function of gene products in surface colonization, invasion, intracellular growth and toxin production. The class will be taught from reviews and original research papers and will emphasize the use of modern molecular biological tools in problem solving.

INSTRUCTOR: P. Hoffman

MICR 5301.03: Immunobiology.

This class is designed to examine the experimental approaches which have led and are leading to our knowledge of the biological characteristics of the immune system. We will look at the cells involved and the interactions between them, focusing on "hot topics" in antigen processing and presentation, the idiotypic network, immunological tolerance and approaches to inducing it when the immune system causes disease, and the interactions between the mucosal immune system and the systemic immune system, normal and pathological autoimmunity, organ transplantation, and CNS immune system interactions. The end of the class (last two weeks) will focus on some "super hot" topics.

INSTRUCTOR: R. Carr

FORMAT: Lecture, student presentation, discussion

MICR 5302.03: Molecular Immunology.

This class investigates the molecules involved in the generation and expression of immune responses. Topics typically include the function of cytokines, the generation of antibody diversity by immunoglobulin gene rearrangement, the structure and function of cell surface receptors such as the T cell antigen receptor, MHC and adhesion molecules, and the molecular interactions which lead to immune non-responsiveness. This class is offered in alternate years with MICR 5303.03.

INSTRUCTORS: T. Lee and A. Stadnyk

FORMAT: Lecture, student presentations, discussion

MICR 5303.03: Granulocytes and the Immune Response.

This class deals with the contribution of granulocytes to immunologic function. Mast cells, basophils, neutrophils, macrophages, NK cells and eosinophils will be considered with respect to their unique functions and contribution to a variety of immune effector mechanisms. This class is offered in alternate years with MICR 5302.03.

INSTRUCTORS: T. Lee and A. Stadnyk

FORMAT: Lecture, student presentations, discussion

MICR 5601.03: Laboratory Techniques in Molecular Biology I.

This class will consist of 3 laboratory modules (each of 4 weeks duration, 6 hours per week) organized collaboratively by the Departments of Biochemistry, Biology and Microbiology and Immunology. A choice of modules will be offered in 3 sections covering techniques used in the study of molecular biology, protein structure-function, and specific metabolic processes. Graduate students may select their 3 modules from any section or sections, subject to availability of space. This class is open to senior undergraduate students and the number of places in the class is limited. If necessary, priority for enrolment will be given to undergraduate students for whom this is a required class for their degree programme. Students may not necessarily be assigned to the modules of their first choice but every effort will be made to accommodate those needing the techniques provided in a specific module or who have to meet distribution requirements among the three sections.

Students must obtain a class outline from the Biochemistry Office prior to registration and return the module selection form at least 24 hours prior to the organization meeting, the date of which will be indicated in the Registration Timetable.

INSTRUCTORS: Biochemistry, Biology, Microbiology and Immunology faculty members

COORDINATOR: H.-S. Ro

FORMAT: Laboratory approximately 72 hours total

MICR 5602.03: Laboratory Techniques in Molecular Biology II.

This class consists of a series of laboratory modules covering techniques used in molecular biology and immunology (each of 4 weeks' duration, 6 hours per week). The three modules offered are: cloning and expression in Baculovirus, molecular genetics and immunochemistry.

INSTRUCTORS: L.E. Murray and members of the Department of Microbiology & Immunology.

FORMAT: Lab 1 day or 2 afternoons

MICR 9000.00: MSc Thesis.

MICR 9530.00: PhD Thesis.

Neuroscience

Contact: Dr. K. Semba
Department of Anatomy and Neurobiology
Telephone: (902) 494-2008
Fax: (902) 494-1212
or Graduate Coordinator of individual
Departments

Faculty Advisors

Department of Anatomy & Neurobiology

Allen, G.V., PhD (Dal)
Baldridge, W.H., PhD (McMaster)
Clarke, D., MD, PhD (McGill)
Currie, R.W., PhD (Man)
Darvesh, S., MD, PhD (UNB) (primary appointment in Neurology)
Ellenberger, H., PhD (Miami)
Hagg, T., MD (Leiden), PhD (UCSD)
Hopkins, D.A., PhD (McMaster)
Mathieson, W.B., PhD (Ottawa)
Mendez, L.M., MD, PhD (UWO) (primary appointment in Neurosurgery).
Neumann, P.E., MD (Brown)
Rutherford, J.G., PhD (SUNY)
Semba, K., PhD (Rutgers)
Smith, F.M., PhD (UBC)
Wassersug, R.W., PhD (Chicago)

Department of Biochemistry

Byers, D.M., PhD (Alta)
Cook, H.W., PhD (Dal)

Department of Pharmacology

Downie, J., PhD (Man.)
Dursun, S., MD (Turkey), PhD (primary appointment in Psychiatry).
Hall, R.L., MD (Dal) (primary appointment in Anaesthesiology).
Hong, M., PhD (Queen's) (primary appointment in Neurosurgery)
Howlett, S.E., PhD (Memorial)
Hung, O., MD (Dal) (primary appointment in Anaesthesiology)
Kelly, M., PhD (Southampton)
Robertson, H.A., PhD (Cantab)
Sawynok, J., PhD (Queen's)
White, T., PhD (Bristol)

Department of Physiology & Biophysics

Barnes, S., PhD (Berkeley)
Chauhan, B.C., PhD (Wales) (primary appointment in Ophthalmology).
Croll, R.P., PhD (McGill)
Fine, A.V., MD, PhD (Penn)
French, A.S., PhD (Essex)
Guernsey, D.L., PhD (Hawaii) (primary appointment in Pathology).
Murphy, M.G., PhD (Dalhousie)
Peizer, D. J., MD (Heidelberg)
Rasmuson, D.D., PhD (Dalhousie)
Villarroel, A., PhD (U.C.L.A.)
Wilkinson, M., PhD (London) (joint appointment in Obstetrics/Gynecology)

Department of Psychology

Adamo, S.A., PhD (McGill)
Brown, R.E., PhD (Dalhousie)
Connolly, J.F., PhD (London)
Eakes, G.A., PhD (Berkeley) (primary appointment in Psychiatry).
Fentress, J.C., PhD (Cantab.)
Klein, R.M., PhD (Oregon)
Kopala, L., MD (Calgary) (primary appointment in Psychiatry).
Kuitcher, S.P., MD (McMaster) (primary appointment in Psychiatry).

McGrath, P.J., PhD (Queen's)
Meinertzhagen, I.A., PhD (St. Andrews)
Mitchell, D.E., PhD (Berkeley)
Nakajima, S., PhD (McGill)
Phillips, D.P., PhD (Monash)
Rusak, B., PhD (Berkeley) (joint appointment in Psychiatry)
Shaw, S.R., PhD (St. Andrews)
Yoon, M.G., PhD (Berkeley)

In addition to the above, over 30 members of clinical departments and divisions in the Faculty of Medicine (Anaesthesiology, Pathology, Ophthalmology, Geriatric Medicine, Neurology, Neurosurgery, Psychiatry, Physical Medicine and Rehabilitation, and Urology) and DalTech (Electrical and Computer Engineering) are involved in neuroscience research.

The University offers a graduate programme leading to the Master of Science and/or Doctor of Philosophy degree. This interdisciplinary programme is coordinated with the departments of Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology and Biophysics, and Psychology with the degree being awarded in Anatomy/Neuroscience, Biochemistry/Neuroscience, etc. Approximately fifty faculty members in these five departments are involved in Neuroscience research and can serve as supervisors in this programme. The student must be accepted first by the Departmental Graduate Programme Committee and then by the Neuroscience Programme Committee.

The programme is designed to give the student a broad knowledge of the field of Neuroscience in addition to specialized training in one field of research. Normally, the student must take the Principles of Neuroscience (NESC6100) during his or her first year; this replaces some of the departmental course requirements. The student's Supervisory Committee will be selected by the Departmental Graduate Programme Committee and the Neuroscience Programme Committee; the Supervisory Committee is primarily responsible for designing and approving the programme that will best meet the student's needs.

I. Admission Requirements

In order to be admitted into the Neuroscience programme, a student must have a 4-year honours bachelor's degree with an average of A- or better in two most recent years, or equivalent. Students with a BSc degree wishing to do a PhD are usually registered initially in the MSc programme, but may be considered for transfer into the PhD programme after successful completion of the MSc class requirements. Students with strong undergraduate training in Neuroscience may apply to have some of the course requirements waived.

II. Classes Offered

- NESC 6100.06: Principles in Neuroscience
- NESC 6101.03: Principles in Neuroscience: Cellular and Molecular Neuroscience
- NESC 6102.03: Principles in Neuroscience: Systems and behavioural Neuroscience
- NESC 5060.03/ANAT 5060.03: Neurobiology of Neurological Disorders
- NESC 5062.03/ANAT 5062.03: Autonomic Regulation: Central Mechanisms
- NESC 5063.03/ANAT 5063.03: Neurobiology of the Peripheral Autonomic Nervous System
- NESC 5070.03: Chemical Neurobiology / ANAT 5070.03B: Chemical Neuroanatomy / PHYL 5494.03B: Synaptic Transmitters
- ANAT 5090.03: Cellular Development in the Nervous System
- ANAT 5100.06: Neuroanatomy
- BIOC 5300.03: Biochemical Communication: Membranes and Cell Signalling
- PHAC 5405.03: Advanced Pharmacology
- PHYL 5518.03: Ligand-gated Ion Channels
- PHYL 5520.03: Cellular Biophysics
- PHYL 5521.03: Molecular Physiology
- NESC 5603.03/PHAC 5603.03: Neuropharmacology of Pain

- **NESC 5605.03/PHAC 5605.03: Role of the Brain's Immune Inflammatory System in Disease**
- **PHAC 5608.03: Psychopharmacology**
- **ANAT 5609.03/PHAC 5609.03: Anatomical and Molecular Neuropharmacology of the Basal Ganglia**
- **PHAC 5615.03: Pharmacological and Biophysical Approaches to Understanding Cellular Ion Transport**
- **PHAC 5616.03: Molecular Pharmacology**
- **NESC 5619.03/PHAC 5619.03: The Autonomic Nervous System and its Pharmacology**
- **PSYO 6051.03: Neural Basis of Perception**
- **PSYO 6160.03: Comparative Psychology**
- **PSYO 6218.03: Topics in Psychopharmacology**
- **PSYO 6270.03: Comparative Neurobiology**
- **PSYO 6300.06: Cognitive Neuropsychology**
- **PSYO 6313.03: Topics in Cognitive Psychology**
- **PSYO 6800.03: Clinical Neuropsychology**

Nursing

Location: Forrest Building, First Floor
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Director

Downe-Wamboldt, B.L., DipPH, BN, MEd(Dal), PhD (Texas-Austin), RN. Chronically ill elderly people and their families, coping, health promotion and primary health-care, elder abuse, death and dying, health care policy analysis, meaning of illness.

Associate Directors

Gregor, F., BN, MN, PhD (Dal), RN. Social organization of nurses' work, women's health care work, gender and caregiving.

Smillie, C.L., BScN (UBC), MSc(Ed) (Dal), EdD (OISE), RN, CM (Canadian Medal of Honour). Program planning evaluation, health education, volunteer development, cancer related prevention.

Youden, S., BN (Dal), MS(N) (McGill), RN.

Professors

Keddy, B., BScN (MSVU), MA, PhD (Dal). Women and aging, women's health, qualitative and feminist methodologies, cross-cultural health, health care reform

Ritchie, J.A., BN (UNB), MN, PhD (UPitts), RN. Children/families chronic illness, pain, coping, research utilization, health policy

Associate Professors

Ellerton, M.L., BScN (Ottawa), MN (McGill), RN. Nursing of children and families, breast health, coping with childhood illness, preparation for children's hospitalization.

Hart, G., BN (McG), MSN (UBC), RN. Qualitative assessments, interventions for persons/families with chronic illness.

Hughes, J.M., BN (Dal), MS (Boston), RN, PhD (candidate) (McGill)

Meagher-Stewart, D., BScN (MSVU), MHS (McM), PhD (Candidate) (OISE), RN. Community health, women's health, cardiovascular health: health promotion and rehabilitation perspectives.

Melanson, P., BScN (Ott), MN (Dal), RN. Gerontological nursing, chronic illness, coping, elder abuse

Sommerfeld, D., BScN (MSVU), MSN (UBC), RN. Maternal and infant health, parent/caregiver interaction, mothering

Staples, E., BAA (Nurs) (Ryerson), MScN (D'Youville), PhD (Candidate) (Case Western Reserve), RN. Acute pain management, organizational change, advanced practice, medical/surgical oncology.

Tomblin-Murphy, G., BN, MN (Dal), RN. Collaboration and social support, job satisfaction, and coping in Canadian nurses in HIV/AIDS care, health human resource planning and worklife issues for nurses.

Wong, J., BScN (MSVU), MScN (Western), PhD (Dal), RN. Physiology of aging in the cardiovascular system, patient compliance.

Wong, S., BScN (MSVU), MScN (Western), PhD (Dal), RN. Physiological-based nursing, patient compliance, quantitative methods, analysis of qualitative data using content analysis.

Honorary Adjunct Professor

Butler, L., BScN (MSVU), MN (Dal), PhD (Toronto), RN. Quantitative methods, oncology quality of living, meaning of illness, recurrences, sexual health.

I. Admission Requirements

All applicants must be licensed to practice as registered nurses (active practitioner) in a province in Canada or in a foreign country. Applicants must have a Bachelor's degree with a minimum "B" standing. The Graduate Record Examination (Aptitude Test) must be taken and the results forwarded to the Graduate Programme Coordinator before a decision on admissibility can be made. Basic preparation including work experience for the clinical specialization study is required, as are introductory classes in research and statistics. Three letters of reference are also required.

II. Degree Programmes

A. Master of Nursing (MN)

Dalhousie University School of Nursing offers a two-year research-oriented programme preparing graduates to demonstrate leadership in nursing. The programme consists of 8 credits. Following completion of core classes which include advanced preparation in clinical nursing, students choose among three streams:

- A thesis is intended for those students seeking to conduct independent and/or collaborative research,
- A practicum is intended for those students seeking to increase knowledge and skills in health care policy development, implementation or evaluation, or
- An advanced practitioner option is intended for those students seeking preparation as an advanced nursing practitioner.

Prospective applicants are encouraged to consult the School of Nursing to identify specific clinical offerings in any academic year. Elective class(es) may be chosen, in consultation with the academic advisor, from a variety of fields.

The MN programme is accepted by MPHEC as the regional programme for the Maritime Provinces. Non-nursing electives may be taken at other universities (prior approval must be obtained from the School of Nursing). Graduate nursing classes within the programme are also offered by distance education modes to other Maritime regional centres.

B. Master of Nursing with Master of Health Services Administration (Combined MN/MHSA)

The combined MN/MHSA programme is a three-year programme which enables students to select classes leading to degrees of Master of Nursing and Master of Health Services Administration. The MN/MHSA programme is designed to enable students to:

- Advance knowledge in the area of nursing management;
- Analyze, implement, and evaluate theories and models relevant to nursing;
- Conduct independent, and/or collaborative research;
- Work collaboratively with other health professions in planning, implementing, and evaluating health care; and
- Demonstrate leadership in nursing and society.

The method of delivery includes traditional classroom seminar/classes, professional clinical experiences, a residency in administration in a nursing area and a thesis with an administrative focus. The thesis committee will include faculty committee members from the Schools of Nursing and/or Health Services Administration. The integrity of both programmes is maintained by the design of the three-year MN/MHSA programme; however, the number of credits required is reduced by electing to take this joint programme.

Candidates for the MN/MHSA programme must satisfy the entrance requirements of both programmes, and may obtain further information about the combined programme by contacting either the School of Health Services Administration or the School of Nursing. For admission, students must apply to both the School of Health Services Administration and the School of Nursing individually. Students applying for the MN/MHSA programme may submit GRE results in lieu of the GMAT results.

III. Classes Offered

NURS 5000.03: Intermediate Statistics.

This class is designed so that students will be able to select appropriate statistical methods to analyse categorical, ordinal and measurement data and to carry out the analysis on the computer using MINITAB and GLIM languages.

PREREQUISITE: MATH 1060.03

CROSS-LISTING: HBAS 6500.03, HEEDS 5503.03, LEIS 5503.03, PHAR 5980.03, PHSE 5503.03

NURS 5100.03/NURS 5120.03: Research Methods I and II.

This qualitative research class differentiates between method and methodology. The latter addresses all assumptions which guide research as a political process. Method refers to the ways in which data are collected, or the techniques for designing methods of analysis. An emphasis will be placed on the examination of various philosophical and ideological assumptions which guide all research, that is, the methodology. Positivism and all that is implied by the concept will be examined. The question "Is research gender, race, sexual orientation and class biased?" will be addressed throughout the class in order to best understand what is meant by *methodology*. In addition, various *methods* which are qualitative in nature will be explored in detail.

NURS 5120.03: Research Methods II.

There is a basic structure and process to the development of a design for scientific inquiry. This class focuses on research methods in general and quantitative research methods in particular. These research methodologies are used in nursing science as they relate to the development and/or testing of theoretical formulations, design, critique and writing of research proposals.

NURS 5160.03: Analysis of Research.

NURS 5200.03: Health Care Reform and Its Impact on Nursing.

This class is an examination of the evolution of the health care system towards a consumer-centred, community-based system. The development of health policy is critiqued within a broad social, socio-cultural and economic policy context. Issues of resources (i.e., human, financial, physical) that are created/reinvested based on a consumer health outcome perspective are discussed. Identification of and ways of developing the skills required by nurses to influence change from within the system are addressed.

NURS 5310.03: Social Organization of Nursing Knowledge.

This class examines the social organization of nursing knowledge by exploring a number of key social processes for their relevance and impact on nursing, both past and present. The goal is to identify and make explicit in the work of nurses' processes of gender, professionalism, managerialism, technology and ethics to understand both change and constancy in the character of nursing work and knowledge. Students will apply their theoretical insights to an analysis of selected nursing work processes.

NURS 5330.03: Theoretical Concepts & Competencies Related to the Helping Relationship in Advanced Nursing Practice.

This class will examine theoretical concepts related to the nature of functions of helping relationships that involve nurses engaged in advanced practice and consumers (individuals, family, group). In addition, it will explore the reciprocal effects of issues, such as complex health phenomena and changing health care systems, on this relationship. Finally, it will provide opportunity for students to practice advanced roles and competencies with consumers (either actual or simulated), in keeping with the theoretical concepts discussed throughout the class.

NURS 5410.03: Advanced Study of Biopsychosocial Phenomena.

This class is a study of the theories and research related to selected health-related concepts (e.g. coping, social support, meaning of illness, health, chronicity) relevant to advanced practice across specialty areas. Students will study each concept from the perspective of their own focus on advanced practice.

NURS 5420.03: Advanced Study of Nursing Approaches to Biopsychosocial Phenomena.

This class focuses on the examination of the research, evidence for nursing interventions for biopsychosocial and psychosocial phenomena (e.g. anxiety, pain, confusion, wound healing) as a basis for advance nursing practice across specialty areas. Students will examine how the evidence provides the foundation for clinical judgments and interventions designed for specific outcomes in their population of interest.

PREREQUISITE: NURS 5410.03

NURS 5510.03: Advanced Clinical Practicum I.

This class will focus on the assessment and understanding of patterns of health and illness occurring within a selected client population. Students will engage in clinical practice with the population of interest, and will apply relevant theories, paradigms and concepts in understanding and developing a plan of care for that client population.

PREREQUISITE OR CO-REQUISITE: NURS 5410.03

NURS 5530.03: Advanced Clinical Practicum II.

This class requires students to incorporate the implementation of advanced approaches to nursing phenomena on individual and aggregate bases. This will include an examination of issues from the perspective of individual client and family needs as well as from organizational and societal perspectives. Students will develop their own definition of an advanced nursing role within the organizational context of their professional practice.

PREREQUISITE: NURS 5510.03

PRE/CO-REQUISITE: NURS 5420.03

NURS 5610.03: Advanced Practitioner Role Development.

The focus of this class is on the role of advanced practice nurse in health care (e.g., clinical nurse specialist, nurse practitioner). Emphasis will be on the examination and critique of the role of components of the clinical nurse specialist, i.e., direct care, consultation, education, research, leadership/administration. Issues surrounding the implementation of these roles within a primary health care context in clinical specialties will be discussed.

PREREQUISITE: NURS 5410.03

NURS 5620.06: Advanced Practice Role Practicum.

This class requires intensive clinical practice in an advanced nursing role. Students will be expected to apply theory and research in complex nursing situations. She/he will integrate knowledge from all previous and concurrent classes to develop and analyse an advanced practice role in one of the clinical specialty areas pursued in either NURS 5510.03 or NURS 5530.03. While implementing the role, students will consider organizational and political issues and responses to change.

PREREQUISITE: NURS 5530.03

NURS 5730.03: Pathophysiology & Pharmacology for Advanced Nursing Practice.

This class is designed to help students appreciate the physiological changes associated with the disease process and to understand how they may be produced. It includes: (1) discussion of common syndromes that are consequences of a variety of etiological factors of disease mechanisms; (2) the interactions between pharmacological agents and the disease processes; (3) discussion of nursing care designed to assist patients to restore the normal physiological state.

NURS 5740.03: Advanced Health Assessment.

This class focuses on the interpretation of symptoms which the patient presents, using the advanced level of physical examination technique, and an understanding of physiology and of the ways consecutively.

NURS 5830.03: Death and Dying/Palliative Care (Palliative Care: Theory and Practice).

This class will provide a general overview of the significant issues facing individuals and their families related to life threatening illness and dying. Research findings, theories of pain and symptom management, grief and loss, communication, and coping and their significance for palliative care nursing will be explored. The impact of health care reform on services for clients with life threatening illness (LTI) and the role of the nurse within an interdisciplinary palliative care team will be a focus.

CROSS-LISTING: NURS 4340.03

NURS 5850.03: Women and Aging.

As women grow older the experience of aging is generally more difficult for them than for men. Somewhere in the forties, anxieties about the aging process exacerbate the difficulties facing women in modern society. Disempowering older women is usually accomplished in small increments. "Old woman" is a pejorative label; the older a woman becomes, the less credibility she generally has; this is especially true for women of color, poor women, lesbians, and women who are physically challenged. While aging is a biological phenomenon, ageism is socially constructed. Specifically, under patriarchy, older women are seen as a burden, desexualized and segregated by both men and younger women. They are usually not taken very seriously, nor seen as a threat. This class will explore the issues related to social, psychological, political and economic factors that are major determinants to the well-being of aging women based upon race, gender, sexual orientation, disabilities and class inequities.

CROSS-LISTING: NURS 4370.03, SOSA 3245.03, WOST 3810.03

NURS 5860.03: Development of Grounded Theory.

This class will illustrate the use of constant comparison in the development of theory, focusing on the psycho-social-cultural problems of persons, groups, or organizations that is relevant to the practice of nursing.

PREREQUISITE: NURS 5100.03, NURS 5210.03, NURS 5310.03 AND NURS 5430.03

NURS 5898.03: Health Promotion/Primary Health Care and Professional Practice.

An interdisciplinary class that increases students' awareness of recent actual and proposed changes to the Health Care System directed towards promoting health. It provides an opportunity for clinical analysis of deterrent health collaboration with peers with different professional or discipline backgrounds.

NURS 5900.06/5910.03/5920.03: Reading Class.

NOTE: Students taking NURS 5900 must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

NURS 5950.03: Self-directed Learning in Nursing.

This elective provides an opportunity for students to carry out an independent study or project related to health care, with assistance from the faculty facilitator and resource persons. Students will systematically identify, plan, execute and evaluate a learning project relevant to nursing practice, administration or education.

NURS 5960.03: Social Support.**NURS 5990.03: Interdisciplinary Human Nutrition.**

Students will acquire current information about the basic principles of human nutrition and nutritional requirements throughout the life cycle. They will also analyse a variety of psychological, social, economic, physical, educational and cultural factors which influence eating habits. Appropriate nutrition-related community resources will be identified. The students will gain an insight into the similarities of classmates' educational backgrounds and a further

understanding of their professional roles, thus enhancing possibilities for interdisciplinary cooperation in future clinical areas and the community.

CROSS-LISTING: NURS 4800.03, HEED 2250.03, PHYT 3090.03, PHAR 4850.03

NURS 6000.03: Nursing Administration and Leadership (Leadership and Administration in Health Care).

This class focuses on the changing role and expectations for health care managers and leaders within the Canadian health care system. Class topics such as organizational theories, the philosophy of primary health care, management theory and research-based practice and management challenges are covered through a variety of class activities including extensive readings, case studies, student presentations, field assignments and papers.

CROSS-LISTING: HEAS 6000.03

NURS 7000X/Y.06: Health Policy Practicum.

A practicum provides students with an opportunity to build knowledge and skills regarding health policy development, its application and/or evaluation. The practicum will focus on one particular policy relevant to the student's discipline/field of practice and will be tailored to individual student needs. The focus of the practicum can be generated from the student work completed in other classes, or as a new topic of interest. The practicum is offered to any Master of Nursing student who elects the Policy option. Graduate students from other health-related disciplines are also eligible for this practicum subject to the availability of faculty expertise and resources.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

NURS 9000.00 Thesis.**Nursing Electives**

*NURS 5160.03: Analysis of Research.

NURS 5780.03: Assessment of Caregiver/Parent-Infant/Child Interaction

NURS 5850.03: Women and Aging.

*NURS 5860.03: Grounded Theory.

NURS 5865.03: Quality Management (cross-listed with HEAS 6365.03)

*NURS 5770.03: Mind and Body in Nursing Practice.

NURS 5830.03: Death and Dying/Palliative Care.

*NURS 5898.03: Health Promotion/Primary Health Care and Professional Practice.

*NURS 5960.03: Social Support.

NURS 5950.03 A or B: Self-directed Learning in Nursing.

NURS 5990.03: Interdisciplinary Human Nutrition.

*NURS 6000.03A/MHSA 6000.03: Nursing Administration and Leadership.

*Not offered every year

A minimum registration of three students is normally required for any class to be offered.

Occupational Therapy

Location: (Atlantic) School of Occupational Therapy
Forrest Building, Dalhousie University
Room 215
Halifax, NS B3H 3J5

Telephone: (902) 494-8804
Fax: (902) 494-1229
E-mail: occupational.therapy@dal.ca
Website: <http://ls.dal.ca/~dalot/gradcal.html>

Director

Townsend, E., DipP & OT (Tor), BSc (OT) (Tor) MAEd (St. FX),
PhD (Dal)

Graduate Coordinator

Townsend, E., DipP & OT (Tor), BSc (OT) (Tor) MAEd (St. FX),
PhD (Dal)

Professor Emeritus

O'Shea, B., DipP & OT (Tor), BSc (Queens), MS (Colorado State)
Occupation as a determinant of health; curriculum design for
professional studies; cross-cultural transfer of knowledge

Professor

Townsend, E., DipP & OT (Tor), BSc (OT) (Tor) MAEd (St. FX),
PhD (Dal) Educational and social foundations of occupation and
occupational therapy; social organization of knowledge and
systems; power and empowerment

Associate Professors

Doble, S., BSc (OT) (Western), MS (Boston), PhD Candidate (Dal)
Measurement related to occupational function; care giving of
seniors; occupational analysis of seniors

Unruh, A., BSc (OT) (Western), MSW (Carleton), PhD (Dal)
Appraisal, gender pain, and occupation; pain education for
occupational therapists; spirituality and gardening

Assistant Professors

Banks, S., BSc (Dal), MA (Dalhousie) Educational outcomes;
integration of academic and theoretical learning

Blain, J., BSc (Napier), MA (Dal), PhD (Dal) Research interests;
discourse, narrative and identity, gender; spirituality,
shamanism, and nature religions; culture, occupation and
meaning; sociology of knowledge

MacNeill, M., BSc (OT) (Dal), MS (Illinois) Design, implementation
and evaluation of new and innovative service delivery methods

Pranger, T., BSc (OT) (Tor), MEd (Tor), PhD Candidate (Tor)
Consumer empowerment, health systems, program evaluation

Smits, E., BSc (OT) (Western), MS (Queens), PhD (Queens)
Neurotherapeutic treatment; educational outcomes; integration
of learning

Stadnyk, R., BA (Alberta), BSc OT (Queens), MSc (Queens), PhD
Candidate (Tor) Community practice; everyday lives of frail
elderly persons and services to support them

Taylor, S., DipOT (Queens), MA (SMU) Fieldwork education;
sociocultural factors in international transfer of knowledge;
environment for the teaching-learning process

I. Introduction

The School of Occupational Therapy opened a Master of Science (Occupational Therapy) programme in 1998. Serving Atlantic Canada and beyond, this is an innovative, part time or full time, distance education, five-credit thesis Master's program. A practicum component completed in a student's chosen location affords students the opportunity to explore and develop theory on

enabling occupation through practice. Students undertake Atlantic region, national, or international studies which focus on occupation or occupational performance, with studies linked to one of three concentrations. Examples include: Foundations: Nature, processes and organization of occupation; anthropological, economic, educational, historical, medical, philosophic, physiological, psychological, social or other foundations of occupation and occupational therapy. Evaluation: Qualitative or quantitative evaluation of occupation or occupational therapy, and evaluation of individuals, populations, programs, or systems including measurement issues, instrument development focus of ethnographic, narrative and other methods in evaluation. Systems Organization: Organization of occupation in society, organization and management of occupational therapy services, examining public and/or private systems, policy development systems change and reform, funding, health, law, etc.

II. Admission Requirements

Admission may be: a) to the MSc (Occupational Therapy) programme, full or part time *by distance*; b) to specified class(es) (maximum 2 full credits), as a Special Graduate Student *by distance*; c) to an individualized graduate Qualifying Programme, full or part time, *at least partially on site*. Distance classes use e-mail as the primary form of communication, and the Internet as a central educational medium. Admission to OCCU 5020, Graduate Seminar and Practicum, may require eligibility for licensure as an occupational therapist if practice is regulated in a student's chosen practicum location. Students should note the technology requirements for each class. Numbers admitted in a), b), or c) categories will depend on school resources.

A. Master of Science (Occupational Therapy)

Admission to the degree programme is open to occupational therapists with a Bachelor degree with honours or strong evidence of independent research. Priority will be given to occupational therapists who demonstrate the most favourable combination of academic excellence, leadership experience, referee recommendation, and a knowledge of current trends in occupational therapy.

B. Special Graduate Students (No-Degree, For Class Specific Admission)

Admission to a maximum of two full (four half) classes is open to occupational therapists who meet Faculty of Graduate Studies criteria, with permission of class instructors and the School graduate coordinator. Special Graduate students may submit a Letter of Permission for Dalhousie credits to be transferred to another university. Transfer credits for classes taken by special Graduate Students may be applied if students are later admitted to the MSc (OT) programme, with approval of the Graduate Programme Admissions Committee.

C. Qualifying Programme

Occupational therapists with a diploma, or who are without honours standing or research, theory or other classes which are now typical in an undergraduate occupational therapy program may apply to complete a Qualifying Programme prior to applying for admission to the MSc (OT) programme. A Qualifying Programme may be full or part time, 0.5 to 5.0 credits, and may include qualitative and/or quantitative research methods, occupational therapy theory and processes, occupational development, occupational analysis and synthesis, and program design. An applicant's individually-designed Qualifying Programme will be finalized by both the applicant and the Graduate Program Admissions Committee as part of the admissions process. Those who satisfactorily complete a Qualifying Programme with an average of B+ or better in all Qualifying classes become eligible to apply for admission to the MSc (OT) programme. Completion of the Qualifying Programme does not automatically guarantee admission to the MSc (OT) programme. Qualifying Programme students are governed by regulations in the Faculty of Graduate Studies. Occupational Therapy classes will be completed on the Dalhousie campus, not by distance.

D. Advanced Standing

Occupational therapists with partial or completed graduate level education in another field or at another university are invited to apply. Credits with a grade of A or above may be accepted, on individual review of transcripts and full class descriptions.

E. Dalhousie Letters of Permission

Students planning to complete up to 1.0 full credit of the MSc (OT) programme outside Dalhousie will require Letters of Permission from the School Admissions Committee. Documentation can be submitted with an application or after the student has been admitted. Inquiries prior to admission are normally not answerable since review is done in the context of an applicant's study plans. A grade of B- or higher is required for these courses to be given credit for the MSc (OT). Enrolment at Dalhousie enables students to complete classes by Letter of Permission at Canadian Maritime universities without additional fees, whereas additional fees may be required by other universities.

F. Notice of Special Needs

Applicants with special needs are encouraged to discuss resource requirements before admission to ensure that Dalhousie and/or applicants have the necessary resources (see Dalhousie Calendars for Graduate or Undergraduate Programmes). The School of Occupational Therapy is strongly in support of creating inclusive learning opportunities and will guide students to find needed resources to the best of the School's ability within the time and resource limits of the School. Funding and arrangements for special needs resources will be the responsibility of applicants.

G. Awards, Scholarships, Bursaries

A Psychiatry Practicum Award (\$2,000) supports a mental health practicum in the Maritime Provinces. Additional School awards are being developed, so inquiries to the School are welcome. Applicants are strongly encouraged to seek funding from external sources, some of which have information at the office of the Dalhousie Faculty of Graduate Studies.

III. Application

A. Documentation

All application materials are available from the Registrar's Office, and include:

- Faculty of Graduate Studies Application Form;
- if applicable, proof of English language competency;
- admission fee;
- distance fee;
- Letter of Intent;
- Curriculum Vitae;
- Two letters of Reference (Academic, if possible);
- official transcripts of all university classes;
- Distance Questionnaire;
- if applicable, specified classes of interest.

B. Deadlines

MSc (OT) and Qualifying Programme Applications June 1
(Acceptance begins after February 1)

Special Graduate Student Applications June 1
(for September) October 1
(for January)

IV. Programme Requirements

A. Description

Students registered in the programme will complete a minimum of five full credits.

Core Classes (1.5 credits)

- OCCU 5510.03: Advanced Studies on Enabling Occupation (0.5 credit)
- OCCU 5520X/Y.06: Graduate Seminar and Practicum (1.0 credit)

Classes by permission at Dalhousie or another university (1.5 credits)

- one graduate level Research Theory and Methods class (0.5 credits)
- two graduate level elective classes (1x1.0 credit or 2x0.5 credits)

Thesis (2 credits)

- OCCU 9000.00: Thesis (2 credits)

B. Residency and Orientation

A two week residency period at the end of August is expected at the start of the first year of a student's programme of study for both full-time and part-time students. The full day schedule includes orientation to the program, library and technology, and seminars and reading to start the two core courses, OCCU 5010.03: Advanced Studies on Enabling Occupation and OCCU 5020.06: Graduate Seminar and Practicum.

Flexibility is offered for completing the other required classes: one graduate level Research Theory and Methods class, (0.5 credits), and a minimum of two graduate level elective classes (2x0.5 credits). These credits may be completed, with prior permission and in compliance with Dalhousie Faculty of Graduate Studies regulations, at Dalhousie or another university, by distance or on campus, depending on the availability, appropriateness, and acceptability of classes. Negotiations between a student and Supervisor may result in a student being required to complete an additional half (0.5) or full (1.0) class credit in research methods or elective classes, as available and accessible with appropriate permission. Additional classes at Dalhousie are being developed for distance study. Students should note that a maximum of one full credit can be taken at other universities.

C. Full-Time and Part-Time Study

The MSc (OT) programme is available to students on a full time or part time basis. The normal upper time limits are four years for full time and five years for part time study. Extensions may be granted in special cases upon petition to the Faculty of Graduate Studies. Full-time students may enrol in up to five full or ten half credits per year. Part-time students may enrol in up to two and one-half credits in any one academic year. Students are advised to enrol first in OCCU 5010.03: Advanced Studies on Enabling Occupation and OCCU 5020.06: Graduate Seminar and Practicum.

D. Distance Costs

Students pay a Distance Fee per class on application to cover mailings, limited long distance phone costs, administration, and related expenses. Additional student expenses include: texts, long distance costs for approximately 10 audio-conference calls to Dalhousie, photocopy costs for library materials during orientation, access to the Internet and other technology or software, travel and accommodations for the 2 week orientation. Depending on a student's thesis research, statistical or qualitative analysis software and bibliographic software are recommended. Students wishing to spend more time on campus are welcome to make their own arrangements to use library and other university and School facilities. Each student is assigned a Faculty Advisor for contacts in addition to those with class instructors.

E. Programme Inquiries or Registrar

Programme application and information at <http://www.dal.ca/registrar@dal.ca>, or (902) 494-2450 (phone) or (902) 494-1630 (Fax).

Further information at: <http://is.dal.ca/~dalot/gradcal.html> or (902) 494-8804 (phone) or (902) 494-1229 (Fax), or e-mail at occupational.therapy@dal.ca

V. Class Descriptions

OCCU 5010.03: Advanced Studies on Enabling Occupation.

This class will begin during the two week, on-campus residency/orientation followed by 11 weeks of distance learning with web-based learning teleconferences and an e-mail discussion group. The class will facilitate advanced critique on research and

theories on occupation, and on processes on enabling change in individuals and their own environment. Drawing on empirical, interpretive, and critical social sciences, students will explore the key issues and literature relating to occupation and occupational therapy, particularly focusing on the three areas of concentration for the MSc (OT) programme: Foundations, Evaluation, and Systems Organization.

INSTRUCTOR: R. Stadnyk and E. Townsend

FORMAT: Orientation Workshop/Teleconference/E-mail Discussion Group/Web-Based learning

TECHNOLOGY: Netscape 3.0 minimum; Windows 95 (sound recommended)

OCCU 5020X/Y.06: Graduate Seminar and Practicum.

This distance education seminar and practicum course provides students with the opportunity to explore and develop theory in enabling occupation through practice. The goals of the course are to explore a particular theoretical area, develop new skills and roles, become competent in the approach of reflective practice. The course has two components: The seminars occur at strategic points throughout the course. The initial seminars take place during the two week on-campus residency/orientation and are aimed at orienting students to key concepts and issues relevant to the practicum part of the course. In subsequent seminars, students present and discuss key issues and learnings they have gathered from the practicum. Interprofessional and interdisciplinary participation in the seminars are encouraged.

The practicum experience entails students working in a site of their choice for normally 180 hours of designated practicum time, separate from normal work duties and typically spread over 8 weeks in the fall term and 12 weeks in the winter term. The practicum is to focus on organizational, systems and societal level issues and allows the students to explore roles in management, consulting, program planning and evaluation, policy development and implementation. Individual practicum requirements will be negotiated in a signed learning contract by the students and course instructor.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

INSTRUCTOR: T. Pranger

FORMAT: Seminars, practicum, e-mail, discussion, teleconference, and web-based learning

TECHNOLOGY & SOFTWARE: Netscape 3.0 minimum; Windows 95, e-mail system and account

OCCU 5030.03: Advanced Research Theory and Methods for Occupational Therapists.

This web-based distance-education course gives a comprehensive introduction to theory and epistemology underlying qualitative and quantitative research methods in the social sciences, distinguishing between realist and constructionist approaches. It then focuses on the development and application of theoretical approaches to research within the three areas of Foundations, Evaluation, and Systems Organization, which form the basis of Dalhousie's MSc (OT) programme. Goals of the course are to develop facility in designing and pursuing research projects, within the three areas of concentration, encouraging students to become critical, independent researchers. In addition to completing research assignments relating to both qualitative and quantitative methods and analysis, students will prepare a proposal which may serve as a first draft of their thesis proposal, giving particular attention to epistemology, methodology, and ethical considerations. While ethnographic/narrative methods will be emphasized, students are encouraged in this course to develop a facility with quantitative methods and statistics packages that will benefit their thesis research. The course is open both to students registered in the Dalhousie MSc (OT) programme and to occupational therapists who register as Special Graduate Students on permission of the instructor.

INSTRUCTOR: J. Blain

FORMAT: WebCT and e-mail

TECHNOLOGY AND SOFTWARE REQUIREMENTS: Netscape 3.0 or Microsoft Internet Explorer 3.0 minimum, modem 28.8Kb minimum, Internet connection, statistics program such as SPSS or SAS

OCCU 9000.00: Thesis.

The thesis will require original research at the Master's level. Basic or applied research using qualitative or quantitative methodologies will be conducted as appropriate.

Oceanography

Location: Life Sciences Centre
1355 Oxford Street
Halifax, NS B3H 4J1
Telephone: (902) 494-3557
Fax: (902) 494-3877
E-mail: Oceanography@Dal.Ca
WWW: <http://www.phys.ocean.dal.ca>

Chair of Department

Moore, R.M.

Graduate Studies Co-ordinator

Boudreau, B.

Professors

- Beaumont, C., BSc (Sussex), PhD (Dal), INCO Fellow of the CIAR. Geodynamics
- Bowen, A.J., MA (Cantab), PhD (Scripps), FRSC. Physical oceanography, nearshore dynamics, sediment transport.
- Chylek, P., Diploma (Physics) (Charles, Prague), PhD (Calif), joint appointment in Physics. Radiation physics; radiative transfer in theory, in the laboratory, and in the atmosphere.
- Cullen, J., AB (Calif, Santa Cruz), PhD (Scripps) (NSERC/Satlantic Research Chair) Phytoplankton processes, optical measurements, effects of ultraviolet radiation
- Doyle, R.W., MSc (Dal), PhD (Yale), cross appointment with Biology
- Fournier, R.O., MSc (Wm. & Mary), PhD (URI). Biological oceanography
- Grant, J., BSc (Duke), PhD (South Carolina). Benthic ecology, shellfisheries
- Greatbatch, R.J., BSc (Liverpool), PhD (Cambridge) (NSERC/MARTEC/AES Research Chair). Ocean atmosphere dynamics.
- Hay, A., BSc, MSc (Western), PhD (UBC) (NSERC/Satlantic Research Chair. Physical oceanography, ocean acoustics
- Lewis, M.R., BS, MS (Maryland), PhD (Dal). Biological oceanography, marine ecosystem modelling
- Louden, K.E., BA (Oberlin), MEd. (Temple), PhD (MIT). Marine geophysics
- Mills, E.L., BSc (Carl.), MS, PhD (Yale), FLS. Benthic ecology, history of oceanography
- Moore, R.M., BA (Oxon.), PhD (Southampton). Chemical oceanography, low molecular weight halocarbons in the marine environment
- Ruddick, B.R., BSc (Victoria), PhD (MIT). Physical oceanography

Associate Professors

- Boudreau, B.P., BSc (UNB), MS (Texas A&M), PhD (Yale). Diagenesis, sediment-water interactions, geochemical modelling
- Folkins, I., BSc (Dal), MSc, PhD (UofT), joint appointment with Physics. Stratospheric ozone modelling, atmospheric chemistry.
- Hill, P.S., AB (Dartmouth), MSc, PhD (Wash). Fine sediment transport, particle aggregation.
- Miller, W., BA (Wake Forest), MSc (S. Florida), PhD (URI). Trace element cycles, aquatic photochemistry, chemical-biological interactions
- Taggart, C.T., BSc (Carleton), MSc (York), PhD (McG). Fisheries oceanography and early life history phenomena, biological-physical interactions, population genetics
- Thompson, K.R., BSc, MSc (Manchester), PhD (Lív), jointly with Math and Computer Science. Physical oceanography/climatology

Assistant Professors

- Fu, Q., MSc (Peking), PhD (Utah), joint appointment with Physics. Atmospheric radiative transfer modelling emphasizing interaction among radiation, clouds, and climate, atmospheric remote sensing
- Kelley, D., BSc (MtA), PhD (Dal). Ocean mixing, deep convection, double diffusion, arctic mixing
- Lohmann, U., PhD (Hamburg), jointly with Physics. Cloud physics, climate modelling, aerosol-cloud-radiation interactions
- Sheng, J., BSc (East China Technical Univ), MSc, PhD (MUN), Shelf circulation, ocean modelling, data assimilation

Adjunct Professors

- Barker, Howard, BSc (UofT), MSc, PhD (McMaster), ARMP, AES
- Boyd, C.M., MA (Ind), PhD (Scripps). Zooplankton distribution, behaviour, and sensory physiology.
- Bricelj, M., Licenciatura, Univ. Of Buenos Aires, MS, PhD, MSRV, SUNY, Stony Brook, NRC. Physiological ecology, bioenergetics, aquaculture of bivalve molluscs
- Cembella, A., BSc (Simon Fraser), PhD (UBC), NRC. Population dynamics, genetics and ecophysiology of toxic marine algae and transfer of biotoxins in marine food webs
- Craigie, J.S., BA, MA, PhD (Queen's), NRC. Algal physiology, algal membrane structure, storage products
- Frank, K.T., BSc, PhD (Toledo), Dept. of Fisheries & Ocean, BIO. Population dynamics, stock assessment, fisheries oceanography recruitment
- Hargrave, B.T., BSc, MSc (Dal), PhD (UBC), BIO, Fisheries & Oceans. Benthic ecology
- Isaac, G., BSc, MSc, PhD (McG), Atmospheric Environment Service. Atmospheric chemistry, tropospheric aerosols, cloud measurements from aircraft
- King, M., BA (Colorado College), MS, PhD (Arizona), NASA, Goddard Space Flight Center. Atmospheric radiation, remote sensing, cloud physics
- Li, Z., BSc, MSc (Nanjing), PhD (McGill), CCRS
- Oakey, N.S., BSc (McG), MSc (Saak), PhD (McM), BIO. Physical oceanography, mixing processes in the ocean, instrumentation related to mixing processes
- Piper, D.J.W., BA, MA, PhD (Cantab), BIO. Marine sedimentology
- Ritchie, H., BSc (Mt.A), BA (Oxford), MSc, PhD (McGill). Numerical methods for atmosphere and oceans, atmosphere-ocean coupling, environmental prediction
- Sathyendranath, S., BSc (St. Teresa's College), PhD (Univ. P & M Curie). Optical oceanography, remote sensing of ocean colour, marine primary production
- Smith, P.C., BSc MS (Brown), PhD (MIT/Woods Hole Oceanography Inst), Atlantic Oceanographic Laboratory, BIO. Continental shelf dynamics, air-sea interaction, data assimilation
- Wright, D.G., BSc (Laurentian), PhD (UBC), Atlantic Oceanographic Laboratory, BIO. Climate dynamics, coastal oceanography, geophysical fluid dynamics.

Research Associates

- Dobson, F., BSc, MSc (Dal), PhD (UBC), Atlantic Oceanographic Laboratory, Environment Canada
- Gershey, R., BSc (Scranton), MSc (Texas), PhD (Dal), BDR Research Ltd.
- Harrison, W.G., BSc, PhD (NC State Univ), BIO, Ocean Sciences Division
- Head, E. BA (Cambridge), MPhil (Lond), PhD (Wales), Dept. of Fisheries and Oceans, BIO
- Loder, J., BSc (Acadia), PhD (Dal), Dept. of Fisheries and Oceans, BIO
- Sinclair, M., BSc (Hons) (Qu), MSc (Southampton), PhD (Scripps), Fisheries and Oceans

I. Admission Requirements

A good Honours degree, or its equivalent, is required for admission to the Oceanography Department.

Undergraduate preparation may be in any of the basic sciences - Biology, Chemistry, Physics or Geology. Degrees in Atmospheric Science, Meteorology, Mathematics or Engineering are also acceptable if the undergraduate work includes a reasonably good background in relevant basic science.

II. Degree Programmes

A. Master of Science (MSc)

For minimum time required to complete this programme, see Section 1.3.1, of the Faculty of Graduate Studies Regulations in this calendar.

Minimum course requirements are a total of 5 half-credit classes at the 5000 level or higher, at least three of which must be chosen from the introductory classes (5110.03-5140.03).

Additional classes may be required to strengthen a student's background in basic science.

Research and a thesis are required.

B. Doctor of Philosophy (PhD)

For minimum time required to complete this programme, see Section 1.3.2. In addition to completion of four introductory half-classes (5110.03-5140.03), and at least two additional advanced classes, ordinarily in the area of the candidate's special interest. Candidates must write a comprehensive exam. Consult the Oceanography Graduate Handbook for details.

Candidates must write and defend a proposal for thesis research.

Research and a thesis are required.

III. Classes Offered

Classes marked * are not offered every year. Please consult timetable upon registration.

OCEA 5080.03: Time Series Analysis II.

This class is concerned with the analysis of multivariate time series, and provides an advanced coverage of the statistical theory behind time series methods. Topics to be covered include theoretical aspects of Box-Jenkins models, Kalman filtering and the state space model, and the frequency domain approach to transfer function estimation.

INSTRUCTOR: K. Thompson

CROSS-LISTING: STAT 5400.03.

OCEA 5110.03: Introduction to Geological Oceanography.

This class is intended to give a broad survey of topics in marine geology and geophysics for new students in Oceanography at a graduate level. No previous background in geology or geophysics is required. The class content covers recent methods and observations with quantitative applications to an understanding of geophysical and geological processes. Some topics covered in Part I are plate tectonics and seismic, heat flow, gravity and magnetic methods. In Part 2 patterns and processes of sediment transport and deposition are explored. Some laboratory exercises augment the lectures, including a field cruise to Bedford Basin. Third year and honours undergraduates only will be admitted by consent of the instructor.

INSTRUCTORS: P. Hill, K. Loudon

OCEA 5120.03: Introduction to Physical Oceanography.

This class explores the physical forces driving the oceans, and describes the responses of ocean water to these forces. Scales of ocean motion discussed range from currents of oceanic dimensions, like the Gulf Stream, through tides and waves, down to very small-scale random movements of water known as turbulence. The class also includes a brief introduction to practical aspects of

instruments and methodology, via a field trip and a laboratory session. This class takes a quantitative approach in which equations describing the fluid motions and phenomena are derived, analysed and discussed. Quantitative problem-solving is emphasized in assignments. Those desiring a more qualitative approach are urged to consider OCEA 3170.

INSTRUCTOR: B. Ruddick

OCEA 5130.03: Introduction to Chemical Oceanography.

This class covers the major and minor constituents of sea water, the controls on its chemical composition, nutrient cycling, gas exchange, and the influence of the oceans on atmospheric chemistry. Other topics included are chemical tracers, and radiochemical dating methods, stable isotope studies, chemical speciation and chemical models of sea water.

INSTRUCTOR: R.M. Moore

OCEA 5140.03: Introduction to Biological Oceanography.

A class for graduate students in which the relationship between the plants and animals of the sea and their chemical and physical environment is explored. The class is concentrated on the research literature, so that students can examine the major unsolved problems of the discipline, as well as gain background knowledge for research in oceanography.

INSTRUCTOR: M. Lewis

OCEA 5160.03: Fisheries Oceanography.

Students who are not competent with fundamental population dynamics, ecology, physical oceanography, calculus, statistics, and computerized analysis should not enroll. The class focuses on the ecology of marine fish (including significant advances made in freshwater systems) from an oceanographic perspective and on the biotic and abiotic influences on marine fish population dynamics and production, distribution and abundance. Lectures include reproduction, early life history, feeding, growth, metabolism, mortality, and recruitment variability and forecasting. Emphasis is placed on: 1) the hydrological and meteorological processes influencing the above; and on 2) the primary literature, current problems and hypotheses, and fruitful research directions, approaches and techniques. Some emphasis is also placed on the application of scientific insights to fishery management techniques. Students are required to write a primary publication-style research paper.

INSTRUCTOR: C. Taggart

*OCEA 5210.03: Time Series Analysis in Oceanography.

Time series analysis in both the time and frequency domain is introduced. The class is applied and students are required to develop their own computer programs in the analysis of time series drawn from real problems. Topics to be discussed include the nature of time series, stationarity, auto and cross covariance functions, the Box-Jenkins approach to model identification and fitting, power and cross spectra and the analysis of linear time-invariant relationships between pairs of series.

INSTRUCTOR: K. Thompson

*OCEA 5221.03: Ocean Dynamics.

An advanced class for graduate students in Physical Oceanography and Atmospheric Science that studies the basic equations governing rotating geophysical flows, plus applications. Topics include geostrophy, conservation of potential vorticity, quasi-geostrophic dynamics, waves of frequency f , response to surface forcing (steady and unsteady), baroclinic/barotropic instability, quasi and semi-geostrophic frontogenesis, and tropical dynamics.

INSTRUCTOR: B. Ruddick

*OCEA 5222.03: Estuary, Coast and Shelf Dynamics.

An advanced class in the physical processes operative on the continental shelf. Topics include long waves, tides, tidal mixing, thermohaline circulation, wind forcing, upwelling, etc.

INSTRUCTOR: A.J. Bowen

***OCEA 5223.03: Ocean Waves.**

This class will consider at an advanced theoretical level, several types of waves known to be important in the ocean, and use concepts like group velocity and wave refraction to link them. We plan to cover surface and internal gravity waves, Rossby and topographic shelf waves, and various problems related to refraction and interactions with currents.

INSTRUCTOR: B. Ruddick

***OCEA 5230.03: Biology of Phytoplankton.**

The role of phytoplankton as primary producers of organic material in the sea, and as agents of biogeochemical transformations, explored in the context of interactions with physical and chemical oceanographic processes. Emphasis is on the current literature.

INSTRUCTOR: M. Lewis

OCEA 5250.03: Introduction to Acoustical Oceanography.

This class covers the basic theory of sound propagation and scattering in the ocean environment, and the applications to acoustic remote sensing of the ocean interior. The areas of application include: physical oceanography, biological and fisheries oceanography, and marine geophysics and geology. This class is open to students with backgrounds in the life and environmental sciences, as well as in the physical sciences and engineering.

INSTRUCTOR: A. Hay

OCEA 5270.03: Special Topics in Biological Oceanography.**OCEA 5280.03: Chemical Sedimentology & Early Diagenesis.**

This class aims at a quantitative understanding of the chemistry of sedimentary systems and the changes that occur during early burial history. Thermodynamic, kinetic and transport models are employed to describe and conceptualize the biological, chemical and physical processes responsible for these modifications. Some topics to be covered include compaction, formation and dissolution of carbonate and siliceous sediments, organic matter degradation and nutrient regeneration, iron and manganese diagenesis and the formation of ferromanganese nodules, and basalt-sediment interactions.

INSTRUCTOR: B. Boudreau

OCEA 5285.03: Marine Geochemical Processes.

This class combines thermodynamic and kinetic approaches to the description of processes which control chemical distributions in the ocean. Basic chemical equations are presented and evaluated for their ability to explain and predict oceanic observations. Topics include metal chemistry, reactive transient reactions, dissolved organic carbon, and gas exchange. Assignments will require simple computer modelling skills and draw from current literature.

INSTRUCTOR: W. Miller

***OCEA 5290.03: Advanced Chemical Oceanography.**

INSTRUCTOR: R. Moore

***OCEA 5292.03: Chemical Methods in Oceanography.**

This class provides a more detailed account of analytical methods used in chemical oceanography. Included are the procedures for precise measurement of parameters of the inorganic carbon system in seawater, total inorganic carbon, alkalinity, partial pressure of carbon dioxide. Gas chromatography, mass spectrometry, stable isotope measurement and radiochemical methods will be covered. Emphasis is on techniques which are available either in our own laboratories or at neighbouring institutions.

INSTRUCTOR: R. Moore

***OCEA 5293.03: Advanced Marine Particles.**

A firm grasp of the processes governing transport of particles in the sea forms a basis for understanding key aspects of the marine carbon cycle, ocean productivity, and pollutant dispersal. It is also fundamental to the interpretation of ancient and modern sedimentary deposits. To build understanding of marine particles

this class explores the various roles of particles in the sea and the processes that govern them. Topics to be covered include sources and types of marine particles, methods of particle characterization, patterns of vertical flux, vertical distribution of particles in the ocean, particle size distributions, settling velocities, mass transfer to and from small particles, mechanics of particle contact, surface chemistry, and erosion, deposition and transport.

INSTRUCTOR: P. Hill

OCEA 5311.03: Fluid Dynamics I.

An introduction to the theory of fluid dynamics, with some emphasis on geophysically important aspects. Contents: tensor mathematics, flow kinematics, equations of motion, viscous flow, potential flow, convection, turbulence, and basic aerodynamics. Occasional reference will be made to current research topics, especially those in Physical Oceanography.

INSTRUCTOR: D. Kelley

***OCEA 5330.03: Benthic Ecology.**

An advanced level graduate class concentrating on the major problems of benthic ecology, such as how food is supplied to benthic animals, what factors control the structure of biological communities, and how the benthos is related to geomicrobiological processes in the sediments. The class is heavily oriented to the current literature. Classes consist of two lectures per week and one journal paper discussion session. The last 3 weeks of the class are devoted to a class research project. Students are required to have a background in ecology, statistics, and invertebrate zoology.

INSTRUCTOR: J. Grant

***OCEA 5331.03: History of Marine Science.**

This class describes the development of the marine sciences from biological, chemical, physical and geological knowledge going back to the 17th century or earlier. It includes the important voyages of exploration, the development of marine biology, ocean circulation and plate tectonics, also the importance of technological changes upon marine science.

INSTRUCTOR: E.L. Mills

***OCEA 5350.03: Marine Geophysics.**

This class is designed to give the student an in-depth perspective in the areas of marine gravity, magnetics, and seismics. The mathematical basis for each of these data types is presented, but the prime emphasis is placed on interpretation of what an anomaly or a reflector may mean and how significant it is. This class is taught from a tectonics perspective. A good grounding in calculus is necessary. Previous experience in computer programming is very useful.

INSTRUCTOR: K.E. Loudon

***OCEA 5380.03: Marine Modelling.**

A graduate level survey of modelling techniques applied to biological-physical problems in oceanography. Lecture material includes: philosophy of modelling, dimensional analysis, parameterization of unresolved processes, numerical representation of ordinary or partial differential equations, model validation and fundamental limits to predictability and frequency domain analysis. Students are given the opportunity to study special topics in the current literature, e.g., prey-predator models, spatial patchiness models, models of the biomass size spectrum, models of pollutant dispersal, etc.

INSTRUCTOR: M. Lewis

OCEA 5411.03: Dynamic Meteorology I.

The basic laws of fluid dynamics are applied to studies of atmospheric motion, including the atmospheric boundary layer and synoptic scale weather disturbances (the familiar highs and lows on weather maps). Emphasis will be placed on the blend of mathematical theory and physical reasoning which leads to the best understanding of the dominant physical mechanisms.

INSTRUCTOR: Q. Fu

CROSS-LISTING: PHYC 5441.03

OCEA 5412.03: Dynamic Meteorology II.

The approach is the same as for 4411.03/5411.03, with emphasis placed on synoptic-scale wave phenomena, frontal motions, and the global circulation. An introduction to numerical techniques and their use in weather forecasting models and studies of climate is included. Additional special topics are covered at the discretion of the instructor.

INSTRUCTOR: Q. Fu/H. Ritchie
CROSS-LISTING: PHYC 5412.03

***OCEA 5500.03: Atmospheric Physics I.**

Main topics covered in this class are atmospheric thermodynamics and atmospheric radiation.

CROSS-LISTING: PHYC 5500.03

***OCEA 5510.03: Atmospheric Physics II.**

The major topic covered is cloud physics. Other topics include atmospheric optics and acoustics, lightning and radar techniques.

INSTRUCTOR: U. Lohmann
CROSS-LISTING: PHYC 5510.03

OCEA 5520.03: Introduction to Meteorology.

This is a self-contained class that provides an introduction to the main ideas and concepts in meteorology. The emphasis will be on developing an understanding of how the atmosphere works and to begin to "read" and appreciate the ever-changing sky and weather. Mathematics will be used occasionally (some first year calculus and algebra). Class participation will be encouraged by using a discussion and seminar format in the afternoon classes. The class is open to all students of all interests and disciplines.

INSTRUCTOR: U. Lohmann
CROSS-LISTING: PHYC 5520.03

***OCEA 5530.03: Introduction to Radiation and Climate.**

This class provides the student with an understanding of the origin, composition and thermal structure of the atmosphere, and radiative transfer through clear and cloudy atmospheres. The course includes a discussion of atmospheric general circulation, atmospheric absorption and scattering, radiative transfer, atmosphere-ocean-biosphere interaction, and climate change.

INSTRUCTORS: P. Chylek, Q. Fu
CROSS-LISTING: PHYC 5530.03

***OCEA 5541.03: Synoptic Meteorology I.**

This class introduces principles and techniques of meteorological analysis, diagnosis of weather systems and prognosis of system motion and development. A brief review is presented of meteorological instrumentation, observational procedures, codes and analysis techniques essential to the study of the main subject matter. Atmospheric systems and processes are carried out during the tutorial-laboratory period.

***OCEA 5550.03: Synoptic Meteorology II.**

This class extends the analysis and diagnosis of atmospheric dynamics and weather processes introduced in OCEA 4541.03/5541.03. Modern statistical and computer methods and satellite techniques are discussed. Case studies of atmospheric systems and processes are carried out during the tutorial-laboratory period.

OCEA 5570.03: Light Scattering and Radiative Transfer.

The equations of radiative transfer through the atmosphere will be developed and used. Special topics include transfer of infrared radiation, Mie scattering, absorption by atmospheric gases and aerosols, transfer through clear and cloudy atmospheres.

INSTRUCTORS: P. Chylek, Q. Fu

***OCEA 5575.03: Topics in Atmospheric Radiation.**

This advanced graduate course will focus on current hot research topics in atmospheric radiation. By doing research projects the fundamental theory of light scattering and radiative transfer will be applied to the selected topics. In each research project, the students will be required read papers, participate class discussions, do

computer work, write project report, and give presentation. The form of the class will be a combination of lecturing and team learning. It is expected that students learn to do research best when they are actively involved in the process.

INSTRUCTOR: Q. Fu

***OCEA 5580.03: Cloud Physics.**

A detailed examination of the behaviour of condensed water in the atmosphere. Microphysical topics include nucleation, hydrodynamics of cloud and precipitation particles, ice physics, mechanisms of precipitation formation, electrical and radiative properties. Cloud dynamics will include effects of latent heating feedback, thunderstorm structure, precipitation efficiency, mixed-phase storms and cloud models.

INSTRUCTOR: P. Chylek

***OCEA 5590.03: Paleoclimatology.**

Climate models, quaternary climates, dating systems, paleoclimatic indicators, historical climate fluctuations, prequaternary climates, environmental consequences of an asteroid impact, synthesis of past climates, paleoclimatic perspectives on the greenhouse problem.

INSTRUCTOR: P. Chylek

OCEA 5595.03: Atmospheric Chemistry.

This class will discuss the reactions that govern the distribution of chemical species in the troposphere and stratosphere. It will include such topics as the ozone layer and the reasons for its depletion over Antarctica, the formation of acid rain, and photochemical smog. It is desirable for students taking this class to have taken "Introduction to Meteorology" previously or have some other previous exposure to Atmospheric Science.

INSTRUCTOR: I. Fokins

OCEA 5600.03: Invertebrate Fisheries and Aquaculture.

Subject matter will deal with commercially exploited invertebrates (crustaceans and molluscs) with a heavy emphasis on bivalves. Topics to be covered include: (1) Review of the major invertebrate harvest fisheries (locations, methods, population cycles, fisheries models). (2) Biology and ecology of the Bivalvia (feeding, bioenergetics, growth, and reproduction). (3) Shellfish aquaculture (methods, species, site location, economics). These topics will be covered with respect to the Maritimes as well as non-local fisheries. Class structure will be a mixture of lecture and class discussions, supplemented by visits to aquaculture sites. Class requirements will include a research paper and oral presentations.

INSTRUCTORS: J. Grant, G. Newkirk

OCEA 6500.03: Graduate Seminar in Tectonics.

A lecture and seminar course on quantitative aspects of tectonics that focuses on plate boundary processes on geological timescales.

INSTRUCTOR: C. Beaumont/R.A. Jamieson

OCEA 9000.00: MSc Thesis.

OCEA 9530.00: PhD Thesis.

In addition to the weekly oceanographic departmental seminar, each of the oceanographic subdisciplines has a regular seminar in its specialty. At the seminar, topics of specific interest are discussed and examined. Students are required to attend both the general departmental seminar and the specialty seminar in their field of interest.

Oral and Maxillofacial Surgery

Location: 5981 University Avenue
Halifax, NS B3H 3J5
Telephone: (902) 494-1679

Chair

Precious, D.S., DDS, MSc, FRCD(C), FICD, FADI, FACD,
Programme Director of Graduate Training Programme.
Dento-facial deformities, cleft palate and/or lip

Honourary Professor

Natsume, N., DDS, MD, PhD

Professors

Cohen, M.M., Jr., AB (Mich), DMD (Tufts), MSD (Minn), MPH
(Boston), PhD (Minn), FCCMG, Head, Division of Oral and
Maxillofacial Pathology. Syndromology, genetics, pediatrics
Coonan, T.J., MD, FRCP(C). Neuroanesthesia
Holness, R., BSc, FRCS(C), DABNS
Janigan, D., BSc, MD, CM
Lovely, F.W., DDS (Dal), MS (Mich), FRCD(C) FICD, FACD
Marrie, T., MD, FRCP(C), FACP
Precious, D.S., DDS, MSc (Dal), FRCD(C), FICD, FADI, Chair;
Programme Director of Graduate Training Programme.
Dento-facial deformities, cleft palate and/or lip

Associate Professors

Alexander, D., MD, FRCS(C)
Amirault, D., MD, FRCS(C). Outcomes, research in total knee
replacement and fractures
Forward, K., MD, FRCP(C)
Goodday, R.H.B., DDS, MSc (Dal), FRCD(C), Head, Division of Oral
and Maxillofacial Surgery. Orthognathic surgery
Hamilton, K., MBBS, FRCP
Howes, W., MD, FRCS(C)
Leahey, L., MD, FRCS(C)
Lovas, J.G.L., BSc, DDS (Tor), MSc (Western), FRCD(C). Oral and
maxillofacial pathology
Mann, E., BSc, MD, FRCP(C)

Assistant Professors

Drysdale, A.A., MDCM, FRCP(C), (Emeritus)
Goulding, J., BSc, MD, MCFP(EM), FACEP
Hung, O., MD, Cert. in Anaesthesia, FRCP(C)
Michael, R., BSc, MD, FRCP(C), FCCP
Morrison, A.D., DDS, MSc, FRCD(C). Trauma and orthognathic
surgery
Pass, B., MSc, PhD, DDS, Head, Division of Oral and Maxillofacial
Radiology. Trace element analysis
Wright, B.A., BDS (Lond), LDS, RCS (Eng), DDS (Dal), MS (Indiana),
MD (Dal), FRCP(C), FACS. Medical, legal and independent
medical insurance examination
Yabsley, R.H., MD, BSc (Med), FRCS(C), FACS. Medical, legal and
independent medical insurance examination

The six-year programme in Oral and Maxillofacial Surgery which starts on June 1st each year is designed to provide students with a comprehensive background for the practice and teaching of Oral and Maxillofacial Surgery, and to qualify them for examination by the Royal College of Dentists of Canada.

Particular emphasis is placed upon the basic sciences and clinical hospital surgery practice.

I. Admission Requirements

Candidates to be considered must possess either a DDS or DMD and be eligible for student Licensure in the Province of Nova Scotia (as granted by the Provincial Dental Board of Nova Scotia).

Candidates must register for the entire six years of the programme and pay full tuition for the first five years and thesis only registration for the sixth year.

Application must be completed prior to June 30 of the year preceding commencement of the programme.

II. MD/MSc Degree Programme Requirements

1. Satisfactory completion or credit for the prescribed classes
2. Satisfactory knowledge and skills in all the phases of clinical oral and maxillofacial surgery
3. Satisfactory completion of a research study and submission of the results in the form of a thesis acceptable to the Director of the programme

In addition to the requirements for successful completion of the MD degree, the following classes are required to complete the MSc component of the programme.

III. Classes Offered

Not all classes listed are necessarily offered in any given year.

ORAL 5000.06: Anatomy.

This class is offered during the 1st year, consists of 14 hours of lectures and 36 hours of dissection and serves as an overview of the anatomy of the chest, thoracic cavity, arm and iliac crest areas of the pelvis. Detailed anatomy of the head and neck shall be covered. Emphasis will focus on anatomical structures and adjacencies as they relate to deformities, injuries and other pathological processes of the head and neck.

ORAL 5010.06: Surgical Anatomy.

This class is offered during the 1st year and consists of 30 hours of dissection. It permits the graduate student to perform a variety of surgical procedures on the cadaver. The opportunity exists to not only practice the steps of the surgical procedures but to explore the major anatomic adjacencies.

ORAL 5060.06: Oral and Maxillofacial Pathology.

This class is presented to residents over a two year period, twice during the 4 years of their programme. Students study the cause, pathogenesis, clinical, radiographic and microscopic characteristics of diseases affecting the oral and parana structures. Emphasis is placed on recognition of abnormalities, formulation of differential diagnoses, arrival at definitive diagnoses and patient management.
CROSS-LISTING: ORAL 6030.06, ORAL 7000.06

ORAL 5070.06: Oral and Maxillofacial Surgery Seminar. (Audit)

This class is offered during Year 1, 2, 3 and 4 of the MSc component of the programme. This seminar, with all the Oral Maxillofacial Surgery Senior Staff and residents, will: 1) review, by subjects, the various major treatment aspects in the total practice of Oral and Maxillofacial Surgery by Resident presentation and 2) have monthly case reviews.
CROSS-LISTING: ORAL 6040.06, 7010.06, 8010.06

ORAL 5080.06: Clinical Oral and Maxillofacial Surgery.

Is presented during Year 1, 2, 3 and 4 of the MSc component of the programme. A major portion of the Graduate Student's time will be spent in the provision of Oral Maxillofacial Surgical services for patients. Residents will be given increasing responsibility for the care of out-patients in the Teaching Unit and shall be responsible, through the Senior Resident, to the Chief of the Service. The Senior Resident shall provide care for all in-patients under supervision.
CROSS-LISTING: ORAL 6050.06, 7020.06, 8000.06

ORAL 6000.06: Anesthesia.

This is a four month rotation. Working with a tutor assigned monthly, the Oral and Maxillofacial Surgery Resident will be supervised in pre-operative and post-operative rounds, and in the minute-to-minute administration of anesthesia in the operating room.

ORAL 6010.06: Medicine.

The objectives of this one month rotation are: 1) to participate in the management of patients who have either cardiac or respiratory disease; 2) to develop skills of assessing patients in order to consult intelligently with the Department of Medicine; 3) to prepare for anesthesia rotation.

ORAL 6030.06: Oral and Maxillofacial Pathology.

CROSS-LISTING: ORAL 5060.06.

ORAL 6040.06: Oral and Maxillofacial Surgery Seminar (Audit).

CROSS-LISTING: ORAL 5070.06

ORAL 6050.06: Clinical Oral and Maxillofacial Surgery.

CROSS-LISTING: ORAL 5080.06

Oral 6080.06: Orthopaedics.

This is a two-month rotation with the main objectives being: 1) to provide the resident with sufficient clinical experience to harvest bone solo from the iliac crest; 2) to support the clinic skills in (1) with an appreciation of general principles of bone management; 3) to allow participation in the management and care of the polytraumatized patient.

ORAL 6070.06: Infectious Diseases. (Audit)

This rotation is one month. The objectives of the rotation are: 1) to participate in the management of patients who have been admitted to the Infectious Diseases service; 2) to apply skills and knowledge acquired in Dr. Dalton's Microbiology class; 3) to acquire the skills of responsible and appropriate use of antimicrobial agents.

ORAL 6080.06: Emergency Medicine. (Audit)

This is a one month rotation with its objectives being: 1) to participate in the general management of patients in an emergency situation; 2) to apply skills acquired on Orthopedics and anesthesia in the management of the emergency patient; 3) to manage and instruct Emergency room staff in the techniques of facial fracture treatment.

ORAL 6090.06: Neurosurgery. (Audit)

This is a one month rotation.

ORAL 7000.06: Oral and Maxillofacial Pathology.

CROSS-LISTING: ORAL 5060.06.

ORAL 7010.06: Oral and Maxillofacial Surgery Seminar.

CROSS-LISTING: ORAL 5070.06

ORAL 7020.06: Clinical Oral and Maxillofacial Surgery.

CROSS-LISTING: ORAL 5080.06

ORAL 7030.06: Research.

The graduate student shall complete a research project and publish his findings in a thesis, acceptable to the Senior Staff, Programme Director and Faculty of Graduate Studies. All or animal studies pertaining to research requirements shall be completed prior to January 1 of this year. The complete first draft of thesis shall be available to committee by February 15, with the completed document ready by April 1 of the senior year.

CROSS-LISTING: ORAL 9000.00

ORAL 8000.06: Clinical Oral and Maxillofacial Surgery.

Covered under 5080.06

ORAL 8010.06: Oral and Maxillofacial Surgery Seminar.

Covered under 5070.06

ORAL 9000.00: Thesis.

Covered under 7030.06

IV. Medicine

First Year

Second Year

Clinical Years (Obstetrics and Gynecology, Pediatrics and Psychiatry clerkships only)

Please refer to the Four Year Programme in the undergraduate calendar for Medicine.

Pathology

Location: Sir Charles Tupper Building, 11th Floor
5859 University Avenue
Halifax, NS B3H 4H7
Telephone: (902) 494-2091
Fax: (902) 494-2519

Head of Department

Moss, M.A.

Professors

Fraser, A.D., BA (Houghton), PhD (Boston), FCACB, DABCC.
Clinical toxicology; Therapeutic drug monitoring
Guernsey, D.L., BA (Lehigh), MS (Bridgeport), PhD (Hawaii).
Molecular oncology; genetic basis of human disease; molecular
neurobiology
Moss, M.A., MB, BS (London), MSc (Dal), FRCP(C). Environmental
pathology
Rowden, G., BSc (Exeter), MSc, PhD (Lond), DSc (Lond), FRCP (UK),
MRC Path. Dermatopathology with emphasis on the immune
system of the skin
Wright, Jr., J.R., BS, MA, MD, PhD (Ohio State). Experimental
diabetes; islet transplantation; perinatal pathology

Associate Professors

Dooley, K.C., PhD (UBC). Computerization and instrumental
methods; diagnostic enzymology; screening for metabolic
disease
Fraser, R.B., MSc, MD (Dal), FRCP(C), FCAP, PP
Greer, W.L., BSc, PhD (Western), FCCMG - Graduate Studies
Coordinator. Human molecular genetics; molecular diagnosis of
cancer
Gupta, R., MB, BS (India), FRCP(C). Kidney transplantation -
chronic rejection; uropathology
Marshall, J.S., BSc, PhD (Manchester)
Nassar, B.A., BSc (Beirut), PhD (Newcastle), MB, BCh (Cairo),
FRCP(C). Essential fatty acids and prostaglandins; molecular
diagnosis of hyperlipidemias; familial cancers; porphyrias
Neumann, P.E., MD, BA (Brown), (major appointment in Anatomy
and Neurobiology). Developmental neurogenetics
Riddell, D.C., BSc, PhD (Queen's). Tumour suppressors; human
molecular genetics
Trillo, A.A., MD (Nat'l Univ Mexico), PhD (Western).
Cardiopathology; atherosclerosis; nephropathology;
ultrastructural pathology
Zayed, E.Z.M.A., MB, BCh (Egypt) FRCP(C). Coagulation and
platelet disorders

Assistant Professors

Dymond, L.C., BSc (Memorial), MSc, MD (Dal), FRCP(C).
Interference in digoxin assays; hypouricemic states
Guha, A.K., BSc, MD, MSc, PhD (Dal), FRCP(C). Autoimmune
disease testing & use of monoclonal antibodies for cancer
detection and therapy
McAlister, V., BCh, DCh, MB (Dublin), FRSC(I), FRCS(C), (major
appointment in Department of Surgery).
Resch, L., MD (Dal), FRCP. Computerized Image Analysis
Wright, B.A., BDS (Lond), LDS, RCS (Eng), DDS (Dal), MS (Indiana),
MD (Dal), FRCP (C), Head and neck pathology; oral disease and
diseases of salivary glands

Research for the MSc degree may be conducted in experimental
pathology and/or allied fields of medical sciences (e.g. clinical
chemistry, hematology, histopathology or molecular pathology and
molecular genetics) for those planning a career as a laboratory
scientist.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. In addition, candidates with the MD degree may be admitted.

II. Master of Science (MSc)

This programme is intended to give the student a strong background in the experimental approach in pathology. Although the programme may be completed in 12 months, most students require 24 months.

The research work and thesis defence are valued at 2½ credits. All students are required to attend and participate in the research seminar programme (PATH 5091.03) for a credit value of ½. In addition, 2½ other credits are required, in a subject related to the thesis or in the laboratory field chosen. Other classes may be required depending upon the background preparation of the student, the nature of their thesis, or the student's career goals.

Candidates must participate as appropriate in the weekly series of conference seminars in Pathobiology, Laboratory Medicine, Surgical and Autopsy conferences or molecular pathology/genetics.

Research and a thesis are required. The thesis must be defended by oral examination which covers the candidate's area of study and research. Yearly presentations to the Department are required of every candidate.

III. Classes Offered

PATH 5000.03: General Pathology.

A reading/discussion class covering basic systems and processes in pathology.

INSTRUCTOR: J. Wright

PATH 5001.03: Advanced Mechanisms of Pathology.

This class will provide an in-depth study of such topics as cell injury, adaptation and repair, inflammation, fluid and hemodynamic derangements, free radical damage, environmental pathology and aging.

INSTRUCTOR: B. Wright

PATH 5011.03: Biochemistry of Clinical Disorders I.

This class is an introduction to the pathophysiology of disease. It provides the clinical and biochemical background to disease groups and system disorders and the laboratory approach to their diagnosis. Topics include cardiovascular, renal, gastrointestinal and hepatobiliary disorders, in addition to acid-base, blood and immune abnormalities.

INSTRUCTOR: B.A. Nassar

CROSS-LISTING: BIOC 4811.03/5811.03

PATH 5012.03: Biochemistry of Clinical Disorders II.

This class is an introduction to the pathophysiology of disease. It uses the same approach as PATH 5011.03 but different groups of diseases are discussed. Topics include carbohydrate, lipid and amino acid disorders; endocrine and rheumatological diseases, as well as tumor markers and toxicology.

INSTRUCTOR: B.A. Nassar

CROSS-LISTING: BIOC 4812.03/5812.03

PATH 5027.03: Molecular Mechanisms of Cancer.

An in-depth study of the molecular and genetic basis of cancer. The multi-step nature of carcinogenesis will be the broad basis for studying oncogenes, tumour suppressor genes, genes regulating differentiation and apoptosis, and cancer susceptibility genes. Certain molecular biology techniques will be discussed in order to fully understand the molecular events of cancer.

INSTRUCTORS: D. Guernsey

CROSS-LISTING: MICR 5027.03/4027.03

PATH 5035.03: Human Genetics.

Topics include inborn errors of metabolism, human development, transmission genetics, DNA structure, gene function, mutation and chromosomal alterations, population genetics, genetics of immunity and cancer, genetic technology in medicine and ethical and social issues related to medical genetics.

INSTRUCTORS: Drs. W.L. Greer, D.c. Riddell, P.E. Neumann

CROSS-LISTING: ANAT 5035.03/BIOL 4035.03

PATH 5035.03: Human Genetics.

Topics include inborn errors of metabolism, human development, transmission genetics, DNA structure, gene function, mutation and chromosomal alterations, population genetics, genetics of immunity and cancer, genetic technology in medicine and ethical and social issues related to medical genetics.

INSTRUCTORS: Drs. W.L. Greer, D.C. Riddell, P.E. Neumann

CROSS-LISTING: ANAT 5035.03/BIOL 4035.03

PATH 5040.03: Pathobiology of Cancer.

This class will outline the pathobiology of neoplasia. It will discuss both normal and abnormal mechanisms of cell growth and differentiation since cancer is ultimately a disease of these processes. The basic biology of carcinogenesis and behaviour of tumours will be highlighted. The clinical aspects of cancer management will also be presented.

INSTRUCTOR: A. Guha

PATH 5050.03: Immunopathology.

This class will explore the intricacies, functions and abnormalities of the immune system. Both the humeral and cellular arms of the immune system will be detailed. Immunological deficiencies and autoimmune diseases will be discussed. Clinical aspects of topics such as transplantation and tumour immunology will also be presented.

INSTRUCTOR: A. Guha

PATH 5051.03: Special Topics: Molecular Pathology and Molecular Genetics.

INSTRUCTOR: C. Riddell

PATH 5060.06: Special Topics: Morphometrics and Stereology.

PATH 5070.06: Special Topics: Electron Microscopy.

Introduction to diagnostic electron microscopy. Coverage of virology, renal pathology and tumour diagnosis.

INSTRUCTOR: G. Rowden

PATH 5080.06: Special Topics: Immunocytochemistry and Histochemistry.

Basics of immunostaining technique including fluorescent and peroxidase methods, FACS analysis. Applications in various fields of diagnostic surgical pathology. In situ DNA/RNA hybridization methods for infectious agents.

INSTRUCTOR: G. Rowden

PATH 5091.03: Pathology Research Seminar Series.

The objectives of this class are: 1) to provide a forum for graduate students to develop skills at presenting seminars; 2) to provide constructive evaluation of their research; and 3) to promote interaction between students and faculty.

INSTRUCTOR: W.L. Greer

PATH 5100.03: Processes and Mediators of Inflammation.

The objectives of this course are to provide students with an in-depth understanding of the major mechanisms of inflammation at a molecular and cellular level; to introduce students to the current research questions and emerging methods of treatment for inflammation; to develop student critical appraisal skills as they relate to the current scientific literature in this area.

INSTRUCTOR: J. Marshall

CROSS-LISTING: MICR 5100.03

PATH 9000.00 MSc Thesis

IV. Seminars - Conferences

A series of weekly seminars, journal clubs, and conferences is conducted throughout the year in various areas of pathology, and laboratory medicine.

V. Areas of Specialization for MSc Thesis

- Computerization and instrumental methods; diagnostic enzymology; screening for metabolic disease: K.C. Dooley
- Interference in digoxin assays; hypouricemic states: L.C. Dymond
- Clinical toxicology; therapeutic drug monitoring: A.D. Fraser
- Animal models of diabetes: R.B. Fraser
- Human molecular genetics; molecular diagnosis of cancer: W.L. Greer
- Molecular oncology; genetic basis of human disease; molecular neurobiology: D.L. Guernsey
- Autoimmune disease testing and use of monoclonal antibodies for cancer detection and therapy: A.K. Guha
- Kidney transplantation-chronic rejection; uropathology: R. Gupta
- Clinical transplantation; recipient's immune conditioning and chronic rejection: V. McAlister
- Environmental pathology: M.A. Moss
- Essential fatty acids and prostaglandins; molecular diagnosis of hyperlipidemias; familial cancers; porphyrias: B. Nassar
- Developmental neurogenetics: P.E. Neumann
- Computerized image analysis: L. Resch
- Tumour suppressors; human molecular genetics: D.C. Riddell
- Dermatopathology with emphasis on the immune system of the skin: G. Rowden
- Cardiopathology; atherosclerosis; nephropathology; ultrastructural pathology: A.A. Trillo
- Head and neck pathology; oral disease and diseases of salivary glands: B.A. Wright
- Experimental diabetes; islet transplantation; perinatal pathology: J. Wright
- Coagulation and platelet disorders: E.Z.M.A. Zayed

Pharmacology

Location: Sir Charles Tupper Medical Building, Sixth Floor
5859 University Avenue
Halifax, NS B3H 4H7
Telephone: (902) 494-3435
Fax: (902) 494-1388
E-mail: tom.white@dal.ca

Head of Department

Robertson, H.A.

Professors

- Downie, J.W., BSc, PhD (Man). Spinal cord, neurophysiology, neuropharmacology, autonomic nervous system, lower urinary tract sphincter, peripheral nerves, spinal cord injury, bladder inflammatory disease
- Ferrier, G.R., BSc, PhD (Man). Cardiac physiology and pharmacology, excitation-contraction coupling, transmembrane ion currents, cardiac arrhythmias and antiarrhythmic drugs, ischemia, heart failure, adrenergic drugs
- Gray, J.D., BSc, MD, (Alta), FRCP(C), Medicine
- Howlett, S.E., BSc (Concordia), MSc, PhD (Memorial). Cardiovascular pharmacology and electrophysiology, cardiac excitation-contraction coupling, heart disease
- Renton, K.W., BSc (Sir Geo Wms), PhD (McG). Drug metabolism, cytochrome P-450, drug interaction, CNS inflammation
- Robertson, H.A., BA, MSc, (Western), PhD (Cantab). Immediate early genes, dopamine, kindling, parkinsonism, molecular neurobiology
- Sawynok, J., BSc, MSc (Melb), PhD (Queen's). Adenosine, ATP, nociception, spinal cord, inflammation, caffeine
- Vohra, M.M., BPhm, MPhm, PhD (Ban). Excitation-contraction coupling in smooth muscle, adrenergic neurotransmission, drug-receptor interactions, Ca-channel blockers
- White, T.D., BSc, MSc (Western), PhD (Bristol) Graduate Studies Coordinator. Purines, ATP, adenosine, neuromodulator, neurotransmission, CNS, excitotoxicity, neuroprotection, neuroinflammation

Associate Professors

- Blay, J., BSc (Brad), PhD (Cantab). Cancer, immunotherapy, antioplastic drugs, growth regulation, cytotoxicity assays
- Kelly, M.E.M., BSc, PhD (Southampton). Ion channels, membrane transport, autonomic neurons, ocular epithelial cells, cholinergic agonists, catecholamines, patch-clamping, cell culture, immunocytochemistry
- McKenzie, G.M., BSc (Windsor), MSc, PhD (Dal)

Assistant Professors

- Nachtigal, M., BSc, PhD (Manitoba). Ovarian cancer, cell signalling, TGF β , molecular endocrinology

Cross Appointments

- Anderson, G., MSc (Guelph), PhD (U of T). Major Appointment in Department of Applied Oral Science
- Dursun, S., MD (Hacettepe, Turkey), PhD (Aston, UK). Major Appointment in Department of Psychiatry
- Hall, R.L., BSc Pharm, MD (Dal), FRCP(C), FCC, Major Appointment in Department of Anesthesia
- Hung, O.R., BSc Pharm, MD (Dal) FRCP(C), Major Appointment in Department of Anesthesia
- Kopala, L.C., BSc (Alta), MD (Calgary), Major Appointment in Department of Psychiatry
- Peterson, T.C., BSc (SMU), MSc, PhD (Dal), Major Appointment in Department of Medicine

Ruedy, J., MDCM (Queens), FRCP(C), Major Appointment Dean Faculty of Medicine at Dalhousie

Rusak, B., BA (Tor), PhD (Berkeley), Major Appointments in Departments of Psychology and Psychiatry

Adjunct Appointments

- Marshall, W., BSc (Acadia), PhD (UBC), Major Appointment in Department of Biology at St. FX University
- Cribb, A., DVM (Saskatchewan), PhD (UofT), Major Appointment in Department of Anatomy / Physiology at UPEI
- Jackson, D., BPharm, MSc, PhD (U of Sydney, Aus), Astra (Sweden)

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

Normally, a previous class in Biochemistry and in Physiology will be expected; however, applicants are advised to consult the department as to the appropriateness of their specific academic background. With departmental permission, specific classes in these subjects may be taken as part of a graduate programme in Pharmacology.

II. Degree Programmes

The following are the MINIMUM requirements for our graduate programs. Equivalencies may be granted for courses taken before entering our program. As indicated below, equivalency may also be granted for courses taken during the programs.

A. MSc Pharmacology

Candidates must satisfactorily complete the following classes or their equivalents: 5405, 5406, 5407 or 5408, 5506, and a minimum of one (1) 5600 1/2 credit course and another 5600 1/2 credit course or equivalent. A class in statistics may be required if an appropriate class has not been successfully completed before entrance to the program. This may be taken during the course of the graduate program. Students are expected to attend all research seminars within the department. Thesis research (9000) and preparation and oral defense of a thesis are required.

B. MSc Pharmacology/Neurosciences

Candidates must satisfactorily complete the following classes or their equivalents: 5405, 5406, 5407 or 5408, 5506, one (1) 5600 1/2 credit course, Neurosciences 6100 (full credit). A class in statistics may be required if an appropriate class has not been successfully completed before entrance to the program. This may be taken during the course of the graduate program. Students are expected to attend all research seminars within the department. Thesis research (9000) and preparation and oral defense of a thesis are required. Student Advisory Committees for this program must include an extradepartmental Neuroscientist faculty member.

C. Pharmacology/Industrial Research Experience

There is a possibility for MSc students to take a 3-4 month Industrial Research Rotation (5514) in a pharmaceutical company or government laboratory. This rotation will be under the joint guidance of a faculty member and a supervisor within the industrial/government laboratory and must be approved by the Department.

D. PhD Pharmacology

Candidates must satisfactorily complete the class requirements listed for the MSc Pharmacology program, plus 5507, two (2) additional 5600 1/2 credit classes or equivalents and one (1) 1/2 credit ancillary course (extradepartmental). A class in statistics may be required if an appropriate class has not been successfully completed before entrance to the program. A comprehensive examination must be passed within the first year of admission into the PhD program. Thesis research (9530) and preparation and oral defense of a thesis are required.

E. PhD Pharmacology/Neurosciences

Candidates must satisfactorily complete the course requirements listed for the MSc Pharmacology/Neurosciences program, plus 5507, two (2) additional 5600 classes or equivalents, and one (1) 1/2 credit ancillary class. (Note: Neurosciences 6100 may be counted as both a 5600 1/2 credit equivalent and as the 1/2 credit ancillary class.) A class in statistics may be required if an appropriate class has not been successfully completed before entrance to the program. A comprehensive examination must be passed within the first year of admission into the PhD program. Thesis research (9530) and preparation and oral defense of a thesis are required. Student Advisory Committees for this program must include an extradepartmental Neuroscientist faculty member.

F. MD/PhD Pharmacology

Selected medical students with superior academic records who intend to pursue careers in biomedical research will be permitted to withdraw temporarily from medical school to pursue a program of study leading to the PhD degree. Students will then return to medical school to complete the MD degree. The candidates must have a demonstrated interest in research. The following classes are required: 5405, 1 ancillary class, 3 specialty classes (5600 series), 5506, 5507, comprehensive examination, thesis research (9530), preparation and oral defense of a thesis.

III. Classes Offered

PHAC 5405.03: Advanced Pharmacology.

This is a core pharmacology graduate class dealing with classical and modern receptor theory, signal transduction, cellular regulation and molecular biology as applied to receptors. The format will combine student-centred discussion with lectures by faculty. Two sessions per week of approximately 2 hours/session. This class is required for pharmacology graduate students but may be available to other graduate students with the permission of the class coordinator.

PHAC 5406.03: Introduction to Pharmacology I.

This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions in mammals including humans. Factors which affect the blood levels of drugs (absorption, distribution, metabolism, and elimination) will be considered, together with the mechanisms by which drugs act and their potential uses. The interaction of drugs with various body systems will be covered, including the central and peripheral nervous systems, the cardiovascular system and the immune system. Drugs that assist or regulate host defence mechanisms will also be studied. Graduate students also must complete a tutorial component for this class.

PHAC 5407.03: Introduction to Pharmacology II.

This class is intended to cover specific aspects of drug action in greater depth than PHAC 5406.03 and to provide students with practical experience in pharmacology and a perspective on pharmacological research. The laboratory component consists of practical exercises using various techniques, as well as computer simulations. The practicalities of drug marketing are briefly considered. Instructor's consent and signature are required.

PHAC 5408.03: Laboratory Exercises from 5407.03.

PHAC 5506.03: Laboratory Demonstrating.

PHAC 5507.03: PhD Lectures (2).

PHAC 5514.00: Industrial Research Rotation.

PHAC 5600's: Pharmacology Specialty Classes.

The advanced specialty classes offered to graduate students cover a variety of pharmacology topics. In each term several of these classes are offered allowing students to select advanced subjects which are of interest to them. *Classes offered are subject to change. Please contact the Department.

Offered in 1999-2000*

- PHAC 5602.03: Cardiac Excitation and Contraction; Physiology and Pharmacology. G.R. Ferrier
- PHAC 5609.03: Anatomical and Molecular Neuropharmacology of the Basal Ganglia: the Scientific Basis for Grafting and Neural Transplantation. H.A. Robertson, I. Mendez
- PHAC 5610.03: Anesthesia. R. Hall
- PHAC 5612.03: Clinical Trial Design. J. Gray
- PHAC 5613.03: Pharmacology of Autocoids. M.M. Vohra
- PHAC 5615.03: Transmembrane signal transduction in vertebrate cells. M.E. Kelly
- PHAC 5621.03: Pharmacology of Drug Abuse. G. McKenzie
- PHAC 5623.03: Clinical Pharmacology. J. Gray
- PHAC 9000.00: MSc Thesis
- PHAC 9530.00: PhD Thesis

Offered in 2000-2001*

- PHAC 5603.03: Neuropharmacology of Pain. J. Sawynok
- PHAC 5605.03: Role of the Brain's Immune/Inflammatory System in Disease. T.D. White
- PHAC 5607.03: Pharmacology of Calcium Handling in the Heart. S.E. Howlett
- PHAC 5611.03: Cytochrome P450 Mediated Drug Metabolism. K.W. Renton
- PHAC 5616.03: Molecular Neuropharmacology. H.A. Robertson
- PHAC 5617.03: Pharmacology of Cell Growth. J. Blay
- PHAC 5618.03: Pharmacology of Selected Cytokines in Disease. T.C. Peterson
- PHAC 5619.03: The Autonomic Nervous System and Its Control by the CNS. J.W. Downie
- PHAC 5621.03: Pharmacology of Drug Abuse. G. McKenzie
- PHAC 5623.03: Clinical Pharmacology. J. Gray

Pharmacy

Location: Burbidge Building
5968 College Street
Halifax, NS B3H 3J5
Telephone: (902) 494-2378
Fax: (902) 494-1396

Acting Director of College
Caldwell, R.K., BSc (Pharm), MSHA (Dal)

Professors Emeriti
Duff, J.G., BSP, MSc (Sask), PhD (Fla)

Professors
Sketris, I.S., BSc (Pharm) (UofT.), PharmD (Minn), MPA (HSA) (Dal)
Yeung, P.K.F., BSc (Pharm), MSc (Man), PhD (Sask)

Associate Professor
Whelan, A.M., BSc(Pharm) (Dal), PharmD (MUSC)

Adjunct Professors
Jones, D., BSc, PhD (Birm), F.I.Ceram, FIM, C.CHEM, FRSC(UK),
FADM, D.O.hc., major appointment in Faculty of Dentistry
Kirumira, A.K., BSc (Mosul), MSc (Reading), PhD (Murdoch)
Pollak, P.T., BSc, MD, PhD (UWO), FRCP
Quilliam, M., BSc, PhD (Manitoba)

There will be no new admission in 1999/2000 to the MSc and PhD in Pharmacy programme. All graduate students currently enrolled in Masters and Doctoral programmes should refer to the 1996/97 Graduate Studies calendar for programme regulations and class descriptions.

Philosophy

Location: 1400 Henry Street
Halifax, NS B3H 3J5
Telephone: (902) 494-3810
Fax: (902) 494-3518
WWW: <http://www.dalgrad.dal.ca/homepage.htm>

Acting Chairperson of Department
Brett, N.

Professor Emeritus
Braybrooke, D., BA (Harvard), MA, PhD (Cornell) FRSC. Political Philosophy

Professors
Burns, S.A.M., BA (Hons) (Acad), MA (Alta), PhD (Lond), Graduate Co-ordinator. Interests: Wittgenstein, Plato, aesthetics, political philosophy
Campbell, R.M., BA (Harvard), PhD (Cornell). Interests: Moral and political philosophy, philosophy of mind, and philosophy of biology
Martin, R.M., BA (Columbia), MA, PhD (Mich). Interests: Philosophy of language, analytical metaphysics, and practical ethics
Schotch, P.K., PhD (Wat). Interests: Philosophy logic and its applications to economic and moral philosophy
Sherwin, S.B., BA (York), PhD (Stanford). Interests: Feminist theory, bioethics, ethics

Associate Professors
Brett, N.C., BA (New Hampshire), MA, PhD (Wat). Interests: Philosophy of Law, ethics, theories of human nature, modern philosophy
Macintosh, D., BA (Hons) (Queens), MA (Wat), PhD (UofT). Interests: Philosophy of language and science, meta-ethics, decision theory, action theory metaphysics
Vinci, T., BA (UofT), PhD (Pitts). Interests: Epistemology, Philosophy of Science, History of Modern Philosophy, decision theory

Assistant Professors
Campbell, S., BA, MA (Alta), PhD (UofT). Interests: Philosophy of mind, feminist theory, aesthetics, ethics
Hogan, M., AB (UC Berkeley), MA, PhD (Wisconsin). Interests: Philosophy of mind, philosophy of language, metaphysics
Hymers, M. BSc, MA (Dal), PhD (Alta)
Maitzen, S.A., BA (Northwestern), MA, PhD (Cornell). Interests: Epistemology, applied ethics, philosophy of religion

Adjunct Professors
Byrne, C.J., PhD (Uof T), StFX. Aristotle, Philosophy of Science
Kernohan, A., MA (Dal), PhD (Uof T). Political Philosophy

Candidates are expected to have some acquaintance with several areas of philosophy, including modern logic and the history of philosophy. Each student's programme is arranged individually in consultation with the department in relation to the student's interests and preparation. Enquiries should be addressed to the Graduate Studies Co-ordinator in the Department.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

II. Degree Programmes

A. Master of Arts (MA)

One Year

For students with an Honours BA or equivalent in philosophy. Requirements include three classes* and a thesis.

Two Year

For those with an honours degree in a related field. Requirements include four classes* in the first year, three in the second, and a thesis.

*NOTE: A "class" means one full-year or two half-year classes.

B. Doctor of Philosophy (PhD)

For minimum time required to complete this programme, see Section 11.3.2 in the Faculty of Graduate Studies regulations. Normally, the doctoral student will be required to attend three graduate seminars beyond the requirements for the MA. Reading knowledge will usually be required in one language other than English in which a significant body of philosophical literature exists. There are three comprehensive examinations to be completed in (1) ethics and political philosophy; (2) metaphysics, epistemology, philosophy of language and science; (3) logic and philosophy of logic. Completion of the programme requires original research on a project of substantial dimensions, culminating in the submission and oral defence of a thesis. This research should be in an area already well-established as a specialty by members of the department, such as, political and social philosophy, ethics, philosophy of mind, epistemology, philosophy of language, or logic.

III. Classes Offered

The Philosophy Department offers four kinds of graduate classes; adjunct, general, seminar, and directed reading. Adjunct classes presuppose no prior preparation in the area covered by the class. Thus, a graduate student with no previous training in modern symbolic logic could take the combination 2130.03 and 2140.03 which provides a comprehensive introduction to this subject. These classes, since they are not intended for advanced study in the area designated, are open to graduate students in philosophy only in special cases and by permission of the Department. *General classes* cover a wide range of topics and presuppose some previous study in the area covered by the class. They are suitable for graduate students who want to deepen their understanding of a general area of study but have not specialized in it as an undergraduate. *Seminar classes* are relatively narrow in focus and presuppose extensive previous study in the area. *Directed Reading classes* are developed jointly by a student and an instructor in special cases to suit individual interests and needs. These are subject to departmental approval.

NOTE: The classes listed are half-year, unless otherwise indicated, and not all are given in any one year. Instructors in seminar classes are likely to vary from year to year. Consult the department for further information.

General Classes

PHIL 5051.03: Theory and Knowledge.

A study of fundamental issues in the theory of knowledge. The class examines Skepticism, Rationalism, and Empiricism, and investigates the nature of knowledge, belief, meaning, evidence, and truth. Questions are raised about perception and memory and their relation to knowledge as well as questions about our knowledge of ourselves and other people. Attention is given to ancient and modern authors.

INSTRUCTORS: R. Campbell, D. MacIntosh, T. Vinci
FORMAT: Lecture/discussion 3 hours
CROSS-LISTING: PHIL 3051.03

*PHIL 5060.03: Logic: Logical Theory II.

Devoted primarily to the study of formal semantics and its relation to symbolic language.

INSTRUCTOR: P.K. Schotch

FORMAT: Lecture/discussion 2 hours

PREREQUISITE: PHIL 2130.03, PHIL 2140.03 or permission of the instructor

CROSS-LISTING: PHIL 3060.03

*PHIL 5105.03: Ethics.

A systematic study of the foundation of morality, including readings from Kant, *Foundation of the Metaphysics of Morals*; Hume, *A Treatise of Human Nature*; and Rawls, *A Theory of Justice*.

INSTRUCTOR: N. Brett, R. Campbell, S. Campbell

FORMAT: Lecture/discussion 2 to 3 hours

EXCLUSION: PHIL 3100.06

CROSS-LISTING: PHIL 3105.03

PHIL 5170.03: Theories of Feminism.

A study of the theoretic underpinning of the major feminist theories in critical comparison, concentrating on the ideological disputes and the implications for traditional approaches to social and political thought.

INSTRUCTOR: S. Campbell, S. Sherwin

FORMAT: Seminar 2 hours

CROSS-LISTING: WOST 3500.03, POLI 3428.03

*PHIL 5211.03: Philosophy of Law.

Is coercion central to the concept of law? How are law and morality related? What justification can be given for punishment? What is the appropriate scope of individual liberty? These and other issues relating to the analysis and evaluation of law will be considered. The course will examine the competing claims of the Positivist, Realist, and Natural Law accounts of law before turning to some normative issues concerning the justification of legal practice.

INSTRUCTOR: N. Brett

FORMAT: Lecture/discussion 3 hours

CROSS-LISTING: PHIL 3211.03

*PHIL 5265.03: Aesthetics.

This class examines major texts in philosophical aesthetics. We begin with relevant parts of Kant's *Critique of Judgment* and conclude with a consideration of Wittgenstein's contribution, especially in *Lectures and Conversations*, and *Culture and Value*.

INSTRUCTOR: S.A.M. Burns, S. Campbell

FORMAT: Lecture

CROSS-LISTING: PHIL 3265.03

PHIL 5300.03: Philosophy of Language.

What does it mean to say that the elements of language have meaning?

INSTRUCTORS: D. MacIntosh, R. Martin, M. Hymers

FORMAT: Lecture/discussion, 2 hours

PREREQUISITE: Two previous classes in Philosophy including one logic class, half or full-year

CROSS-LISTING: PHIL 3300.03

*PHIL 5420.03: Philosophy of Biology.

The class begins with a general introduction to the philosophy of science, focusing on the often conflicting criteria for evaluating scientific theories. The relative importance of successful novel predictions, consistency, simplicity, scope, and fruitfulness are assessed in relation to the current status of Darwinian evolutionary theory. In considering the competing views of Popper, Hempel, Kuhn, Lakatos, and Giere, emphasis will be placed on the logic of scientific reasoning and the question whether there can be objectivity and progress in science. The class then turns to issues surrounding the role of teleology in current biological thought: the interpretation and significance of biological functions, the debate about whether genes are the fundamental units of natural selection, and the alleged reduction of modern genetics to physics and chemistry. Finally, the class considers the implications of human sociobiology for matters of traditional philosophical concern: the possibility of biological determinism, the origins of morality, and the reliability of cognitive functions.

INSTRUCTOR: R. Campbell
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: BIOL 3580.03, PHIL 3420.03

***PHIL 5440.03: Philosophy of Mind.**

A systematic study of the mind-body problem and/or theories of personal identity.

INSTRUCTOR: S. Campbell, M. Hogan
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: PHIL 3440.03

***PHIL 5460.03: Mind and Brain.**

An interdisciplinary approach, combining philosophical analysis and neuroscientific data to study current controversies about the relation between brain function and conscious experience, such as why consciousness evolved and how it is organized in the normal human brain, and whether the mental can be construed as itself physical.

INSTRUCTOR: M. Hogan
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: PHIL 3460.03

PHIL 5470.03: Utilitarianism, Liberalism and Democracy.

This seminar class is a study of themes central to the theory of political liberalism. Contemporary political liberalism in its various forms articulates a conception of legitimate government as providing the conditions under which the members of a community can be free, equal, and self-governing. In addition to the general concern with liberty and equality, the course will study two particular themes. The first is the question of state *neutrality*. The second has to do with the relationship between individual *identity* and community.

INSTRUCTOR: N. Brett
FORMAT: Seminar
CROSS-LISTING: POLI 5479.03/4479.03, ECON 5446.03/4446.03,
PHIL 4470.03

***PHIL 5530.03: Freedom, Action, and Responsibility.**

An investigation of the nature of action, seeking criteria for individuating, describing, and explaining actions. Topics may include the roles of volitions, intentions, motives, and reasons in actions; responsibility for actions and the concept of free actions.

INSTRUCTORS: P. Schotch, D. MacIntosh
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: PHIL 3530.03

***PHIL 5630.03: History of Philosophy: Kant.**

Special attention will be paid to Kant's metaphysics.

INSTRUCTOR: T. Vind
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: PHIL 3630.03

***PHIL 5640.03: History of Philosophy: Twentieth-Century Philosophy.**

The Twentieth Century has been a period of revolutionary change in Anglophone philosophy. This class surveys the most influential figures, including Frege, Russell, Wittgenstein, and Quine.

INSTRUCTOR: D. MacIntosh
FORMAT: Lecture/discussion 2 hours
CROSS-LISTING: PHIL 3640.03

***PHIL 5650.03: Modern Philosophy.**

"Modern Philosophy" refers to a philosophical perspective that arose during the great advances of Western science in the 17th and 18th centuries. Modern Philosophy seeks to advance the thesis that persons are beings with conscious thoughts (ideas) and that all of the interesting forms of contact people have with the world - perceptual, semantic, epistemic, casual - are mediated by conscious thoughts. Modern Philosophy also seeks to reconcile this thesis with the scientific/materialistic image of the world then emerging. This class involves a study of the systematic properties of this perspective employing both historical primary sources and contemporary commentary. (This class is designed to complement PHIL 3660.03 but can be taken independently.)

INSTRUCTOR: T. Vind
FORMAT: Lecture/tutorial
CROSS-LISTING: PHIL 3650.03

***PHIL 5670.03: Philosophy of Science.**

Induction, probability, and explanation are studied with special attention to the nature of scientific theories. No scientific background is presupposed.

INSTRUCTOR: D. MacIntosh
FORMAT: Lecture/discussion
CROSS-LISTING: PHIL 3670.03

***PHIL 5801.03: Topics in Ethics and Health Care.**

An in-depth look at some questions in health care ethics.

INSTRUCTOR: S. Sherwin

***PHIL 5851.03: Metaphysics.**

A study of topics such as the nature of substance and change, body and mind, cause and effect, and the concept of existence.

INSTRUCTOR: M. Hogan, S. Maitzen
FORMAT: Lecture/discussion
CROSS-LISTING: PHIL 3851.03

***PHIL 5900.03: Logic: Logic and Philosophical Analysis.**

This class will examine the application of logical theory to philosophical problems and issues in the philosophy of logic. Topics in this area include: reference and definite descriptions, problems of intensionality, relativized identity and sortals, bivalence and the sorites paradox, logicism and set theoretic paradoxes, trans-world identity, paradoxes of confirmation, counterfactuals, multivalued logic, quantum logic, Arrow's theorem, analyticity and the a priori, negative existentials.

INSTRUCTOR: R. Campbell
FORMAT: Lecture/discussion
CROSS-LISTING: PHIL 3900.03

Other Seminar Classes

PHIL 5055.03: Topics in Epistemology
PHIL 5070.03: Topics in Philosophical Psychology
PHIL 5080.03: Topics in Logical Theory
PHIL 5115.03: Topics in Ethics I
PHIL 5120.03: Theory of Rational Decision
PHIL 5125.03: Topics in Ethics II
PHIL 5190.03: Topics in the History of Philosophy I
PHIL 5191.03: Topics in the History of Philosophy II
PHIL 5192.03: Topics in the History of Philosophy III
PHIL 5200.03: Topics in Normative Theory
PHIL 5215.03: Topics in Philosophy of Law
PHIL 5220.03: Contemporary Philosophical Issues
PHIL 5430.03: Game Theory as a Foundation for Ethics & Politics
PHIL 5470.03: Contemporary Liberalism and Democracy
PHIL 5480.03: Social Choice Theory
PHIL 5500.03: Topics in Feminist Philosophy
PHIL 5510.03: Topics in Philosophy of Language
PHIL 5600.03: Philosophy of religion Seminar
PHIL 5680.03: Topics in Philosophy of Science
PHIL 5855.03: Topics in Metaphysics

Directed Reading Classes

PHIL 5960.03/5980.03 ; 5970.06/5990.06
PHIL 9000.00 MA Thesis
PHIL 9530.00 PhD Thesis

Physics

Location: Sir James Dunn Science Building
Halifax, NS B3H 3J5
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Fax: (902) 494-5191
WWW: www.physics.dal.ca
E-mail: physics@dal.ca

Chairperson of Department

Kiang, D.B.I. (494-2315) (Sabbatical 1999-2000)

Acting Chair

Stroink, G. (494-7062)

Graduate Advisor

Dunlap, R.A. (494-2394)

Professors Emeriti

Archibald, W.J., MA (Dal), PhD (Virg), DSc (UNB), LLD (Dal), FRSC
Betts, D.D., BSc, MSc (Dal), PhD (McG), FRSC - Research

Professors

Blackford, B.L., BSc (Acadia), MSc (MIT), PhD (Dal) Research
Chytek, P., Physics Diploma (Charles, Prague), PhD (Calif, Riverside), joint appointment with Oceanography
Coley, A.A., PhD (Lond), cross appointment with Mathematics and Statistics
Dahn, J.R., BSc (Dal), MSc, PhD (UBC), NSERC/3M Canada Inc. Industrial Research Chair, cross appointment with Chemistry
Dunlap, R.A., BS (Worcester), AM (Dartmouth), PhD (Clark)
Geldart, D.J.W., BSc (Acadia), PhD (McM), FRSC - Research
Jericho, M.H., BSc, MSc (Dal), PhD (Cantab), FRSC, George Munro Professor of Physics
Kiang, D.B.I., BSc (MtA), MSc, PhD (McM)
Kreuzer, H.J., MSc, DSc (Bonn), FRSC - Faculty of Science Killam Professor, A.C. Fales Professor of Theoretical Physics
Langstroth, G.F.O., BSc (Alta), MSc (Dal), PhD (Lond), Assistant Dean, Faculty of Science
Moriarty, K.J.M., BSc (St. Mary's), MSc (Dal), DIC, PhD (Imperial College), joint appointment with MSCS
Paton, B.E., BSc, MSc (Waterloo), PhD (McG)
Reynolds, P.H., BSc (UofT), PhD (UBC), cross appointment with Earth Sciences
Stroink, G., BSc, MSc (Delft), PhD (McG), PEng, cross appointment with Physiology and Biophysics
White, M.A., BSc (UWO), PhD (McMaster), cross appointment Chemistry

Associate Professors

Cordes, J.G., BSc, MSc (Dal), PhD (Cantab)
Goble, D.F., BSc, MSc (Alta), PhD (UofT), BEd (Dal)
Labrie, D., BSc (Montreal), MSc, PhD (McM)
Lee, J.M., BSc (UNB), PhD (Western Ontario), cross appointment with Applied Oral Sciences
Tindall, D.A., BA, PhD (Cantab)

Assistant Professors

Folkina, L., BSc (Dal), MSc, PhD (UofT), cross appointment with Oceanography
Fu, Q., BS, MS (Peking), PhD (Utah), cross appointment with Oceanography
Hale, M.E., BSc, PhD (UNB), cross appointment with Radiation Oncology
Herbut, I., Diploma (Belgrade), MA, PhD (Johns Hopkins)

Lohmann, U., MSc, PhD (Hamburg), joint appointment with Oceanography

Adjunct Professors

Charbonneau, S., PhD (Simon Fraser) National Research Council of Canada
Denton, A., PhD (Cornell), Physics, Acadia U.
Lawther, D.W., PhD (Dal), Physics, UPEI
Leitch, R., PhD (York), Atmospheric Environment Services
Pink, D.A.H., PhD (UBC), Physics, StFX
Purcell, C.J., PhD (Dal), Defense Research Establishment Atlantic
Steinitz, M., PhD (Northwestern), Physics, StFX

Research Associates

Das, A.K., DPhil (Oxon)
Lesins, G.B., PhD (Toronto)
Payne, S.H., PhD (Cantab)
Senba, M., PhD (Rutgers)
Wang, R.L., PhD (Dal)

Postdoctoral Fellows

Larcher, D., PhD (Picardie, France)
MacKay, G., PhD (Dal)
Paulsen, J., PhD (Tech. U of Dresden)
Tso, W., PhD (Stevens Inst. of Tech.)
Wang, M., PhD (Utah)
Yao, X., PhD (Shanghai Inst. of Nuclear Research)

MacGregor Teaching Fellows

Bardouille, T. Billyard, A.
Beaulie, L. Flynn, J.
Sanderson, R. Seel, J.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. An MSc is the normal admission requirement for the PhD programme. It is recommended that all international students provide the Department with an official copy of the Advanced Graduate Record Examination in Physics. In some cases this will be made a precondition to consideration of the student's application for admission.

II. Degree Programmes

A. Master of Science (MSc)

For minimum time required to complete this programme, see Section 1.3.1 of the Faculty of Graduate Studies regulations in this calendar.

At least two full credit classes are required, of which at least one must be at the 6000 level.

Research, preparation, and oral defense of a thesis are required.

B. Doctor of Philosophy (PhD)

For minimum time required to complete this programme, see Section 1.3.2 of the Faculty of Graduate Studies regulations in this calendar.

At least two full credit classes are normally required and additional classes may be specified by supervisory committees.

A preliminary oral examination must be completed successfully.

Research and the preparation and oral defense of a thesis are required.

The PhD degree will be granted primarily on the basis of the candidate's ability to carry through original investigation. Part of the evidence of this will be acceptance of scientific material for publication in refereed journals and the preparation of a satisfactory thesis.

III. Classes Offered

5000-level classes are fourth-year undergraduate classes which may be taken for graduate credit in certain circumstances. They are normally taken by new graduate students having background deficiencies in specific areas. 6000-level classes are full graduate classes.

All graduate students are required to attend and participate in regular departmental seminars.

A selection of the following graduate classes will be offered subject to demand.

PHYC 5100.03: Electrodynamics.

Topics include the wave equation and solutions, waves at metallic boundaries, the inhomogeneous wave equation, radiation from moving charges, scattering and dispersion

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 2010.03, 4160.03; MATH 3110.03/3120.03; or the permission of the instructor

PHYC 5151.03: Quantum Physics II.

This class is a continuation of PHYC 3140.03. Topics include: time-independent perturbation theory, the variational principle, the WKB approximation, time-dependent perturbation theory, scattering.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 3140.03

PHYC 5152.03: Quantum Physics III.

Selected topics from: angular momentum and tensor operators, many-body problem, symmetry and invariance, path integral approach and relativistic quantum mechanics.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 5151.03

PHYC 5160.03: Mathematical Methods of Physics.

Topics discussed include: complex variable theory, Fourier and Laplace transform techniques, special functions, partial differential equations.

FORMAT: Lecture 3 hours

PREREQUISITE: MATH 3110.03/3120.03 or permission of instructor

PHYC 5170.03: Topics in Mathematical Physics.

This class is a continuation of PHYC 5160.03 and deals with special topics in mathematical physics selected from areas such as the Green's function technique for solving ordinary and partial differential equations, scattering theory and phase shift analysis, diffraction theory, group theory, tensor analysis, and general relativity.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 5160.03, or permission of instructor

PHYC 5180.03: Nuclear and Particle Physics.

This is an introductory class in nuclear physics. Topics discussed include: nucleon-nucleon interactions, nuclear structure, gamma transitions, alpha decay, beta decay, nuclear reactions and elementary particle physics.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 3140.03 or permission of instructor

PHYC 5220.03: Microcomputer Based Instrumentation.

Subject material: instrument design, analog to digital and digital to analog techniques, custom interfacing to sensors, algorithms, parallel and serial output data links, software testing and debugging, hardware testing and debugging, research project.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 3810.03 or permission of instructor

PHYC 5230.03: Introduction to Solid State Physics.

An introduction to the basic concepts of solid state physics which are related to the periodic nature of the crystalline lattice. Topics include crystal structure, X-ray diffraction, phonons and lattice vibrations, the free electron theory of metals, and energy bands.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 3140.03 or permission of instructor

PHYC 5311.03: Fluid Dynamics.

An introduction to the theory of fluid dynamics with some emphasis on geophysically important aspects. Topics include kinematics, equations of motion, viscous flow, potential flow and basic aerodynamics.

FORMAT: Lecture 3 hours

PREREQUISITE: Permission of instructor

CROSS-LISTING: OCEA 5311.03

PHYC 5411.03: Atmospheric Dynamics I.

The basic laws of fluid dynamics are applied to studies of atmospheric motion, including the atmospheric boundary layer and synoptic scale weather disturbances (the familiar highs and lows on weather maps). Emphasis will be placed on the blend of mathematical theory and physical reasoning which leads to the best understanding of the dominant physical mechanisms.

FORMAT: Lecture 3 hours

PREREQUISITE: Permission of instructor

CROSS-LISTING: OCEA 5411.03

PHYC 5412.03: Atmospheric Dynamics II.

The approach is the same as for PHYC 5411.03, with emphasis on synoptic-scale wave phenomena, frontal motions, and the global circulation. An introduction to numerical techniques and their use in weather forecasting models and studies of climate is included. Additional special topics are covered at the discretion of the instructor.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 5411.03, or permission of instructor

CROSS-LISTING: OCEA 5412.03

PHYC 5500.03: Atmospheric Physics I.

Main topics covered in this class are atmospheric thermodynamics and atmospheric radiation.

FORMAT: Lecture 3 hours

PREREQUISITE: At least one 3rd year physics class, preferably thermodynamics

CROSS-LISTING: OCEA 5500.03

PHYC 5510.03: Atmospheric Physics II.

The major topics covered in this class are cloud and aerosol physics. Other topics include atmospheric optics, atmospheric acoustics, lightning and radar techniques.

FORMAT: Lecture 3 hours

PREREQUISITE: PHYC 4500.03, or permission of instructor

CROSS-LISTING: OCEA 5510.03

PHYC 5520.03: Introduction to Meteorology.

This class provides the student with an understanding of the composition and thermal structure of the atmosphere, air mass and frontal theory, and weather generating physical processes and their consequences. Other topics include atmospheric radiation, dynamic meteorology, climatology, and the physics of clouds and storms.

FORMAT: Lecture 3 hours

PREREQUISITE: Permission of instructor

CROSS-LISTING: OCEA 5520.03

PHYC 5540.03: Synoptic Meteorology I.

This class introduces principles and techniques of meteorological analysis, diagnosis of weather systems and prognosis of system motion and development. A brief review is presented on meteorological instrumentation, observational procedures, codes and analysis techniques essential to the study of the main subject matter. Atmospheric systems and processes are carried out during the tutorial-laboratory period.

FORMAT: Lecture 2 hours, tutorial-lab 3 hours
PREREQUISITE: At least 1 third-year physics class
CROSS-LISTING: OCEA 5541.03

PHYC 5550.03: Synoptic Meteorology II.

This class extends the analysis and diagnosis of atmospheric dynamics and weather processes introduced in PHYC 5540.03. Modern statistical and computer methods and satellite techniques are discussed. Case studies of atmospheric systems and processes are carried out during the tutorial-laboratory period.
FORMAT: Lecture 2 hours, tutorial-lab 3 hours
PREREQUISITE: PHYC 5540.03
CROSS-LISTING: OCEA 5550.03

PHYC 5650.03: General Relativity.

A review of differential geometry will be given followed by an introduction to the general theory of relativity. Various topics will be discussed, including: linearized theory and gravitational radiation, spherically symmetric metrics and the Schwarzschild Solution, gravitational collapse, black holes, and cosmology.
FORMAT: Lecture 3 hours
PREREQUISITE: MATH 3050.06 or permission of instructor
CROSS-LISTING: MATH 5650.03

PHYC 5660.03: Cosmology.

A self-contained introduction to cosmology will be given and no prior knowledge of differential geometry of general relativity will be assumed (although some knowledge or elementary differential equations will be useful). A cosmological model is a model of the universe, as a whole, on the largest scales; the emphasis of the class will be on the modelling aspects of cosmology.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor
CROSS-LISTING: MATH 5410.03

PHYC 6121.03: Quantum Theory.

Topics covered include angular momentum and tensor operators, scattering theory, many-body systems.
FORMAT: Lecture 3 hours
PREREQUISITES: PHYC 4151.03 and 4152.03, or permission of instructor

PHYC 6201.03: Solid State Physics.

Topics covered include crystal structures, reciprocal lattices, space groups, x-ray scattering, Debye scattering formalism, lattice vibrations, phonon dispersion, specific heat of solids, electronic structure, free electron model and nearly-free electron model.
FORMAT: Lecture 3 hours
PREREQUISITE: PHYC 4151.03 and 4230.03, or permission of instructor

PHYC 6261.03: Statistical Mechanics I.

Topics: quantum statistics; canonical and grand canonical ensemble; Bose-Einstein condensation; fermi liquids; lattice statistics and critical phenomena; transport and irreversibility, Boltzmann equation.
FORMAT: Lecture 3 hours
PREREQUISITES: phyc 3210.03 AND 4151.03, or permission of instructor

PHYC 6262.03: Statistical Mechanics II.

This class is a continuation of PHYC 6261.03.
FORMAT: Lecture 3 hours
PREREQUISITES: PHYC 6261.03, or permission of instructor

PHYC 6291.03: Surface Science I.

Topics include experimental methods of surface characterization; structure of surfaces and adsorbates; adsorption, desorption and diffusion; surface reconstruction.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor

PHYC 6292.03: Surface Science II.

A continuation of PHYC 6291.03 covering surface reactions and catalysis; kinetic theory; lattice gas models; multilayer growth and epitaxy; adhesion and friction.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor

PHYC 6301.03: Electrodynamics I.

Topics will normally include: boundary-value methods for problems in electrostatics and magnetostatics, multipolar expansions for the electrostatic and magnetostatic fields, Maxwell equations, plane electromagnetic waves and wave propagation in a variety of media, reflection and transmission of electromagnetic waves at an interface, simple radiating systems, elementary Mie scattering theory.
FORMAT: Lecture 3 hours
PREREQUISITE: PHYC 4110.03, or permission of instructor

PHYC 6302.03: Electrodynamics II.

Topics will normally include: wave guides and resonant cavities, diffraction, angular frequency, analysis of the radiation by moving charges including synchrotron and Cherenkov radiation, radiation damping, self-fields, scattering and absorption of radiation by bound systems.
FORMAT: Lecture 3 hours
PREREQUISITE: PHYC 6301.03 or permission of instructor

PHYC 6570.03: Light Scattering and Radiative Transfer.

The equations of radiative transfer through the atmosphere will be developed and used. Special topics include transfer of infrared radiation, Mie scattering, absorption by atmospheric gases and aerosols, transfer through clear and cloudy atmospheres.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor
CROSS-LISTING: OCEA 5570.03

PHYC 6575.03: Topics in Atmospheric Radiation.

This advanced graduate course will focus on current research topics in atmospheric radiation. The fundamental theory of light scattering and radiative transfer will be applied to the selected topics. Each student will participate in a research project, write a project report and give an oral presentation.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor
CROSS-LISTING: OCEA 5575.03

PHYC 6580.03: Cloud Physics.

A detailed examination of the behaviour of condensed water in the atmosphere. Micro physical topics include nucleation, hydrodynamics of cloud and precipitation particles, ice physics, mechanisms of precipitation formation, electrical and radiative properties. Cloud dynamics will include effects of latent heating feedback, thunderstorm structure, precipitation efficiency, mixed-phase storms and cloud models.
FORMAT: Lecture 3 hours
PREREQUISITE: Permission of instructor
CROSS-LISTING: OCEA 5580.03

PHYC 6600.03: Topics in Physics.

Topics selected will depend on the current interests of the instructor and the students.
FORMAT: Lecture 2 hours
PREREQUISITE: Permission of instructor

PHYC 6601.03: Topics in Physics.

Topics selected will depend on the current interests of the instructor and the students.
FORMAT: Lecture 2 hours
PREREQUISITE: Permission of instructor

PHYC 6602.03: Topics in Physics.

Topics selected will depend on the current interests of the instructor and the students.

FORMAT: Lecture 2 hours

PREREQUISITE: Permission of instructor

PHYC 6971.03: Selected Topics in Particle Physics.

Topics selected will depend on the current interests of the instructor and the students.

FORMAT: Lecture 2 hours

PREREQUISITE: Permission of instructor

PHYC 9000.00: MSc Thesis.

PHYC 9530.00: PhD Thesis.

Physiology and Biophysics

Location: Sir Charles Tupper Building, Third Floor
Halifax, NS B3H 4H7
Telephone: (902) 494-3517
Fax: (902) 494-1685

Head of Department
French, A.S.

Professors Emeriti

Issekutz, Jr., B., MD (Szeged), DSc (Budapest)
MacLeod, E., MD (Dal)
Szerb, J.C., MD (Munich), FRCP(C)

Professors

Armour, J.A., BSc (McG), MD (Western), PhD (Loyola). Neural control of the heart; coronary circulation; myocardial mechanics
Barnes, S.A., PhD (Berkeley). Retinal neurobiology; ion channel function in synaptic communication; novel neuromodulators and neural messengers
Croll, R.P., BSc (Tufts), PhD (McG). Physiology and functional anatomy of invertebrate nervous systems; analyses of motor programme generation; regeneration, development, and evolution of identified neurons
Fine, A., AB (Harvard), VMD, PhD (Penn). Neural plasticity; learning and memory, development and regeneration; optical monitoring of neural activity and plasticity; neural transplantation
French, A.S., MSc, PhD (Essex). Sensory transduction and adaptation; epithelial ion transport; ion channel biophysics
Guernsey, D., PhD (Hawaii). Major appointment in Pathology. Molecular basis of carcinogenesis; the role of thyroid hormone and the *erb-a* oncogene (t3 receptor) in carcinogenesis; thyroid hormone regulation of gene expression.
Horacek, B.M., MSc(Eng) (Prague), PhD (Dal). Quantitative cardiac electrophysiology; body surface potential mapping; the inverse problem of electrocardiography and magnetocardiography
Horackova, M., MSc, PhD (Prague). Cellular cardiology; excitation and contraction; regulation of calcium transport
McDonald, T.F., BSc (Alta), PhD (Dal), DIC (Imperial College). Heart physiology (membrane channels, excitability, coupling, arrhythmia, conduction, contractility); metabolism; cardiac drugs; volume regulation
Meinertzhagen, L.A., BSc (Aberdeen), PhD (St. Andrews), major appointment, Dept. of Psychology. Simple invertebrate nervous systems; aspects of their structure, synaptic organization, morphogenesis and cell lineage; evolution of nervous systems
Moger, W.H., BS (Cornell), PhD (Calif). Regulation of testicular steroidogenesis
Pelzer, D., Dr Med (Heidelberg), Priv-Doz in Physiology (Homburg). Channel function; pharmacology (cardiovascular drugs) and modulation (transmitters, second messengers, G-proteins) of Ca²⁺ channels; intracellular Ca²⁺ imaging
Rasmussen, D., BA (Colo C), MA, PhD (Dal), Graduate Student Co-ordinator. Plasticity in the central nervous system; acetylcholine release
Wilkinson, M., BSc (Southampton), PhD (Lond), major appointment, Department of Obstetrics/Gynecology. Opiate peptides and neural control of fertility and sexual maturation
Wolf, H., Dipl Ing (Munich), PhD (Dal). Modelling of the cardiovascular system; computerized electrocardiography; cardiovascular epidemiology

Associate Professors

Brown, R.E., BSc (Victoria), MA, PhD (Dal), major appointment in Department of Psychology. Hormones and behaviour; behavioral development in animals
Kozey, C.L., BPE (UNB), MSc (Waterloo), PhD (Dal), major appointment, School of Physiotherapy. Digital signal processing of electrophysiological signals; electrocardiographic diagnosis; electrophysiology of transplanted heart
Morgunov, N., BSc, MSc, PhD (UofT). Effects of neurotransmitters on membrane transport of anions and cations; electrophysiological electrochemical studies on isolated perfused renal tubules
Murphy, M.G., MSc, PhD (Dal). Polyunsaturated fatty-acid modulation of neuroreceptor function in cultured neural cells; pathophysiology of Reye's syndrome; potentiation of viral virulence by environmental chemicals
Murphy, P.R., MSc, PhD (Dal). FGF; growth factors; gliomas; lymphomas; gene therapy; antisense
Pelzer, S., BSc, MSc, PhD (Freiburg). Modulation of Ca²⁺ channels and NA⁺/Ca²⁺ exchange by neurotransmitters, second messengers, G-proteins and drugs; intracellular Ca²⁺ imaging
Stroink, G., PhD (McG), Major appointment, Dept. of Physics. Biomagnetism; comparative studies between electro- and magnetocardiograms; imaging cardiac currents

Assistant Professors

Chauhan, B., PhD (Wales), Major appointment, Department of Ophthalmology. Visual function; structural and functional assessment of glaucoma; risk factors for glaucoma progression
Landymore, K., BSc, MD, PhD (Dal), major appointment Department of Obstetrics/Gynecology. Reproductive endocrinology and infertility neuroendocrinology
Linsdell, P., BSc (London), PhD (Leicester). Ion channel biophysics; chloride channel structure and function; epithelial transport; cystic fibrosis
Villaruel, A., BS, MS (Chile), PhD (UCLA). Ligand-gated ion channels; coupling of electrical activity to gene expression

Information on research interests in the Department and openings for graduate and post-PhD or post-MD study should be requested from the Graduate Coordinator of the Department.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

The following constitutes the minimum entrance requirements for the graduate programme in Physiology and Biophysics:

- (a) An average mark of B+, with no mark below B- in the following basic undergraduate courses or their equivalent:
- MATH 1000.03/1010.03 (differential and integral calculus)
 - PHYC 1100X/Y.06 (using differential calculus)
 - CHEM 1010X/Y.06 (general chemistry)
 - STAT 1060.03/1070.03 (basic statistics for scientists)
 - BIOL 1000X/Y.06 (general biology)
 - Expository English (essay writing class)
- b) A minimum average mark of A- over the last two years of the student's undergraduate programme.

Unless exempted, applicants must also provide the Department with an official copy of the results of the Graduate Record Examination General (Aptitude) Test and one Subject (Advanced) Test.

II. Degree Programmes

A. Master of Science (MSc)

For the minimum time required to complete this programme, see Section 1.3.1 in the Faculty of Graduate Studies regulations. However, students should expect to spend two years working toward the MSc.

Students who have not completed upper level classes in human physiology with at least a grade of B- will be required to complete PHYL 4321X/Y.06: Human Cell Physiology. Students are also

required to take Cellular and Molecular Physiology 5520.03 and 5521.03, Graduate Seminar 5517.03 and two half courses, one of which must be from the classes listed below.

A research thesis which constitutes two credits is required.

B. Doctor of Philosophy (PhD)

For minimum time required to complete this programme, see Section 1.3.2 in the Faculty of Graduate Studies regulations.

Selected classes of this or other departments may be required.

A preliminary examination in the field of thesis research is required.

Research and the preparation and defense of a thesis are required.

A candidate must demonstrate the ability to carry out research of high quality leading to an advance in knowledge of physiology and biophysics.

C. Doctor of Philosophy/Master of Science (MSc/PhD) in Physiology and Biophysics/Neuroscience

Physiology and Biophysics also offers a MSc and PhD in Physiology and Biophysics/Neuroscience through the Interdisciplinary Neuroscience Programme.

D. Doctor of Philosophy/Doctor of Medicine (MD/PhD)

For information on the combined MD/PhD programme see Interdisciplinary and Joint Programmes (page 239)

III. Teaching Requirements

Teaching undergraduate physiology, in laboratories, tutorials, or reviews is considered an integral part of graduate training. All students will be expected to perform a minimum amount of undergraduate teaching, regardless of the source of their financial support. Students are expected to present 1 lecture to an undergraduate class during their second year in the programme and 2 lectures in subsequent years. This teaching will be evaluated by the class director and a copy of the evaluation placed in the student's file.

IV. Classes Offered

Neuroscience

The following classes are offered through the interdisciplinary neuroscience programme:

NESC 6100X/Y.06: Principles of Neuroscience.

This is the core class for all first year Neuroscience graduate students. The first term will focus on cellular and molecular neurobiology and will cover topics such as membrane potentials, synaptic transmission, second messengers, trophic factors, cell differentiation and neurodegeneration. The second term will focus on systems neurobiology and will cover topics such as visual and somatosensory systems, motor programme generation, autonomic and neuroendocrine functions, motivation, learning, circadian rhythmicity and sleep/wake cycles. Evaluation will be based on participation during class discussion of recent literature, several oral and written presentations prepared throughout the year, and take home examinations.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will only be given if both are completed consecutively.

INSTRUCTOR: K. Semba

NESC 6101.03: Principles of Neuroscience: Cellular and Molecular Neuroscience.

NESC 6102.03: Principles of Neuroscience: Systems and Behavioral Neuroscience.

Neuroscience 6101.03 and 6102.03 are Neuroscience 6100X/Y.06 divided into terms A and B for suitable incorporation into non-Neuroscience programmes. Please see class description of NESC 6100X/Y.06.

Physiology

PHYL 4321X/Y.06: Human Cell Physiology.

This class examines fundamental physiological concepts at the cellular/molecular level and provides a framework for assessing pathophysiology of disorders in which derangement of membrane transport processes are a major factor responsible for the clinical manifestation of disease. The topics include cell surface receptors and transporters (channels, carriers and pumps), intracellular and intercellular communication, signal transduction and regulation/integration of epithelial transport systems. This class is primarily directed to fourth year honours science students and graduate students.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

NOTE: PHYL 4321X/Y.06 can be taken for credit in an Honours BSc programme.

INSTRUCTOR: N. Morgunov

PREREQUISITES: PHYL 2030X/Y.06 or BIOL 3070.03 or permission of the Director

PHYL 5323.03: Human Physiology: The Mechanisms of Body Functions.

This class covers the physiology of human organ systems including neurophysiology, cardiovascular, respiratory, renal, gastrointestinal and endocrine physiology. In addition to lectures there will be in-depth discussions and analyses of current topics as they apply to the organ systems. This class is mainly directed towards 4th year Honours science students and graduate students.

DIRECTOR: M. Horackova

FORMAT: Lectures supplemented with tutorials

EXAMINATIONS: Two written examinations (mid-term and final, 50% each)

PREREQUISITES: PHYL 4321X/Y.06/BIOL 4321X/Y.06 or knowledge of basic cellular physiology, and approval of the class director

PHYL 5459.03: Cellular Biophysics of Excitable Tissues.

Offered every second year, next offered in 2000/2001.

This class provides specialized information on the structure and function of ion channels and transporters in excitable membranes as well as their role in cellular responses to membrane excitation. The topics include: membrane structure and properties; electrophysiological techniques and fluorescence microscopy; voltage-gated ion channel currents and their transmitter/second messenger modulation; gap junction channels; transporters and pumps; action potential, initiation and conduction; excitation-contraction and excitation-secretion coupling. The format of the class is 70% lecture/discussion and 30% student presentation/discussion. Grades are based on (1) participation and presentation/discussion during the class (worth 10% of final mark), (2) a take-home midterm exam (worth 40% of final mark), and (3) a final take-home exam (worth 50%) of final mark.

INSTRUCTOR: D.J. Peizer

PREREQUISITE: Undergraduate human physiology class (PHYL 2030X/Y.06 or equivalent); Undergraduate cellular physiology course (4321X/Y.06 or equivalent); basic classes in mathematics/statistics, physics, and/or chemistry are highly desirable; permission of the Director

PHYL 5494.03: Synaptic Transmitters.

The goal of this class is to acquaint the student with contemporary concepts of neurotransmission and neuromodulation. Topics include classical neurotransmitters (monoamines, acetylcholine, amino acids), neuropeptides (especially opioids), gene expression, and anatomical tracing methods.

INSTRUCTORS: M. Wilkinson and K. Semba

FORMAT: Lecture

PREREQUISITES: PHYL 2030.03; fourth year honours; a graduate programme in another department

PHYL 5508.03/5509.03/5510.03: Directed Readings in Physiology and Biophysics.

These classes allow the Department to provide a more specialized instruction on specific topics to graduate students with particular interests. Class format is variable and may include seminars, lectures, literature searching, evaluation of papers, etc. There is usually a high degree of one-on-one interaction. The classes are organized on a year-to-year basis in accordance with student interest and faculty expertise. Since different subjects may be covered each year, each class in the series has a separate number.

PREREQUISITE: Permission of the Director

PHYL 5512.03: Physiology and Biophysics of the Heart and Circulation.

Offered every second year, or on demand, next offered 2000/2001. The class provides an exposure to broad aspects of cardiovascular physiology/biophysics in areas where local expertise exists. Topics covered include: synopsis of the history of cardiovascular physiology; cardiac structure, function and metabolism; hemodynamics; neural and hormonal control; fetal/neonatal life; space/underwater cardiovascular physiology; cardiovascular response to hypo- and hyperthermia; cardiac electrophysiology; electrical instability problems; aging of the cardiovascular system; and risk factors for heart attack and heart failure. The class includes lectures, student presentations, and laboratory exercises.

INSTRUCTOR: D. Armour.

PREREQUISITE: PHYL 2030X/Y.06 completed or concomitant, and permission of the Director

PHYL 5513.03: Endocrine Physiology.

This class provides an in-depth survey of Endocrinology with emphasis on recent developments. Topics include: the mechanisms of hormone action; physiology of the hypothalamic-pituitary axis; thyroid and adrenal physiology; endocrine control of mineral and energy metabolism. Seminars will deal with fundamental aspects of these topics derived from reading recent textbooks of Endocrinology, as well as advanced aspects from reading review articles and research papers.

INSTRUCTOR: W. Moger

PREREQUISITE: PHYL 2030X/Y.06 completed or concomitant, or equivalent, or permission of Director

PHYL 5514.03: Reproductive Physiology.

Offered every second year, next offered in 1999/2000. This is a lecture/seminar class devoted to a modern treatment of human and animal reproductive physiology. Topics include: sexual differentiation, sexual maturation, menstrual cycle, male reproduction and the physiology of pregnancy, birth and lactation.

INSTRUCTORS: M. Wilkinson, W. Moger and K. Landymore

PREREQUISITE: PHYL 2030X/Y.06; fourth year honours; graduate students (permission of class Director)

PHYL 5517.03: Physiology and Biophysics Graduate Seminar.

A mandatory class that all graduate students attend throughout their studies in the Department. The objectives of the class are to provide opportunities for students to acquire experience in giving lectures to scientific audiences, in giving scheduled lectures to undergraduate students, and in assimilating and evaluating scientific information presented by others.

There are four components of the class:

1. The Physiology and Biophysics Departmental Seminar. There are 20-30 seminars per year and attendance is mandatory for all class registrants. Students are often given the opportunity to meet informally with guest speakers.
2. A separate bi-weekly graduate student seminar series organized and run by the Graduate Student Society from September to April forms the central component of the class. These seminars cover selected topics determined by the participants in an organizational meeting held in September. Aside from research-related presentations by the students themselves, invited speakers will present seminars on topics related to communication by academics (e.g. teaching techniques, use of audio-visual aids, writing grant proposals,

writing scientific papers), research methodologies (e.g. experimental design, theories of data acquisition and analysis), animal ethics, etc.

3. Each student in 5517.03 must present at least one departmental seminar during their degree programme. Each student's seminar is monitored by a faculty committee selected by the Graduate Education Committee to ensure that the student receives oral and written feedback on his/her presentation.
4. Each registrant beyond the first-year MSc level must normally present one lecture per year in one of the non-medical undergraduate Physiology classes (PHYL 1010X/Y.06, 2030X/Y.06, 3110.03 or 3120.03). Each lecture is attended by an advisory teacher who evaluates it in terms of structure, clarity of presentation, general effectiveness, etc., and provides oral and written feedback to the student.

INSTRUCTOR: D. Rasmussen

PHYL 5518.03: Ligand-gated Ion Channels.

Offered every second year, or on demand, next offered 2000/2001. This half-credit class analyzes the basic properties of ligand-gated ion channels, in particular those that participate in synaptic transmission. The class will examine the properties of ligand-gated channels as presented in current scientific articles, which will be discussed in each session. The nicotinic acetylcholine receptor, as well as the BA, AMPA, Kainate, NMDA, and serotonin 5-HT₃ receptors will be treated in detail. Evaluation will be based on the presentations and discussions, and the submission of a short written essay on one of the topics discussed.

INSTRUCTOR: A. Villarroel

PREREQUISITE: Permission of the Director

PHYL 5520.03: Transport Physiology.

Offered every second year, next offered in 1999/2000. This class emphasizes physical aspects of transport physiology and examines in depth the assumptions and concepts used to characterize transport across cell membranes and integrates this information with regulation of transport events. Examples are drawn from such systems as erythrocytes, intestine, kidney, and capillary transport. Evaluation is based on a midterm exam (40%) and end of term exam (60%).

INSTRUCTOR: N.S. Morgunov (Director) and Staff

FORMAT: Lectures 4 hours/week (Tues., Thurs. 2:30-4:30 pm)

PREREQUISITES: PHYL 4321X/Y.06/BIOL 4321X/Y.06 or permission of the class director.

PHYL 5521.03: Molecular Physiology.

This is a lecture/seminar class designed to give the student an in-depth exposure to contemporary concepts of the physiology of intracellular communications. Topics include transmembrane and intracellular receptors, ion channels, molecular adaptor proteins, signal transduction pathways and signal cross-talk. The class consists of lectures, guided reading and student presentations of recent research papers in the field. Evaluation is based on participation and presentations (50%), and on a written paper in the format of a research grant application.

INSTRUCTOR: P.R. Murphy (Director) and staff

FORMAT: Lecture, seminar and guided reading

PREREQUISITES: PHYL 4321X/Y.06/BIOL 4321X/Y.06 or permission of the class director

PHYL 5608.06/5609.06/5610.06: Directed Readings in Physiology and Biophysics.

These classes allow the Department to provide more specialized instruction on specific topics to graduate students with particular interests. Class format is variable and may include seminars, lectures, literature searching, evaluation of papers, etc. There is usually a high degree of one-on-one interaction. The classes are organized on a year-to-year basis in accordance with student interest and faculty expertise. Since different subjects may be covered each year, each class in the series has a separate number.

PREREQUISITE: Permission of the Director

PHYL 9000.00: MSc Thesis.

MSc students should register for this "class" each year.

PHYL 9530.00: PhD Thesis.

PhD students should register for this "class" each year.

Physiotherapy

Location: Forrest Building, 4th Floor
Halifax, NS B3H 3J5
Telephone: (902) 494-2524
Fax: (902) 494-1941

Director

I. Makrides, BPT (Sask), MSc (Ottawa), PhD (McM), MCSP

Graduate Coordinator

C. Kozey, BPE (UNB), MSc (Waterloo), PhD (Dal)

Professors

D. Egan, MCSP, Dip. T.P. (England), MSc (UWO), PhD (Curtin)
L. Makrides, BPT (Sask), MSc (Ottawa), PhD (McM), MCSP
G.I. Turnbull, MSCP, DipTP, BPT (Man), MA (Dal), PhD (Rhodes)

Associate Professor

C.L. Kozey, BPE (UNB), MSc (Waterloo), PhD (Dal)

Assistant Professors

M. Earl, BScPT (UWO), BSc, MSc, PhD (Waterloo)
A. Fenety, BSc (UNB), DPT (Manitoba), MSc (Alta), PhD (Dal)
K. Harman, BScPT (Tor), MSc (Ottawa), PhD (Carleton)

Adjunct Professor

J.M. Walker, Certs Phys. Ther. (NZ), DipTP, BPT, MA (Man), PhD (McM)

I. Introduction

A programme of study leading to a Master of Science in Physiotherapy is offered through the School of Physiotherapy. In addition to the requirements for the Faculty of Graduate Studies, applicants must be licensed physiotherapists with a university degree and a B average or higher in four Physiotherapy undergraduate courses taken at the university level. Applicants must include a statement of goals and graduate research area with their application to the programme. Successful applicants will be chosen by the School's Graduate Committee. Foreign applicants must meet the English language competency requirements as outlined by Graduate Studies.

II. Application

Applicants must

- Complete the application form for admission to the Faculty of Graduate Studies
- Include a one page statement of experience, goals and objectives with the application
- Meet the English language competency requirements as outlined by Graduate Studies.
- Include two academic references. A work reference from someone who may comment objectively on your goals may be included in addition to the two required academic references.

In addition applicants are strongly advised to

- Include a copy of a recent paper authored in the area in which the applicant is planning to pursue studies (if available)
- Submit a recent GRE score

III. Admissions and Programme Requirements

A. Programme Requirements

Students registered in the programme will be expected to obtain a minimum of five (5) credits as follows:

Thesis: 2 credits

Course work: 3 credits

B. Course Work

Three half-credit classes are required. The other three half-credit classes will be selected based on the individual programme of study approved by the Supervisory Committee. Graduate students are also expected to attend several Physiotherapy Research Seminars (non-credit).

C. Residency

It is expected that upon completion of the course work an additional year will be required to complete the thesis. Students are expected to spend at least one year full-time in the program.

D. Scholarship Deadlines

Applicants who wish to be considered for scholarships are strongly urged to have their applications completed by January 1 for University Scholarships

For School of Physiotherapy Scholarships: March 1

A limited amount of money is available from the School of Physiotherapy and this will be distributed on a competitive basis. Applicants are encouraged to seek external funding. Further information for sources of funding may be obtained from the Graduate Studies office.

In order to qualify for scholarship consideration a student is expected to hold a first-class honours degree in an appropriate field and to enter a full-time graduate programme.

E. Application Inquiries

For more information regarding admission and program requirements, please write to the Graduate Coordinator, School of Physiotherapy, Dalhousie University, Halifax, NS, B3H 3J5.

IV. Classes Offered

An approved half credit class in Statistical Methods and/or Research Design (required).

PHYT 5002.03: Instrumentation and Measurement.

This class is aimed at providing the student with the theoretical basis and practical experience associated with measurement techniques used in Physiotherapy Research. The content of the class will focus on the fundamentals of instrumentation and measurement of biomechanical and physiological measures. The objective of this class is to gain the necessary knowledge and skills for data acquisition, processing and interpretation of electrophysiological, kinematic and kinetic data. (Required.)

INSTRUCTOR: C. Kozey

FORMAT: Lecture/lab and discussion

PHYT 5010.03: Special Topics in Musculoskeletal II.

PHYT 5030.03: Special Topics in Neurology I.

PHYT 5050.03: Special Topics in Cardiac Rehabilitation III.

PHYT 5070.03: Directed Studies.

PHYT 5080.03: Directed Studies.

Special Topics in Physiotherapy I, II, III

PHYT 5090.03: Foundations Seminar.

This class will provide students with the opportunity to study the development of the profession of physiotherapy from ancient times to the present. Models of physiotherapy delivery will be evaluated and novel approaches formulated which will be relevant to emerging health-care needs both in developed and developing countries utilizing a framework of clinical care, education and research. Methods of using new technologies to enhance the time and cost efficiency of total physiotherapy care will be considered as will the influencing of health-care policy formulation. Emphasized will be the delivery of physiotherapy to a variety of client populations in non-institutional contexts. (Required.)

INSTRUCTOR: G. Turnbull

PHYT 9000.00: Thesis (Required)

Political Science

Location: Arts & Administration Building
Third Floor
6299 South Street
Halifax, NS B3H 4H6

Telephone: (902) 494-2396
Fax: (902) 494-3825
WWW: <http://ia.dal.ca/~finbow//gradprog.htm>

Chairperson of Department

Cameron, D.M.

Graduate Co-ordinator

Finbow, R.

Professors Emeriti

Beck, J.M., BA (Acadia), MA, PhD (UofT), LLD (Dal), FRSC
Braybrooke, D., BA (Harvard), MA, PhD (Cornell), FRSC
Eayrs, J.G., BA (UofT), AM, PhD (Col), FRSC
Mann Borgese, E., DipMus (Zurich), LHD (MSVU)

Professors

Aucoin, P.C., BA (SMU), MA (Dal), PhD (Queen's), jointly with Public Administration. Public administration (policy processes, government organization, management systems); Canadian political institutions

Bakvis, H., BA (Queen's), MA, PhD (UBC), jointly with Public Administration. Public administration - Federalism (Canadian and comparative); Political parties, electoral behaviour

Boardman, R., BSc, PhD (London). International organization, European Politics, Environment

Cameron, D.M., BA (Queen's), MA, MPhil, PhD (UofT). Canadian federalism and intergovernmental relations; Canadian public policy; city government

Middlemiss, D.W., BA, MA, PhD (UofT). Canadian defence policy (especially defence economies and Maritime strategy); Canadian foreign policy

Shaw, T.M., BA (Sussex), MA (East Africa, Prin.), PhD (Princeton), Director, Centre for Foreign Policy Studies. Global developments; African and Asian political economy and foreign policy; human security

Stairs, D.W., BA (Dal), MA (Oxon), PhD (UofT), FRSC. Canadian foreign policy; foreign policy process

Winham, G.R., BA (Bowdoin), Dip Int Law (Manchester), PhD (N Car), FRSC, Eric Dennis Memorial Professor of Government and Political Science. International relations and diplomatic practice; international political economy; U.S. Foreign policy; Canada-U.S. relations

Associate Professor

Black, D., BA (Trent), MA, PhD (Dal). Canadian & comparative foreign policy; Southern Africa; North-South relations

Fierbeck, K., BA (Alta), MA (York), PhD (Cantab). Political theory, Modern and Post-modern; Distributive justice

Finbow, R.G., BA (Dal), MA (York), MSc, PhD (Lond). Comparative politics (Western democracies [Latin America]); Comparative theory; Canadian regionalism

Harvey, F., BA, MA, PhD (McG). Theories of international relations; International conflict and crises; comparative foreign policy; empirical research methods

Smith, J., BA (McM), MA, PhD (Dal). Canadian government and politics; American government; Modern liberal theory

Assistant Professors

Carbert, L., BA (Alta), MA, PhD (York). Political theory; Canadian political behaviour; feminist theory

Adjunct Professors

Heard, A., Simon Fraser University
Pyrz, G., Acadia University

I. Admission Requirements

Applicants must satisfy the minimum requirements set by the Faculty of Graduate Studies.

Successful applicants for the MA programme will have an Honours BA in Political Science, or its equivalent, with first-class or high second-class standing (GPA of 3.30 or higher).

Admission decisions are based on academic transcripts, letters of reference, a sample of written work submitted by the applicant, and the capacity of the Department to supervise a thesis in the applicant's proposed field of research.

Successful applicants for the PhD programme will have an MA in Political Science with first-class standing (GPA of 3.70 or higher). Admission decisions are based on the same considerations as apply to the MA programme, but PhD students are admitted only when a faculty member is prepared to supervise the applicant's programme, including the proposed thesis topic.

Applicants who do not meet all of the above requirements, but who have superior academic qualifications, may be considered for admission to the MA or PhD programmes, but may be required to satisfy additional requirements within the programme. All such requirements will be specified at the time of admission.

Applicants whose native language is not English must demonstrate a minimum TOEFL score of 600, or the equivalent score on a comparable test.

II. Degree Programmes

A. Master of Arts (MA)

The MA is a one-year (12 month) programme consisting of three full-credit classes (or the equivalent in half-credit classes) and a thesis. Classes include at least two of the core graduate seminars, other graduate classes (including directed reading classes and graduate classes in other departments), and not more than one credit of classes cross-listed as undergraduate/graduate (3000/5000).

The MA may be completed on a full-time or part-time basis.

B. Doctor of Philosophy (PhD)

The PhD programme requires two years of full-time residency, and can be completed in three to four years. The two principal requirements consist of comprehensive examinations in two fields (a major and minor field) and an original thesis. Course work will be required as appropriate to prepare the student for her or his comprehensive examinations. These examinations will include both written and oral components. Before proceeding to the thesis, a student must present and defend a thesis proposal. Also, reading competence in a second language, usually French, must be demonstrated before the student begins work on the thesis. The thesis is written under the direction of a committee comprising the supervisor and two other members, and may include qualified faculty members from other departments and other universities. The completed thesis is subject to a public, oral defence.

III. Classes Offered

Classes offered by the Department are organized into four fields, as follows:

- Canadian Politics
- Comparative Politics
- Political Theory
- International Relations and Foreign Policy

Each field contains classes offered as core graduate seminars, and classes cross-listed at the undergraduate/graduate level. The latter usually contain a majority of undergraduate students, and graduate students will be required to satisfy appropriately higher standards. In addition, directed reading classes may be arranged on an

individual or small group basis with appropriate faculty members. This will often be particularly appropriate in areas closely related to a student's thesis research, in conjunction with the thesis supervisor.

Not all classes are offered each year. A more accurate timetable will be available in the spring of each year.

A. Canadian Government and Politics

Core Graduate Seminar:

POLI 5204.06: Advanced Seminar In Canadian Politics.

INSTRUCTORS: P. Aucoin and D. Cameron

Cross-listed Classes:

***POLI 5205.03: Canadian Political Thought.**

The class examines enduring controversies in Canadian politics. Examples include: the nature of Canadian federalism; partisanship and party government; parliamentary versus republican institutions; religion and politics. These controversies are examined as they have been articulated in speeches, pamphlets and articles by people active in public life. Approved with Canadian Studies.

INSTRUCTOR: J. Smith

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2200.06

CROSS-LISTING: POLI 3205.03

POLI 5206.03: Constitutional Issues in Canadian Politics.

These are political issues that possess an important constitutional dimension. They include judicial review and the role of the Supreme Court of Canada, constitutional amendment, the representation formula, the Charter of Rights and Freedoms, language rights and the Crown.

INSTRUCTOR: J. Smith

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2200.06

CROSS-LISTING: POLI 3206.03

***POLI 5216.03: City Government in Canada.**

The unique character of council government is examined in terms of its historical evolution and present structure and operation. Special attention is given to the government of cities and to recent reforms at the metropolitan level. Approved with Canadian Studies.

INSTRUCTOR: D. Cameron

FORMAT: Lecture and discussion 2 hours

PREREQUISITE: POLI 2200.06 or equivalent

CROSS-LISTING: POLI 3216.03, PUAD 6400.03

***POLI 5220.03: Intergovernmental Relations In Canada.**

The territorial division of political power and the relations that have developed between governments are considered, with emphasis on the impact on policy outcomes.

INSTRUCTOR: H. Bakvis

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2200.06 or instructor's permission

CROSS-LISTING: POLI 3220.03, PUAD 6750.03

***POLI 5224.03: Canadian Political Parties.**

The Canadian party system, viewed as an integral part of the entire political system, presents a number of interesting questions for exploration, such as the alleged fickleness of voters, the role of party leaders, and the manner in which parties contribute to Canadian democracy. The particular themes emphasized will vary from year to year. Approved with Canadian Studies.

INSTRUCTOR: H. Bakvis

FORMAT: Lecture and discussion 2 hours

PREREQUISITE: POLI 2200.06 or instructor's permission. Students

will find it helpful to have some background in statistics or methodology, such as POLI 3494.06

CROSS-LISTING: POLI 3224.03

*POLI 5228.03: Interest Groups: Function and Management.

This class will attempt a systematic examination of the function and management of interest groups in Canada and, to a lesser extent, other western countries. It will begin by considering the functions such groups perform for their supporters on the one hand and, on the other, the role they play in 1) maintaining political systems; 2) securing and modifying public policy, and 3) implementing programmes. It will explore the ways in which their structures and behaviour patterns vary according to the resources of the groups themselves, the nature of their concerns and the demands of the political/bureaucratic systems in which they operate. An important feature of the class will be a discussion of the internal management of groups. This discussion will include a review of how membership is secured and retained and how group resources are obtained and applied; the role of professional staff in developing group positions and in interacting between the interest group and government officials. In conclusion, the class will examine the role of interest groups in policy processes and the relationship between that role and the prospects for democracy in western politics. Approved with Canadian Studies.

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2200.06 or instructor's permission

CROSS-LISTING: POLI 3228.03, PUAD 6505.03

*POLI 5233.03 : Canadian Political Economy.

This seminar class, for graduates and senior undergraduates, will explore the relationship between politics and economic life in Canada. Canada's economic development, the role of the state, imperial and continental relationships, the debate over free trade, economic nationalism, and Canada's place in a global economy will be analyzed. Students will consider staples, liberal Keynesian and neo-classical, socialist and feminist perspectives. Other topics include women, trade unions, native and immigrant communities, and the impact of economic forces on national unity. Students will debate controversial themes on each topic. Student essays will explore a range of contemporary issues including the debt crisis, federal-provincial fiscal relations, the economic consequences of Quebec separation, regional development programs, and policies for industrial development, human resources, technological change, poverty and inequality, etc.

INSTRUCTOR: R. Finbow

FORMAT: Seminar 2 hours

PREREQUISITE: Open to graduate students and senior undergraduates, who have completed classes in Canadian politics or economic history, or by permission of the instructor

CROSS-LISTING: POLI 3233.03

*POLI 5235.03: Regional Political Economy in Canada.

The class surveys the interaction between politics and economics in Canada with emphasis on the question of regional development. It will canvas competing explanations for differences in economic development among Canada's regions with special emphasis on Maritime economic problems, highlighting both the political sources of regional disparities and continuing efforts to rectify them. Distinctive Western, Quebec and Ontario concerns will also be covered. Seminars, for graduates and senior undergraduates, will feature students presentations and research projects.

INSTRUCTOR: R. Finbow

FORMAT: Seminar 2 hours

PREREQUISITE: Open to graduate students and senior undergraduates, who have completed classes on Canadian politics, or permission of the instructor

CROSS-LISTING: POLI 3235.03

*POLI 5240.03: Policy Formation in Canada.

A comprehensive examination of the three critical questions in the study of policy formation in Canada: 1) the function of the state; 2) the question of why governments develop policies; and 3) the means by which governments authoritatively develop policies. The discussion links these variables with a macro level analysis of the scholarly approach to decision-making. The emergence of tension resulting from the development of superindustrial society and from regionalism in the Canadian community provides policy problems on which the general theoretical analysis is hinged.

INSTRUCTOR: P. Brown

FORMAT: Seminar 2 hours

PREREQUISITE: Open to Honours students in their fourth year and to graduate students

CROSS-LISTING: POLI 3240.03, PUAD 5120.03

INSTRUCTOR: P. Brown

POLI 5241.03: Introduction to Policy Analysis.

This class examines four aspects of policy analysis: 1) the role of the analyst in modern government; 2) the analyst's working environment; 3) techniques used in carrying out research and preparing position papers; 4) and the analyst's responsibilities to government and to the public in determining what information should reach decision-makers. Approved with Canadian Studies.

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 4240.03 or instructor's permission

CROSS-LISTING: POLI 3241.03, PUAD 5121.03

POLI 5250.06: Canadian Public Administration.

This class examines the organization and management of the executive-bureaucratic structures of government for the formation and management of public policy and public services. It considers the design and operation of the cabinet system and ministerial portfolios; relations between ministers and the career public service, policy and budgetary processes; and the structural designs of departments, agencies, crown corporations and regulatory commissions. A major focus will be the effects of the new public management on public administration, as governments in Canada, as elsewhere, seek to cope with budgetary restraints, increased demands for quality services and public participation, and greater effectiveness in securing results.

INSTRUCTOR: P. Aucoin

FORMAT: Lecture and discussion 2 hours

B. Comparative Politics

Core Graduate Seminars:

POLI 5301.03: Comparative Theory.

INSTRUCTOR: R. Finbow

POLI 5340.03: Approaches to Development.

INSTRUCTOR: T. Shaw

Cross-listed Classes:

POLI 5302.03: Comparative Development Administration.

INSTRUCTOR: D. Black

POLI 5303.03: Human Rights and Politics.

This class will introduce students to the evolving place of human rights in politics, both comparative and international. We begin by examining the historic emergence of human rights as an issue in world politics, principally since the Second World War; and by considering both the philosophical foundations of the idea of human rights and some of the main controversies concerning their scope and application. We then focus on a number of specific topics and controversies concerning human rights in world politics, including: the sources of and struggle to end human rights abusive regimes in Latin America; the multilateral politics of human rights; human rights in national foreign policies, with a specific focus on the challenges posed by China; Islam and human rights; genocide and humanitarian intervention; and efforts to foster justice and reconciliation in the aftermath of abusive regimes. Finally we look specifically at the role of human rights in domestic politics, focusing on the issues of women's rights and sexual orientation.

INSTRUCTOR: David Black

FORMAT: Seminar, 2 hours

PREREQUISITE: POLI 2300 or 2500 or instructor's permission

POLI 5304.03: Comparative Federalism.

A seminar class which examines the theory and practice of federalism within a comparative framework. The actual federations discussed depends in part on student interest but usually includes both established federal nations and those moving in that direction.

INSTRUCTOR: H. Bakvis
FORMAT: Seminar 2 hours
PREREQUISITE: POLI 2200.06 or POLI 2300.06 or instructor's permission
CROSS-LISTING: POLI 3304.03, PUAD 6755.03

POLI 5311.03: Sport and Politics.

INSTRUCTOR: D. Black

***POLI 5315.03: African Politics.**

The diversity of states, politics, economy and society in post-colonial sub-Saharan Africa is examined in this seminar. Topics include theoretical approaches, economic frameworks, governmental regimes, structural adjustments, civil society, and intra-regional political economies, and selected aspects of policy such as economic reform, political liberalization, women and development, drought and ecology, AIDS and health

INSTRUCTOR: D. Black

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2300.06 or equivalent or instructor's permission

CROSS-LISTING: POLI 5315.03

POLI 5325.06: European Politics.

The comparative study of politics in European countries gives a useful perspective on Canadian politics. Focusing primarily on western Europe, this class examines party politics, government institutions, contemporary public policy issues, and related topics in selected European states. Discussion of the politics of the European Union is an integral part of the class.

INSTRUCTOR: R. Boardman

FORMAT: Seminar

***POLI 5360.03: Politics in Latin America.**

This seminar class surveys the politics of Latin American states colonial to contemporary times. Students first examine political history and development, focusing on particular challenges of colonial inheritance, military politicization, modernization, development and dependency and international interference. Institutions, public policies, and state-society relations are then discussed. Other topics include women and indigenous people and prospects for durable democratization. Students will debate controversial questions on each topic.

INSTRUCTOR: R. Finbow

FORMAT: Seminar 2 hours

POLI 5316.03: Politics in South Africa.

This seminar class focuses on the politics of change and development in South Africa. It explores both comparative and distinctive features of the South African case. Comparatively, we consider, for example, settler colonialism, ethnic and racial cleavages and conflicts, the politics of resistance and "liberation", the challenges of democratic transitions, and the demands of balancing growth and redistribution. Distinctively, we study the origins and effects of South Africa's extraordinary variant of racialist rule, apartheid, and the "negotiated revolution" by which it was transcended.

INSTRUCTOR: D. Black

FORMAT: Seminar 2 hours

***POLI 5379.06: U.S. Constitution, Government, and Politics.**

The purpose of this seminar class is to gain a thorough and critical understanding of American political process. To this end, a series of topics are examined, beginning with a framing of the constitution and concluding with questions about political culture. There is considerable emphasis on formal and informal political institutions, especially political parties and elections.

INSTRUCTOR: J. Smith

FORMAT: Seminar 2 hours

PREREQUISITE: POLI 2200.06 or POLI 2300.06 or instructor's consent

CROSS-LISTING: POLI 3379.03

C. Political Theory and Methodology

Core Graduate Seminar:

POLI 5400.03: Advanced Seminar in Political Theory.

INSTRUCTOR: K. Fierbeck

Cross-Listed Classes:

POLI 5431.03: The Political Imagination in Literature.

***POLI 5475.03: Democratic Theory.**

Democracy is an essential component of legitimacy for all western states: few would be inclined to assert their "undemocratic" nature. But what are the *essential* characteristics of democracy; and to what extent must modern democratic theory remain grounded in nineteenth-century western liberal thought? While this class has a predominantly *theoretical* orientation, it will include an examination of the relations between democratic theory and economic production/redistribution; as well as an investigation into how democratic theory can be developed in non-western political contexts.

INSTRUCTOR: K. Fierbeck

FORMAT: Seminar 2 hours

***POLI 5479.03: Classical Liberalism and Democracy.**

Liberalism takes a variety of forms and includes many topics including the rule of law, limited government, the free exchange of goods, entitlement to property, the self, and individual rights. Its philosophical and political assumptions provide the intellectual context within which its account of the individual, its vision of the community and its preferred allocation of resources will be assessed.

FORMAT: Seminar 2 hours

PREREQUISITE: Normally, classes in philosophy or political science or economics: consult instructor

CROSS-LISTING: PHIL 4470.03/5470.03, ECON 4446.03/5446.03

D. International Relations & Foreign Policy

Core Graduate Seminar:

POLI 5520.06: Theories of International Relations.

INSTRUCTOR: G. Winham

Cross-listed Classes:

***POLI 5525.03: Comparative Foreign Policy Simulation.**

This class is designed for advanced (i.e., 3rd/4th year) undergraduate and graduate students in Political Science. Once students become familiar with basic concepts, theories and decision-making frameworks developed within the sub-field of comparative foreign policy (part I), they will be expected to apply what they have learned through participation in an interactive computer simulation involving other teams throughout North America (and possibly Europe). As they attempt to implement policy initiatives and work in teams to resolve international disputes, students will confront foreign policy issues in a context that provides an authenticity of experience. The objective is to enable students to create and test organizational skills, understand the interdependence of international issues, appreciate cultural differences and approaches to world problems, and use computers for multinational communications.

INSTRUCTOR: F. Harvey

FORMAT: Seminar 2 hours

POLI 5530.03: International Humanitarianism.

POLI 5531.03: The United Nations in World Politics.

The evolution of the United Nations from its early concentration on problems of collective security, through the period of preventative diplomacy and anti-colonialism to its present role as a forum for the aspirations and demands of the Less Developed Countries is

reviewed. The more distant future, and the continuing relevance of the United Nations in world politics, and how its role and objectives should be determined, are considered.

INSTRUCTOR:

FORMAT: Seminar 2 hours

PREREQUISITE: Class in international politics or instructor's permission

CROSS-LISTING: POLI 3351.03

***POLI 5535.03: The New International Division of Labour.**

This seminar provides an overview of the global political economy in the current post-Bretton Woods and Cold War period. It treats the New International Division of Labour/Power from several theoretical and political perspectives, from comparative foreign policy to feminism. Issues addressed include the Newly Industrialising Countries, the Middle Powers and the Fourth World; new functionalism; popular participation; and alternative futures.

INSTRUCTOR: T. Shaw

FORMAT: Seminar 2 hours

PREREQUISITE: Class in international politics or instructor's permission

CROSS-LISTING: POLI 3535.03

***POLI 5537.06: Management and Conservation of Marine Resources.**

This is an intensive programme on the problems of managing the multiple uses of the Exclusive Economic Zone. It covers the New Law of the Sea and its many implications for politics and management, the social, economic and technical aspects of managing living resources, non-living resources, shipping, ports and harbours, coastal management and the protection of the environment; national legislation and required institutional infrastructure, regional cooperation and cooperation with international institutions.

INSTRUCTOR: E.M. Borgese

FORMAT: Seminar 2 hours

PREREQUISITE: Class in international politics or instructor's permission. Offered as a summer class only; consult instructor

POLI 5540.03: Foreign Policies in the Third World.

INSTRUCTOR: T. Shaw

POLI 5550.03: Japanese Foreign Policy.

INSTRUCTOR: R. Boardman

POLI 5570.06: Canadian Foreign Policy.

INSTRUCTOR: D. Stairs

POLI 5571.06: The Politics of Contemporary Canadian Defence Policy.

INSTRUCTOR: D. Middlemiss

POLI 5574.03: American Foreign Policy.

INSTRUCTOR: G. Winham

POLI 5575.03: Nuclear Weapons and Arms Control in World Politics.

INSTRUCTOR: D. Middlemiss

POLI 5577.03: Civil-Military Relations in Contemporary Western Society.

The class will examine the trilateral relationship between society, government and the military in the post-Cold War era. The context includes: changing societal values and the domestic pressures they produce; and the implications of a constantly changing strategic environment. Different perspectives will be examined to assess the implications for civil-military relations of the above-noted changes; legal/constitutional (Charter challenges); military/professional (operational requirements); and political (constituency and special interest demands).

INSTRUCTOR: D. Middlemiss

FORMAT: Seminar 2 hours

POLI 5581.03: Diplomacy and Negotiation.

INSTRUCTOR: G. Winham

POLI 5585.03: Politics of the Environment.

Environmental issues have become increasingly important on international agendas. In this class, political analysis of these questions is grounded in a global ecological perspective. The topics for discussion include acid rain and other problems in the relations between advanced industrialized countries; the role of international institutions and international law in promoting environmental conservation; the environment dimension of international development; and the politics of the transnational environmental movement.

INSTRUCTOR: R. Boardman

FORMAT: Seminar 2 hours

PREREQUISITE: A class in international politics or foreign policy, or instructor's permission

CROSS-LISTING: POLI 3585.03

***POLI 5589.03: The Politics of the Sea.**

The major issues involved in the Law of the Sea, the differing interests of different countries, the developing legal framework, and the political process of the ongoing negotiations are covered.

FORMAT: Seminar 2 hours

PREREQUISITE: Preference is given to graduate students, although mature students from other relevant disciplines are welcome.

CROSS-LISTING: POLI 3589.03

***POLI 5596.06: Theories of War and Peace.**

This class examines critically a broad range of theories of the causes, persistence, and termination of war.

INSTRUCTOR: F. Harvey

FORMAT: Seminar 2 hours

PREREQUISITE: Class in international politics or instructor's permission

CROSS-LISTING: POLI 3596.03

POLI 5636.03: Nationalism and Statecraft.

An examination of the sources, ingredients and consequences of contemporary nationalism, with particular reference to its implications for the conduct of international politics. In the early sessions of the class, pertinent literature from the pre-World War II period will be evaluated for its relevance to our understanding of current circumstances, in which the apparent revival of nationalist impulses has coincided with intensifying manifestations of functional interdependence.

INSTRUCTOR: D. Stairs

FORMAT: Seminar

CROSS-LISTING: POLI 3636.03

E. Directed Reading Classes

Graduate students taking directed reading classes register under one of the following designations, depending on whether the class extends for the first term, the second term, or the full academic year:

POLI 5601.06: Readings in Political Science.

POLI 5602.03: Readings in Political Science.

POLI 5603.03: Readings in Political Science.

F. Thesis

Students register for the thesis under the appropriate designation, as follows:

POLI 9000.00: MA Thesis.

POLI 9530.00: PhD Thesis.

Psychology

Location: Life Sciences Centre
1355 Oxford Street
Halifax, NS B3H 4J1
Telephone: (902) 494-3417
Fax: (902) 494-6585

Chairperson of Department

Moore, C. L.

Professor Emeritus

Honig, W.K., BA (Swarthmore), PhD (Duke). Cognition and memory in animals

Professors

- Brown, R.E., BSc (Victoria), MA, PhD (Dal). Behavioural endocrinology, ethology
- Camfield, C., BS, MD (Michigan) Major appointment in Pediatrics. Pediatric epilepsy and mental handicap, psychosocial-quality of life issues in children with chronic health problems
- Connolly, J.F., AB (Holy Cross), MA (Sask), PhD (Lond). Cognitive and clinical neuroscience, language, memory, stroke, event-related brain potentials, magnetoencephalography
- Croll, R., BSc (Tufts), PhD (McG), Major appointment in Physiology/Biophysics. Biological bases of behaviour, development and regeneration of the nervous system, comparative neurobiology
- Dunham, P.J., BA (DePauw), MA, PhD (Missouri). Infant cognitive development
- Klein, R.M., BA (SUNY), MA, PhD (Oregon), Graduate Programme Coordinator. Human attention and information processing, oculomotor control, cognitive neuroscience
- Kopala, L., BSc (Alberta), MD (Calgary), Major appointment in Psychiatry. Schizophrenia, olfaction, psychopharmacology
- Kutcher, S., BA, MA, MD (McMaster), Major appointment in Psychiatry. Adolescent development, depression, psychopharmacology.
- LoLordo, V.M., AB (Brown), PhD (Penn). Learning, animal behaviour
- Lyons, R., BA (Dal), MEd (StFX), PhD (Oregon), Major appointment in the School of Health and Human Performance. Lifestyle adjustment, personal relationships and health problems/disabilities, coping
- McGrath, P., BA, MA (Sask), PhD (Queen's). Pediatric psychology, pain, child psychopathology
- Meinertzhagen, I.A., BSc (Aberdeen), PhD, DSc (St. Andrews), Killam Professor in Neuroscience. Development neurobiology
- Mitchell, D.E., BSc, MAppSc (Melb), PhD (Berkeley), Faculty of Science Killam Professor in Psychology. Visual system development, visual perception
- Moore, C.L., BA, PhD (Cantab). Early development of social understanding
- Phillips, D.P., BSc, PhD (Monash). Sensory processes in hearing, auditory neurophysiology.
- Robertson, H., MSc (Western), PhD (Cantab), Major appointment in Pharmacology. Molecular neurobiology, long-term changes in brain, learning and memory, Parkinson's disease, stroke, gene expression in brain, aging
- Rusak, B., BA (UofT), PhD (Berkeley), Joint appointment in Psychiatry; Faculty of Science Killam Professor in Psychology. Behavioural, neurophysiological and molecular aspects of biological rhythms.
- Semba, K., BEd, MA (Tokyo), PhD (Rutgers), Major appointment in Anatomy and Neurobiology. Brain mechanisms of sleep and wakefulness

- Shaw, S.R., BSc (Lond), PhD (St. Andrews). Sensory neurobiology, neural evolution and plasticity.
- Yoon, M.G., BS (Seoul), PhD (Berkeley). Development of nervous systems and language.

Associate Professors

- Barresi, J., BSc (Brown), MA, PhD (Wisc). Personology, social cognition, philosophical psychology
- Earhard, B., BA, MA, PhD (UofT). Analytic operations in perception
- Finley, G.A., BSc, MD (Dal), Major appointment in Anaesthesia. Pediatric pain (measurement and management), audible alarm signals, perioperative anxiety, awareness and memory
- McGlone, J., BA, MA, PhD (Western). Clinical neuropsychology, sex differences, epilepsy and multiple chemical sensitivities
- McMullen, P., MSc (UofT), PhD (Waterloo). Visual cognition, cognitive neuropsychology
- Moore, B.R., AB (Emory), PhD (Stanford). Imitative learning in birds, conditioning, the evolution of learning
- Ozler, M., BA, MA, PhD (UofT). Memory, mood
- Stewart, S., BSc (Dal), PhD (McG). Anxiety, substance abuse, cognitive psychophysiology
- Sullivan, M.J.L., MA, PhD (Concordia), Clinical Programme Coordinator. Depression, social cognition

Assistant Professors

- Adamo, S., BSc (UofT), PhD (McG). Insect behavioural neuroscience, cephalopod behaviour, invertebrate behavioural physiology
- Porter, S.B., BSc (Acadia), MA, PhD (UBC). Forensic psychology, memory distortion/deception, psychopathy
- Santor, D., BA (Western), PhD (McG). Depression, vulnerability factors, psychometrics
- Waschbusch, D.A., BSc, MSc (Wisconsin), PhD (Pittsburgh). Developmental psychopathology, ADHD, antisocial behaviour, peer relationships

Senior Instructors

- Hoffman, R.S., BA (Col Coll), MA (Dal)
- Leary, J., BSc (Dal), MSc (MUN), PhD (Adelaide)
- Schellinck, L.

Instructor

- Schellinck, H., BSc, MSc, PhD (Dal)

Adjunct Professors

- Backman, J., MA, PhD (Carleton), Psychology/IWK Grace Health Centre. Learning disabilities, neuropsychology and reading
- Catano, V.M., BSc (Drexel), MSc, PhD (Lehigh), Psychology/Saint Mary's. Industrial/organizational psychology, assessment of work behaviour, psychology of trade unions
- Clark, J.W., BA, MA (McG), PhD (Queen's), Psychology/Dalhousie. History of psychology, comparative
- Cohen, A.J., BA (McG), MA, PhD (Queen's), Psychology/UPEL. Music cognition
- Davidson, K., BA (Queen's), MAsc, PhD (Waterloo), Psychology/Alabama. Behavioural medicine, personality, gender differences
- Ellsworth, C., MA, PhD (Queen's), Psychology/IWK Grace Health Centre. Clinical, developmental, infants and preschoolers, early identification and intervention
- Eskes, G.A., BA, PhD (Berkeley), Psychology/QEII Health Sciences Centre. Neuropsychology, memory, neglect, reading disorders, aging, stroke, cognitive remediation, depression
- Farmer, M., BSc (MSVU), MSc, PhD (Dal), Psychology/IWK Grace Health Centre. Dyslexia, learning disabilities, developmental disorders, behaviour management
- Fentress, J.C., BA (Amherst), PhD (Cantab), Psychology/Dalhousie. Ethology and behavioural neuroscience
- Fisk, J., BSc, MA, PhD (Western), Psychology/QEII Health Sciences Centre. Neuropsychology, motor control, neurodegenerative disorders, aging, assessment instrument development
- Harvey-Clark, C., BSc (Victoria), DVM (Western College of Vet. Medicine), University Director of Animal Care. Applied ethology, pain.
- MacDonald, G.W., BA (StFX), MA, PhD (Windsor), Psychology/IWK Grace Health Centre. Learning disabilities, developmental reading disorders, pediatric neuropsychology

- McCormick, P.A., BSc (Dal), MA, PhD (Waterloo), Psychology/StFX. Visual cognition, attention, perception, and memory
- McLeod, P., BSc (Mt.A), MSc (MUN), PhD (Dal), Psychology/Acadia. Social and cognitive development, perceptions of control, physiology and behaviour of wild canids
- McNulty, J.A., BA, MA, PhD (UofT), Hyperbaric Unit, QEII Health Sciences Centre. Sensory processes, underwater perception and performance, hyperbaric medicine
- Nakajima, S., BA (Chiba), MA (Wash), PhD (McG), Psychology/Dalhousie. Physiological psychology.
- O'Neill, P., MSc, PhD (Yale), Psychology/Acadia. Ethical decision making, community psychology
- Potter, S.M., BSc (Victoria), PhD (McG), Psychology/Acadia. Behavioural teratology, effects of fetal exposure to alcohol, tobacco and other substances, infant information processing, evoked potentials
- Rodger, R.S., MA (Edin), PhD (Queen's, Belfast), Department of Fisheries and Oceans. Statistical theory
- Schwartz, M., BSc (McG), MA, PhD (Waterloo), Psychology/QEII Health Sciences Centre. Hemispheric specialization, handedness, cognitive changes with cardiac disease
- Smith, I., BA (Dal), MSc (Brown), PhD (Dal), Psychology/IWK Grace Health Care. Developmental disorders (especially autistic spectrum disorders), normal and abnormal perceptual and motor development, Autism: epidemiology, early identification, clinical assessment and intervention methods, parent training, program development and evaluation
- Symons, D., BSc (McM), MA, PhD (Western), Psychology/Acadia. Early social development, child-clinical and family psychology, behavioural assessment
- Symons, S., BSc (Dal), MA, PhD (Western), Psychology/Acadia. Literacy development, educational psychology, learning disabilities

Research Associates

- Doane, B., BA (Princeton), MD, MA (Dal), PhD (McG), Psych/QEII Health Sciences Centre
- Frohlich, A., Diplom. Dr. rer. Nat. (Freie Universität Berlin), MSVU
- Palameta, B., BSc (McG), PhD (Cantab), Psych/UNB
- Pyza, E., PhD (Jagiellonian Univ), Inst. of Zoology, Jagiellonian Univ.
- Trappenberg, T., MSc, PhD (RWTH Aachen), Brain Science Inst., Japan

Postdoctoral Fellows

- Bosacki, S., PhD (Toronto OISE)
- Dong, Y.-N., PhD (Beijing Medical University)
- Jiao, Y.-Y., PhD (Suzhou Medical College, China)
- Lu, J., PhD (Oita Medical Univ., Japan)
- Podhorna, J., PhD (Charles Univ.)
- Rybak, J., PhD (Freie Universität, Berlin)
- Shore, D., PhD (UBC)
- Song, X., PhD (Univ. of New England, Australia)
- Sun, X., PhD (Melbourne Univ., Australia)

i. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies.

ii. Degree Programmes

The Department of Psychology offers graduate training leading to MSc and PhD degrees in Psychology, MSc and PhD degrees in Psychology/Neuroscience, and to a PhD degree in Clinical Psychology. Master's level students in Psychology and Psychology/Neuroscience are expected to advance into the corresponding PhD programmes. The Department does not have a "terminal" Master's programme nor does it offer a Master's degree in Clinical Psychology.

A. Psychology (Experimental)

The graduate programmes in Psychology emphasize training for research. They are best described as "apprenticeship" programmes in which students work closely with a faculty member who has

agreed to supervise the student's research. Compared with many other graduate programmes, the Department places less emphasis on course work and greater emphasis on research, scholarship and independent thinking.

1. Master of Science (MSc) in Psychology

In addition to the Master's thesis (PSYO 9000.00), which is the major requirement of this programme, the Master's student must complete the following classes:

- PSYO 6001.03: Fundamentals of Statistics and Experimental Design
- PSYO 7500.06: Proseminar-Methods of Psychological Inquiry
- At least one other full credit of elective seminar(s)

During each residency year Master's students must register for and attend the weekly colloquium series (PSYO 8000.06R) and are required to do some teaching in the undergraduate programme. The minimum amount of teaching is the equivalent of no more than 10 hours/week for one term. This consists of working as a laboratory instructor, seminar leader, or teaching assistant.

2. Doctor of Philosophy (PhD) in Psychology

Students are expected to conduct research leading to empirical, methodological and/or theoretical advances in their field of study, some or all of which will be included in their dissertation and defended publicly. In addition to the dissertation (PSYO 9530.00), which is the major requirement of this programme, students in the PhD programme must complete the following classes (unless they were completed as part of the Master's programme):

- PSYO 6001.03: Fundamentals of Statistics and Experimental Design, and at least one other 1/2 credit class in the quantitative/analytic area
- PSYO 7100.03: Seminar in Teaching Effectiveness
- PSYO 7500.06: Proseminar: Methods of Psychological Inquiry
- 1 full credit of elective (with approval, this may be taken outside the department)

During each year in the PhD programme students are required to register for Dissertation Research (PSYO 9530.00) and are encouraged to enrol in graduate seminars. During each residency year students must register for and attend the weekly colloquium series (PSYO 8000.06) and do some teaching in the undergraduate programme (see Master's programme description). At least one year before submission of the dissertation students must also satisfy the comprehensive examination requirement. This requirement, which is administered by an examination committee of between three and five faculty members, entails completing at least three comprehensive 'projects' that are not directly related to the student's dissertation research.

B. Psychology/Neuroscience

The graduate programmes in Psychology/Neuroscience are coordinated by the Psychology Department and an interdisciplinary Neuroscience Programme Committee with representation from the Departments of Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology and Biophysics, and Psychology (see Neuroscience calendar entry). They are also designed as "apprenticeship" programmes in which students work closely with a Neuroscience faculty member who has agreed to supervise their research. Emphasis is placed on interdisciplinary research, scholarship and independent thinking rather than on course work.

1. Master of Science (MSc) in Psychology/Neuroscience

In addition to the Master's thesis (PSYO 9000.00), which is the major requirement of this programme, the Master's student must complete the following classes:

- NESC 6100.06: Principles of Neuroscience
- PSYO 7500.06: Proseminar: Methods of Psychological Inquiry
- Students are expected to take at least 1/2 credit of class work in the quantitative/analytical area

During each residency year Master's students must register for and attend a weekly colloquium series offered by one of the participating departments (such as PSYO 8000.06) and are required to do some teaching in the undergraduate programme. The minimum amount of teaching is the equivalent of no more than 10 hours/week for one term. This consists of working as a laboratory instructor, seminar leader, or teaching assistant. Master's students

must register for PSYO 9000.00 (Thesis). The Neuroscience and Psychology Graduate Programme Committees, in collaboration with the student and supervisor, will assess the needs of the student and determine any other requirements beyond the minimum outlined above.

2. Doctor of Philosophy (PhD) in Psychology/Neuroscience

Students are expected to conduct research leading to empirical, methodological and/or theoretical advances in their field of study, some or all of which will be included in their dissertation and defended publicly. In addition to the dissertation (PSYO 9530.00), which is the major requirement of this programme, students in the PhD programme must complete the following classes (unless they were completed as part of the Master's programme):

- NESC 6100.06: Principles of Neuroscience
- PSYO 7100.03: Seminar in Teaching Effectiveness
- PSYO 7500.06: Proseminar: Methods of Psychological Inquiry

During each year in the PhD programme students are required to register for Dissertation Research (PSYO 9530.00) and are encouraged to enrol in graduate Neuroscience and/or Psychology seminars. During each residency year students must register for and attend a weekly colloquium series offered by one of the participating departments (such as PSYO 8000.06), and do some teaching in the undergraduate programme (see Masters programme description). The Neuroscience and Psychology Graduate Programme Committees, in collaboration with the student and supervisor, will assess the needs of each student and determine any other requirements beyond the minimum outlined above. At least one year before submission of their dissertation students must also satisfy the comprehensive examination requirement. This requirement, which is administered by an examination committee of between three and five faculty members, entails completing at least three comprehensive 'projects' that are not directly related to the student's dissertation research.

C. Doctor of Philosophy (PhD) in Clinical Psychology

The PhD programme in Clinical Psychology is cooperatively administered by the Psychology Department and the Clinical Programme Committee with representation from Acadia University, Dalhousie University, Mount Saint Vincent University, Saint Mary's University and professional psychologists from the teaching hospitals. It is an APA/CPA accredited, structured, five-year programme which follows the "scientist-practitioner" model. It considers clinical psychology as part of the science of psychology and therefore emphasizes research.

During the first four years of the Clinical Psychology programme, students complete required and elective classes, conduct supervised and thesis research, and gain clinical experience through field placements (PSYO 8333.06, a minimum of 600 hours are required). Students are involved in research from the outset, and are expected to conduct research leading to empirical, methodological and/or theoretical advances in their field of study, some or all of which will be included in their dissertation and defended publicly. In the fifth year, students are placed in a full-year clinical internship. Upon admission, students are assigned to a faculty member who will supervise their thesis and other research projects. The Department does not offer a Master's degree in the Clinical PhD programme, but students entering with a Master's degree in Psychology may receive advanced standing.

The following classes are required:

- PSYO 6001.03: Fundamentals of Statistics and Experimental Design. At least one other $\frac{1}{2}$ credit class in the quantitative/analytic area.
- PSYO 6201.03: Psychological Assessment: Child
- PSYO 6202.03: Psychological Assessment: Adult
- PSYO 6205.06: Interviewing and Intervention
- PSYO 6215.06: Psychopathology and Treatment
- PSYO 6220.06: Seminar: Advanced Clinical Intervention
- PSYO 6800.03: Clinical Neuropsychology
- PSYO 7100.03: Seminar in Teaching Effectiveness
- PSYO 7500.06: Proseminar: Methods of Psychological Inquiry
- PSYO 8005.03: Research Seminar
- PSYO 8201.03: Ethics and Professional Decision-Making

- At least two credits of elective seminars must also be completed.

Students in year one of the programme are required to register for PSYO 5000.06 (Assignment Research). During each subsequent year in the PhD programme students are required to register for Dissertation Research (PSYO 9530.00). During each residency year students must register for and attend the weekly colloquium series (PSYO 8000.06), Clinical Rounds/Case Conference (PSYO 8010.06) and do some teaching in the undergraduate programme. The minimum amount of teaching is the equivalent of no more than 10 hours/week for one term. This consists of working as a laboratory instructor, seminar leader, or teaching assistant. At least one year before submission of their dissertation students must also satisfy the comprehensive examination requirement. This requirement, which is administered by an examination committee of between three and five faculty members, entails completing at least three comprehensive 'projects' that are not directly related to the student's dissertation research.

III. Classes Offered

Required classes are offered on a regular basis. Other classes are offered, and seminar topics chosen, on the basis of faculty interests and student needs.

PSYO 5000.06: Research Assignment.

Students become actively involved in ongoing research in the laboratory of a faculty supervisor. In addition to research training, this class aims to improve the student's oral presentations and scientific writing. A final report (e.g. in the form of a Journal article) is required.

PSYO 5001.03/5002.03: Independent Study.

Students work closely with a faculty supervisor on a topic of mutual interest. Study may focus on laboratory research or library research and empirical, methodological, theoretical and/or professional issues may be covered. A final report is required.

PSYO 6001.03: Fundamentals of Statistics and Experimental Design.

This class will survey some common parametric statistical procedures in psychology, including analysis of variance and covariance. Major emphasis is placed on the general linear model and how best to apply the model as a function of the type of data, experimental design, and hypotheses under investigation. Some knowledge of basic statistics is assumed.

PSYO 6003.03: Multivariate Methods.

This class will cover a variety of topics in multivariate statistics, such as factor analysis, regression, multivariate analysis of variance and covariance, and discriminant function analysis. Some topics in categorical data analysis may also be covered, such as multiway frequency analysis and logic models.

INSTRUCTOR: D. Santor

PSYO 6051.03: Neural Basis of Perception.

This seminar class explores the correlations between 1) stimulus properties and neural responses produced by sensory stimulation and 2) the neural coding of environmental events and the behaviours that may be produced in the context of these events. These correlations will be studied within the auditory, visual and tactile modalities.

INSTRUCTOR: D.E. Mitchell, D. Phillips

PSYO 6060.03: Biological Basis of Mental Illness.

This seminar class explores our current understanding of the physiological mechanisms that may underlie various forms of abnormal behaviour. Its subject matter includes disorders for which a physiological mechanism has been identified as well as those for which a physiological basis is currently a matter for speculation. This class is intended for graduate students with backgrounds in some aspects of neuroscience and clinical psychology.

INSTRUCTORS: J. Connolly, B. Rusak

PSYO 6071.03: Physiological Psychology.

This seminar class covers contemporary, fundamental topics in physiological psychology, including methods, research and/or theory. Various topics such as brain mechanisms of reinforcement, hormones and behaviour, and biological rhythms, will be covered in different years.

PSYO 6081.03: Topics In Personality and Social Psychology.

Different topics in personality and social psychology (such as psychology of persons, attitude formation, group dynamics) are covered in a seminar format.

INSTRUCTOR: J. Barresi

PSYO 6091.03: Topics In Child Development.

Different topics in child development (such as language acquisition, social development, meta-cognitive processes) are covered in a seminar format.

INSTRUCTORS: P. Dunham, C. Moore

PSYO 6160.03: Comparative Psychology.

Different topics in comparative psychology (such as kin selection, parental behaviour, hormonal control of behaviour, olfaction and behaviour) are covered in seminar format.

INSTRUCTORS: S. Adamo, R. Brown

PSYO 6201.03: Psychological Assessment: Child.

This class addresses the theoretical and applied foundations of psychological measurement. Historical, theoretical and psychometric issues are addressed to provide the students with a sound knowledge base in issues related to test development, including various forms of validity and reliability, as well as research designs in test development. The second part of the class emphasizes the development of skills in the assessment of cognitive abilities, personality, behaviour and emotional functioning. Students learn to administer, score and interpret performance on a variety of assessment instruments for children. Report writing skills are developed through case studies. Computer-based test administration and interpretation are also addressed.

PSYO 6202.03: Psychological Assessment: Adult.

This class is the adult equivalent of PSYO 6201.03 and is organized to complement material covered in the first term. The emphasis is on adult assessment.

INSTRUCTOR: S. Stewart

PSYO 6205.06: Interviewing and Intervention.

This class emphasizes the development of skills in clinical interviewing. Class content focuses on the applications of different modes of interviewing, applications to different populations, social and cultural factors, the examination of variations in style of interaction, the different phases of an interview, and building a working relationship. Students learn how to structure interviews according to specific assessment and intervention goals. The class also focuses on the development of skills in diagnostic interviewing. Students become familiar with the classification system of the DSM-III-R, DSM-IV, hierarchical decision trees, and differential diagnosis. Students view training tapes, as well as case vignettes of interviews with patients with various psychological and dimensional classification systems (e.g. Achenbach's Child Behaviour Profiles) will also be examined.

INSTRUCTOR: D. Santor

PSYO 6211.03: Topics In Assessments.

Different topics in assessment are covered in a seminar format.

INSTRUCTOR: J. Connolly

PSYO 6215.06: Psychopathology and Treatment.

This class examines the different approaches to the study and treatment of psychopathology. The class examines historical and social aspects of research on psychopathology and highlights issues of current concern. Emphasis is placed on human and animal literature addressing the bases of psychological disorders. Research addressing the efficacy of psychological and pharmacological interventions is also examined. One of the aims of the class is to

familiarize students, from an empirical perspective, with the applications as well as limitations of different intervention modalities.

INSTRUCTORS: J. Connolly, D. Waschbusch

PSYO 6218.03: Topics In Psychopharmacology.

This class examines the neural and behavioral effects of drugs. The agonist and antagonist actions of drugs on receptors for neurotransmitters and the effects of drugs on neurotransmitter synthesis, storage, release and deactivation are covered. Aimed specifically at psychologists, the class focuses on the use of drugs to treat clinical disorders such as depression, schizophrenia, Alzheimer's disease, etc.

INSTRUCTORS: R. Brown, S. Stewart

PSYO 6220.06: Advanced Clinical Intervention.

This class focuses on a wide range of theoretical and applied aspects of intervention. The class comprises a didactic component, as well as direct participation in evaluation, case planning and intervention.

The didactic component focuses on instruction in case conceptualization, treatment planning, and treatment evaluation. Part of the class will be conducted through a clinical service in the community. Students will be required to conduct psychological evaluations of patients and participate in treatment interventions.

INSTRUCTOR: M. Sullivan

PSYO 6240.03: Topics In Animal Learning.

Different topics in the field of animal learning (such as classical and operant conditioning, quasi-neural modeling of learning phenomena, etc.) are covered in a seminar format.

INSTRUCTOR: V.M. LoLordo

PSYO 6313.03: Topics In Cognitive Psychology.

Varied topics in cognitive psychology (such as theories of attention, memory and amnesia, cognitive inhibition) are covered in a seminar format.

INSTRUCTORS: R. Klein, P. McMullen

PSYO 6330.03: Topics In Forensic Psychology.

Forensic Psychology deals with the applications of psychological principles and methods to various aspects of the criminal justice system (i.e., the courts, corrections, policing). Coverage of this broad topic will vary from a general overview of the field to specific topics of interest to the students. Whatever the topic, professional and ethical issues will be addressed and the complexities of conducting research on psycho-legal issues will be explored.

INSTRUCTOR: S. Porter

PSYO 6410.03: Topics In Therapeutic Intervention.

This seminar will focus on specific types of intervention. Topics, which may vary from year to year, may include: crisis intervention, feminist therapy, operant interventions, family therapy, marital therapy, sex therapy, cognitive behaviour therapy, individual psychotherapy, pharmacotherapy, etc.

PSYO 6420.03: Topics In Health Psychology.

This seminar will examine specific topics concerning the inter-relationship between physical health and psychology. Topics, which may vary from year to year, may include: paediatric psychology; pain, health in the aged, health promotion, cardiovascular disease, etc.

PSYO 6580.06: History of Psychology.

In writing dating from antiquity to the early years of the 20th century we explore the understanding of such abiding sources of our curiosity as individual, racial and sexual differences, the distinctions between man and animal, the sources of odd actions, the nature of the brain and of vision

PSYO 6800.03: Clinical Neuropsychology.

This class emphasizes the development of a knowledge base by surveying several aspects of clinical neuropsychology. Topics include neuroanatomy, neurological exam, investigations and

diseases, models of neuropsychological assessment, dementia, epilepsy, localization of function, cognitive remediation, theories of aphasia, amnesia, and agnosia.

INSTRUCTOR: J. McGlone

PSYO 8803.03: Topics in Psychopathology.

Topics in psychopathology, which may vary from year to year, include: anxiety, child psychopathology, drug abuse, schizophrenia.

INSTRUCTOR: M. Sullivan

PSYO 8804.03: Topics in Neuropsychology.

These seminars will vary from term to term and will focus on specific aspects of neuropsychology. Topics may include: localization of function, neuropsychological assessment, neurological, psychiatric and medical neuropsychology, cognitive rehabilitation, child neuropsychology, aphasia, amnesia, agnosia and apraxia.

INSTRUCTOR: J. McGlone

PSYO 8820.03: Topics in Community Psychology.

The focus of this seminar will be on the delivery of psychological services in community settings. The topics will vary from year to year depending on the needs of the class and the expertise of the instructor.

PSYO 7100.03: Seminar in Teaching Effectiveness.

Students currently engaged as Teaching Assistants in PSYO 2000.03 must concurrently enroll in this class, which has two components: 1) a weekly meeting in which all students meet to discuss general and specific issues related to class planning, assessment of student performance and dealing with problems; 2) actual teaching experience in class for 2 hours/week. Teaching performance is intermittently observed and feedback provided on an individual basis.

INSTRUCTOR: P. Dunham

PSYO 7500.06R Proseminar: Methods of Psychological Inquiry.

With the assistance of regular and adjunct faculty in the Department of Psychology all new students are exposed to the broad range of topics in Psychology as well as a sampling of methodologies used to study behaviour (human and animal) as well as its neural underpinnings. In addition, the class aims to develop the student's communication skills (oral, writing, poster presentation) and research ability.

INSTRUCTOR: R. Klein, Coordinator

PSYO 8000.06: Psychology Colloquium.

Students enrolled in this class are required to attend the weekly colloquium series.

PSYO 8005.03: Research Seminar.

This class focuses on theoretical and substantive aspects of research design. Topics include reliability and validity of measurement, correlational, quasi-experimental, and experimental designs, measurement redundancy, and power analysis. Students present on selected topics, as well as present on design issues related to their dissertation.

INSTRUCTOR: P. McGrath

PSYO 8010.06: Clinical Rounds/Case Conference.

All students are expected to attend clinical rounds and presentations in various clinical settings in the community. Students are also expected to attend clinical case conferences that will be held on a monthly basis through the Fall and Winter terms. Clinical psychologists from the community and senior students are invited to present cases from their clinical practice. The aim of this class is to familiarize students with different ways of conceptualizing psychological problems, planning and initiating interventions, and evaluating outcome. Evaluation is based on student attendance and participation.

INSTRUCTOR: M. Sullivan

PSYO 8201.03: Ethics and Professional Decision Making.

This class covers ethical and professional issues arising in various fields of psychology, including clinical practice and research. Students will be encouraged to develop a methodology for appraising their ethical and professional behaviour through an understanding of such issues as the legal regulation of psychology, codes of ethics and professional standards, and malpractice. The class will introduce students to the concepts of quality and risk, and explore the relationship between psychology and other professions in multi-disciplinary contexts. The class will also examine the relation between psychology standards and standards established by organizations in which psychologists work, such as health facility accreditation.

PSYO 8333.06: Field Placements.

Students are assigned to field placements in co-operating institutions where the student will spend one day per week (or equivalent). Placements are individually arranged to provide the student with experience in a variety of clinical environments. Field placements are coordinated and monitored by the Clinical Programme Committee. Students who are assigned to field placements will present case reports in a weekly one-hour seminar. Students must complete a minimum of 600 practicum hours before they can register for the predoctoral internship (see Practicum Guidelines).

PSYO 9000.00: MSc Thesis.

PSYO 9100.00: Pre-Doctoral Internship.

A 12-month, full-time internship in an approved setting is required. Typically, the internship setting will be accredited by the Canadian Psychological Association or the American Psychological Association.

INSTRUCTOR: M. Sullivan, Coordinator of Clinical Programme

PSYO 9530.00: PhD Thesis.

Public Administration

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WWW: <http://www.mgmt.dal.ca/spa/>

Director of School

Sullivan, K.C.

Graduate Co-ordinator

Cassin, A.M.

Professors

Aucoin, P., BA (SMU), MA (Dal), PhD (Queen's), jointly with Political Science. Government organization, public management reform

Bakvis, H., BA (Qu), MA (UBC), PhD (UBC), jointly with Political Science. Intergovernmental relations, government structure and organization, political parties and interest groups, and electoral reform

Brown, M.P., BA (MtA), MA (Dal), PhD (UofT). Organizational analysis, political culture and public policy, forestry and environmental policy, Nova Scotia political economy

McNiven, J.D., MSc, PhD (Michigan), jointly with Business Administration. Business/government relations and economic development policy

Poel, D.H., BA (Calvin), MA (W Mich), PhD (Iowa). Programme evaluation and policy analysis, accountability and governance

Sullivan, K.C., BSc, BEd (Dal), MEd, PhD (Alta). Technology use in public administration and analysis of organizational culture

Traves, T., BA (Man), MA, PhD (York), President and Vice-Chancellor, Dalhousie University (jointly with History)

Associate Professors

Siddiq, F.K., BA, MA (Dhaka), PhD (Dal). Income and wealth distribution, economic inequality and well-being, public debt management

Assistant Professor

Cassin, A.M., BA (Man), MA (UBC), PhD, (UofT). Public sector management, gender relations, career advancement, community economic development

Adjunct Professors

Durier-Copp, M., BA, MA, PhD (McG)

Fanjoy, E., BSc (Hons) (UNB), LLD (UNB)

Gilbert, M., BSc (SMU), MBA (Dal), PhD (Brad)

Lopes, B., BA (SMU)

Pross, A.P., BA, MA (Queen's), PhD (UofT)

Regan, T., BA (UofT), MA, PhD (Duke) (Sociology, Acadia University)

Ricker, E., BA, MEd (UBC), PhD (Uof T). Policy theory, educational policy, educational administration, local government of education

Special Lecturers

Carroll, R., BBA, BEd (StFX), MBA, PhD (Dal), CGA

Students seeking further information or help in planning courses of study in the School of Public Administration should address themselves to:

Graduate Co-ordinator
School of Public Administration
6152 Coburg Road

Halifax, NS B3H 3J5
Telephone: (902) 494-3742
Fax: (902) 494-7023

I. Degree Programmes

The graduate programmes of the School are designed to provide the professional education essential to a career in modern public service. They are offered to students who either are preparing for initial employment or are returning to university with work experience. The School's location in Dalhousie's Faculty of Management allows students to develop an MPA programme that links public administration to business, the environment and the information sciences.

The programmes are professional in that they equip students with both the administrative skills required in public sector management and an understanding of the organization, process, and activities of government. Each component is essential, and consequently required of all students. They are expected to achieve an expanded awareness of the public interest and a personal appreciation of the ethical standards appropriate to a career in the service of the public. The professional requirements have been developed in consultation with senior officials of all levels of government (including graduates of the School).

Admission requirements for the GDPA and the MPA are those of the Faculty of Graduate Studies, and its standards must be maintained throughout the duration of the programme. The quantity and quality of work expected in individual classes will reflect the high scholarly standards of graduate education.

The curriculum encompasses the essential components of financial, personnel and statistical techniques on the one hand, and economic, organizational and policy analysis on the other. The Graduate Diploma programme and the first year of the two year MPA programme require students to complete courses in these basic fields.

Students in the second year will propose their programme from the offerings in the School and may elect to take up to three half credits from classes outside the School. Elective classes proposed from outside the school must be relevant to the field of Public Administration. Students must discuss with and have their programme approved by the graduate coordinator. The second year of the MPA programme offers the student the opportunity to select one of the following concentrations:

- Public policy
- Public management.

Each student, at the start of the second year of studies (or the equivalent for part-time studies), may declare one of the above as an area of concentration. A minimum of six (including projects and directed readings, if any) of the nine elective classes will be selected from the area of concentration. The other three classes, designated as free standing, may be selected from elsewhere. These include classes from the other area of concentration, cross-listed classes taught by non-SPA members, and classes from other academic units at Dalhousie or other universities provided they have some public sector content. The offerings of related programmes and disciplines, such as business administration, economics, health services administration, law, planning, political science, sociology, and social work can be used by students subject to the approval of the Graduate Co-ordinator. Students who receive some advanced standing or exemptions on the basis of their previous course work will take at least two-thirds of the elective classes from their area of concentration.

A one-year MPA, consisting of five full credits of course work, may be considered for students who have completed, with a first-class standing, a BA honours degree in public administration, political science or economics. Admission to the one-year MPA may also be based on completion, with first-class standing, of an MA degree in these academic areas or a professional graduate-level degree in a field relevant to public administration (i.e., with public sector content). Course work in the honours degree and/or the masters programme must have included at least three of the five course credits required in the first year of the two-year MPA programme.

Students in the one-year MPA programme will select their area of concentration at the start of the programme and may take up to one elective class, from outside the area of concentration.

The School and the Faculty of Law offer a joint LLB/MPA programme. The programme allows students to take the two degrees simultaneously and to complete them in four years, rather than in five years as is the case if each is taken independently. Students interested in entering the joint programme should apply separately to both the School of Public Administration and the Faculty of Law, indicating on their applications that they wish to enter the MPA/LLB programme. The closing date for applications for the LLB is the end of February.

Students in the LLB/MPA programme will be eligible to take up to one of the five elective classes from outside the area of concentration. The Senior Seminar: Ethics in the Public Service (PUAD 6000.03) class is not a required class for LLB/MPA students, but may be taken as an elective class.

II. Applications Procedure

Application forms are available from the Admissions Office of Dalhousie University. Applications should be submitted as early as possible and not later than June 1 in the academic year in which studies are to commence.

A. General Admission Requirement for GDPA and MPA

Enrolment in the School is limited. In general, competitive applicants will have attained a good second class standing (B+ average) in their previous university work.

Admission is based on an assessment of:

- Professional experience and/or promise;
- All previous academic work;
- Letters of reference;
- TOEFL for foreign students (Test of English as a Foreign Language), a minimum score of 580 is required for acceptance in the Faculty of Graduate Studies. The TOEFL score must be submitted at the time of application;

Therefore, it is imperative that in addition to your application we receive:

- A statement of career interest (one page should be sufficient);
- A current résumé;
- At least two letters of reference (one of which should be academic);
- A TOEFL score (if applicable)

Students may submit a score from the Graduate Management Admission Test (GMAT) in support of their application. In the case of North American candidates, applications for the test are accepted by the ETS in Princeton until approximately six weeks before test dates. For candidates in other countries, closing dates are eight weeks before test dates.

The Dalhousie School of Public Administration GMAT Number is 0957.

Applicants for the test should use an order form obtainable from the Registrar's Office of the nearest University, Dalhousie University, or you may write to the address below to obtain an information bulletin and registration form for the GMAT. If the order form is lost or omitted from the materials you receive, you should write directly to:

Graduate Management Admission Test
Educational Testing Service
Box 966
Princeton, NJ, 08540, U.S.A.

Students are required to demonstrate at an early stage in their studies that they are proficient in writing reports and essays in English. Candidates from countries outside Canada whose mother tongue is not English will be required to take the Test of English as a Foreign Language as a requirement for admission. (See section 2 of this calendar.)

For further information, contact the Administrative Secretary of the School.

B. Part-time Study

The programmes offered through the School are available to students on a part-time basis. A part-time student may enrol in up to two and one-half full credit classes during the 12 months, September to August.

In order to ensure that graduate students benefit from a reasonable concentration of their studies, part-time programmes leading to the GDPA must be completed within four years, and part-time programmes leading to the MPA must be completed within six years.

III. Degree Programmes

A. Graduate Diploma in Public Administration (GDPA)

The Graduate Diploma in Public Administration is a one-year graduate programme designed for public servants who hold a first degree, and for students wishing to obtain professional preparation for a career in public administration.

Class Requirements

The GDPA requires the successful completion of five credits:

- PUAD 5100.03: Government Structure and Organization
- PUAD 5110.03: Public Sector Management
- PUAD 5120.03: Introduction to Public Policy
- PUAD 5121.03: Introduction to Policy Analysis
- PUAD 5130.03: Applied Economics I
- PUAD 5131.03: Applied Economics II
- PUAD 5140.03: Quantitative Methods I
- PUAD 5141.03: Quantitative Methods II
- PUAD 5150.03: Public Sector Accounting
- PUAD 5151.03: Public Sector Financial Management

When a student has a demonstrated competence in the area of a required class, an alternate class may be substituted if approved by the Graduate Co-ordinator.

B. Master of Public Administration (MPA)

The MPA is a graduate programme designed for individuals prepared to undertake advanced professional study. Individual programmes will vary in content to reflect each student's background and interests, while at the same time recognizing the central principles and functions of public administration.

Class Requirements

The two-year MPA will require the successful completion of 11 classes, which must include:

- PUAD 5100.03
- PUAD 5110.03
- PUAD 5120.03
- PUAD 5121.03
- PUAD 5130.03
- PUAD 5131.03
- PUAD 5140.03
- PUAD 5141.03
- PUAD 5150.03
- PUAD 5151.03
- PUAD 6000.03

The remaining credits will be electives, depending primarily on the student's area of concentration. Some advanced standing, resulting in a reduction of up to two and a half full-credits, may be granted to well qualified candidates.

The one-year MPA will require the successful completion of five credits, including up to two credits from the 5000-level classes, the Senior Seminar: Ethics in the Public Service (6000.03), and at least two and a half elective credits.

C. MPA (Management)

In July 1997, the School received Senate approval for an MPA (Management) degree. The MPA (Management) will be a distance education, 16 credit graduate professional management degree for

public sector executives wanting to improve the quality of their management performance today and maximize their prospects for career advancement in the 21st century.

The MPA (Management) will develop the following competencies in managers:

- Greater substantive knowledge of critical current issues in management/organizational design/policy;
- Analytical and problem-solving competencies for strategic change management;
- Leadership skills, in terms of interpersonal relations, building and using teams, effective verbal and written communications, and public service professionalism;
- Critical capacities for assessing best practices in comparative public/private sector contexts;
- Ability to manage financial resources optimally;
- Ability to manage people effectively;
- Ability to communicate and negotiate effectively both internally and externally;
- Ability to manage information;
- Sharpened ethical sensitivities.

Applicants will normally have a solid undergraduate degree with at least a B average. However, applicants who lack formal university training but have 10 years or more management experience and an appropriate professional certification or designation may still apply and be admitted if a Prior Learning Assessment (PLA) establishes that the combination of their work experience and professional designation or certification provides B standing equivalency.

The MPA (Management) will feature a number of off-campus delivery modes, including the Internet. Each class will conclude with an on-campus 2-day intensive classroom session.

For further information, contact the Coordinator, MPA (Management).

D. The LLB/MPA Programme

The combined LLB/MPA programme is a four-year programme which enables students to select classes leading to degrees of Master of Public Administration and Bachelor of Laws. The suggested order of the programme is:

Year 1

- First year classes of the MPA programme

Year 2

- First year classes of the LLB programme

Year 3

- One and a half credits from the MPA programme
- Civil Procedure
- Constitutional Law
- 16 hours of classes from the LLB programme.

Year 4

- One credit from the MPA programme
- A minimum of 23 hours of classes from the LLB programme, which must include The Legal Profession and Professional Responsibility.

Candidates for the LLB/MPA programme must satisfy the entrance requirements of both programmes, and may obtain further information about the combined programme by writing to the School of Public Administration and the Faculty of Law. For admission, students must apply to both the School of Public Administration and the Law School individually. Students applying for the MPA programme may submit LSAT results in lieu of GMAT results.

Advanced Standing

Advanced Standing of up to five credits (one year) may be granted to students who have completed graduate level classes which are relevant to the Masters in Public Administration Programme but which have not been used towards another degree. Students are advised to seek advanced standing when they apply for admission.

The Internship Programme

The Internship provides for formal integration of practical public service experience with academic studies in the MPA programme. It involves work by students for employers in the public sector on projects deemed to be significant by the employer and appropriate to the skills of career-oriented graduate students. The terms of reference are established through consultation between the student, the participating employer, and the School.

The opportunity for an internship placement is available to students who have completed one year of course work.

Previous work placements have been in the federal, provincial and municipal levels of government, international and non-governmental organizations and in the private sector.

IV. Classes Offered

PUAD 5100.03: Government Structure and Organization.

This class examines the structure of government and organizational design for public administration in Canada. The objectives of the course are that students develop an understanding of: 1) the principles and conventions which structure the legislative, executive and judicial branches of constitutional government; 2) the principles and theories which inform organizational design for public management; and 3) the dynamics of politics and power which shape organizational practices in public management. For information about assignments and other course requirements, please consult the instructor.

INSTRUCTOR: P. Aucoin

PUAD 5110.03: Public Sector Management.

This class explores managerial practice and theory in the public sector. It focuses upon the character and technique of management in the public service and upon how managerial action in organizational settings may be investigated. Management theory and practice have only recently influenced public sector organizations but are now replacing traditional modes of thinking and organizational practices. Yet very little consideration has been given to the desirability and consequences of applying managerial thinking and techniques in the public domain. The course begins with a consideration of the proposition that management is a definite method of organization and thinking. It goes on to consider how managerial methods of control, co-ordination, co-operation, planning and decision-making have been and are being adopted by the public sector. For information about assignments and other course requirements, please consult the instructor.

INSTRUCTOR: P. Aucoin

PUAD 5120.03: Introduction to Public Policy.

This class examines policy-making theory and practice and considers 1) how important policy-making procedures are in determining eventual policy "outcomes" and 2) whether policy theory provides clear answers to what constitutes best practice for liberal democratic forms of government. The class begins by reviewing commonly held understandings or conventions about policy-making in the parliamentary system of government and then considers whether a case can be made for a dominant (or paradigmatic) view of the policy process and the extent to which any such view of policy making remains stable over long periods of time. Various empirical and normative characterizations of policy-making are then considered. Topics will be selected from the following list: institutionalism and neo-institutionalism, rational policy-making, incrementalism, mixed-scanning, systems analysis, various theories of interest group influence and control (pluralism, post-pluralism, liberal corporatism, constitutionalism), theories of bureaucratic control (coupled with theories of elite and class control), and finally, public choice theory. Each of these perspectives or models is considered in terms of its explanatory adequacy as well as its claim to normative status. The objective of the class are: 1) to enable students to see that the policy-making process can be understood in different ways by employing different conceptual perspectives and to enable them to apply these perspectives in the analysis of policy problems; and 2) to demonstrate that methodological pluralism is not only characteristic of policy studies today, but a worthwhile way to encourage both objectivity in the analysis of policy-making and creativity in the consideration of

appropriate policy instruments for particular kinds of policy contexts. For the purpose of a seminar presentation and major assignment, students will be required to work with one or more of the conceptual perspectives considered in this class to assess a policy problem (selected from any level of government). A number of short papers on particular perspectives or models and/or response papers to class presentations will also be required. There is no final examination.

INSTRUCTOR: Ricker

PUAD 5121.03: Introduction to Policy Analysis.

A distinction can be made between policy research and policy analysis and at least one difference is that policy analysis will be "client-oriented advice." The aim of this course is to provide participants with some familiarity with the process and techniques of analyzing public policy problems and proposing options for their resolution.

Policy analysts bear much of the responsibility for determining what information will be considered by ministers and senior officials as they determine public policy. Their role has been made increasingly difficult in the recent periods of down-sizing, financial restraint, and re-engineering in which alternative and competing models of governance are tried in attempts to do more (or the same) with less. The course will be divided approximately one-third/two-thirds between an overview of recent directions in policy analysis, approaches and methods, and the application of these to a policy analysis problem. Teams will be formed to implement small scale policy analysis projects for government agencies in the Halifax area.

INSTRUCTOR: Poel

FORMAT: Seminar

PUAD 5130.03: Applied Economics I.

This is an introductory course in economics that covers the basic principles of microeconomics. In particular, it places special emphasis on the economic behaviour of individual households and firms and the determination of the market prices of individual goods and services. As well, the course is structured to enable the student to interpret clearly the workings of a free market economy and the role of the public sector in the context of such an economy. The objectives of this course are to provide an understanding of basic economic concepts and principles and analytical techniques, to complement other first year courses, and to provide the necessary theoretical and analytical background for second year courses. The class structure for the course is based on a weekly two-hour lecture and one-hour tutorial class. Students will be expected to do a number of assignments and write one mid-term test as well as a final examination.

INSTRUCTOR: F. Siddiq

PUAD 5131.03: Applied Economics II.

This course introduces the basic principles of macroeconomics and public finance. It places special emphasis on the role of the government in the economy and on the application of economic theory in the analysis of government policy.

Together with Applied Economics I, its objectives are to provide an understanding of basic economic concepts, principles, analytical techniques, to complement other first year courses in government structure and management, policy formulation, and quantitative methods, and to provide the necessary theoretical and analytical background for second year courses.

The class structure for the course is based on a weekly two-hour lecture and one-hour tutorial class. Tutorial classes will review assignments, and will deal with policy issues such as government budgets and interest rates. Students will be expected to do a number of assignments and write one mid-term test as well as a final examination.

INSTRUCTOR: F. Siddiq

PUAD 5140.03: Quantitative Methods for Public Sector Management I.

The course is designed for students from a variety of backgrounds, including those with only slight acquaintance with quantitative methods. The course is designed to give participants a reasonable understanding of both the potential and the limitations of quantitative methods in the policy and administrative process.

Participation in this course (as well as PUAD 5141B) should lead to the ability to apply simple quantitative techniques; to read critically quantitative research reports; and to communicate the results of such reports to a lay audience.

The bulk of course time is devoted to basic descriptive and inferential statistics.

Students are introduced to the use of computers and their role in storing and analyzing data. A number of exercises are assigned, including ones involving the analysis of data on the computer. There is a mid-term test and a final examination.

INSTRUCTOR: D. Poel

PUAD 5141.03: Quantitative Methods for Public Sector Management II.

This course is designed to give participants a reasonable understanding of the potential and limitations of quantitative methods in the policy and administrative process. It will also give students practice in selected applications in quantitative methods and the communication of quantitative analysis to different information users. The course will use quantitative research reports to highlight issues in analysis and presentation.

This course is a continuation of the material covered in PUAD 5140.03, which is normally a prerequisite. It will assume that students are familiar with basic descriptive and inferential statistics and with the analysis of data on the computer (basic file management and editing and an introduction to SPSS). Please consult the instructor for additional information about assignments, and other course requirements.

INSTRUCTOR: H. Bakvis

PUAD 5150.03: Public Sector Management and Accounting I.

This course introduces students to the subject of accounting in governmental, non-profit and private sector organizations. A "user" approach is taken, but the course is presented from the standpoint of both users and authors of financial reports. No previous background in accounting is required but the course is challenging and provides a knowledge of the essential elements of accounting for professionals in the field of public administration. For information about assignments and other course requirements please consult the instructor.

INSTRUCTOR: R. Carroll

PUAD 5151.03: Public Sector Financial Management and Accounting II.

This sequel to PUAD 5150 focuses upon financial management. Topics include: discounted cash flow analysis; valuation models; risk and rates of return; cost of capital; capital budgeting; long-term financing decisions; short-term financial management and financial analysis and planning. Further case applications of budgeting techniques and financial analysis are taken up in PUAD 6100. Please consult the instructor for information about assignments and other course requirements.

NOTE: PUAD 5150A or an equivalent accounting course approved by the instructor is a prerequisite for PUAD 5151B.

INSTRUCTOR: R. Carroll

PUAD 6000.03: Senior Seminar: Ethics In the Public Service.

One of the senior seminars and designed as a culminating and integrating exercise for the MPA programme, this course focuses upon a wide range of ethical problems. Topics covered include conflict of interest, accountability, political neutrality, service to the public and codes of conduct.

The course is based on case studies with a premium placed on discussion. Please consult the instructor for information on assignments and other course requirements.

NOTE: For students enrolled in the two-year MPA programme, successful completion of the first year of studies is the prerequisite for this course.

INSTRUCTOR: P. Brown

Public Policy Concentration Classes

PUAD 6010.03: Issues in Public Administration.

This course offers students an opportunity to examine one or more currently salient issues in the field of public administration. For the 1996-97 academic year, the course focuses upon government restructuring, with the Nova Scotia government taken as a case study, but considered in the much broader context of government restructuring in certain of the western democracies in the 1990s. In the first few sessions the forces underlying restructuring will be examined with reference to specific conditions that are common to a number of these democracies; assigned readings will address both the causes and consequences of restructuring from various perspectives. Attention will also be given to restructuring initiatives in other Canadian provinces.

Against this background the Nova Scotia case will be considered. Detailed assessments of restructuring within particular government departments and government agencies will be provided together with some overarching assessments of the restructuring process. The latter will include an assessment of the significance of the budgetary and deficit crisis for the restructuring agenda; an assessment of selected evaluative techniques used by government departments in the pursuit of the restructuring agenda, and an assessment of what restructuring has meant for human resource management and for the morale of government employees. This course will involve expert presentations by several members of faculty and for certain topics senior government officials will be invited to join in the discussion that will follow each presentation. Students will be required to prepare a number of short papers either in preparation for or as responses to particular presentations; a term paper on a topic associated with restructuring will also be required. For the term paper students will be encouraged to apply one or more techniques or theoretical perspectives acquired in one of the first year MPA courses to a topic covered in the course or to a closely related topic on government restructuring.

NOTE: For students enrolled in the two-year MPA programme, successful completion of the first year of studies is the prerequisite for this course.

INSTRUCTOR: Ricker

PUAD 6100.03: Public Sector Financial Administration.

This course will provide participants with an opportunity to review the ways in which governments have tried to connect what they want to do with what they spend money for — i.e., the attempts to link planning, programming, budgeting and accountability. Recent developments at both the provincial and national levels of Canadian government will be used as case material; expenditure management systems, the development of "business plans" and lines of "business", the use of alternative delivery systems, and the impact, generally, of new public management developments on notions of accountability. All will be considered.

INSTRUCTOR: D. Poel

PUAD 6235.03: Issues in Applied Economics.

This course addresses a selection of topics in applied economics that are of considerable significance for an economy. It is designed for those students who wish to develop the ability to (a) understand and interpret different economic programmes and policies beyond the introductory level; and (b) help formulate and implement such policies. Topics covered will depend in part upon the interests of students but some will be based upon the following areas: poverty and inequality; inflation and unemployment; stabilization policies; public sector economics; international trade and the balance of payments; labour markets and unions. Each student will be expected to specialize in a topic of his or her choice and prepare a major paper for presentation in class. There will also be short assignments and a final examination. Please see the instructor for additional information about course requirements.

INSTRUCTOR: F. Siddiq

PUAD 6300.03: Alternative Methods in Program Delivery.

Alternative Methods in Program Delivery is a graduate and honours undergraduate level seminar which allows participants to conduct and present research on the increasing resort by governments at all

levels to alternative methods of program delivery. Over the last decade and a half, governments around the world have moved from designing and delivering program themselves to utilizing the private sector, both profit and non-profit, for this purpose. These alternative methods have taken the form of the privatization of crown assets, public-private partnerships to address a myriad of concerns (from the design and construction of bridges and highways to the management of laundry facilities in institutions for long term care), user fees and charges, contracting out, and the adoption of business-like practices in their own operations.

This course has two purposes. The first is to allow participants to explore a methodology for assessing the viability of alternative program delivery in particular fields, based on the best practices of the past decade. The second is to allow participants to explore critically the use or proposed use of alternative methods of program delivery in areas in which they have an interest. Each participant is expected to prepare a seminar paper of at least 5,000 words, to present their findings in class in a presentation not exceeding thirty minutes in length, and to respond to questions. In addition, participants are asked to prepare a critique of a paper by another participant, and to lead discussion on that paper.

PUAD 6400.03: Local Government.

It has been said that a student who would understand the government of a country can only obtain a full knowledge of it if he or she has a basic understanding of that country's government at its local or municipal level. This class will examine the organization of local government in Canada and will provide a means for students to acquire that "basic understanding". A particular focus on the class this year will be the government of metropolitan areas, including in particular the amalgamation programs in Halifax and Cape Breton. This will be achieved through weekly readings, lectures, class discussion, personal observation, and individual research. For additional information about course assignments and other requirements, please consult the instructor.

INSTRUCTOR: Cameron

PUAD 6500.03: Business and Government.

This course builds upon knowledge acquired in the first year of the MPA and MBA programmes. The aim is to explore the relationship between the worlds of business and government. The course begins by outlining the different logic and ethical codes of businesses and bureaucracies and then proceeds to examine the dynamics of interactions between the two sectors. Class topics are focused on the real world of business-government relationships. Assigned work includes a videotaped presentation on an appropriate topic. There is a final examination. Please consult the instructor for further details about course requirements.

INSTRUCTOR: J. McNiven

PUAD 6505.03: Interest Groups.

This course undertakes a systematic examination of the functions and management of interest groups in Canada, and to a lesser extent, other western countries. It commences with a review of the role interest groups have played historically in Canadian politics and government and a discussion of the conceptual approaches that have been taken to interpret both the development of interest groups and their influence. These introductory sessions are intended to provide a framework for later seminars and for papers to be prepared by class members. The remaining sessions deal with the organization of particular interest groups and interest group associations and how they operate under conditions of consensus and conflict. The class is conducted on a lecture-seminar basis. Please see the instructor for information about assignments and other course requirements.

INSTRUCTOR: H. Bakvis

PUAD 6510.03: Policy Analysis Project.

Intended for students who have already taken introductory classes in economics and policy analysis, this class synthesizes the conceptual and technical material introduced in the first year of the MPA program, refines approaches to policy analysis, and prepares students for government employment. Project assignments focus

on selected key issues in public finance. Please consult the instructor for further information about course assignments and other requirements.

INSTRUCTOR: F. Siddiq

PUAD 6537.03: Issues in Environmental Policy.

Issues in Environmental Policy is a graduate and honours undergraduate level seminar which allows participants to conduct and present research on the major environmental issues of our day. In general terms, the course is concerned with what governments do and how they do it insofar as the environment is concerned. This entails an examination of both the instruments of governance, ranging from expenditures to regulation, including the use of economic instruments, and of the factors which govern the use of particular instruments. Course participants are encouraged to bring these concepts to bear in exploring the environmental issue of their choice. Each participant is expected to prepare a seminar paper of at least 5,000 words, to present their findings in class in a presentation not exceeding thirty minutes in length, and to respond to questions. In addition, participants are asked to prepare a critique of a paper by another participant, and to lead discussion on that paper.

INSTRUCTOR: P. Brown

PUAD 6540.03: Canadian Regional Development Policy.

PUAD 6545.03: Provincial and Municipal Economic Development.

The aim of this course is to provide an understanding of the elements of economic development as practiced by government officials in most parts of the world. Most of this activity takes place at the local or regional (province, state) level. Economic development, in this context, refers not to technical economics, but to the way in which government officials try to encourage business and job growth in their respective territories.

The course will touch on such topics as industrial attrition, incentives and subsidies, community economic development, industrial parks, technology development and job training. Experienced individuals from the North American Policy Group (NAPG), Business Development Information (BDI) and local development agencies will add their expertise to the course. A seminar format will be used if it is appropriate for the number of students enrolled. Evaluation will be based on participation and on a major project.

*NOTE: Dr. McNiven will be assisted by Janice Plumstead of the North American Policy Group
INSTRUCTOR: J. McNiven

PUAD 6750.03: Intergovernmental Relations.

This class will examine the territorial division of political and administrative power and the nature of relations between governments which result from such a division of power. Weekly readings as well as lectures and discussion in class will deal with the causes and the character of the division of power established by Confederation in 1867, and the evolution of that division through legal, financial and administrative decisions and arrangements. Also, the similarities and differences as between inter-provincial, and federal-municipal (including federal-provincial-municipal or "tri-level") relations will be examined. Specific topics will include the role of the courts in constitutional interpretation, the instruments of "fiscal federalism" (including equalization payments, conditional grants, tax sharing arrangements and shared cost programs), administrative relationships and the concept of "executive federalism", as well as the 1982 constitutional changes and their implications for the future. In examining these topics, several themes will be explored, including the concepts of centralization and decentralization in Canadian federalism, the inter-relatedness of political and administrative structures with the division of power, and therefore intergovernmental relations, for policy outcomes. The last of these themes will be pursued further by each student through the preparation of a research paper. This paper will deal with a policy area selected by the student (transportation, education, health, etc.) and will provide an opportunity for a more intensive

examination of the impact of intergovernmental relations, on public policy and vice versa. For additional information about course requirements, please consult the instructor.

INSTRUCTOR: H. Bakvis

PUAD 6755.03: Comparative Federalism.

This is a seminar class which examines the theory, practice and administration of federalism within a comparative framework. Particular federations selected for discussion will depend in part upon the interests of students, but for the 1996-97 regular session special attention will be given to the political, economic and administrative aspects of the European Union. Students will be expected to make a minimum of one class presentation as well as to prepare a term paper. There will be a final examination.

INSTRUCTOR: H. Bakvis

PUAD 6785.03: Advanced Quantitative Methods.

INSTRUCTOR: F. Siddiq

Public Management Concentration Classes

PUAD 6100.03: Financial Administration and Budgeting.

INSTRUCTOR: D. Poel

PUAD 6110.03: Public Sector Auditing.

PUAD 6410.03: Municipal Management.

The purpose of this class is to provide students with an enriched experience in understanding practical decision-making situations in the municipal arena. The assumption throughout is that course participants are headed for a Chief Administrative Officer (CAO) position in smaller municipalities or a middle management position in larger municipalities.

Accordingly, the emphasis is on small group dynamics. Students will be expected to deal with the substantial paper flow which accompanies senior management positions, including some theoretical literature. However, the central thrust will be on developing a capacity to meet the requirements of the senior management level, and to respond appropriately to financial, personnel and project problems. For additional information on assignments and other course requirements, please consult the instructor.

PUAD 6420.03: Municipal Financial Administration.

The student is introduced to the financial structure of municipal government, the assessment function and real property tax, the operating and capital budget, capital financing, global issues in municipal finance and municipal reform. The curriculum is presented in a non-technical manner and is intended to help the generalist better understand and respond to contemporary issues in municipal finance.

It would be desirable, but not essential, for students to have a basic understanding of the organization and operation of local government in Canada prior to enrolling in this class. For information on assignments and other course requirements please consult the instructor.

INSTRUCTOR: M. Gilbert

PUAD 6520.03: Programme Evaluation Seminar.

Approaches to programme evaluation have proliferated over the past thirty years. The early emphasis on experimental designs and quantitative methods has been expanded to include the full continuum of evaluative techniques, including both quantitative and qualitative research methods. The course introduces students to the discipline of programme evaluation across this methodological spectrum. It focuses on the following topics: the epistemology of programme evaluation; issues in evaluation research design; implementation and utilization; evaluation in international development; and ethical issues in programme evaluation. Attention is also given to the development of programme evaluation within the federal government. Students who plan to take the second-term practicum (PUAD 6521B) will use the first term to initiate contact with a cooperating agency (or programme) which will become the basis of an evaluation design

and assessment report. Students enrolled only for this seminar will select a topic from the literature and experience of programme evaluation as a basis for a seminar presentation. Please see the instructor for additional information about course assignments and other requirements.

INSTRUCTOR: D. Poel, Bakvis

PUAD 6521.03: Programme Evaluation Practicum.

The Practicum is intended to provide a consultative context in which students can successfully implement a small scale, *pro bono* evaluation project for an agency. Any student, however, who is implementing field research which would both contribute to and benefit from the Practicum may join the group.

The research group will meet weekly at the beginning of term to discuss research strategies and applications, primarily in the area of program evaluation. Topics will be organized around the research needs of the projects and may include measurement and design strategies, sampling, questionnaire design, computer applications (SPSS review, file management), and analysis strategies, report writing and presentation.

Materials will consist primarily of the professional literature and project content brought to the Practicum by the participating students as well as examples of existing evaluation reports.

Materials from the first-term seminar and the MPA first-year course in Quantitative Methods are assumed to be available for reference. Some materials may be assigned to standardize the information base of all participants. For additional information on course requirements, please consult the instructor.

INSTRUCTOR: Bakvis

PUAD 6550.03: The Design and Use of Projects.

One of the major changes in public administration during the 1990's from the previous two decades is the reliance of the private and public sectors on contracting work. This is usually accomplished through the design and use of projects.

This class will examine the nature of projects, project sources and initiation, issues identification, proposal preparation, design models, data collection, analysis, findings, funding, recommendations and reporting. Actual proposals will be developed, often in conjunction with private consulting companies. The class will prepare students to be confident with the preparation and completion of projects.

INSTRUCTOR: K. Sullivan

PUAD 6555.03: The Impact of Technology on Public Administrators.

This course examines a multitude of technological advances as impacting on public administrators. Because technological innovation are developing at a rapid pace, it is impossible to present an up-to-date detailed description of this course. For example, technology that is too expensive in January for an organization may have a drastic drop in price by the next month so that it is now affordable for a medium size organization. Therefore, the course description must be fluid and general so that both the instructor and students have the latitude to change the topics being discussed and studied. For additional information about course requirements and assignments please consult the instructor.

INSTRUCTOR: K. Sullivan

PUAD 6560.03: The Organizational Culture of Public Administration Institutions.

This course examines public organizations through the conceptual framework of organizational culture.

Edgar Schein argues that the term culture "...should be reserved for the deeper level of basic assumptions and beliefs that are shared by members of an organization, that operate unconsciously, and that define in a basic 'taken for granted' fashion an organization's view of itself and its environment.

He suggests that there are three levels of culture: artifacts, values and assumptions. The artifacts are the most easily observed and include such things as an organization's physical space, and members' overt behaviours and language(s). Values include a person's assessment of what "ought" to be, and assumptions are values that have become so much a part of a person's every day functioning that they are rarely consciously thought about or

discussed because there is such wide-spread acceptance of the value among the organizational members. The assumptions and values together compose the organization's culture.

The class will be a seminar of readings and discussions on organizational culture. With the assistance of the instructor, students will choose an organization and write a major paper describing the organizations' values, assumptions, maturity and ability to change.

For information about course assignments and other requirements, please consult the instructor.

INSTRUCTOR: K. Sullivan

PUAD 6600.03: Public Personnel Administration.

The principles and practices of personnel management are well established and clearly elaborated in public sector organizations. This course critically explores the technology of managing positions and employees in the public service. The technology of personnel management refers to the routine practices for organizing positions, employee selection, compensation and performance appraisal.

Various methods of assembling organizational relations are explored. The management of employees is concerned with day-to-day managerial practices within work sites in public organizations. Issues related to merit, political neutrality, pay equity, affirmative action, career advancement, human resource planning and employee assistance are introduced. Other topics examined include sex and work, office etiquette, hierarchy and gender equality, male and female management styles, and the gender basis of occupations. The legislative and legal frameworks in which the public service is managed are also examined. The course concludes with a consideration of the differentiated nature of personnel management in public and private contexts. This year, the course will focus upon an analysis of the job organization of the Government of Nova Scotia. We will work with the departments and investigate the current developments in classifications, job design and job evaluation. For information about course assignments and other requirements, please consult the instructor.

INSTRUCTOR: M. Cassin

PUAD 6620.03: Women, Men and Management.

The conventional view is that management is gender neutral work which in principle can be practiced routinely by both men and women. Accordingly, the absence of women in public sector management is to be explained by the lack of suitable qualifications and the remedy is to provide more opportunities to acquire such qualifications as are needed for managerial employment. This course critically assesses this view of gender opportunity in the public sector. First, it explores the gender objectivity and neutrality claims that are made about the character of management and management practice. Second, it examines the relationship of positions, gender and merit in the public service. Third, it discovers and explores a "line of fault" between the ideology of management and the experience of men and women in the public service. On the basis of this exploration the course seeks to develop management ideas and practices which recognize and include both men and women and provide a basis for them to work together as social equals. Please consult the instructor for information about course assignments and other requirements.

INSTRUCTOR: M. Cassin

PUAD 6625.03: Special Topics in Human Resource Management.

Organizations have been designed to carry out occupationally differentiated and hierarchically arranged work. This basic arrangement is increasingly challenged by different groups in society. This course explores three contemporary issues surrounding traditional conceptions of managerial organization and work: a) control and governance; b) the human dimension of work, including race relations, sexual orientation and physical disabilities; and c) the environment. For information about course assignments and other requirements, please consult the instructor.

INSTRUCTOR: M. Cassin

Cross-Listed Classes

PUAD 2000.06: Administrative Law.

PUAD 5518.03: Antitrust Economics.

INSTRUCTOR: C. Marfels

PUAD 6300.03: LIBS Government Information Resources.

PUAD 6240.03: Social Cost-Benefit Analysis.

INSTRUCTOR: T. Pinfold

PUAD 6400.03: Local Government.

INSTRUCTOR: D. Cameron

PUAD 6775.03: Management of Sustainable Development.

PUAD 6780.03: Comparative Development Administration.

This course examines some important aspects of public administration in developing countries in comparative perspective. It is divided into three broad sections: (1) the characteristics of developing countries and the distinguishing features of "development administration"; (2) the structure, organization, and management of public sector organizations charged with "managing development"; and (3) the impact of trends in bi- and multi-lateral aid on development.

Issues of special interest will include: the political setting of public administration in developing countries, notably the trend towards "democratization"; the relevance of lessons from "Newly Industrializing Countries" (NICs) for other developing countries; and the impact of Structural Adjustment conditionalities on public sector organisations.

The course is organized around a weekly seminar consisting of presentations and discussion. For additional information about course requirements, please consult the instructor.

INSTRUCTOR: D. Black

PUAD 6925.03: Management Information Systems.

PUAD 6800.06/6820.06: Projects.

A course designated "project" and using this course number can be developed around an area of interest that is sufficiently complex to justify a full course credit. Such a project will likely be grounded in the needs of a particular agency and an area of professional literature that represents current debate or issues in the field of public administration. It may reflect an interest held by a student, faculty member or by a government agency.

PUAD 6850.06: Internship.

INSTRUCTOR: D. Poel

PUAD 6900.06/ 6910.03/ 6920.03/ 6944.06/ 6940.03/ 6942.03: Directed Reading.

A special programme of directed reading, with appropriate written assignments, may be arranged with a faculty member where the interest in a subject is not sufficiently widespread to warrant offering a regular class.

Students who wish to take any of the Project or Directed Reading Courses mentioned above must provide the School with the following before approval is granted:

1) a letter from the Professor concerned indicating his/her willingness to supervise 2) a course outline which includes a description of the goals and objectives of the course, the grading scheme, a preliminary reading list and a schedule of the work; 3) the period in which the course is to be completed.

NOTE: Approval must be obtained from the Graduate Coordinator *before* the course begins.

Not all classes are offered each year. Consult the School for current year offerings. In addition to the above, classes may be selected from other schools, departments, or faculties, subject to the approval of the Graduate Co-ordinator.

Social Work

Location: 6414 Coburg Road
Halifax, NS B3H 2A7
Telephone: (902) 494-3760
Fax: (902) 494-6709
E-mail: social.work@dal.ca
Website: <http://www.dal.ca/socialwork>

Director of the School

Drover, G.

Graduate Coordinator

Harbison, J.

Administrative Staff

Denemore, J., BA (Al), BEd (St. Mary's), Admissions
Keddy, M., BA (Acadia), MSW (Dal), RSW, Coordinator of Field Programmes
Leadbeater, L., DipSSc(HCVS), Student Services
McInerney, M., BSc(Hons) (Dal), CertABEd., Administrative Officer
Trueman, J., BOA(MSVU), Enquiries

Professors

Carlson, R.W., BS, MSW (Penn), PhD (Chicago)
Drover, G., BA (UofT), MSW (Fordham), PhD (London School of Economics)
Wien, F.C., BA (Queen's), MA, PhD (Cornell)

Associate Professors

Harbison, J., BA, BSoc Stud (Dublin Trinity Coll), Grad Dip SW (Edinburgh), PhD (UofT)
O'Day, R., BA (UBC), MA, PhD (Michigan)

Assistant Professors

MacDonald, M.M., BA (StFX), BJ (Carleton), MSW (Dal)
Neal, R., BA/BSW (McM), MA (OISE/UofT), PhD (UofT)
Richard, B.K., BA (MtA), MSW (Dal)
Sexton, A., BA (St.Thomas), MSW (Dal)
Thomas-Bernard, W., BA (MSVU), MSW (Dal), PhD (Sheffield)

I. The Maritime School of Social Work

The Maritime School of Social Work was founded in 1941 as an independent school serving the needs of the region for professionally educated social workers. The political, social, cultural, and economic conditions of the Maritime provinces have continued to give direction to the School's teaching programmes since its amalgamation with Dalhousie University in 1969. It has pioneered in developing theories of practice that take account of systemic inequalities based on factors such as gender, sexual orientation, race, culture, ethnicity, class and (dis)ability.

Both the undergraduate and graduate programmes are accredited by the Canadian Association of Schools of Social Work. The School also offers a diversified Continuing Education programme.

ii. Master of Social Work (MSW) Degree

The Master of Social Work degree programme provides professional education for advanced, specialized social work practice and leadership positions in the practice field.

In order to practice social work in Nova Scotia, all persons must have a social work degree (BSW or MSW) AND be approved for practice by the Board of Examiners of the Nova Scotia Association of Social Workers. Persons applying to the Board to practice social work should contact the address below for further information:

The Registrar of the Board of Examiners
Nova Scotia Association of Social Workers
1891 Brunswick St., Suite 106
Halifax, NS B3J 2G8
Telephone: (902) 429-7298

Opportunity for in-depth learning is provided both in the classroom and in the field. The student's critical ability is developed in relation to a variety of content areas including social policy, social work methods and social work values, especially with regard to social justice. Elective classes enable the student to focus on areas of special interest.

Please consult our web site for updates to our MSW Degree programme.

A. The Specializations

Two areas of specialization for the development of practice are offered:

- Community Practice, and
- Individual and Family Practice, in either of two concentrations:
 - Physical and Mental Health or
 - Family and Child Welfare

1. Community Practice

The Community specialization provides graduate students with an opportunity to work with community groups. It also invites them to investigate and evaluate community action and community social work in relation to social movements and to social work values.

The specialization seeks to meet the theoretical and practical concerns of the particular students in the programme. The Community specialization also examines how social work practice is shaped by the interrelationships of place, class, race, ethnicity, gender and sexual orientation in diverse communities.

2. Individual and Family

This specialization increases the student's ability to evaluate the efficacy and benefits of social work interventions by considering legislation, policies, and service delivery issues in relation to theories and models of practice interventions. It offers opportunities for students to apply this knowledge in field practice situations.

In the Family and Child Welfare concentration, the focus is on the family as a social entity and on child welfare. There is an emphasis on social analysis and policy.

In the Physical and Mental Health concentration, the focus is on theory, knowledge, and issues as they relate to social work practice in the areas of adult health and mental health.

B. Programme Objectives

The Maritime School adheres to the principles of adult learning in its educational approach. This has special application for students of relative maturity with previous or concurrent professional social work experience. In the course of their study, MSW students are encouraged to identify and pursue their learning goals within the parameters of the curriculum and the objectives of the programme, which include the following:

- Development of an understanding of the methods for critical appraisal and systematic inquiry related to existing practice theories, models of intervention and personal practice experiences and abilities;
- Application of these means to existing and new knowledge regarding practice contexts, practice-related issues, practice theories, models of intervention and personal practice experience and abilities;
- Acquisition of new knowledge with respect to practice contexts, theories and interventions, including an area of practice of particular interest to the student;

- Integration of the new knowledge acquired into practice situations which support the development of personal and social change.

III. Admission Requirements

All applicants must satisfy the admissions requirements of the Faculty of Graduate Studies, Dalhousie University as stated in this calendar. These include an undergraduate degree from an accredited university with no less than a "B" level average. Applicants from outside Canada whose first language is not English must submit a Test of English as a Foreign Language (TOEFL) prior to the application deadline of February 1st, with a minimum acceptable score of 580. Where TOEFL is unavailable, the following tests will be accepted with the following minimum scores: MELAB, 90; IELTS, 7. See Faculty of Graduate Studies Admission Requirements, page 98.

A. MSW Degree Programme Prerequisites

The MSW programme of advanced study in the theory and practice of Social Work is primarily intended for persons with a baccalaureate degree in Social Work and at least two years of social work experience. Successful candidates are able to complete the programme in one calendar year of full-time or three years of part-time study.

Prerequisites for the one-year MSW degree programme include:

- A baccalaureate degree in Social Work;
- A cumulative academic GPA of 3.00 (on a 4.30 scale), or an equivalent cumulative average of at least B;
- Two years of full-time employment in a social work position, following the BSW degree (see also Selection Criteria below);
- Personal suitability for the study and practice of social work.

B. Qualifying Year

Persons who do not have a Bachelor of Social Work degree may apply for a qualifying year provided that they have the following prerequisites:

- An outstanding employment background in social work or related community work for a duration of approximately five years;
- An undergraduate or graduate degree in a related academic discipline, with content that facilitates a five-credit preparatory year of Social Work study;
- Personal suitability for social work education and practice.

Only a very limited number of applicants have the academic and employment backgrounds to be admitted to a qualifying year, which consists of five credits of study. A modified application for admission to the MSW degree programme is required on completion of the qualifying year credits, at which time the student's academic performance and personal suitability is reviewed by the Admission Committee.

Persons who meet the above prerequisites and who hold a graduate degree in a closely related discipline may be admitted to the first year of a two year MSW programme. During this first year, they need to satisfactorily complete certain advanced undergraduate social work classes.

C. Special Students

Special student status is not available for enrolling in graduate classes in Social Work. Classes are normally restricted to students who have applied and been accepted to the MSW qualifying year and the MSW degree programme, except in those cases where the instructor grants permission.

D. Full-time and Part-time Study

The graduate programme, including the qualifying year, may be taken on a full-time or part-time basis. Classes begin in September. Full-time MSW students who choose to do the non-thesis option may complete the programme by late July and graduate in October. Full-time thesis students may need an additional six to twelve months for completion. Graduation is possible in either May or

October. Continuation as a "Thesis Only" student requires annual registration and payment of continuation fees. (In 1998/99, this fee was \$874 for 6 months, \$1509 for 12 months).

A full-time year normally requires three years of part-time study. Part-time students who choose the thesis option need to allow an additional twelve to eighteen months for completion. Annual registration and an annual fee for continuing as a part-time "thesis only" student is required. (In 1998/99, the part-time thesis only fee was \$748 for six months, \$1363 for 12 months). It is important for prospective part-time students to note that most MSW core classes and the requisite agency field placement are available during daytime hours only.

E. Selection Criteria

The number of places offered each year to graduate students is limited. Candidates are selected according to their qualifications and the number of places that will be available for each specialization and concentration at the beginning of the academic session. The MSW Admissions Committee makes its selection on the basis of the following criteria:

- Academic performance, with particular reference to the Bachelor of Social Work degree;
- Two years of full-time employment in a social work position following the BSW degree. Applicants who do not meet this criterion will be considered but they need to give evidence of: (a) A clearly defined field of practice related to social work; (b) A (professional) leadership role in their work or volunteer experience; (c) Maturity and intellectual capacity demonstrated in a thoughtful and reflective personal statement (proposal of study); and (d) An understanding of the complexity of the learning process, including a recognition of the limitation of their prior learning;
- Strength of academic, work and personal references;
- Appropriateness of educational/professional goals to the School's class offerings;
- Personal suitability for social work.

F. Proposal for Study

The student's plan of study is presented in a formal Proposal for Study, which is an important component of the MSW application material. Candidates specify their choice of specialization (and concentration); indicate the relationship of their background experience to the chosen area of study; and discuss where they intend to focus their learning and why. Applicants for the qualifying year are assessed on similar standards of excellence as candidates for the one-year MSW degree.

G. Personal Suitability

Aptitude and fitness for the profession of Social Work, as determined by the MSW Admissions Committee, is a requirement for admission as well as for continuation in the programme. (See Section V: Required Withdrawal on Grounds of Unsuitability section.)

H. Affirmative Action Policy

The Maritime School of Social Work has an affirmative action policy for residents of the three Maritime provinces who belong to regional Aboriginal, Acadian and indigenous Black populations, and for persons with disabilities. The School is committed to admitting and graduating students who qualify under this policy.

The admissions prerequisites described in the above sections are similar for all applicants. Each candidate who applies under the affirmative action policy is, however, considered on the basis of her/his qualifications for graduate study in Social Work rather than in relation to other candidates.

I. Application Procedure

Applications for admission are reviewed once a year following the application deadline date of February 1st.

MSW application packages include instructions, the three required reference forms, work/volunteer experience summary sheets, and guidelines for the Proposal for Study. The cover sheet for the latter includes a place for eligible candidates to indicate whether they

wish to apply under the Affirmative Action policy. MSW application packages are available on request from the Dalhousie University Registrar's Office and may be found on the School's website: <http://www.dal.ca/socialwork>.

Incomplete and late applications cannot be considered. Each applicant is notified by mail of the Admission Committee's final recommendation to the Dean of Graduate Studies. Acceptances are conditional on the approval of the Dean followed by official notification from the University Registrar.

J. Scholarships, Bursaries, Teaching Assistantships and Financial Aid

For information on prizes, bursaries, scholarships and loans available to graduate students, consult the relevant section of this graduate calendar and the School's MSW brochure.

K. Sexual Harassment

The Maritime School is governed by the Sexual Harassment Policy and Procedures of Dalhousie University. For more information, see Graduate Calendar: Resources and Services - Advisory Committee on Sexual Harassment.

IV. Curriculum Requirements

A. Qualifying Year

Students who meet the requirements for acceptance to a qualifying year undertake a five-credit programme of preparatory study based on individual needs as assessed by the Graduate Coordinator. Classes consist primarily of BSW class content offered in the regular Fall/Winter academic session.

B. MSW Degree Programme

BSW graduates are admitted directly to the regular one-year MSW programme. The course of study also applies to those students who have successfully completed their Qualifying Year requirements.

The professional MSW degree programme consists of five Social Work credits and a non-credit colloquium. This requirement cannot be reduced by advanced standing or transfer credit in relation to any graduate classes taken prior to MSW registration.

Students register for the core classes that apply to the specialization and concentration to which they have been accepted:

Individual and Family Practice Specialization

- SLWK 6001.03: Theory and Practice of Anti-Oppressive Social Work (0.5 credit)
- SLWK 6020X/Y.06: Master's Project in Individual and Family Practice (1 credit) OR SLWK 9000.00: Master's Thesis (1.5 credits)
- SLWK 6335X/Y.06: Theory and Methods of Intervention (1 credit)
- SLWK 6340X/Y.06: Social Work in Family and Child Welfare, including a 400 hour field placement (1.5 credits) OR SLWK 6345.09: Social Work in Physical and Mental Health, including a 400 hour field placement (1.5 credits)
- One or more elective classes and the Colloquium
- SLWK 5990.00: Colloquium (non-credit)

Community Practice Specialization

- SLWK 6001.03: Theory and Practice of Anti-Oppressive Social Work (0.5 credit)
- SLWK 6380.03: The Social Party Context of Community Work (0.5 credit)
- SLWK 6385.03: Community and Social Change Analysis (0.5 credit)
- SLWK 6390X/Y.09: The Theory and Practice of Community Work, including a 400 hour field placement (0.5 credits)
- SLWK 6240X/Y.06: Master's Project in Community Practice (1 credit) OR SLWK 9000.00: Master's Thesis (1.5 credits)
- one or more elective classes
- SLWK 5990.00: Colloquium (non-credit)

Electives

Students are required to complete 1 full elective credit (or two 0.5 credits) if they do a Master's Project, or one 0.5 credit if they do a thesis.

At least one 0.5 credit elective must be taken outside the Maritime School of Social Work. This applies to both thesis and Master's project students.

The following Social Work electives are usually offered:

- SLWK 6365.03: Community Socio-Economic Development (0.5 credit)
- SLWK 6370.03: Advanced Practice Skills (0.5 credit)

C. Field Experience

Students should note that the required 1.5-credit core class of applied theory and practice for each specialization includes a field experience component of 400 hours in an appropriate agency other than the student's place of employment. This is undertaken in regular daytime hours between September and March concurrently with the classroom seminar. The MSW Field Manual contains the policy and procedures which define various aspects of the field placement.

D. Class Sequencing for Part-Time Students

In order to maintain the integrity of the part-time student's academic program, two of the core classes are taken in sequence, beginning in the first year with the one-credit advanced Social Work theory class in the Individual and Family Specialization, or the two .5-credit classes in the Community specialization. This is followed in the second year by the 1.5-credit core class of applied theory, which includes the field placement. The remaining classes may be taken concurrently with either of these, or in the third part-time year.

Enrolment in the core thesis or project usually occurs in the third year. The remaining classes may be taken concurrently with the other core classes in any one or more of the three year programme.

V. Regulations

All students are required to be familiar with and to observe University, Faculty of Graduate Studies and Maritime School of Social Work regulations. Students should therefore request a Graduate calendar when they register.

A. Grading Requirements

Students are governed by the grading regulations of the Faculty of Graduate Studies.

B. Required Academic Withdrawal

A student who fails to meet the minimum grade requirement of "B-" in each class may be withdrawn from the programme. Students who are withdrawn may submit a formal, written request to be readmitted. If the student is allowed to continue in the programme, the failed or uncompleted class or classes must be repeated if core, repeated or replaced if elective, and successfully completed with a final grade of at least "B-".

C. Required Withdrawal on the Grounds of Unsuitability

The MSSW acting through its Programme Committee and its Director may require a student to withdraw if judged to be unsuitable in aptitude and fitness for the profession of Social Work. Because the nature of the study and practice of Social Work places clients in a position of special trust in relation to social workers and social work, certain impairments or some types of conduct unbecoming to a member of the social work profession may be grounds for dismissal, or suspension. Aptitude and fitness for the profession of Social Work, as determined by the MSW Programme Committee are requirements for continuation in the programme.

The following list of examples illustrates the criteria used to assess the unsuitability in aptitude and fitness. This list should not be considered to exclude other such behaviours:

- (1) conviction of criminal activity (e.g. assault, sexual assault, fraud and drug trafficking).

- (ii) persistent substance abuse (e.g. alcoholism, drug addiction, use of illegal drugs).
- (iii) any medical condition which affects an individual's ability to perform as a social worker if that condition is chronic and/or recurring and affects judgments.
- (iv) unethical behaviour (see Nova Scotia Association of Social Workers Code of Ethics, 1994)

The MSW Committee will consider the student's situation to determine whether he/she is fit for the study and practice of Social Work. The principles of confidentiality, natural justice and due process are observed in all Committee deliberations.

VI. Classes Offered

SLWK 6001.03: Theory and Practice of Anti-Oppressive Social Work.

The principles of cross-cultural and ethnic-specific social work practice are now widely accepted in social work education, training and practice. The more recent challenge has been to develop anti-racist and anti-oppressive theory and practice. Racism and oppressive practices are in conflict with the "caring" notion of social work as a profession. Multiple forms of oppression frame everyone's lives. Social work intervention either adds to oppression, condones it through non-action, or does something to ease or break oppression. The aim of this course is to unravel the underlying thread of multiple oppression, and the interaction of various sources and forms of oppression, and to develop practice strategies that seek to challenge and break oppression.

SLWK 6020.06: Master's Project in Individual and Family Practice.

SLWK 6240.06: Master's Project in Community Practice.

SLWK 6335.06 Theory and Methods of Intervention.

This class offers an opportunity to develop intervention guidelines for a specific area of social work practice. Each student selects her/his own topic. Case-based reasoning, as developed from research by experienced practitioners, is presented as a basis for developing useful guidelines. Attention is given to assessing biases in the evidence used to develop guidelines, and to systematic inquiry in order to assess service outcomes.

SLWK 6340.09 Social Work in Family and Child Welfare.

Including a 400 hour field placement. In the Family and Child Welfare concentration, students develop a greater understanding of individuals as they are situated within a familial and societal context. One half of the classroom content of the course is devoted to social policy and social work practice relevant to analyzing the family, and child welfare within the family. Students are expected to analyze conceptions of the family in relation to perspectives of social class, racism, sexism, heterosexism, and disability. The other half of the classroom content includes the more clinical aspects of working directly with individuals, both children and adults, within families.

The 400-hour field placement comprises the third component of this course. A student must successfully complete the field component in order to pass the course.

SLWK 6345.09 Social Work in Physical and Mental Health. Including a 400 hour field placement.

The Social Work in Physical and Mental Health course concerns itself with the application of theory to social work practice in the broadly defined field of health. It engages students in:

- (a) The development of a critical analysis and understanding of social and political/economic factors which impact on health and health service delivery
- (b) An examination of the nature of health service delivery including issues of access, equity and power, and new ways of delivering services which involve institutional/community lineages and community-based programs
- (c) A critical appraisal and review of social work practice theories, methods and models of intervention, as they relate to individual students' practice fields and interests; and

- (d) The integration of new knowledge, understanding and skills into their existing practice (through a 400-hour field placement component) in order to prepare them for specialized practice which is anti-oppressive and supports client empowerment.

SLWK 6365.03: Community Socio-Economic Development.

This class deals with the socio-economic development of communities and regions that are economically disadvantaged, as measured by high rates of poverty and underemployment. This course includes an examination of the leading theoretical frameworks that seek to explain high rates of poverty and underemployment, the policy-strategy directions that flow from each of these frameworks, and current attempts to achieve socio-economic development, including the work of community practitioners. The applied aspect of the course will involve in-class seminars with resource persons as well as field trips to selected community development projects in the province, including Mi'kmaq and African Scotian locations.

SLWK 6370.03: Advanced Practice Skills.

This elective class, intended primarily for students in the Individual and Family Practice Specialization, is designed to put into practice the knowledge and skills students are developing in their field placements and work environments. Much of the learning is experiential.

Students will be encouraged to think critically about the assumptions that underpin various approaches to practice. They will be given the opportunity to apply newly acquired knowledge and skills in a supportive environment, and to receive constructive feedback. Students are encouraged to develop a model of practice. Because this is a skills directed course, theory will be discussed within the context of practice. For example, if a particular practice approach derived from theory is being discussed, there will also be an opportunity to demonstrate that approach or technique via a role play or some other experiential method.

SLWK 6380.03: The Social Policy Context of Community Work.

This class is divided into two parts: (a) Theoretical interpretations of the current and projected status of the welfare state in advanced industrial societies, and consideration of the economic, political, social and demographic factors that lead to change in social policy. And (b) an in depth examination of several policy areas that are most relevant for community work such as income support, affirmative action and employment equity, education and training, and employment and economic development.

SLWK 6385.03: Community and Social Change Analysis.

There are tensions within the concept of "community" between marginalization and/or self-determination. Through case studies, the course explores these tensions as they occur in the field of community "care", an expanding field of social work practice. The theoretical base for the course draws on a variety of perspectives such as communitarianism, eco-feminism, social ecology, managerialism, neo-liberalism, and "new" social movement theory. The core classes for community students, SLWK 6380.03 and 6385.03, may be taken as electives by individual and family students.

SLWK 6390X/Y.09: The Theory and Practice of Community Work, Including a 400-hour field placement.

In Canada, turn of the century settlement houses provided a community foundation for the work of paid and unpaid social workers. Today, women's centres, transition houses, AIDS support organization, anti-poverty networks, neighbourhood organizations and a variety of other community-based social action groups and service programs continue the social movement tradition of community involvement, organizing for local community control over social and economic development.

The first term of this course is designed to assist students in building their academic and analytical skills in community work, while reinforcing an examination of their past work experiences and their field placements. In the second term, students have the opportunity both to enhance the academic and practical work of the first term, as well as to assist each other in the development of student determined critical practice skills.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

SLWK 5990.00: MSW Colloquium.

Students also register for a series of colloquia dealing with contemporary issues in social work, which are discussed monthly during each term. Topics and guest speakers are determined in consultation with students. Part-time students may include this requirement in any one year of study.

SLWK 9000.00: Master's Thesis.

Sociology and Social Anthropology

Location: Corner of Seymour and South Streets
Halifax, NS B3H 3J5
Telephone: (902) 494-6593
Fax: (902) 494-2897
E-mail: mmwatts@is.dal.ca

Chairperson of Department

Morgan, J.G.

Professors

Apostle, R., BA (Simon Fraser), MA, PhD (Calif, Berkeley). Economic Sociology; Research Methodologies; Sociology of Culture
Barkow, J.H., AB (Brooklyn), AM, PhD (Chicago). Psychological Anthropology; Medical Anthropology; Evolutionary Psychology; West Africa; Human Nature
Binkley, M., BA, MA, PhD (UofT). Maritime Anthropology; Coastal communities; Anthropology of Tourism; Women and Work; Qualitative and Quantitative Research Methods.
Cohen, F., BA, MEd (Harvard), PhD (Minn). Major appointment in the School for Resource & Environmental Studies. Native people and natural resources; fisheries co-management; education and training in environmental management.
Clairmont, D.H., BA, MA (McM), PhD (Wash). Social Problems; Public Policy; Justice; Work; Ethno-cultural Relations
Thiessen, V., BA (Man), MA, PhD (Wis). Family Sociology; Sociology of Occupation; Youth Transitions; Social Psychology; Survey Research; Social Statistics; Education; Aspirations; School-to-Work; Coastal communities; Social Stratification

Associate Professors

Butler, P.M., BA (MUN), MA (UNB), PhD (UofT). Power; Public Opinion; Politics; Quantitative Methods; Public Opinion Polling; Canadian Society; Occupations; Telework.
Gardiner Barber, P., BA, MA (Auckland), PhD (UofT). Culture of Political Economy; Development Discourse; Gender and Work; Globalization; Feminist Studies; Philippines; Transnationalism
Jarman, J., BA, MA (UofT), PhD (Cambridge). Occupational Gender Segregation; Equal Pay Policies; Sociology of Work; Gender Studies
Li, T., BA, PhD (Cambridge). Development; Rural; Class; Culture; Theory; Gender; Property; Indonesia; Communities; Livelihoods
Miller, V.P., BA (Calif, Berkeley), MA, PhD (Calif, Davis). Anthropology History and Theory; Ethnohistory; North America; Sociolinguistics
Morgan, J.G., BA (Nott), MA (McM), D Phil (Oxon). Religion; Theory; Science; Knowledge; Cults/Sects; Secularization; Sectarianism
Murphy, C.J., BA (StFX), MA (Dal), PhD (UofT). Sociology; Social Order; Control and Criminal Justice; Comparative and Alternative Policing
Stolzman, J.D., BA (Ore), MS (Fla), PhD (Ore). Mental Health; Mental Disorders; Moral Panics; Sociological Pedagogy

Assistant Professors

Clark, P.G., BA, MA (McM), PhD (UBC). Theory Construction; Bodily Rituals; Pollution Taboos; Community Studies; Hutterian Society
DuBois, L. BA (McG), MA, PhD (New School-NY). History and Anthropology; Political Culture; Argentina; Latin America; Human Rights
Findlay, D., BA, BSW, MA, PhD (McM). Medical Sociology; Sociology of the Body; Sociology of Gender, Women's Health

vanRoosmalen, E., BA, MA (Waterloo), PhD (Alberta). Gender Relations, Womens' Health; Adolescent Health; Quantitative and Qualitative Research Methods

Adjunct Professors

Elliott, D., BA (Yale), PhD (Pitt)
Frank, B., BA, BEd, MEd (Acadia), PhD (Dalhousie)
Gamberg, H.V., BA (Brandeis), AM, PhD (Princeton)
Kaill, R.C., BA (Dalhousie), BD, MA (Toronto), PhD (McGill)
Kasdan, L., MA, PhD (Chicago)
Looker, D., BA (Carleton), MA (Waterloo), PhD (McM)
McCormick, C., HBA (Acadia), MA (Queen's), PhD (York)
Raymond, B., MA, MLS (Univ. Of California - Berkeley), MA (Manitoba), PhD (Chicago)

Research Associates

Thomson, A., BA, BEd, MA (Dal), PhD (Cambridge)

I. Admission Requirements

The Department of Sociology and Social Anthropology offers programmes leading to the M.A. in Sociology, the M.A. in Social Anthropology, and the Ph.D. in Sociology.

All candidates who are applying to the M.A. programme in Sociology or Social Anthropology must satisfy the general requirements for admission to the Faculty of Graduate Studies. Candidates will normally be expected to hold a four-year degree in Sociology or Social Anthropology with at least an upper second class (A-) standing. It is expected that a candidate's undergraduate work will have included classes in theory and methods appropriate to the particular discipline. Promising applicants who fail to meet these requirements may be admitted to a qualifying year which, if successfully completed, would permit subsequent enrolment in the MA programme.

All candidates who are applying for the Ph.D. in Sociology must hold an M.A. in Sociology, Anthropology or its equivalent. Applicants must have a graduate academic record of at least A-. Priority for acceptance to the PhD programme will be given to students whose areas of interest coincide with the Department's major areas of concentration. Priority in acceptance will also be given to students who have not acquired both a B.A. and M.A. from Dalhousie University.

II. Degree Programmes

A. Master of Arts (MA)

A full-time MA programme is normally of one year's duration, its upper time limit (in accordance with Faculty of Graduate Studies regulations) being three years. A part-time option is also available, its upper time limit (once again, in accordance with Faculty of Graduate Studies regulations) being four years. Both full-time and part-time options are available.

The normal programme is made up of five full credits. A thesis (SOSA 9000.00), worth two credits, is required as are the following classes: Graduate Seminar (SOSA 5200.06R) and Area Examination (SOSA 5300.06R). An elective class (or two one-half credit classes) approved by the Graduate Education Committee constitute the final credit.

An examination in the student's chosen area of specialization as well as defense of a thesis proposal are required.

B. Doctor of Philosophy (PhD)

In accordance with the Faculty of Graduate Studies regulations, the programme has a two year residency requirement. It is expected that the programme will take approximately four years to complete.

The student will also complete any additional graduate classes, internal or external to the Department, that the student's Advisory Committee deems necessary.

By the end of the second academic year the student must have written three interrelated comprehensive exams in theory, in methods and in a substantive area. The student is required to pass

all three comprehensive exams in order to continue in the PhD programme. During this year, or the following, the student is required to make a presentation to a departmental colloquium on a topic that normally will be related to the research proposal. The latter must also be completed and approved by the Advisory Committee by the end of the second year.

For the third (and any subsequent) years the student will register for "thesis only" credit. By the end of the third year, the student must demonstrate a working knowledge of a language other than English which is relevant to the student's studies and research. If a student does not have an approved doctoral thesis proposal within three calendar years after acceptance into the programme, the student will not be permitted to continue in the programme. In accordance with Faculty regulations, an oral defense of the thesis is required.

III. Classes Offered

Classes may not be offered every year. Please consult the current timetable upon registration to determine if these classes are offered.

SOSA 5001.03A or B: Survey Methods.

This class will examine techniques and issues in survey methods. Topics covered will include sampling designs, questionnaire construction, measurement theory, data collection, and pre-tests. As well, this provides instruction in the organization and presentation of quantitative data, including graphs, charts and tables using computer software such as SPSS. Depending on the instructor, practical experience in survey methods is provided through secondary analysis of an existing data set, or through a class project.
FORMAT: Seminar 2-3 hours

SOSA 5002.03: Social Statistics.

This class develops statistical approaches to social science data, focusing on correlation/regression analysis. Beyond developing a basic competence in statistical analysis, the class stresses the creative process of constructing solid scholarly arguments using statistical principles, as well as uncovering artifacts which weaken them. In lieu of a term paper, weekly assignments are given using existing social science data which provides students the opportunity to participate in this process. The class includes both lectures, in which the logic of statistical reasoning is presented, and laboratories, in which statistical techniques are applied to social science data using computer software programmes such as SPSS.
FORMAT: Lectures/lab 2 to 3 hours

SOSA 5003.03: Contemporary Perspectives in Ethnography.

Ethnographies and critical writings which grapple with questions of theory and interpretation in a range of contexts—near and far, familiar and strange, local and global—will be examined in this class.
FORMAT: Seminar 2 to 3 hours

SOSA 5004.03: Advanced Issues in Work, Industry and Development.

Each year, this "advanced issues" class focuses on a different specific topic within its general area. In 1998, its focus was on Changing work Relations and the Worker's Experience. Consult Department for the specific topic for 1999/2000.

SOSA 5005.03: Advanced Issues in Social Injustice and Social Inequality.

Each year this "advanced issues" class focuses on a different specific topic within its general area. In 1998, its focus was on understanding Restorative Justice. Consult Department for the specific topic for 1999/2000.

SOSA 5006.03: Advanced Issues in Health and Illness.

Each year, this "advanced issues" class focuses on a different specific topic within its general area. In 1998, its focus was on Darwinian and Other Alternatives to Biomedicine. Consult Department for the specific topic for 1999/2000.

SOSA 5011.03: Advanced Issues in Social Theory.

This seminar consists of an intensive examination of one or more selected bodies of theory, and makes links between theory and current trends in research in sociology and/or social anthropology.
FORMAT: Lecture 2 to 3 hours

SOSA 5012.03: Special Topics in Sociology and Social Anthropology.

This seminar consists of an intensive examination of a selected substantive issue within Sociology and Anthropology. Since the specific topic or research problem which receives special treatment will differ from year to year, students are advised to consult the department prior to registration.
FORMAT: Seminar 2 or 3 hours

SOSA 5060.03: Advanced Social Analysis.

This seminar begins with an exploration of the nature of arguments/theses/explanations. Included in this exploration is an examination of the criteria for relevant data/information used to assess such arguments/theses/explanations. Following this general introduction to the nature of social-scientific scholarship, the focus shifts to an overview of the main types of data collection designs used in sociology and social anthropology: field research (including community studies, case studies, participant observation), survey research (including telephone-based, questionnaire-based and interview-based variants), non-reactive design (including archival research and document analysis) and experiments (including quasi-experimental designs). The understanding of these types of data collection designs will be deepened through an intensive review of a published case study, a critique of a research report based on a survey research, and an examination of a study using either non-reactive measures or an experimental design. Students will be permitted to choose exemplars that are related to their intended thesis. (The student's thesis committee members will be asked for suggested readings that are worthy of close scrutiny.) This class is intended to help students develop tighter links between the formulation of their thesis and the characteristics of the data they anticipate collecting. To help avoid premature closure on the research design to be used, students will be given the opportunity to formulate how three different research designs could be applied fruitfully to their thesis topic.

SOSA 5200.06: Graduate Seminar.

This class is structured to assist students in a process of professional development, as well as to facilitate a student's general progress through the Master's programme. The seminar will include formal presentations by each of its participants and will have as goals: (1) practice in giving and receiving criticism, (2) identifying the important literature in an area and critically assessing it, and (3) understanding the stages and purposes involved in an advanced research undertaking. The second part of the seminar will involve working towards producing a preliminary proposal for the Master's thesis.
FORMAT: Seminar 2 to 3 hours

SOSA 5300.06: Area Examination.

The Area Examination is an examination in some designated area of Sociology or of Social Anthropology. The area itself is based on a reading list developed by the student's Programme Committee in consultation with the student.

SOSA 5301X/Y.06: Issue Essay I.

The student writes a major essay on an issue of sociological importance. The student's three-person Advisory Committee jointly: (a) supervisors the (library) research required; (b) prepares a schedule for the preparation of drafts; and (c) evaluates the final draft.
NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

SOSA 5302X/Y.06: Issue Essay II.

The student writes a major essay on an issue of sociological importance. The student's three-person Advisory Committee jointly: (a) supervises the (library) research required; (b) prepares a schedule for the preparation of drafts; and (c) evaluates the final draft.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

SOSA 5303X/Y.06: Issue Essay III.

The student writes a major essay on an issue of sociological importance. The student's three-person Advisory Committee jointly: (a) supervises the (library) research required; (b) prepares a schedule for the preparation of drafts; and (c) evaluates the final draft.

NOTE: Students taking this class must register in both X and Y in consecutive terms; credit will be given only if both are completed consecutively.

SOSA 5510.03: Graduate Readings in Sociology and Social Anthropology.

In a reading class, the student is assigned to a member or staff or regular meetings to discuss in a selected area. Papers and research projects are expected.

FORMAT: Individual instruction

SOSA 5520.03: Graduate Readings in Sociology and Social Anthropology.

In a reading class the student is assigned to a member or staff or regular meetings to discuss in a selected area. Papers and research projects are expected.

FORMAT: Individual instruction

SOSA 5530.06: International Development Studies Through the Shastri Summer Institute in India.

The placement would be for nine-ten weeks offered during the summer. Two weeks of briefing and debriefing both within Canada and India, with remaining weeks spent in the actual placement in India. This class is for students who wish to earn academic credit related to their work in India. Students will be chosen on the basis of their academic standing as well as their strong interest in South Asia. Students will be accompanied overseas by a faculty member.

SOSA 9000.00: MA Thesis.**SOSA 9530.00: Ph.D. Thesis.**

Statistics

Location: Chase Building
Halifax, NS B3H 4H7
Telephone: (902) 494-2572
Fax: (902) 494-5130
WWW: <http://www.msca.dal.ca/home2.html>

Chair of the Department
Nowakewski, R.J.

Director of Division
Hamilton, D.

Professors

Field, C.A., MSc, PhD (Northwestern) Robust Statistics, Data Analysis
Gabor, G., MSc, PhD (Eotvos) Statistical Inference, Information Theory
Gupta, R.P., MSc (Agra), PhD (Delhi) Multivariate Analysis, Distribution Theory, Statistical Inference
Hamilton, D., MA, PhD (Queens) Linear and Nonlinear Regression, Time Series Analysis, Data Analysis

Associate Professors

Smith, B., MSc (Calgary), PhD (Berkeley) Time Series Analysis, Applied Probability, Data Analysis
Thompson, K., MSc (Manchester), PhD (Liverpool), joint appointment with Oceanography. Time Series Analysis, Applications to Oceanography.

Assistant Professors

Bowen, K., PhD (Calif)
Susko, E.A., MSc (UBC), PhD (Waterloo) Mixture models, large sample theory, optimization, data analysis.

Post-Doctoral Fellows

Butler, K., PhD (Simon Fraser) Goodness of fit, data analysis

Adjunct Professor

Gupta, R.D., PhD (Dalhousie) Multivariate distribution theory
Astatke, T., PhD (Queens) Time series, applications to agriculture

Statistical Consultant

Blanchard, W., MSc (UBC)

Please refer to the entry for the Department of Mathematics, Statistics and Computing Science in this calendar for a full listing of the members of the Department and information on other programmes offered by the Department.

The department offers programmes leading to the degrees of MSc and PhD in the following areas: statistical inference, robust statistics, data analysis, multivariate analysis, linear and nonlinear regression, time series analysis, statistical graphics and computing, information theory.

I. Admission Requirements

Candidates must satisfy the general requirements for admission to the Faculty of Graduate Studies. Candidates will normally be expected to hold a degree recognized by Dalhousie University as the equivalent of a Bachelor's degree with Honours in one of its own faculties.

GRE Aptitude and Advanced Mathematics scores are recommended for all applicants for graduate studies whose undergraduate work has been completed outside of Canada, and TOEFL scores are required for applicants whose native language is not English. Valid score reports must be received directly from the Educational Testing Service. To ensure consideration for scholarship funds, application should be made by January 31.

II. Degree Programmes

A. Master of Science (MSc)

Requirements

1. At least three full-credit classes, not including seminar classes, at the graduate level to be chosen in consultation with a department adviser. In addition, students whose preparation is deficient will be required to complete appropriate classes which will be designated by the adviser.
2. Attendance and participation in seminars.
3. A satisfactory thesis.
4. Students are required to give an oral presentation of their thesis and at that time to answer questions about the thesis. This presentation will be made after the thesis is in the hands of the student's committee and will be taken into account when the committee makes its decision.
5. Fifty hours consulting.

B. Doctor of Philosophy (PhD)

Requirements

NOTE: The minimum and maximum time required to complete this programme are set out in Section 1.3.2 and 6.1 in the Faculty of Graduate Studies regulations.

1. At least two full-credit classes.
2. Comprehensive examinations which must be taken for the first time within 12 months and successfully completed within 16 months of registration in the programme.
3. Attendance and participation in an appropriate seminar.
4. Preparation and defence of a satisfactory research thesis.
5. Fifty hours consulting.

III. Classes Offered

A selection of the following graduate classes will be offered subject to demand.

STAT 5060.06/4060.06: Advanced Statistical Theory.

This class is intended to provide a solid basis in statistical theory. The classical theory of estimation and testing provides a starting point. The Rao-Blackwell theory, Cramer-Rao bound, Neyman-Pearson theory and uniformly most powerful tests will be covered. From here, conditioning and invariance will be used to obtain good procedures in more complex situations. The theory will be developed in the context of specific problems including the general linear model.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3460.03

CROSS-LISTING: MATH 4060.06, STAT 4060.06

STAT 5070.03/4070.03: Multivariate Distributions.

This class deals with the distribution theory of the observations on more than one variable. Topics covered include: the multivariate normal distribution, the Wishart distribution, Hotelling's T, distributions associated with regression, canonical correlations and discriminant analysis.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3460.03

STAT 5075.03: Multivariate Analysis.

STAT 5090.03/4090.03: Probability.

The theory of probability in Euclidean space. Topics include measure and integration, probability measures, the definitions and properties of random variables and distribution functions,

convergence concepts, Borel-Cantelli lemmas, laws of large numbers, characteristic functions and central limit theorems, conditional probability and expectation.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3360.03 and a third year analysis class, instructor's consent

CROSS-LISTING: MATH 4090.03/5090.03, STAT 4090.03

STAT 5100.03/4100.03: Survival Analysis.

This class is an introduction to survival analysis methods and will cover both the statistical theory behind the methods, and the application of various techniques. Topics to be discussed include survivorship and hazard functions and their relationship to lifetime distributions and densities; modes of censoring; the Kaplan-Meier estimate of the new survivor function; parametric survival time distributions; proportional hazard models and their semi-parametric estimation; accelerated life models, log rank tests, including the Mantel-Haenszel test; and goodness of fit measures.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3340.03 and STAT 3460.03, or equivalent

CROSS-LISTING: STAT 4100.03

STAT 5300.03: Topics In Statistics and Probability.

STAT 5350.03/4350.03: Applied Multivariate Analysis.

This class deals with the stochastic behaviour of several variables in systems where their interdependence is the object of analysis. Greater emphasis is placed on a practical application than on mathematical refinement. Topics include classification, cluster analysis, categorized data, analysis of interdependence, structural simplification by transformation or modelling and hypothesis construction and testing.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3340.03 and MATH 2135.03 or 2040.03

CROSS-LISTING: STAT 4350.03

STAT 5360.03/4360.03: Robust Statistics.

Robust statistics are those which provide protection against violation of assumptions underlying the statistical procedure. We will develop basic concepts including sensitivity, influence and breakdown of estimates and tests. Classical procedures will be evaluated in terms of robustness and alternate techniques developed based on weighted least squares and/or median based generalizations. Starting from the location problem, we will move on to regression and to multivariate problems by means of robust covariance estimates. We will also consider robust techniques in time series. Some simple programming will be required to implement various procedures.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3460.03 and 3340.03

CROSS-LISTING: STAT 4360.03

STAT 5370.03/4370.03: Stochastic Process.

The theory and application of stochastic processes. Topics to be discussed include the Poisson process, renewal theory, discrete and continuous time Markov processes, and Brownian motion.

Applications will be taken from the biological and physical sciences, and queuing theory.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3360.03 or instructor's consent

CROSS-LISTING: STAT 4370.03

STAT 5390.03/4390.03: Time Series Analysis I.

Time series analysis in both the time and frequency domain is introduced. The class is applied and students are required to develop their own computer programmes in the analysis of time series drawn from real problems. Topics to be discussed include the nature of time series, stationarity, auto and cross covariance functions, the Box-Jenkins approach to model identification and fitting, power and cross spectra and the analysis of linear time-invariant relationships between pairs of series.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3340.03, 3460.03, or instructor's consent

CROSS-LISTING: OCEA 4210.03/5210.03, STAT 4390.03

STAT 5410.03/4410.03: Advanced Topics In Time Series Analysis.

STAT 5500.03: Topics In Advanced Statistics.

STAT 5620.03/4620.03: Data Analysis.

A variety of statistical models which are useful for the analysis of real data are discussed. Topics may include: generalized linear models, such as logistic regression and Poisson regression, models for multidimensional contingency tables, ordered categories and survival data.

FORMAT: Lecture 3 hours

PREREQUISITE: STAT 3340.03, 3460.03, or instructor's consent

CROSS-LISTING: STAT 4620.03

STAT 5990.03: Intermediate Statistics for Health Sciences.

FORMAT: Lecture 3 hours.

PREREQUISITE: STAT 1060.03 or equivalent. Cross-listing: NURS 5000.03, PHAR 5990.03, LEIS 5503.03, KINE 5503.03, HEED 5503.03, HEAS 6500.03. Restriction: Not open to graduate students in Mathematics, Statistics and Computing Science

STAT 7320.03 Statistics Seminar.

Urban and Rural Planning

Location: 5410 Spring Garden Road
Halifax, NS
Mail: Department of Urban and Rural Planning
Faculty of Architecture
DalTech
Dalhousie University
P.O. Box 1000
Halifax, NS B3J 2X4
Telephone: 902-494-3260
Fax: 902-423-6672
E-mail: Planning.Office@Dal.Ca
Website: www.dal.ca/architecture/planning

Head

Foulton, M.C., BSc, MPhil (London), MS, PhD (Calif. at Berkeley),
MCIP, MRTPI

Professor

Palermo, F., BArch (Toronto), MArchUD (Harvard), MCIP

Assistant Professor

Guppy, S., BSc (Nottingham), MSc, PhD (Wales), MArch
(Columbia), MCIP (Prov.)

Part-Time Faculty

Epstein, H., BA (Carleton), LLB (Dal)
Fraser, P., BComm (Dal), MBA (St. Mary's), MURP (TUNS)
Hart, W.C., BSc (Ohio Wesleyan), MA (Indiana), PhD (Dal)
Wisnart, B., BA (UNB), BEd (Lakehead), MURP (Queen's), MPA
(Dal)

Departmental Secretary

Leslie, D., BA (MSVU)

I. Introduction

The Department of Urban and Rural Planning provides a professional planning education at the graduate level. The programme is recognized by the Canadian Institute of Planners. Many graduates of the programme will become professional planners working for private firms or for government. Others will find that the education provides a solid foundation for careers in related spheres such as international development, environmental protection or urban design.

Planners are involved in a variety of activities that shape the future of communities, the quality of the environment and the character of daily life. In their work for government, planners engage and motivate the public, help develop a wide range of policies affecting the character and potential of rural and urban areas, and are the guardians of the environment and the heritage of communities. Working as consultants or specialists in the private sector, planners undertake a wide variety of tasks ranging from the control of physical design to the creation of strategies for sustainable development. Planners work throughout the world from the heart of Canada's towns and cities to the fields and villages of the Third World.

Instruction is at the graduate level and encourages initiative, resourcefulness and creative questioning of received doctrine. The educational programme of the Department emphasizes: (a) up-to-date skills; (b) a sound appreciation of the environmental, social and economic processes that propel the evolution of rural and

urban societies and their physical forms; (c) the active contribution of students in confronting and resolving contemporary planning problems in local communities; and (d) the development of personal capabilities suited to the leadership roles that planners assume.

A. Co-Op Work Term

The MURP programme includes a four-month work term that provides students with practical experience in planning. The Co-op Co-ordinator for the Faculty of Architecture assists students in finding suitable work-term placements. In recent years, Planning students have been employed throughout Atlantic Canada and most other Canadian provinces, and some have chosen to work abroad - in Gambia, Indonesia, the Philippines, and Thailand.

B. Professional Registration

On completion of the MURP degree, and after further professional experience, graduates are eligible for full membership in the Canadian Institute of Planners (CIP). A foreign applicant is advised to contact his/her national accreditation organization about requirements for professional registration.

II. Degree Programmes

A. Master of Urban and Rural Planning (MURP)

MURP is a two-year programme consisting of six required classes, eight elective classes, a co-op work term and a thesis. It may be completed through full-time or part-time study. The first year consists mainly of required classes, followed by a summer co-op work term. The second year emphasizes elective classes in the fall term and thesis in the winter term.

The required classes provide the essential elements of a planning education. They cover: planning theory; planning methods, skills and computer applications; institutional and environmental contexts; and experience in the use of planning skills and knowledge.

The elective classes enable students to pursue individual interests. Classes offered within the Department are linked primarily to: urban communities; rural and regional planning; environment and sustainable development; and housing and real estate development. Extramural classes may be taken at other universities in Halifax, and elective credit may be given for suitable classes taken at other universities in Canada and abroad.

B. Master of Engineering/Master of Urban and Rural Planning (MEng/MURP) and Master of Applied Science/Master of Urban and Rural Planning (MASc/MURP)

These joint degrees require programmes of study that satisfy both the MURP requirements and the MEng or MASc requirements of the Department of Civil Engineering. Normally a student must:

- take the required classes needed for each degree;
- take sufficient electives to satisfy the requirements of each degree (with some or all of these satisfying the requirements of both degrees);
- complete a planning work term;
- undertake a thesis that is approved by both departments.

III. Admission Requirements

A. Minimum Academic Requirements

Each September, the Department admits approximately twenty students. The Department seeks students with high scholastic standing, demonstrated academic interests pertinent to planning, and community experience. All candidates must meet the Admissions Regulations of the Faculty of Graduate Studies.

Master of Urban and Rural Planning

MURP admission requires an undergraduate degree with high scholastic standing. Other applications will be considered when supported by career experience.

Master of Engineering/Master of Urban and Rural Planning
 MEng/MURP admission requires an engineering degree with high scholastic standing or its equivalent through a combination of an engineering degree and career experience.

Master of Applied Science/Master of Urban and Rural Planning
 MASc/MURP admission requires an engineering degree with high scholastic standing, a science degree with honours and high scholastic standing, or the equivalent of one of these through a combination of educational attainment and career experience.

B. Inquiries

Please contact the Department of Urban and Rural Planning for an application package, a brochure or additional information about MURP programmes. (The Department's phone number and e-mail address are shown at the beginning of this calendar section.) Please contact the Dalhousie University Office of the Registrar for an application package, admission status, or registration information.

C. Transfer Students

Applicants who have completed part of another graduate planning programme will be considered for transfer credit by the Admissions Committee. A transfer student must complete a minimum of six half-credits of classes and a thesis within the MURP programme to qualify for the degree.

IV. Academic Regulations

In addition to the Faculty of Graduate Studies regulations, the following apply to the Department of Urban and Rural Planning.

Readmission

A student who wishes to be readmitted to the programme, after withdrawing or failing to register for three consecutive terms, must reapply as though he/she were a new applicant to the programme.

Class Offerings

Some required subjects may be interchanged between academic terms, depending on the availability of instructors. Elective classes in each term are subject to the availability of instructors and may have enrolment limits. A student may take up to two senior-level undergraduate classes as part of the programme, with approval from the Department Head.

V. Classes Offered

The sessional distribution of classes throughout the two years of the MURP programme is outlined below. All classes are required except those designated specifically as "elective".

Six required classes	8 half-credits
Eight elective classes	8 half-credits
Work term	non-credit
Thesis	non-credit

Year 1 - Term 1 (Fall)

- PLAN 5001.06 Studio - Urban Planning
- PLAN 5101.03 History/Theory of Planning
- PLAN 5102.03 Planning Practice
- PLAN 5103.03 Quantitative Methods

Year 1 - Term 2 (Winter)

- PLAN 5002.06 Studio - Rural Planning
- PLAN 5104.03 Planning Law
- 2 electives **

Year 1 - Term 3 (Summer)

- PLAN 8891.00 Work Term

Year 2 - Term 4 (Fall)

- 5 electives **

Year 2 - Term 5 (Winter)

- PLAN 9001.00 MURP Thesis*
- 1 elective **

* Thesis for Joint Programmes

- PLAN 9002.00 MEng/MURP Thesis
- PLAN 9003.00 MASc/MURP Thesis

** Planning Electives

- PLAN 6001.06 Studio/Research Project - Urban Planning
- PLAN 6002.06 Studio/Research Project - Rural Planning
- PLAN 6003.06 Studio - Housing
- PLAN 6101.03 Urban Design
- PLAN 6102.03 Urban Economics
- PLAN 6103.03 Urban Ecology
- PLAN 6104.03 Comparative Urbanization
- PLAN 6105.03 Land Development Economics
- PLAN 6106.03 Transportation Planning
- PLAN 6107.03 Regional Planning
- PLAN 6108.03 History and Theory of Landscape Architecture
- PLAN 6109.03 Water Resources
- PLAN 6110.03 Environmental Impact Assessment in Social and Environmental Planning
- PLAN 6111.03 Housing Theory
- PLAN 6112.03 Computers in Planning
- PLAN 6201.03 Directed Studies (two available)
- PLAN 6301.03 Mid-Term Modules (two available)***
- PLAN 6401.03 Extramural Subject (four available)

*** Two mid-term modules must be completed to satisfy this class requirement.

A graduate or senior-undergraduate class taken at another faculty/university. To enrol in the class, a student must receive prior approval from the Department Head and from other sources specified in the Graduate Studies Academic Regulations. A student may take up to four extramural elective classes during the programme.

V. Class Descriptions

Class Numbers

The first digit of a PLAN class number indicates whether it is a required class (5), an elective class (6), co-op work term (8), or thesis (9). The second digit indicates the class format: studio (0), lecture/seminar (1), directed studies (2), mid-term module (3), or extramural (4). The credit-hour extensions (.03, .06) indicate the approximate number of class hours each week. Note that not every elective class may be offered every year. Please consult the academic timetable for current listings, including classes that are open to students from other faculties/universities.

PLAN 5001.06: Studio - Urban Planning.

An introduction to land planning and development in urban settings. The class investigates fundamental aspects of planning. Specific "real world" projects are used to: (i) explore the procedural, physical, social, economic and polemical context for decision making; (ii) to apply skills in information gathering, analysis and synthesis; and (iii) to develop communication techniques. The class will concentrate on documenting the existing situation, formulating strategies for intervention, developing a specific plan and assessing the consequences of proposed changes.

FORMAT: Studio/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1010

PLAN 5002.06: Studio - Rural Planning.

This class is a continuation of PLAN 5001.06, in a rural or small town setting.

FORMAT: Studio/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1011

PLAN 5101.03: History and Theory of Planning.

An intensive examination of traditions, ideas and current issues in planning. The class will trace the historic development of planning, examine the foundations of the Canadian planning profession and critique the major theoretical directions of contemporary planning in Canada and abroad.

FORMAT: Lecture/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1110

PLAN 5102.03: Planning Practice.

An exploration of the role of the planner and the planning process through lectures, seminars and case studies. The focus is on: (i) understanding the institutional framework for planning including social, political and economic dimensions; (ii) examining approaches to community involvement, negotiation and policy formulation; (iii) developing effective communication skills; and (iv) significant current issues facing planners (including ethical questions).

INSTRUCTOR: B. Wishart

FORMAT: Lecture/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1210

PLAN 5103.03: Quantitative Methods.

An introduction to quantitative and research methods used in planning. The class covers simple statistics, population forecasting, economic multipliers, spatial location analysis and a range of research methods: surveys and questionnaires, interviews, observing, participant observation and participatory appraisal. These methods are used in a project of practical and immediate value.

INSTRUCTOR: M. Poulton

FORMAT: Lecture/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1310

PLAN 5104.03: Planning Law.

The legislation, case law, and government authority applicable to planning and development control. Zoning and subdivision controls, development control, expropriation, planning appeals and the process of establishing and implementing plans will be examined. Attention is paid to the roles of all the primary players in planning: private citizens, special interest groups, corporations and municipal, provincial and federal government departments.

INSTRUCTOR: H. Epstein

FORMAT: Lecture/seminar

RESTRICTION: MURP students, or permission of instructor

EXCLUSION: ARP1211

PLAN 6001.06: Studio/Research Project - Urban Planning.

An in-depth examination of current urban planning issues in a studio context. Students engage in a project which is of current concern and offers opportunities to advance research interests. The emphasis is on developing original solutions which are based on a clear understanding of the existing situation, the mechanics of development and the realities of implementation.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0011

PLAN 6002.06: Studio/Research Project - Rural Planning.

An in-depth examination of current rural planning issues in a studio context. Students will undertake a project which is of concern to a rural area/small town and offers opportunities to advance research interests. The emphasis is on developing original solutions based on a clear understanding of the existing situation, the mechanics of change and the realities of implementation.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0012

PLAN 6003.06: Studio - Housing.

An in-depth examination of current housing issues in a studio context. Students will undertake a project which focuses on some significant aspect of housing and offers opportunities to advance research interests. The emphasis is on developing original solutions based on a clear understanding of the existing situation, the possibilities for intervention and the realities of implementation.

FORMAT: Studio/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0013

PLAN 6101.03: Urban Design.

An introduction to urban design as a distinct area of professional knowledge and skill within the spectrum of planning concerns and specialities. Lectures, seminars and case studies deal with issues associated with the quality of the public environment, urban design tools and implementation techniques. The relationship between architecture, urban design, and planning is emphasized.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

CROSS-LISTING: ARB 2115, ARCH 4104.02

EXCLUSION: ARP0110

PLAN 6102.03: Urban Economics.

The application of economic principles to (i) urban growth and structure; (ii) urban social and economic problems; and (iii) the provision of services and government activities. The emphasis is on the use of micro economics and welfare economics to explain and analyse urban processes and patterns of behaviour.

INSTRUCTOR: M. Poulton

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0211

PLAN 6103.03: Urban Ecology.

This class deals with cities as ecosystems - systems designed and built for people, but which must necessarily match the processes of natural ecosystems. Energy flows and material cycles are studied, as well as technologies which manage or intervene in these cycles. Through an extension of these ideas to include both other species and problems resulting from malfunctioning systems, the question of urban sustainability is addressed.

INSTRUCTOR: S. Guppy

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0317

PLAN 6104.03: Comparative Urbanization.

A class designed to bring together international antecedents and coincidents for Canadian trends in urban planning and design and to compare policy approaches and methods of environmental design and land use regulation.

INSTRUCTOR: D. Procos

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0113

PLAN 6105.03: Land Development Economics.

The application of basic techniques for analysing the financial feasibility of land development projects. Case studies focus particular attention on methods of financing and organizing real-estate development within the planning framework.

INSTRUCTOR: P. Fraser

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0312

PLAN 6106.03: Transportation Planning.

A critical analysis of the interplay between land uses and transportation. The class analyses transportation trends, the transport needs associated with different activities and the impact of transport facilities on land development. Technology, the costs of supplying transport facilities and the demand outlook for different modes are examined. The emphasis is on urban transportation, mobility demands and the supply of efficient and environmentally sound transport facilities.

INSTRUCTOR: M. Poulton

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0315

PLAN 6107.03: Regional Planning.

A critical examination of the policies, theories, aims and achievements of regional development planning. The class focuses on (i) economics, development theories and regional development policies; (ii) international comparisons of regional development policies and experience; and (iii) Canadian regional development experience with particular reference to government initiatives in the Atlantic region.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0111

PLAN 6108.03: History and Theory of Landscape Architecture.

This lecture and seminar class deals with changing landscapes and perceptions of the natural world during the past 250 years. It discusses the effects of technology and resource use on the design of landscapes as small as a private garden and as large as a bio-region, and examines the changing role of landscape architects, their writings and their collaboration with architects.

INSTRUCTOR: S. Guppy

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0114, ARB2108, ARCH 4106.02

PLAN 6109.03: Water Resources.

An understanding of (i) the hydrologic concepts underlying both the control and use of surface and ground water resources, and the origins and transport of water-borne pollutants, and (ii) the functions and performance of systems designed to supply water and dispose of fluid and solid wastes. Specific topics include: flood control planning and land use planning; erosion and sediment control; water quality objectives, and alternative means of pollution control in urban and rural areas.

INSTRUCTOR: W.C. Hart

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0316

PLAN 6110.03: Environmental Impact Assessment in Social and Environmental Planning.

An introduction to: (i) the theoretical, legislative and methodological aspects of social and environmental impact assessment; and (ii) the use of evaluation techniques including cost-benefit analysis, the planning balance sheet and the goal achievement matrix. The emphasis is on the use of impact assessment and evaluation to ensure informed decision making in the design and adoption of projects or policies.

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0311

PLAN 6111.03: Housing Theory.

An introduction to the history and theory of contemporary practice in housing design and production. The focus is on the quality of housing and the residential environment. A comparative analysis of

significant past and current examples is used to provide insight into the way houses and neighbourhoods are designed. This understanding is placed in the context of differing economic, political and housing market situations.

INSTRUCTOR: J.G. Wanzel

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0112, ARB2106, ARCH 4103.02

PLAN 6112.03: Computers in Planning.

The class will examine the use of computers in Planning for data management, accessing statistical data, geographical information systems (GIS), mathematical modelling, and presentation. These concepts will be covered both in theory and in practice, with students undertaking several small projects to implement the theoretical concepts. A larger project will be undertaken for the GIS component of the class.

INSTRUCTOR: P. Kelly

FORMAT: Lecture/seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

PLAN 6201.03/6202.03: Directed Studies.

A student wishing to pursue an advanced aspect of planning for which no suitable graduate or senior-level undergraduate class is offered may request to do a Directed Studies class. Approval of the Department Head is required and the class must be taken under the direction of a departmental faculty member. A maximum of two such classes in any student's programme is permitted.

FORMAT: Seminar

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0410/0411

PLAN 6301.03/6302.03/6303.03: Mid-Term Modules.

Each term, the Department offers a one-week module. In the fall, the module is normally a study visit. In the winter, the module is usually an intensive professional development workshop on an important contemporary planning theme that brings together students, professional practitioners and high-calibre resource personnel. Two modules must be completed in order to fulfil the requirements of this class, and a grade will be assigned at the end of the second module. A maximum of three pairs of Mid-Term modules in any student's programme is permitted.

FORMAT: Variable

RESTRICTION: Graduate students in the Faculty of Architecture, or permission of instructor

EXCLUSION: ARP0510/0511/0512

PLAN 8891.00: Work Term.

The work term is an integral academic part of the MURP programme. Before graduation, a student must complete fourteen weeks of employment in some aspect of the planning profession. Work placements are co-ordinated by the Co-op Co-ordinator for Architecture and must be approved by the Department.

RESTRICTION: MURP students

EXCLUSION: ARP1100

PLAN 9001.00: MURP Thesis.

In the final term of the programme, each student must complete a written thesis. The thesis is guided by a committee which consists of one supervisor and at least one advisor, one of whom must be a full-time faculty member in the Department of Urban and Rural Planning. The thesis must conform to the standards described in "Guide for the Preparation of Graduate Theses", a manual issued by the Department. The student is also required to make an oral defence of the thesis.

RESTRICTION: MURP students

EXCLUSION: ARP2013

PLAN 9002.00: MEng/MURP Thesis.

In the final term of the programme, each student must complete a written thesis. The thesis is guided by a committee which consists of at least one full-time faculty member from the Department of Urban and Rural Planning and one from the Department of Civil

Engineering. The thesis must conform to the standards described in "Guide for the Preparation of Graduate Theses", a manual issued by the Department of Urban and Rural Planning, and must be accepted by the thesis committee and an external examiner approved by the two departments. The student is also required to make an oral defence of the thesis.

RESTRICTION: MEng/MURP students

PLAN 9003.00: MASc/MURP Thesis.

In the final term of the programme, each student must complete a written thesis. The thesis is guided by a committee which consists of at least one full-time faculty member from the Department of Urban and Rural Planning and one from the Department of Civil Engineering. The thesis must conform to the standards described in "Guide for the Preparation of Graduate Theses", a manual issued by the Department of Urban and Rural Planning, and must be accepted by the thesis committee and an external examiner approved by the two departments. The student is also required to make an oral defence of the thesis.

RESTRICTION: MASc/MURP students

Women's Studies

Location: 1461 Seymour Street, Second Floor
Halifax, NS B3H 3M6
Telephone: (902) 494-2980
Fax: (902) 494-2105
WWW: <http://www.dalgrad.dal.ca>

Women's Studies Coordinator

Sherwin, S.

Graduate Programme Coordinator

Keddy, B.

Inter-University Faculty

Atlantic School of Theology

Davis Finson, S., BA (Waterloo-Lutheran), MRE (Emmanuel), MSW (Tor), DMin (Boston)

Dalhousie University

Andrews, A., BA, BEd, MA (Leeds), PhD (III), FRSA
Banker, J., BA (Tor), LLB (Osgoode)
Barber, P.G., BA, MA (Auckland), PhD (Tor)
Bednarski, B., BA (London), MA (Dal), PhD (Laval)
Campbell, S., BA, MA (Alberta), PhD (Tor)
Carbert, L., BA (Alberta), MA, PhD (York)
Crowley, J., BA (Princeton), MA (Michigan), PhD (Johns Hopkins)
Ginn, D., BA (Mt.A), LLB (Queen's), LLM (Osgoode)
Jarman, J., BA, MA (Tor), PhD (Cambridge)
Keddy, B., BScN (MCSV), MA, PhD (Dal), RN
Laidlaw, T., BA, Med (Calgary), PhD (Alberta)
Lucky, C., BA, MA, PhD (Tor)
Neal, R., BA/BSW (McM), MA (OISE), SSW
Oore, L., BA (TelAviv), MA (Waterloo), PhD (Western)
Farpert, J., BA (Brown), MA, PhD (Boston)
Richard, B., BA (Mt.A), MSW (Dal)
Sherwin, S., BA (York), PhD (Stanford)
Stone, M., BA (Guelph), MA (Waterloo), PhD (Tor)
Thompson, J., BA (Western), MA, PhD (Tor)
Tillotson, S., BSc (Waterloo), MA, PhD (Queen's)
Treves, N., BSc (American University, Cairo), PhD (Rice)
van Roosmalen, E., BA (Waterloo), PhD (Alberta)

Mount Saint Vincent University

Baker, P., BA (Manitoba), MA, PhD (Tor)
Bruhm, S., BA (MSVU), MA (Dal), PhD (McGill)
Conrad, M., BA (Acadia), MA, PhD (Tor), FRSC
Deleas, J., PhD (Montpellier)
Early, F., BA (Florida State), MA, PhD (Concordia)
Evensen, D., BA, MA, PhD (McM)
Frank, B., BA, BEd, MEd (Acadia), PhD (Dal)
Gordon, J., BA (Antioch), MA, PhD (Illinois)
Kelly, U., BA, BEd, Med (MUN), PhD (Tor)
Medfack, S., BA, MA (McGill), PhD (York)
Manicom, A., BEd (McGill), MEd (AIE), PhD (Tor)
Mathieson, C., BA (Ottawa), BA (MacMurray), MA (Northern Arizona), MSc, PhD (Calgary)
Nielsen, L., BEd (Sask), MA (Minnesota), PhD (New Hampshire)
O'Brien, M., BA (Mercyhurst), MA, PhD (Michigan)
Ralston, M., BA (Tor), MA (Sussex), PhD (Dal)
Scrimger, J., BA (Guelph), DipEd, MA (Western)
Varga, D., BAsc (Guelph), MA, PhD (Tor)
Warne, R., BA (Winnipeg), MA, PhD (Toronto)
Zuk, R., BA, MA, PhD (Alberta)

Saint Mary's University

Bell, S.J., BA, MA (Western), PhD (Tor)
Cauville, J., MA (Paris), MA, PhD (UBC)

Chan, W., BA (Carleton), MA (Sheffield)
Christensen-Ruffman, L., BA (Smith), PhD (Columbia)
Connelly, P., BA (SMU), DipEd, MA (Dal), PhD (Tor)
Crooks, S., BA (SMU), MA (Dal), PhD (Edinburgh)
Dalton, A.M., BS, BEd (MUN), MA (Fordham), PhD (Cath. Univ. of America)
Fitzgerald, P., BBA (StFX), MA (N.Dakota), PhD (N.Colorado)
Katz, W., BA (Skidmore), MA, PhD (Dal)
Keeble, E., BA (DePaul), MA, PhD (Dal)
MacDonald, M., BA (Dal), MA, PhD (Boston)
Ralston, H., RSCJ, BA, MA, PhD
Tastoglou, E., MA, PhD (Boston)
Thomas, G., BA, BEd, MA, PhD (Dal)
Thomas, G., BA, MA (Sussex), PhD (London)
VanderPlaat, M., BA, MA, PhD (Dal)

I. Master of Arts in Women's Studies

This degree is offered jointly by Dalhousie University, Mount Saint Vincent University, and Saint Mary's University. The degree will be granted jointly by the three cooperating universities and each students' programme will be approved by the Joint Graduate Admissions and Programme Committee (GAPC). The MA in Women's Studies emphasizes the interdisciplinary basis of Women's Studies, its community linkage and the emerging body of feminist theories and methodologies. Drawing on the collective resource of faculty members across the three universities, the programme invites applications from students whose research interests fall within eight broad categories: feminist theory and methodology; women and work; gender and development; women and health; North American women's history; feminist literary/cultural theory and practice; gender and education; and women and social change.

A. Admission Requirements

To be admitted to the MA, students normally will be expected to have completed an Honours BA or equivalent with a minimum of B average or equivalent. Admission will also be based on the availability of Women's Studies faculty to supervise in the student's proposed area of research. Some students may be required to do qualifying classes to develop their background in social sciences, humanities and/or Women's Studies prior to admission to the programme.

In addition to following normal university procedures for application to graduate programmes, students must submit transcripts, three letters of references, a Supplementary Application Form and a sample of writing.

Applications can be made to any of the three cooperating universities. Decisions in admission are made by the Interuniversity Graduate Admissions and Programme Committee (GAPC) for Women's Studies.

B. Programme Requirements

The programme includes both course work and thesis and can be pursued either full time or part time. The normal time limits for the completion of MA degrees apply (please refer to Section 1.3.1 and 6.1 in the Faculty of Graduate Studies regulations). The programme requires a minimum of five credits (5.0) including three required half-credits (Theories of Feminism, Feminist Methodologies and Graduate Seminar) and a two-credit thesis. Remaining electives can be chosen from among a range of graduate-level classes offered by other departments at the three universities, in consultation with the students' faculty advisor.

II. Classes Offered

WOST 6010.03: Theories of Feminism.

This class provides an in-depth study of feminist theory. It explores the development of theories over time and across borders, focusing on common assumptions and debates among feminists.

WOST 6020.03: Feminist Methodologies.

This class examines feminist critiques and strategies around knowledge and research methodologies. It explores historical and contemporary debates on important research issues.

WOST 6030.03: Graduate Seminar.

(Half-credit, meets through both semesters.) This seminar will be used to discuss student research proposals and to provide a forum to integrate material from other classes. As part of this seminar, each student will be required to engage in field-based learning (i.e. community-based, developed in the context of each student's programme).

WOST 6090.03: Directed Study in Feminist Theory and Methodology.

WOST 6091.03: Directed Study in Feminist Literary and Cultural Theory and Practice.

WOST 6092.03: Directed Study in Gender and Development.

WOST 6093.03: Directed Study in Women and Social Change.

WOST 6094.03: Directed Study in Women in History (North America)

WOST 6095.03: Directed Study in Women and Work.

WOST 6096.03: Directed Study in Women and Health.

WOST 9000.00: Master's Thesis.

Centres and Institutes

A number of centres and institutes for study and research in specific fields are based at the University. Among these are:

Atlantic Health Promotion Research Centre

Director: Renee Lyons, PhD
Co-ordinator: S. Crowell, MPA

The AHPRC was established in 1993 through a Centres of Excellence Award from Health Canada and the Social Sciences and Humanities Research Council of Canada. The Centre is a cooperative effort between the Faculties of Health Professions, Medicine and Dentistry, and the four Atlantic Departments of Health, with support from Health Canada, other government granting agencies and the private sector. The Centre conducts and facilitates health promotion research that influences policy and contributes to the health and well-being of Atlantic Canadians. The Centre's key objective is for Atlantic Canadians to have greater control over their health through personal, family and community practices, policies that enhance health, supportive environments, and action on the determinants of health.

The AHPRC provides assistance with the development of health related research ideas, offers advice and consultation on proposals and reports; helps with networking, advises on potential funding sources, offers letters of support, a regular newsletter, a Web site, a library of health promotion materials and workshops and seminars on health promotion research.

Opportunities exist for faculty members and students to participate in the Centre's projects and activities. Students can also become involved with the Centre as volunteers, through field placements and research internships.

Atlantic Institute of Criminology

Director: D.H. Clairmont, BA, MA, PhD

The Atlantic Institute of Criminology has been established to provide a centre for research in the areas of criminology, policing, and other concerns of the justice system. In this focus and in its contribution to the associated career development, the Institute is equivalent to those existing in other regions of the country. Research awards for graduate students in Criminology are available. Seed funding is also available for research relating to the justice system.

Policy for the Atlantic Institute of Criminology is developed with the assistance of an Advisory Board comprising representatives from the academic and professional community of the region.

Associate memberships are available to interested and qualified persons. Workshops and training classes also provide opportunities for professional development for employees of the Criminal Justice system in the Atlantic Region.

Atlantic Region Magnetic Resonance Centre

Director: Chair, Department of Chemistry
Manager: D.L. Hooper, BSc, MSc, PhD

Established in 1982 with assistance from the Natural Sciences and Engineering Research Council, the Centre is concerned with teaching and research programmes in magnetic resonance. The Centre has modern nuclear magnetic resonance (NMR) and electron spin resonance (ESR) instruments including Bruker AC 250 and AMX 400 NMR instruments and a Varian infinity 200 NMR for solid state studies.

In addition to providing well-equipped laboratories and instrumentation for resident and visiting faculty, research scientists and students, the Centre provides NMR spectra and expertise to scientists in the Atlantic Region.

Atlantic Research Centre

Director: H.W. Cook, MSc, PhD

Established in 1967, the Centre conducts basic biomedical research and population studies in the fields of human genetics, cell and signalling, and neurobiology. It also provides education in these fields to undergraduate and graduate students and the general public. Special tests and consultative services for the prevention and treatment of diseases causing metabolic and neurological disorders are provided by the Centre. The Centre's professional staff hold appointments in various departments of the Faculty of Medicine. Its work is supported by agencies such as the Medical Research Council of Canada, the Dalhousie Medical Research Foundation, and the governments of the three Maritime provinces and by private donations.

Canadian Institute of Fisheries Technology

Director: T.A. Gill, BSc, MSc, PhD

The Canadian Institute of Fisheries Technology was established in 1979 at the former Nova Scotia Technical College (later TUNS). The federal Department of Fisheries and Oceans provided much of its early specialized laboratory and seafood pilot scale processing equipment. As a government approved laboratory for advanced technology, it also provides R&D services on a cost recovery basis to industry and to various governmental agencies. The Institute promotes technology transfer and the development of advanced technologies aimed at more effective commercial utilization of fish supplies in Canada and throughout the world.

In addition, the CIFT offers unique opportunities for post graduate training and research through the Department of Food Science and Technology. Major areas of emphasis are: food biochemistry; fats, oils and nutraceuticals; physical properties of foods; fish/food process engineering; computerized control in the food processing industry; seafood safety and preservation; seafood toxins and food rheology; beverage science.

Facilities

The Canadian Institute of Fisheries Technology is located in the MacDonald building of DalTech at 1360 Barrington Street in downtown Halifax. The Institute's facilities consist of the following areas:

- general office
- marine oils laboratory
- seafood chemistry laboratories and instrument rooms
- microbiology laboratory and autoclave room
- food kitchen and sensory panel area
- engineering pilot plant
- computer-controlled cold storage facility
- teaching laboratory
- physical properties laboratory

These areas contain instrumentation and food processing equipment for experimental processing, product storage and evaluation and laboratory analyses. In addition to a cold storage facility, the pilot plant is equipped for experimental processing including modified atmosphere storage, freezing, retorting, packaging, chilling, drying and smoking, and meat-bone separation. The pilot plant is especially well equipped for thermal processing research. Specialized laboratory instrumentation includes Waters automated HPLC equipment, Perkin-Elmer differential scanning calorimeter, Pen-Ken electrokinetic analyzer, ultracentrifuge, computer-driven U.V. visible spectrophotometer, Perkin Elmer spectrofluorometer, Pharmacia fast protein liquid chromatography system, research microscope equipped with bright field/dark field, phase contrast and fluorescence optics, Du Nouy tensiometer, vertical and horizontal isoelectric focussing/electrophoresis equipment, capillary electrophoresis, Instron Universal Tester, Bohlin controlled stress and controlled rate rheometers, Paar rolling ball viscometer, 2 HP impedance analyzers and a Molecular Devices micro-plate reader. Gas and high performance liquid chromatographic systems, as well as an ion trap GLC detector and a purge-and-trap headspace analyzer are available for the analysis of fish oils and trace constituents.

Educational Opportunities

Graduate programs are available in Fisheries Engineering and Food Science at the Master's and Doctoral level through the Department of Food Science and Technology. Graduate level class work and research opportunities relate to food science, seafood processing technology, marine oils, engineering design, packaging technology, fish post-mortem biochemistry, food rheology and food process science. Students with degrees in food science, engineering, chemistry/biochemistry, microbiology or biology are invited to apply.

Centre for African Studies

Location: 1461 Seymour Street
Halifax, NS B3H 3J5
Telephone: (902) 494-3814/2105
Fax: (902) 494-2105
Director: J.L. Parpart, MA, PhD

This Centre, established in 1975, coordinates instruction, publication, research and development education programmes in African Studies. Associated faculty hold appointments in departments and units concentrated in the social sciences and humanities. The Centre organises academic and informal seminars and public policy conferences on Africa and encourages interdisciplinary interaction at all levels on African subjects and issues. It cooperates with the International Development Studies programme and with the Pearson Institute and International Students Centre.

Centre for Foreign Policy Studies

Director: Timothy M. Shaw, PhD
Assistant Director: Katherine Orr, MA

Established in 1971 the Centre is concerned with teaching, research, publication, policy advice and other professional activities in the various aspects of foreign policy, security studies and international politics. It is funded through the Security and Defence Forum of the Department of National Defence and other foundations, government agencies, international organizations, and contracts.

The Centre's work is concentrated in the area of Canadian and comparative maritime strategy and oceans policy but it also deals with international political economy, regional and global development and peace-building and democratization. Its geographical specializations include foreign policy in Canada, Europe, the South (especially Africa, Asia and the Caribbean), and the U.S. The Centre encourages activities in these areas by senior Research & Doctoral Fellows and advances communication among local and international communities in these fields through seminars, workshops, conferences and colloquia, often co-sponsored by local, national and/or international organizations. It publishes occasional papers and monographs plus a monthly Defence Newsletter on Canadian defence and security policy issue.

The Centre is an integral part of the Department of Political Science. Centre faculty offer classes through the Department in foreign and defence policy, international relations and development, and maritime affairs at both undergraduate (majors & honours) and graduate (MA and PhD) levels. They also supervise masters and doctoral theses in these fields.

For further information, consult the Centre's website:
www.dal.ca/~centre.

Centre for International Business Studies

Director: Mary R. Brooks, BOT, MBA, PhD

The Centre was established in 1975 and is funded by the Department of Foreign Affairs and International Trade. Its purposes include the provision of specialist training in international business studies, research and outreach activity in international business. It carries out these functions within the administrative framework of the School of Business Administration.

The Centre is very proud of its linkages with the local and regional business community. An annual Foreign Business Program was begun in 1989-90; this MBA credit course matches students to Nova Scotian companies to conduct market investigations and assist companies in preparing to visit the market in the course of the

program. Intern programs also assist Atlantic Canadian companies who need more in-depth international market intelligence and offer the intern the opportunity to learn about international business by doing it. Fostering such future partnerships between students and business is a priority for CIBS.

Centre for Marine Geology

Director: David B. Scott, BSc, PhD

The Centre for Marine Geology was founded in 1983 to promote the interdisciplinary study of the continental margins and the sea floor. The Centre draws on the faculty and resources of the Departments of Earth Sciences, Oceanography and Physics and has close links with other oceanographic institutions in North America. The objectives of the Centre are: (1) to expand the university's leading role in international studies of the oceanic crust, (2) to participate with industry and government in the geological aspects of oil and gas development on Canada's east coast and (3) to continue research on sedimentation and the recent history of the Canadian offshore.

Centre for Marine Vessel Development and Research (CMVDR)

Director: C.C. Hsiung, PhD, PEng, CEng, FRINA, Professor of Naval Architecture, Former McConnell Chair of Engineering
Manager: G.R. Richard, Msc, MEng

The Centre was established at DalTech in 1989 to provide specialized technical services to the Marine Industry. Emphasis is on pure and applied research in marine dynamics, with particular focus on the performance prediction analysis of marine vessels and offshore structures.

Areas of expertise include:

- Fundamental research in marine hydrodynamics
- Ship/boat motion and wave-loads, including response of offshore structures in waves
- Vessel seakeeping and safety studies, including swamping and capsize behaviour in extreme seas
- Optimal hull forms for minimum resistance
- Ship maneuverability in restricted waters
- Computer simulation of ship and offshore structure motions and flow fields
- Small Craft model tank tests
- Full scale tests, at sea

CMVDR has a policy to involve graduate students of the Naval Architecture Programme as much as possible in its research contracts with industry.

Research Facilities

Small Craft Towing Tank

The small craft towing tank is located in the Civil Engineering Hydraulic Laboratory at DalTech. The tank's dimensions are 1m x 1m x 30m. The carriage has a maximum velocity of 4.0m/s (13ft/sec) and can sustain a constant carriage speed over a usable rail length of 25m. The fully-automated carriage control system allows the operator to pre-select a desired test velocity profile so that a maximum constant velocity window is obtained within the safe operating limits of the tank.

A computer-controlled wave-making system is installed in the tank, comprising two wave-makers, one at each end. Each can act as a wave-maker or a wave-absorber. The system can make progressive or standing waves, as well as regular or irregular waves. The maximum wave height is about 0.3m (1 ft).

Computing Facilities

CMVDR and the post-graduate Naval Architecture Programme has sophisticated and networked Computer Systems to support its advanced research work. The systems comprise Silicon Graphics and HP Workstations and Pentium PC's running in Unix and/or Win 95 and Win NT.

The computer systems are used for running numerical computations, required for the on-going development of numerical techniques to solve complex hydrodynamic problems. Advanced

2D and 3D visualization software is also developed on the systems so that real-time dynamic simulations can be carried out and displayed.

In addition to advanced hydrodynamic and hydroelastic software developed in-house, CMVDR has commercial hull design and analysis software packages, including FastShip, GHS, Shipul 2000, AutoShip and ABS Safehull which are used to complement research efforts, and to instruct naval architecture students.

Centre for Water Resources Studies

Director: D.H. Waller, PhD, PEng

The Centre for Water Resources Studies was established in December, 1981, by a resolution of the Board of Governors. The objectives of the Centre are to carry out applied research which contributes to the effective and sustainable protection of water resources in Atlantic Canada, nationally and internationally, and to facilitate the transfer of new knowledge to potential users. Research programs directed by the Centre address the design of cost-effective on-site wastewater systems, soil erosion processes, drinking water treatment, the use of roofwater cisterns for domestic water supply, eutrophication, watershed management, the computer modelling of hydrodynamic and hydrochemical processes, as well as topics in hydrogeology. In 1982 the Centre established the Halifax Urban Watersheds Program, a long-term study of a pair of watersheds near the Halifax city limits. This study focuses on the watersheds as a field laboratory for the study of the effects of urbanization on surface water quality and quantity. In order to better facilitate the development of relevant research programmes and the dissemination and application of research results, the Centre has memoranda of understanding with Environment Canada, the Nova Scotia Department of Environment, Fenwick Laboratories and the Dalhousie School of Resources and Environment Studies. The Centre also has a number of research advisory panels, which involve professionals from industry, government and academia in applied research related to water use and water management.

Facilities

The Centre for Water Resources Studies is located on the fifth floor of "D" Building of DalTech. Laboratory and office space is available for specific graduate research topics, as well as ongoing research carried out by Centre personnel. Analytical equipment includes instrumentation for determining low levels of major ions and nutrients, as well as trace quantities of metal ions in water. The Centre has apparatus for laboratory investigation and pilot scale testing of innovative water treatment methods using Dissolved Air Flootation (DAF) and ozonation and has worked with local consultants and municipalities to develop new applications of the technologies. The Centre is a North American leader in the development of on-site sewage disposal and has had an active research programme in this area since 1987. In addition to numerous field installations the Centre fully has functional laboratory installations that duplicate the behaviour of sloping sand

filters and septic disposal. The Halifax Urban Watershed (HUW) is the outdoor laboratory utilized by the Centre for much of its research. The HUW consists of 15 m² of watershed area containing five lakes. The lakes vary in the amount of development within their watersheds from completely undeveloped to completely developed and are, therefore, ideal for studying a variety of subjects related to urban areas. The HUW is located approximately five kilometers from campus and can be reached within ten minutes. This location makes it ideal for studies requiring frequent site visits.

Educational Opportunities

The Centre encourages applications from qualified graduates with experience in engineering and the science who have an interest in water resources research. Graduate programmes which are offered within the Faculty of Engineering include the Ph.D., Master of Applied Science, and Master of Engineering. The Centre also participates in the program leading to a dual degree in water resources engineering and planning in conjunction with the Department of Urban and Rural Planning.

Dalhousie Health Law Institute

Director: Jocelyn Downie, BA, MA, M.Litt., LLB, LL.M.
Associate Director: Colleen Flood, BA, LLB, LL.M., JSD

Associate: Fiona Bergin, BA, LLB, MD, LL.M.
6061 University Avenue
HALIFAX, NS B3H 4H9
Telephone: (902) 494-6881
Fax: (902) 494-6879
E-Mail: hli@dal.ca
Website: www.dal.ca/law/hli

The Health Law Institute is an interdisciplinary Institute supported by and serving the Faculties of Law, Medicine, Health Professions, and Dentistry. The Institute provides teaching services to these four faculties at the undergraduate, graduate, and continuing education levels. Institute faculty also supervise graduate and undergraduate law students interested in writing about topics at the intersection of law and health care. Institute faculty conduct and facilitate research in health law both independently and collaboratively. There are particularly strong research links between the Institute and the Office of Bioethics Education and Research in the Faculty of Medicine. The Institute offers consultation services to various government agencies as well as public interest groups, the private sector, health care institutions and the media. Outreach activities include Institute promotion, international scholarly links and joint initiatives, and service to the University and to the broader community.

Minerals Engineering Centre

Director: William F. Caley, PhD, PEng

The Minerals Engineering Centre was established by DalTech from the Laboratory for the Investigation of Minerals, formerly part of the Atlantic Industrial Research Institute. The Minerals Engineering Centre is intended to provide research, analytical and advisory services to industries, universities, and government bodies in Atlantic Canada. The Centre is located in G Building of DalTech, Sexton Campus which also houses the Department of Mining Engineering. The services offered include:

- Sample preparation of ores, soils, silts, rocks, cores and clay fraction
- Size analysis, including screening, sieving, and sub-sieve analysis
- Dense liquid analysis
- Preparation of thin sections
- Physical and chemical analytical methods using atomic adsorption, spectographic and wet chemical techniques
- Analysis of samples including geological, metalliferous ores, industrial minerals, coals, metals, alloys and water
- Mineral processing test work covering the whole range of investigative techniques from bench scale to pilot plant, including crushing, grinding, classification, gravity separation, dense medium separation, magnetic separation, electrostatic separation, flotation, flocculation, thickening, filtration, and drying

The Minerals Engineering Centre is closely linked with the Department of Mining and Metallurgical Engineering and provides opportunities for undergraduate and graduate students to learn various analytical and mineral testing techniques applicable in their course of studies. It also offers services to faculty members to assist in their teaching and research activities.

Further information may be obtained from the Director of the Centre.

Neuroscience Institute

Acting Director: R.E. Brown, PhD

The Neuroscience Institute was founded in 1990 to promote and coordinate research in neuroscience, the modern interdisciplinary study of the brain and nervous system. The development of the Institute parallels the establishment of many such institutes throughout the world and marks dramatic recent progress in understanding the workings of the brain, as signalled for example by U.S. President Bush's declaration of the 1990's as the Decade of the Brain.

Currently housed in the Sir Charles Tupper Medical Building, the Institute serves as an umbrella organization to foster research and training in neuroscience at Dalhousie. A major objective is to

increase understanding of the functions of the nervous system in health and disease and, to this end, the Institute coordinates the activities of neuroscientists in the Faculty of Medicine and the Faculty of Science, facilitating collaboration between clinical and basic scientists in the two Faculties. Some foci of current research activity include: the autonomic nervous system; development and plasticity of the nervous system; and, sensory physiology. The Institute also provides a vehicle to seek new sources of funding, and will encourage new initiatives in all areas of neuroscience research at Dalhousie. In addition, the Institute promotes and coordinates training programmes in neuroscience currently offered through constituent departments at both the undergraduate and graduate levels. Associated with the latter it sponsors a seminar series annually.

The Nova Scotia CAD/CAM Centre

Location: 1360 Barrington Street
P.O. Box 1000
Halifax, B3J 2X4

Reception: 902 - 494 - 6035

Fax: 902 - 422-8380

Contact: Leigh Beauchamp Day, Business Development Manager
902 - 494 - 6040

Established: April 29, 1983, as a cost-recovery, industry oriented Centre within DalTech. It is primarily affiliated with the Departments of Mechanical and Civil Engineering, but also works with all other departments.

Mandate: As set out in an agreement with the Province of Nova Scotia, DalTech established an "industry-oriented CAD/CAM Centre to assist provincial manufacturers and consulting engineers to develop, design and utilize CAD/CAM applications". It has since expanded to include advanced composite-materials in bridges and structures and remote monitoring of innovative structures.

Director: Dr. Aftab A. Mufti, P.Eng.
494-6034

Assist. Director: Dr. John Newhook, P.Eng.
494-6039

CAD Training and Development

CAD/CAM Engineer: Mr. Andrew Harvie, P.Eng.
494-6046

- Authorized AutoCAD Training Centre
- Applications support
- Communications, Data Exchange & CAD
- Hardware, software advisory service
- solid modelling
- civil and mechanical applications
- animation capability
- exploratory applications

Design Engineering & Manufacturing

CAD/CAM Engineer: Mr. Robert Warner, P.Eng.
494-6096

- CNC application research
- Prototype development
- Equipment consultation
- Coordinate Measuring Machine Services
- Insertion Moulding
- CADkey and SmartCAM
- irregular forms
- variety of metals and advanced engineering materials
- solid modelling/3D design
- Design & fabrication methods advice
- Advisory Service for: flow analysis, mold design analysis, thermosets, thermoplastics, reinforced plastics, compression moulding, etc.

Mr. Warner also teaches Mechanical Engineering class MECH 4631.03 CAD/CAM, where DalTech students are introduced to manual CNC programming and SmartCAM.

Advanced Composite Materials (ACM) in Bridges and Structures
Technical Implementation Officer: Mr. Mike Mahoney, E.I.T.
494-6163

ISIS Engineer: Dr. Javad Jalali, P.Eng.
Manager: Dr. John Newbrok, P.Eng.

- R&D in ACM with wood and concrete
- Finite Element research
- FE training
- CAE advisory service
- Trade Missions
- International Conference Organization
- Operates ACMRS Network
- Operates ISIS - Halifax
- fracture mechanics
- crack propagation
- bearing shaft design
- stress and impact problems
- construction: buildings, bridges, ships and aircraft
- composite and advanced materials
- innovative structures and remote monitoring of structures

Advanced Composite Materials in Bridges and Structures
The Advanced Composite Materials in Bridges and Structures (ACMBS) Division was established in 1989 to serve a need in the engineering, design and construction industries with respect to the application of advanced composite materials in bridges and structures. The Centre works closely with the Advanced Materials Engineering Centre (AMEC) for their testing expertise.

Business Development

Contact: Ms. Leigh Beauchamp Day, 420-7770

- Industry contacts
- Training coordination
- Seminar & event coordination
- Information dissemination
- Proposals & contracts
- Public Relations

Equipment & Software Available for Industry and Daltech' Use

- PC based application software includes: AutoCAD (Release 14), SmartCAM, ALGOR, SolidWorks (3D CAD Modelling Programme) and AutoDESK 3D Studio VIZ (3DS VIZ), solid modelling software-Pro-Engineer
- CNC milling centre Mori-Seiki MV Junior 3-axes
- CNC turning centre lathe Mori-Seiki SL-25
- Co-ordinate Measuring Machine (CMM), Mitutoya measuring range of 13" x 20" x 12"
- Impact testing machine Tinius Olsen Izod - Model 66
- "Roughness" measuring gage unit, Scarface finish
- Remote control color copier Tektronix Phaser II
- CNC milling machine EasyMill-3 2 1/2 axes (for training purposes only)
- Injection Moulding Machine 25 Ton Engel 1.2 oz
- Manual try-out plastic injection press
- 9 Personal Computers (486, Pentium)
- Plotters - HP Design Jet 250

Technology Transfer Activities

- contracts from and joint ventures with companies, industry and government
- training programs for industry and government
- technical and application advisory service
- research and development
- technical services
- prototype development
- use of facilities

Actively Seeking

- collaborative projects
- temporary transfer of staff to companies

- temporary transfer of company staff to the Centre
- access to specialized equipment and facilities
- an expansion of the items listed under Current Activities above

Affiliations with Other Organizations

The Centre has an excellent working relationship with other organizations throughout the Province, including: the University College of Cape Breton and Innovacorp. It also has access to CAD/CAM, robotics, industrial, computer science, mechanical and civil engineering expertise within DalTech.

Member of:

- Society of Manufacturing Engineers
- Nova Scotia Entrepreneur's Forum
- National Agency for Finite Element Methods and Standards in the United Kingdom
- Canadian Network of Advanced Manufacturing Research
- Canadian Plastics Institute
- Society for Plastics Engineers

Supported by:

- The National Research Council Industrial Research Assistance Program (IRAP) and Canadian Technology Network (CTN)
- ISIS Canada (NSERC)
- Canada/Nova Scotia Cooperation Agreement
- Industry Canada

Trace Analysis Research Centre

Director: L. Ramaley, BA, MA, PhD

With the assistance of a grant from the National Research Council, the Centre was established in 1971 to train analytical chemists and, through research, to contribute to the advancement of analytical chemistry. A major facility of the Centre is a low-power nuclear reactor (SLOWPOKE) which is available to researchers within Dalhousie and elsewhere.

Vehicle Safety Research Team

Director and Principal Investigator: C.R. Baird, PhD, PEng

The Vehicle Research Safety Team (VSRT) is one of eight university-based teams located across Canada. These teams operate on a non-profit basis under contract to Transport Canada (Surface), and were established to conduct research into vehicular crashes.

The VSRT has been in operation at DalTech since 1972 and, in addition to participating in national programs, has been involved in several other studies, including an on-going and expanding programme of seeking out and examining alleged safety-related defects. The major portion of the programme is geared to relating injuries from vehicular-crashes to the injury-causing mechanisms or sources in vehicles. As such, results of accident studies are continually being related to Transport Canada Vehicle Standards.

The team is composed of two professional engineers from the Faculty as well as two full-time investigators, one of whom is a professional engineer. In addition, an advisory committee exists, providing liaison and interaction with medical personnel, policing agencies and provincial transportation authorities.

The VSRT has special research interests in casual factor evaluation methods, in computer-aided accident reconstruction, in data base management and modular analysis procedures, particularly in relation to injury severity and injury-casual factors.

Resources and Services

1. Advisory Committee on Sexual Harassment

Sexual harassment is sexually oriented behaviour of a deliberate or negligent nature that adversely affects the working or learning environment or participation in university life. Sexual harassment can take many forms, from constant joking to assault. It may involve promises of reward, or threats that you could fail in class or lose your job. It may make your work or study environment uncomfortable through continued sexual comments, suggestions or pressures. Sexual harassment may involve unwelcome sexual attention from a professor, a teaching assistant, a staff member, a student, or even a patient or a customer.

Dalhousie University is committed to an environment free from sexual harassment. A policy and procedures exist to deal with complaints of sexual harassment. Responsibility for monitoring the policy and coordinating educational programming rests with the President's Advisory Committee on Sexual Harassment, which includes representation from student, staff and faculty groups.

If you believe you are being sexually harassed at Dalhousie you are encouraged to discuss your questions or concerns with the Sexual Harassment Advisor, Room #3, Basement of the Arts and Administration Building, 494-1137. Advice and information about the policy and possible options are available.

Persons found to have engaged in sexually harassing behaviour can be subject to a range of penalties, up to and including expulsion or dismissal from the University.

2. Alumni Association

The Alumni Association is comprised of over 70,000 graduates of Dalhousie University and DalTech. A strong global network of volunteers keeps alumni informed and involved with the Association. By providing many programs and services, the Association fosters a strong relationship between Dalhousie and its alumni.

Dalhousie alumni play a vital role in the health and future of the university. Because of alumni leadership, Dalhousie enjoys a strong pool of applicants to its academic programs each year. Many alumni return to Dalhousie regularly to hire our graduating students. They also advance Dalhousie by serving as advocates, ambassadors and student mentors. The financial support provided by our alumni helps ensure that Dalhousie will continue to provide exceptional post-secondary education to future generations of Nova Scotians and Canadians.

The Alumni Association's Board of Directors works with the Dalhousie Alumni Affairs Office, located in the Macdonald Building (494-2071/1-800-568-7403). Together, the Association and the Alumni Affairs Office strive to identify opportunities for alumni involvement, and to foster an environment that invites alumni to participate fully in Dalhousie's well-being.

3. Athletics

Athletics and Recreational Services offers a wide range of programmes for every Dalhousie student. More than fifty clubs and intramural programmes offer fun, fitness and companionship while 13 varsity sports provide excitement for players and spectators alike. For those who prefer less competitive activities, there are a great number of fitness, leisure and aquatic instructional programmes.

Recreation facilities on campus include: Dalplex—offering a 50,000 sq. ft. fieldhouse, olympic-size pool, two weight rooms, two hardwood basketball courts, numerous "no-fee" racquet courts, and an indoor jogging track, a golf putting green and driving cage, a cardio-fit area and family-fitness features such as the Fun Zone play

area (the largest indoor soft modular play structure in Metro), a babysitting service, and our Family Change Room; the Dalhousie Memorial Arena, Studley Gym, and The F.B. Wickwire Memorial Field (one of the largest artificial playing surfaces in the world). For details on fitness and recreation at Dalhousie contact Dalplex at 494-3372 or the Intramural Office at 494-2049.

4. Black Students

The Black Student Advising Centre is available to assist and support new, prospective and returning Black Students (African, American, Canadian, Caribbean, etc.) The Advisor may organize programme activities which assist Black students in developing contacts with other Black students both on campus and in the Black community. The Centre is intended to foster a sense of support and community among the Black students, with other students and to increase intercultural awareness.

The Advisor will provide confidential services and programmes individual and/or group assistance, impartial observation, relevant resource materials, along with a referral service which may benefit your academic, personal and social development on and off campus. There is a small student resource room for meeting, peer support, reading and/or studying. Awards, scholarships, employment, community information and upcoming events are also made available.

The position of the Black Student Advisor was created by Dalhousie University to provide information to prospective students, increase access and promote retention of indigenous Black students.

The Centre may be beneficial to all students, faculty and staff as a means of increasing awareness and sensitivity to Black student issues and presence within the University community.

For further information contact: Office - Black Student Advisor, Student Union Building, Halifax, Nova Scotia, B3H 4J2; phone - (902) 494-6648; fax - (902) 494-2042; World Wide Web homepage URL <http://is.dal.ca/~bsac>, E-mail: BSAC@Dal.Ca.

5. Chaplaincy at Dalhousie

The chaplains at Dalhousie provide confidential counselling on personal and spiritual issues and provide opportunities for prayer and worship, retreats, workshops and social outings. The Chaplains' office provides a non-threatening environment where students and staff can address the basic questions of meaning and purpose in their lives.

Chaplains currently represent the Anglican, Baptist, Jewish, Lutheran, Roman Catholic, and United Church faith traditions. They are, however, available and receptive to all students and staff regardless of religious background or can refer you to religious leaders of many other denominations and religions. For students who are concerned about religious groups on campus, the chaplains have developed a brochure, "Religious Groups: What to Expect, What to Accept, and What to Avoid."

Office hours are posted on the office door, room 418 on the fourth floor of the SUB. Our phone number is 494-2287. In the event of an emergency, contact the Student Union Building information desk at 494-2140 for chaplains' home telephone numbers. Feel free to drop by the office any time to introduce yourself and to find out more about the office and its services.

6. Continuing Technical Education Division

DalTech offers a variety of continuing education programmes for engineers, architects, computer scientists and other technical professionals. The administrative unit responsible for these activities is the Continuing Technical Education Division (CTE). The programmes offered include seminars, short courses and certificate programmes. Within the mandate of DalTech, the mission of CTE is to provide needs-driven, leading edge technical training and certificate programmes to the industrial and business community, government, defence personnel and technical professions.

Requests from DalTech Alumni to offer a larger variety of programmes closer to their homes led to the development of a national programme. CTE now takes an active role in offering continuing education training programmes across Canada.

CTE maintains a close liaison with business, industry, government, defence personnel and technical professions to ensure training needs are being met now and for the future.

For further information on our programs, contact Rick Gardiner, P.Eng. at (902) 494-3931.

7. Counselling and Psychological Services

The Counselling and Psychological Services Centre offers programmes for personal, career and educational concerns. Counselling is provided by professionally trained Counsellors and Psychologists. Strict confidentiality is ensured. Counselling is available both individually and on a group basis. Topics covered by regularly offered group programmes include Study Skills, Career Decision Making, Exam Anxiety Reduction, Public Speaking, Solutions for the Loss of a Relationship, Anxiety Reduction, Overcoming Procrastination, Anger Management, Resume Writing and Job Search Skills. Information on a wide variety of careers and academic programmes is available in the Frank G. Lawson Career Information Centre. Students wishing to get a first hand view of careers they are considering entering, may contact alumni willing to discuss their career experiences through the Centre's Mentors and Models programme. Interest testing is also available to students.

The Counselling and Psychological Services offices and its Frank G. Lawson Career Information Centre are located on the 4th Floor of the Student Union Building. In addition to regular office hours, the Centre is open three evenings a week during the academic year. Inquire or make appointments by dropping in or calling 494-2081.

8. Dalhousie Arts Centre

Designed as a multipurpose facility, the Dalhousie Arts Centre is home to four University departments: Dalhousie Arts Centre (Rebecca Cohn Auditorium), Dalhousie Art Gallery, and the two academic departments of Music and Theatre. The Arts Centre remains, after twenty-one years, an integral part of the cultural experience in our community and stands as the only arts complex of its kind in Nova Scotia.

Of the numerous performing arts spaces in the Dalhousie Arts Centre, the Rebecca Cohn Auditorium, or "The Cohn", as it is affectionately called, is the most familiar and prestigious. The 1040 seat concert hall is the home of Symphony Nova Scotia, as well as the venue of choice for a wide variety of performers ranging from The Royal Winnipeg Ballet to Blue Rodeo, The Chieftains, and Stompin' Tom to name a few. Other performing and visual arts space in the Arts Centre include: The Sir James Dunn Theatre (240 seats), the David MacK. Murray Studio, Studio II, The MacAloney Room, and the Art Gallery.

The Dalhousie Art Gallery offers the public access to national and international touring exhibitions and initiates many ambitious and exciting exhibition programmes.

Further information on the Music and Theatre Departments can be found in their separate listings.

9. Dalhousie Tutoring Service

The Dalhousie Tutoring Service is a "fee for service". Our tutors are senior baccalaureate, masters, and PhD scholars from Dalhousie and DalTech degree programmes. Tutors are also available to provide help with professional school entrance exams, English as a second language, elementary or high school level students. Tutoring is offered during the regular academic year and during the summer session. The Dalhousie Tutoring Service Office is located in the 4th floor offices of the Student Employment Centre in the Dalhousie Student Union Building on University Avenue. For more information, please contact the Dalhousie Tutoring Service Coordinator at 494-3300 or send an e-mail to: tutor@is.dal.ca.

10. Dalhousie Student Union

Every Dalhousie student is automatically a member of the Dalhousie Student Union. The Student Union is recognized by an agreement with the University Administration and by an Act of the Nova Scotia legislature as the single voice of Dalhousie students. All student activities on campus are organized through the Student Union, and the Student Union is the focus of all student representation. The business of the Student Union is conducted by a

Council made up of 40 members. Every student is represented by one or more representatives of their faculty, elected within their faculty in the spring. As well, a number of other constituency groups are represented on the Council because they are uniquely affected by many campus issues. Also on the Council are the student representatives elected to the Senate and Board of Governors.

One of the most important resources of the Student Union is the Student Union Building located at 6136 University Avenue between Seymour and LeMarchant Streets. The SUB, which is exclusively operated by the Student Union and is paid for through Student Union fees, was opened in 1968 as a centre for student activity on campus. The Student Union Building provides a wide range of services for students including the Student Advocacy Service, Travel Cuts, The Grawood, a Housing Board, and much more. Every student has the opportunity to take advantage of the Union's financial, physical and organizational resources. Students have an opportunity to become involved in committees dealing with various student issues. The DSU also offers over 100 clubs, societies and organizations for students to participate in. All students are invited to satisfy their curiosity by visiting the Student Union Council offices. The Student Council office is located on the second floor of the SUB and is open from 8:30 a.m. to 6:30 p.m. Monday through Friday, phone number 494-1106.

11. Housing/Residence Services

For the 55 per cent of Dalhousie University students whose homes are outside the Halifax Metropolitan area, where to live while attending university is a major question. The supply of University owned housing does not meet the demand and the vacancy rate in the various private, commercial units is low. It is therefore very important that students planning to attend Dalhousie/DalTech think well in advance about their accommodation needs.

Students should be aware of the following points in reference to residence accommodation. You must indicate your interest in residence accommodation on your Application for Admission to a programme of study. Upon admission to a programme of study, those students who have indicated an interest will receive a Residence Application Form. It is important to return the Residence Application Form promptly as the applications will be considered as they arrive. Residence Application Forms will not be distributed to, nor received from, individuals who have not gained admission to a programme of study.

Students with disabilities are encouraged to contact the Residence Office at (902) 494-1054, for information and assistance.

The traditional style residences at Dalhousie are chiefly for undergraduate students; very few graduate spaces are allocated and in many cases students pursuing advanced degrees are not prepared to live with the exuberance of first and second year students. All students living in traditional style residences are required to participate in one of the meal plan options available.

The information below gives a description of 1. traditional on-campus residences, 2. non-traditional on-campus housing, 3. off-campus housing owned by the university, 4. the services offered by the off-campus housing office listing service and 5. general information. For information on housing fees, see the Fees section of the Calendar.

PLEASE NOTE: Academic acceptance by the University, i.e., admission to a course of study, DOES NOT GUARANTEE admission to University Housing or provision of off-campus accommodation.

It is the responsibility of the individual student in all cases to make separate application for the university housing of her/his choice, or to avail him/herself of the listing services provided by the Off-Campus Housing Office.

As available space in University residences is limited students are encouraged to complete and submit their residence application immediately upon receiving it with their letter of academic admission.

1. Traditional Style On Campus Residence

A) Main Campus

i) Howe Hall

Centrally located on campus, Howe Hall, provides accommodation for 524 undergraduate students. The sprawling, grey ironstone complex is divided into five houses: Bronson, Henderson, Smith and Studley Houses are co-ed; Cameron is for men only. Each house has its own distinctive identity and student government. The ratio of seniors to first-year students is approximately 40/60, except in Henderson house which is predominantly for first year students.

The houses offer both double and single rooms with the singles generally reserved for senior undergraduates and the doubles for first-year students. Facilities include two dining rooms, lounges, television rooms in each house, a canteen, games room, squash courts, weight room, study areas, laundry rooms, computer room and ResNet (see below).

ii) Shirreff Hall

The women's residence on the Dalhousie campus, Shirreff Hall, provides accommodation for 444 female students. Located in a quiet corner of the campus, it is minutes from classes, the library, Dalplex and other facilities as well as from the scenic Northwest Arm. It is divided into three houses - Newcombe, Old Eddy and New Eddy (which includes the Annex). Old Eddy and New Eddy have both single and double rooms while Newcombe has single rooms only. The Annex houses only 14 senior students and is distinct from the remainder of Shirreff Hall in that it has a separate outside entrance and is not directly accessible from the main residence.

Shirreff Hall offers a dining room, an elegant library and visitors' lounge, study areas, computer rooms, games room, television lounges, exercise room, kitchenettes, canteen, laundry room, reception desk, and ResNet (see below). Students have access to two pianos.

iii) Eliza Ritchie Hall

Opened in 1987, Eliza Ritchie Hall is a co-ed residence. It provides traditional residence accommodation for 84 students in predominantly single rooms.

This three-storey building is located close to the Dalplex and to Shirreff Hall, where students take their meals. Facilities include study rooms, a multipurpose room, reception area, laundry facilities, leisure lounges with kitchenettes and ResNet (see below).

B) DalTech Campus

i) O'Brien Hall

M.M. O'Brien Hall is centrally located at the corner of Morris and Barrington Streets. Unlike many modern University residences, this seven storey brick building is small and exudes an atmosphere of friendliness. Accommodation is available for 130 students. Each residence floor includes, two large washrooms, twelve single, five double rooms, one RA's room, and access to ResNet (see below). The main floor has a T.V. lounge, student dining hall and kitchen facilities.

ResNet connects your personal computer to the Dalhousie campus network, the Internet, e-mail, etc. All rooms are wired in Eliza Ritchie Hall and O'Brien Hall (DalTech) while work continues at Howe Hall and Shirreff Hall, where many rooms are now wired. Information on applying and costs of installation will be provided to students offered accommodation.

2. Non-Traditional On-Campus Housing

A) Main Campus

i) Glengary Apartments

Located on the campus on Edward Street, Glengary Apartments is a four-storey brick building offering co-ed accommodation for 40 students. Preference is given to students in second and third year and especially to those who apply in groups of three.

Glengary has 12 furnished apartments, each with space for three students in three single rooms. Each apartment includes a kitchen, living room and bathroom. There are also four bachelor apartments which are always in high demand. Laundry facilities are located in the basement, where there is also a limited amount of storage space.

Coordinators are available for security and administrative services and also act as a resource for students who may need advice or assistance.

ii) Residence Houses

Dalhousie also has four residence houses, two of which are co-ed. All were once single family homes, and have their own kitchens, living rooms and bathrooms. The character of these homes has been maintained as much as possible. The houses are all on campus. Although they are generally occupied by students in graduate programmes or professional schools, a few of the 31 spaces are reserved for undergraduates.

Two of the houses are designated as 24-hour quiet areas for students who want a particularly quiet environment in which to live and study.

All of these houses have both single and double rooms, each with a bed, dresser, study desk, lamp and chair. Linen, cooking utensils and small appliances are not provided. Students share kitchen and living room areas. A trained senior student acts as a house assistant and liaises with the Howe Hall Residence Co-ordinator and Facility Co-ordinator to provide administrative and resident-related services.

B) DalTech Campus

i) Graduate House

This facility houses 14 post-graduate students, all in single rooms, and is located beside O'Brien Hall.

Two options are available to graduate students. They are:

- 1) Room with meal plan;
- 2) Room without meal plan.

3. Off-Campus, University-Owned Housing

C) Fenwick Place

Dalhousie's 33-storey Fenwick Place offers students the privacy and some of the independence of apartment living. Located in south end Halifax, it is only a 15-minute walk or a short bus ride from the campus. Because Fenwick houses both single and married students, the mix of people provides a harmonious living environment.

Many of the 252 apartments in Fenwick Place are furnished to accommodate students in groups of two, three or four. Priority is given to students who apply in groups and who are currently living in a Dalhousie residence. Each of these apartments has a full kitchen and bathroom, furnished living room and dining area and a balcony. Bedrooms have desks and a mate-style bed. Heat, hot water, electricity, and satellite television are included in the residence fee.

Fenwick also has a number of unfurnished bachelor, one and two-bedroom apartments which are rented to married and single students. Each of these apartments has a full kitchen and bathroom. Heat, hot water, and satellite television are included in the rent. Laundry facilities are available on every floor of Fenwick Place. The front desk is open 24 hours a day with staff available to provide security, information and advice to students.

4. Living Off-Campus

Dalhousie's Off-Campus Housing Office assists students who do not want to live on campus or who have been unable to find a place in residence or in University apartments and houses. Located in the Student Union Building, this office is designed to help students find privately-owned accommodation.

The Off-Campus Housing Office provides centralized information on available housing in the Halifax metro area, including apartments, shared accommodations, rooms, condos and houses. Up-to-date computerized printouts of these listings are available for viewing as well as telephones for calling landlords and material such as maps and transit schedules.

Off Campus Housing has a Web site:

<http://adminweb.uclis.dal.ca/housing/loc.htm>. You can search for accommodations as well as list your own place. The Web site is updated twice weekly on Tuesday and Thursday.

Although the housing staff cannot arrange, inspect or guarantee housing, they will do everything they can to help students find accommodation that is pleasant, inexpensive and close to campus.

Because of the low vacancy rate in Halifax, it is advised that students start looking for off-campus housing well ahead of the academic year.

5. General Information

- Application forms must be accompanied by an application fee and a deposit in Canadian funds, payable to Dalhousie University. Deposit amounts are listed on the application form.
- Acceptance into an academic programme does not mean that application for a place in residence has been approved.
- To live in any of the University-owned buildings, students must maintain full-time status at Dalhousie throughout the academic year.

For further information on living at Dalhousie, or for additional copies of the residence application form, do not hesitate to contact:

Director of Housing, Conference and Ancillary Services

Location: 6250 South Street
Dalhousie University
Halifax, N.S. B3H 3J5
Telephone: (902) 494-3365

Howe Hall, Eliza Ritchie Hall, Shirreff Hall and the Residence Houses:

Location: Residence Office
Howe Hall
Dalhousie University
6230 Coburg Road
Halifax, N.S. B3H 4J5
Telephone: (902) 494-1054

For Fenwick Place, Glengary Apartments, O'Brien Hall, Graduate House:

Location: Accommodation Office
Fenwick Place
Dalhousie University
5599 Fenwick Street
Halifax, N.S. B3H 1R2
Telephone: (902) 494-2075

For Off-Campus Housing Assistance:

Location: Off-Campus Housing Office
Student Union Building
Room 410
Dalhousie University
6136 University Avenue
Halifax, N. S. B3H 4J2
Telephone: (902) 494-3831

12. Instructional Development and Technology

The Office of Instructional Development and Technology (OIDT) is mandated to initiate, lead, and coordinate activities which encourage reflection upon and improvement in teaching and learning at Dalhousie.

Workshops - To fulfil this primary goal, the OIDT develops and presents a variety of sessions and workshops to faculty and teaching assistants at Dalhousie. Annual events include the Orientation to Teaching at Dalhousie for new faculty and the Celebration of Teaching lecture and reception. During the year, workshops are presented monthly or bi-monthly and are open to the Dalhousie community. The OIDT also cooperates with other universities in Nova Scotia to disseminate information about teaching improvement.

Publications - Focus on University Teaching and Learning, the OIDT newsletter, is published five times a year. Three other publications - Recording Teaching Accomplishment: A Dalhousie Guide to the Teaching Dossier; University Teaching and Learning: An Instructional Resource Guide for Teaching Assistants at Dalhousie

University; Learning Through Writing: A Compendium of Assignments and Techniques - may be purchased or borrowed from the OIDT. The extensive bibliography of materials available for loan includes both print and video resources on topics related to teaching. These may be borrowed by faculty, teaching assistants, and students.

Instructional Media Services - To complement its primary goal, the OIDT also has responsibility for the provision of instructional media services to the campus (excluding Medicine and Dentistry). These services include audio-visual equipment, videotaping, photography, and graphics. Facilities for borrowing discipline-specific audio and video tapes are located in the Learning Resource Centre in the basement of the Killam Library.

Distance Education - Through its support for the development of distance education classes, primarily in the Health Professions, the OIDT assists Dalhousie to respond to the needs of those who wish to upgrade their education. General inquiries about these classes should be directed to the Registrar's Office.

Information, teaching resources, and private consultations are available through the Office of Instructional Development and Technology. The Office is located in the Killam Library Courtyard (494-1622).

13. International Student Advisor

International Student Services (ISS) at Dalhousie University and DalTech fosters cross-cultural understanding within the university and Halifax community. Provides ongoing support to the university's international students, helping them to make a smooth transition as they become familiar with their new university and surroundings, and providing continued advice and support throughout the duration of their academic program.

The International Student Advisor provides services and programmes for students from around the world, serves as a resource for international students, and is dedicated to insuring that international students make the most of their stay in Canada. This includes the provision of information and advice on financial, legal, immigration and personal matters, and referrals to other services on campus. The Advisor organizes orientation programmes that assist international students in adjusting to a new culture and in achieving their educational and personal goals. A variety of social, cultural and educational programmes are also held throughout the year.

The main office of International Student Services is located on the Studley Campus at Lester Pearson International (LPI), 1321 Edward Street, Halifax, NS, telephone (902) 494-1735. There is also an office located on the Sexton Campus at the DalTech Student Service Centre, Main Entrance, 1360 Barrington Street, Halifax, NS Telephone (902) 494-6047. The International Student Advisor will meet with student at either location.

14. Lester Pearson International (LPI)

Lester Pearson International (LPI) was founded in 1985 to promote Dalhousie's involvement in international development activities. In 1987, LPI merged with the Centre for Development Projects and was given responsibility for the guardianship of all externally-financed international development programmes and projects at Dalhousie. In 1994, LPI's mandate was expanded to include a broader responsibility for international activities and for providing leadership in the internationalization of the university.

In general, LPI supports the Dalhousie community's involvement in international activities. Towards this end, LPI helps to develop, support and oversee the university's international projects; facilitates and supports Dalhousie's student exchange programs; provides services to Dal's international students; coordinates a development education programme entitled DAL-Outreach which organizes and sponsors seminars and events; serves as the university's International Liaison Office/r (ILO) and disseminates information concerning international activities and opportunities; hosts official international visitors and helps to facilitate the visits of international scholars; and provides meeting space to international-oriented groups. Although LPI is not an academic unit of the university, it encourages and supports the study of

international issues and serves as a resource centre for students, faculty and staff. LPI is located at 1321 Edward Street (on the corner of University Avenue).

15. Libraries

The Dalhousie University Library System is organized to accommodate the needs of the undergraduate teaching programmes, graduate and faculty research projects, and professional schools. The system is made up of the following components: the Killam Memorial Library - Humanities, Social Science and Science, the Sir James Dunn Law Library, the Kellogg Health Sciences Library, and DalTech Library.

As of April 1, 1998, the total Dalhousie University Library System holdings include over 1,650,000 volumes of books, bound periodicals, documents, and bound reports, 496,000 microfilm & microfiche, 100,000 maps, and other media. Approximately 9,000 serials titles are currently received, and dead title holdings number over 11,000.

Dalhousie libraries participate in Novanet, a network which shares a single automated online catalogue of the holdings of the member libraries (Mount Saint Vincent University, Nova Scotia College of Art & Design, Saint Mary's University, University College of Cape Breton, University of King's College, the Atlantic School of Theology, St. Francis Xavier University and Nova Scotia Community College). Users borrow from Novanet libraries upon presentation of their University ID card.

16. Ombudsperson's Office

The Dalhousie Ombudsperson's Office offers assistance and advice to anyone experiencing problems with the Dalhousie community, including difficulties associated with finances, academics, or accommodations. This student run office can help resolve particular grievances and attempts to ensure that existing policies are fair and equitable. Jointly funded by the University and the Dalhousie Student Union, the Ombudsperson can provide information and direction on any University-related complaint. Clients retain full control over any action taken on their behalf by the Ombudsperson's Office, and all inquiries are strictly confidential.

The Dalhousie Ombudsperson's Office is located in the Student Union Building, Room 442. Regular office hours are posted on the door at the beginning of each Semester. The Ombudsperson's Office can also be reached by calling 494-6583. If no one is available to take a call, a message may be left on voice mail.

17. Registrar's Office

The office is responsible for high school liaison, admissions, awards and financial aid, registration, maintenance of student records, scheduling and coordinating formal examinations, and convocation. Of greater significance to students, however, is the role played by members of the staff who provide information, advice, and assistance. They offer advice on admissions, academic regulations and appeals, and the selection of programmes. In addition, they are prepared to help students who are not quite sure what sort of assistance they are looking for, referring them as appropriate to departments for advice about specific major and honours programmes or to the office of Student Services or to specific service areas such as the Counselling Services Centre. The Registrar's Office also mails tens of thousands of letters and packages annually in response to information requests and for student records, from application to graduation and beyond.

Among the staff are people with expertise in financial aid and budgeting who are available for consultation.

The summer advising programme for first year students in Arts and Social Sciences, Management, Computer Science, Engineering, Computer Science and Science is directed from the Registrar's Office. Prospective students may arrange a tour of the campus through this office.

The fact that the Registrar's Office is in contact with every student and every department means that it is ideally placed to provide or to guide students and prospective students to the source of the advice or assistance they need.

Students can access the services of the Registrar's Office at two locations. The main office is located in Room 133 of the Arts & Administration Building on the Studley Campus. DalTech students can also access Registrar's Office services at the DalTech Student Service Centre which is located in Building A on the Sexton Campus.

Inquiries may be directed to:
The Registrar
Dalhousie University
HALIFAX, NS
CANADA B3H 4H6
Telephone: (902) 494-2450
Fax: (902) 494-1630
E-mail: Registrar@dal.ca

18. Services for Students with Disabilities

Dalhousie University is committed to providing an accessible environment in which members of the community can pursue their educational goals. Ongoing efforts consistent with a reasonable and practical allocation of resources are being made to improve accessibility and provide special services.

The Advisor provides support and advocacy for students with disabilities. In cooperation with faculty, staff, and other student services at the University, the Advisor endeavours to provide appropriate support services as needed by the student. Students are encouraged to contact the Advisor as early as possible, (902) 494-2836, TTY (902) 494-7091.

Website: <http://www.dal.ca/~services/ssd.html>

19. Student Advocacy Service

The Student Advocacy Service was established by the Dalhousie Student Union and is composed of qualified students from the University. The main purpose of the Service is to ensure that the student receives the proper information when dealing with the various administrative boards and faculties at Dalhousie. An Advocate may also be assigned to assist students with academic appeals or in a disciplinary hearing for an academic offence. Our goal is to make the often unpleasant experience of challenging or being challenged by University Administration less intimidating.

The Advocates may be contacted through:
Location: Student Advocacy Service
Room 423
Dalhousie Student Union Building
(902) 494-2205
Telephone: (902) 494-2205

20. Student Clubs and Organizations

Students seeking information on clubs and societies should call the Dalhousie Student Union offices at 494-1106 or check the DSU web page at www.dal.ca/dsu. Extracurricular activities and organizations at Dalhousie are as varied as the students who take part in them. Organizations range from small informal groups to large well organized ones; they can be residence-based, within faculties, or university-wide. Some are decades old with long traditions, others arise and disappear as students' interests change. A list of clubs, societies and organizations is available every fall to new students who are encouraged to select and participate.

21. Student Employment Centre

The Dalhousie Student Employment Centre assists Dalhousie students in their efforts to obtain permanent, summer, or part-time employment. Positions are posted on the bulletin board and on our web site: <http://ls.dal.ca-sec/>. The Centre is located on the fourth floor of the Student Union Building, and operates Monday through Friday from 9:00 a.m. to 4:30 p.m. Telephone: (902) 494-3537, E-mail: sec@ls.dal.ca. The Employment Centre also has useful information on resume preparation, interview techniques, and job-search skills as well as reference materials about international opportunities and recruiting companies. Interviews for graduating students are arranged with employers who visit Dalhousie each year (mid-October to mid-November are usually the busiest months).

Summer employment listings are received as early as October, while new part-time jobs are posted daily for both "on campus" and "off campus" locations. The Centre promotes Dalhousie students to

employers nationally and internationally and follows the guidelines for ethical recruitment of the Canadian Association of Career Educators and Employers.

22. Student Services

Located at 1234 LeMarchant Street, Student Services provides a point of referral for any student concern. The Vice-President is the chief student services officer and coordinates the activities of Athletics and Recreational Services, Dalplex, Bookstore, Counselling and Psychological Services, Health Services, Housing and Conference Services, International Student Services, Office of the Registrar, Writing Workshop, Office of the Ombudsperson, Student Service Centre, Summer Orientation; and Student Resources including Black Student Advising, Advising for Students with Disabilities, Chaplaincy, Student Employment Centre, Tutoring Service, Student Volunteer Bureau and Cooperative Education in Science. Students who experience difficulties with their academic programmes or who are uncertain about educational goals, major selection, honours or advanced major information, degree regulations, changing faculties, inadequate study skills, or conflicts with faculty and regulations, can seek the assistance of the Academic Advisors in the Vice-President's Office.

23. Student Volunteer Bureau

The Dalhousie Student Volunteer Bureau acts as a link between students looking for volunteer opportunities and a broad range of campus and community organizations. Students' skills, interests, and academic field can be matched with volunteer positions in more than 200 organizations throughout Metro Halifax. Overseas information and a resource library are also available. The Fall Volunteer Fair brings dozens of community organizations onto campus to inform students of current volunteer opportunities. The Bureau is open to any interested university student. The Volunteer Bureau is located on the fourth floor of the SUB.
Email: student.volunteer.bureau@dal.ca

24. University Bookstore

The University Bookstore, owned and operated by Dalhousie, is a service and resource centre for the university community and the general public. The Bookstore has all required and recommended texts, reference books and supplies, as well as workbooks, self help manuals and other reference material. As well, you can find titles by Dalhousie authors.

The Health Sciences department has the largest and most complete medical book section in Atlantic Canada, with over 2000 titles in stock. Thousands of other titles are specially ordered annually, and the department ships out books to consumers and hospitals throughout the world.

The Stationery department carries all necessary and supplementary stationery and supplies. The Campus shop carries gift items, mugs, clothing and crested wear, cards, jewellery, class rings, backpacks, novelties and briefcases. A Special Order department is located at the customer service area and will order and ship books worldwide.

The Bookstore is situated on the lower level of the Student Union Building on University Avenue, and is open year round, Monday to Saturday (Hours vary throughout the year).

The DalTech bookstore is located at 1360 Barrington Street (Building A) and is open from 8:30 a.m. - 4:30 p.m. Monday to Friday (year-round). It supplies Daltech-required and reference books as well as DalTech crested clothing, stationery and other supplies. In addition, magazines and greeting cards are available. The DalTech bookstore is located in Building "A", 1360 Barrington Street on the DalTech campus. It is open year-round, Monday to Friday, 8:30 a.m. to 4:30 p.m. (Subject to change.)

25. University Computing and Information Services

University Computing and Information Services (UCIS) provides computing and communication services for students, faculty, and staff for instructional, research, and administrative purposes. It is responsible for all centrally managed computing and communications facilities.

UCIS manages a campus-wide communications network which interconnects office systems, laboratory systems, departmental computers, and central facilities. This network is connected to the CA@net2 research and education network and to the worldwide Internet. Network connections are available in some residence rooms, through Halifax Cable and MT&T, and via modems. UCIS is also responsible for University telephones.

Central computer systems include three IBM RS/6000 computers which are used primarily for academic purposes; an IBM RS/6000 SP2, which is a powerful parallel processing system used for research; and an IBM 4381 and five IBM RS/6000 computers supporting the university's central administrative systems. In cooperation with the relevant academic departments, UCIS also supports numerous micro computer teaching laboratories which are situated throughout the campus, including laboratories in the School of Business, English, History, Sociology, Law, Music, Political Science, Physics, Biology, Earth Sciences, Dentistry, Psychology, the Computer Centre in the basement of the Killam Library and at DalTech. It is strongly recommended, however, that students have access to a personally owned microcomputer with Internet access, especially for word processing, personal e-mail and WWW use, as most university facilities are heavily used for discipline-specific class work.

All students may have access to campus computing facilities on an individual basis or in conjunction with the classes that they take. Network ports for personally used computers are available in several campus locations, and also in rooms of several university residences.

UCIS also manages the campus computer store (PCPC); provides short, non-credit computer related classes in conjunction with Henson College, offers a hardware maintenance service for micro-computers, operates a digital multimedia facility (DMC) and a web authoring system.

UCIS Help Desks are operated in the Computer Centre basement of the Killam Library, and in B Building, ground floor, at DalTech adjacent to the Student Service Centre.

26. University Health Services

The university operates a medical clinic, in Howe Hall, at Coburg Road and LeMarchant Street staffed by family doctors and two psychiatrists. Further specialists' services are available and will be arranged through the Health Service when indicated. All information gained about a student by the Health Service is confidential and may not be released to anyone without signed permission by the student.

Appointments are made during the clinic's open hours, from 9 a.m. to 10 p.m., Monday to Friday and 10:00 a.m. to 6:00 p.m. Saturday and Sunday. In the event of emergency, students should telephone the University Health Service at 494-2171. The university provides 24 hour on call emergency service.

All students must have medical and hospital coverage. All Nova Scotia students are covered by the Nova Scotia Medical Services Insurance. All other Canadian students must maintain coverage from their home provinces. This is especially important for residents of any province requiring payment of premiums. All non-Canadian students must be covered by medical and hospital insurance prior to registration. Details of suitable insurance may be obtained from the Student Accounts office prior to registration. Any student who has had a serious illness within the last 12 months, or who has a chronic medical condition, should contact and advise the Health Service; preferably with a statement from the doctor.

27. Writing Workshop

The Writing Workshop programme recognizes that students in all disciplines are required to write clearly to inform, persuade, or instruct an audience in term papers, laboratory reports, essay examinations, critical reviews and more.

This English language resource centre offers non-credit classes in language and writing, including instruction and practice in English for speakers of other languages (ESOL), a tutorial service, guidelines for acceptable standard language usage, and provides information about sources for reference. For more information about the Writing Workshop, please call 494-3379.

Financial Aid

PLEASE NOTE: The contents of this section are subject to change without notice.

The University reserves the right to publicize the recipients of merit awards.

I. Government Student Loans

Canada Student Loans Plan

Canadian students, other than Quebec residents, are to apply for government assistance to the appropriate agency in that province or territory in which the applicant is a bona fide resident. The addresses for Canada Student Loan authorities of those provinces and territories participating in the plan are listed below:

Alberta

Alberta Students' Finance Board
10th Floor, Baker Centre
10025-106 Street
Edmonton, Alberta T5J 1G7
(403) 427-2740 Fax: (403) 422-4516

British Columbia

Student Services Branch
Ministry of Advanced Education, Training and Technology
2nd Floor, 1106 Cook Street
Victoria, British Columbia V8V 3Z9
(604) 387-6100/6101 Fax: (604) 356-9455

Manitoba

Student Financial Assistance Branch
Manitoba Education and Training
Box 6, 693 Taylor Avenue
Winnipeg, Manitoba R3M 3T9
(204) 945-6321/6322 Fax: (204) 477-4596

New Brunswick

Student Services Branch
Department of Advanced Education and Training
P.O. Box 6000
Fredericton, New Brunswick E3B 5H1
(406) 453-2577 or
1-800-667-5625 (Atlantic Provinces, Ontario and Quebec only)
Fax: (506) 444-4333

Newfoundland

Department of Education
Student Aid Division
Thompson Student centre
Memorial University of Nfld.
St. John's, Newfoundland A1C 5S7
(709) 729-4235/5849 Fax: (709) 729-2298

Northwest Territories

Manager, Student Services
Department of Education
Government of the Northwest Territories
Yellowknife, Northwest Territories X1A 2L9
(403) 873-7190 or 1-800-661-0793 Fax: 1-800-661-0893

Nova Scotia

Student Aid Office
Department of Advanced Education and Job Training
P.O. Box 2290, Station M
Halifax, Nova Scotia B3J 3C8
(902) 424-8420 (metro)
1-800-565-8420 (within province)
Fax: (902) 424-0540

(Street location: Trade Mart Building, 2021 Brunswick at Cogswell Street, Halifax, N.S.)

Ontario
Student Support Branch
Ministry of colleges and Universities
P.O. Box 4500
Thunder Bay, Ontario P7B 6G9
(807) 343-7260 Fax: (807) 343-7278

Prince Edward Island
Student Aid Office
Department of Education & Human Resources
P.O. Box 2000
Charlottetown, Prince Edward Island C1A 7N8
(902) 368-4640 Fax: 9902) 368-4663

Saskatchewan
Student Financial Assistance Branch Saskatchewan Education
1855 Victoria Avenue
Regina, Saskatchewan S4P 3V5
(306) 787-5620 Fax: (306) 787-7537

Yukon Territory
Students' Financial Services
Department of Education
P.O. Box 2703
Whitehorse, Yukon Territory Y1A 2C6
(403) 667-5310 or (403) 667-5929 Fax: (403) 667-6339

The above authorities also administer provincial bursary and loan plans in conjunction with the Canada Student Loan, if applicable.

Québec
Residents of Québec apply to:
Ministère de l'enseignement supérieur et de la Science
Direction générale de l'aide financière aux étudiants
1033, rue de la Chevrotière
Québec, Québec G1R 5K9
(418) 646-5245

Leave brief message, your name, your Code Permanent, and the day/time period you will be "home". Québec will telephone the student back at that time period.

(514) 864-4505 (24-hour automated service)
Fax: (418) 528-0648

II. Dalhousie Graduate Bursaries

Students who find themselves in financial difficulty due to unforeseen expenses may apply for Dalhousie Graduate Bursary funds. Applications are available from the Faculty office and completed forms may be submitted to that office at any time.

All graduate students currently registered in a degree programmes beyond year one are eligible to apply.

A. General Information about Bursaries

It should be noted that Canada Student Loans (with or without provincial bursaries and/or loans) are expected by provincial authorities to meet the financial deficiencies of the students and that bursaries subsequently awarded by the University must be reported and are liable to be deducted (in part or in whole) from the amounts originally allocated under the Canada Student Loan Plan or provincial aid programme.

B. Government Notification

Holders of Dalhousie University bursaries should note that the University is required, upon written request, to report its award winners to the respective Provincial Student Aid Authority.

Fees

Student Accounts Office

Mailing Address: Arts and Administration Building (Room 29)
Halifax, NS B3H 4H6

Service Location: Studley Campus - Basement A&A Bldg.
Sexton Campus - DalTech Student Service Centre

Telephone: (902) 494-3998

Fax: (902) 494-2848

E-mail: Student.Accounts@Dal.Ca

Office Hours: Monday to Friday 10:00 a.m. - 4:00 p.m. (or by appointment)

1999/2000 Important Dates:

August

- 1 Last day to pay registration deposit for classes/registration in fall term. Classes selected after this date must be accompanied by a registration deposit.
- 31 Last day a registration deposit will be accepted for fall term. After this date classes selected must be accompanied by payment.

September

- 24 Fees due for fall term and first instalment of regular session

October

- 8 Last day for partial refund fall term

November

- 5 \$80 reinstatement fee assessed on all outstanding accounts over \$200
- 15 Last day to pay registration deposit for classes/registration in winter term. Classes selected after this date must be accompanied by a registration deposit.
- 24 Last day a registration deposit will be accepted for winter term. After this date classes selected must be accompanied by payment.

January

- 24 Fees due for winter term and second instalment of regular session

February

- 4 Last day for partial refund for winter term

March

- 6 \$90 reinstatement fee assessed on all outstanding accounts over \$200
- 10 Last day for partial refund for winter term

NOTE: Please consult Summer School Timetable for registration/payment schedule for Summer School.

Important Change

The University will be introducing a per class fee structure in certain programmes (mainly undergraduate) in 1999-2000. A detailed description of the new fee structure will be available with the registration material.

I. Introduction

The following section of the Calendar outlines the University Regulations on academic fees for both full-time and part-time students enrolled in programmes of study during the fall, winter and summer terms. A section on University residence and housing fees is also included. Students wishing to register for the Summer term should consult the Summer School Calendar for information on registration dates and fees.

All fees are subject to change by approval of the Board of Governors of Dalhousie University. An Academic Fee Schedule will be available with the registration package. A list of miscellaneous fees is included in Table I.

NOTE: The student tuition fees and other fees that are published herein are applicable only to regular students admitted to a programme through the normal application process. Other students who are admitted to Dalhousie under a special programme or policy will be charged a different tuition fee and different other fees in accordance with such special programme or policy. For further information regarding any fees to be

charged to students who are admitted to Dalhousie under a special programme or policy, please contact Student Accounts or the Dean of the faculty.

Students should make special note of the Academic Dates contained in the front section of the calendar as well as fee dates. Students should also be aware that additional fees and/or interest will be charged when deadlines for payment of fees as contained herein are not met.

All the regulations in this section may not apply to Graduate Students. Please refer to the "Faculty of Graduate Studies" section of the Graduate Studies Calendar.

II. University Regulations

The following general regulations are applicable to all payments made to the University in respect of fees.

- Fees must be paid in Canadian funds by cash, interact, negotiable cheque, money order, Mastercard, or Visa.
- If payment is by cheque and returned by the bank as non-negotiable, there will be an additional fee of \$20.00 and the account will be considered unpaid. Furthermore, if the bank returns a cheque that was to cover payment of tuition, the student's registration may be cancelled and, if permitted to re-register, a late fee will apply.
- The receipt obtained from Student Accounts each time a payment is made will show the date and amount of the payment.
- Cash, interact, certified cheque, money order, Mastercard, or Visa is required for payment of any account in arrears beyond the current academic year.

A. Deposits

1) **Admission Deposit - Limited Enrolment Programmes**
Admission deposits in limited enrolment programmes will be considered part of the registration deposit.

A non-refundable deposit of \$200.00 is required by all new students in Specified Limited Enrolment Programmes within three weeks of receiving an offer of a place at Dalhousie.

Limited Enrolment Programmes include:

- Master of Business Administration
- Master of Environmental Studies
- Master of Library and Information Studies
- Master of Public Administration

All programmes in the following faculties:

- Faculty of Dentistry
- Faculty of Health Professions
- Faculty of Law
- Faculty of Medicine

1) **Registration Deposits**

The University will open to students the class selection process July 1, 1999. With the selection of each class, a student must pay a deposit:

- \$100 per class per term for all undergraduate programmes;
- \$500 per term for Law, Medicine, and Dentistry;
- \$100 per class per term for certain course-based graduate programmes;
- \$500 per term for all other graduate programmes

Students class selecting prior to August 1 or November 15 for the Fall or Winter terms respectively, must pay their deposit to the University by this date. Students class selecting after these dates must have their deposit paid the day that class selection occurs for the term. Students who fail to pay the deposit as required will be removed from classes.

B. Registration

A student is considered registered only after financial arrangements have been made with Student Accounts (i.e. a deposit has been paid as noted above).

The completion of the registration process shall be deemed to be an agreement by the student for the payment of the balance of fees unless written notification to withdraw is submitted to the Office of the Registrar. Students withdrawing in person must attend the Office of the Registrar and the Student Accounts Office before the withdrawal process is official. Students in Graduate and Professional programmes wishing to withdraw should initiate formal action to withdraw at the office of the appropriate Dean.

C. Late Registration

Students are expected to register on or before the specified registration dates. Students wishing to register after these dates must receive the approval of the Registrar and pay a late registration fee of \$50.00. This fee is payable at the time of registration and will be in addition to payment of regular fees.

D. Health Insurance

International students must purchase the Dalhousie International Health Insurance Plan or provide proof of private insurance coverage before registration.

Health Insurance - International Students (1998/99 fees, for information only)

- Single - \$416.00 per year
- Family - \$798.00 per year

E. Academic Fees

The 1999-2000 academic fee schedule is not yet available. Once fees are approved for 1999-2000, a complete schedule showing the required payments of the academic fees and deposits will be made available. The official schedule will be included in the registration package.

Current academic fees are comprised of:

- a) The tuition fee;
- b) An incidental fee comprised of Student Union, Society and Athletic fees, Capital Campaign or Building Fund;
- c) Auxiliary fee (specified Music, Theatre and/or Dance classes, Diploma Costume Studies programme and Graduate Studies Programmes in management studies);
- d) Ancillary fee (Specified Science classes and programmes in Faculty of Architecture);
- e) Co-op fee if applicable;
- f) Differential fees (International students only, see G. Below)

NOTE: Students registered in more than one programme are required to pay separate academic fees for each programme.

F. Payment

The payment of academic fees will be received at the Student Accounts Office located on the basement level of the Arts & Administration building or DalTech Student Service Centre.

For the convenience of students, registration material and non-cash payments are accepted by mail. Please allow sufficient time to ensure that material sent by mail is received on or before the specified dates.

Fees paid by mail must be received by Student Accounts on or before the deadlines specified in order to avoid late payment and/or delinquency charges.

The following regulations apply to the payment of academic fees. For further information on regulations regarding withdrawal of registration, please refer to Section I Class Changes, Refunds and Withdrawals:

- a) All students must pay the applicable deposit in accordance with Section A.
- b) Those holding external scholarships or awards paid by or through Dalhousie must provide documentation of the scholarship or award.
- c) Those whose fees are paid by a government or other agency must provide a signed statement from the organization at time of registration. (Please Note: Upon request, account status information will be made available to a sponsor.)

- d) Those paying the balance of their account by Canada Student Loan must negotiate the Loan by September 24 or December 20 for the respective term. Interest will be charged after these dates and a late registration fee will apply.
- e) Those whose fees are paid by Dalhousie University staff tuition fee waiver must present the appropriate waiver form and pay applicable incidental fees. Any unused portion of the applicable registration deposit will be refunded.
- f) Those who are Canadian citizens or permanent residents, 65 years of age or over and enrolled in an undergraduate degree programme will have their tuition fees waived but must pay the applicable incidental fees. Any unused portion of the applicable registration deposit will be refunded.
- g) Scholarships or awards paid by or through Dalhousie University will be applied to tuition and residence fees.
- h) When Canada Students Loan, Provincial Loan or co-payable bursary is presented at the Student Accounts Office, any unpaid academic, residence fees and/or Temporary Loans will be deducted.
- i) Fees cannot be deducted from salaries paid to students who are employed at Dalhousie University.
- j) Any payments will first be applied to overdue accounts.

G. International Students

Registering students who are not Canadian Citizens or permanent residents are required to pay an additional fee referred to as a "Differential Fee" in the amount of \$1450.00 per term. There is a proportional charge for part-time International students. Graduate Students please see Section 4.7.5 of the Graduate Studies Calendar to determine the number of years a student is required to pay the differential fee.

H. Audit Classes

All students auditing a class pay one-half of the regular tuition fee plus auxiliary fees, if applicable. In such cases, the student is required to complete the usual registration process.

A student who is registered to audit a class who during the session wishes to change their registration to credit must receive approval from the Registrar and pay the difference in class fees plus a transfer fee of \$25.00. This must be done on or before the last day for withdrawal without academic penalty. The same deadline applies for a change from credit to audit.

I. Class Changes, Refunds and Withdrawals

Please consult Student Accounts for all financial charges and the Office of the Registrar for academic regulations.

Refund Conditions

NOTE: Non-attendance does not constitute withdrawal.

A refund of fees will not be granted unless the following conditions are met:

- a) Written notification of withdrawal must be submitted to the Office of the Registrar.
- b) After the approval of the Registrar has been obtained (in the case of graduate and professional school, the appropriate Dean), application for a refund or adjustment of fees should be requested from the Student Accounts Office immediately. The calculation of the refundable portion of fees will be based on this date. (Retroactive withdrawals will not be permitted.)
- c) No refunds will be made for 30 days when payment has been made by personal or foreign cheque.
- d) A student who is dismissed from the University for any reason will not be entitled to a refund of fees.
- e) Refunds will be made to the Bank if a student has received a Canada or Provincial Student Loan.
- f) Refunds will be prorated on fees paid by Scholarships and/or Fee Waiver.
- g) A valid Dalhousie University ID must be presented in order for the student to receive a refund cheque.
- h) No fee adjustment will be made for a student changing their degree or programme in the regular session after September 24.

J. Delinquent Accounts

Accounts are considered delinquent when the balance of fees has not been paid by September 24 for the fall term, (January 24 for students registered for the winter term. Where payment in two instalments is permitted, the remaining balance is due January 25.

Interest at a monthly rate set by the University will be charged on delinquent accounts for the number of days overdue.

At the time of printing the monthly rate of interest is 0.81% (9.75% per annum).

A student whose account is delinquent for more than 30 days will be denied University privileges including access to transcripts and records of attendance. The student will be reinstated upon payment of the fees outstanding, the arrears interest and a \$50.00 reinstatement fee. Students will not be permitted to register for another term or session until all outstanding accounts are paid in full. Subsequently, if the bank returns the cheque, the student may be deregistered.

Students whose accounts are delinquent on April 15 may not be eligible, at the sole discretion of the University, for graduation at the May convocation. For October graduation the date is September 1.

Accounts which become seriously delinquent may be placed on collection or further legal action may be taken against the individual. Students will be responsible for charges incurred as a result of such action.

K. Canada Student Loans

Students planning to pay from a Canada Student Loan should apply to their Province in April or May so that funds will be available by time payment is required. The University will deduct fees/charges from the loan at the time of endorsement. Please contact the appropriate provincial office to determine eligibility as well as course load requirements. A late fee of \$50.00 will apply if the loan is negotiated after September 24, 1999. (January 25, 2000 for students registered for winter term only, and May 15 for students registering for the summer term).

L. Provincial Bursaries and University Scholarships

These cheques are distributed by the Student Accounts Office. Any unpaid Fees and/or Temporary Loans along with charges, if applicable, are deducted and payment will be issued within one week of endorsement for any balance remaining. A valid Dalhousie University ID and Social Insurance Number must be presented in order to receive cheques. Please contact the appropriate provincial office to determine eligibility as well as course requirements for Provincial Bursaries. For more information on Student Loans, Bursaries or Scholarships inquiries should be directed to the Registrar's Office - Information Centre located on the first floor of the Arts & Administration building, Room 123. Telephone (902) 494-6557.

M. Income Tax Credit from Academic Fees

The amount of academic fees constituting an income tax credit is determined by Revenue Canada, Taxation. Currently, the tax credit for students is calculated by deducting the following from Academic Fees: Student Union fees, and Society fees. Seventeen percent (17%) of the remaining balance constitutes the tax credit.

A special income tax certificate (T2202A) will be available at Student Accounts annually no later than February 28. A photocopy of the T2202A will be provided on request for a charge of \$5.00 per receipt. On request, a replacement tax receipt will be provided within 2 weeks for a charge of \$10.00 per receipt.

N. Identification Cards

All full and part-time students should obtain identification cards upon registration and payment of proper fees. If a card is lost, a fee of \$15.00 is charged. Regular academic year ID cards remain valid until the beginning of the following academic year (including summer session).

O. Laboratory Deposits

A deposit for the use of laboratory facilities in certain departments is required. The deposit is determined and collected by these departments. Students will be charged for careless or willful damage regardless of whether or not a deposit is required.

P. Athletic Fee

Membership at Dalplex for 1999-2000 is included in the athletic fee for all full-time students at Dalhousie and all part-time students at Dalhousie taking a minimum of three full credit classes.

Membership in Dalplex for ALL other part-time students at Dalhousie may be obtained at the office of Dalplex at the prevailing rates.

Q. Student Union Fee Distribution

Every student registered at Dalhousie is automatically a member of the Student Union and is therefore required to pay a Student Union fee as part of their registration procedure. These fees have been approved by students in referenda and, along with other revenue of the Union, are allocated each year by the Student Council in a budget.

What follows is the breakdown of how Student Union fees are spent. If you have any questions or comments please contact the Student Union Office located in Room 222 of the SUB Telephone No. 494-2146

DalTech students please contact the Student Union Office located in the J Building at 1360 Barrington Street.

1998-99 Student Union Fees

Full-Time (3 credits or more) - For information only

General Operation	\$52.40
Class Evaluation	1.00
C K D U - FM	9.00
NSPIRG	4.00
South African Trust Fund	1.00
WUSC	1.00
Women's Centre Fund	2.35
Student Accessibility Fund	1.75
Gazette	4.00
Sextant	0.50
TOTAL	\$77.00

Table I: Miscellaneous Fees 1998-99

FEE	AMOUNT	PAYABLE AT
Replacement Tax Receipt.....	\$10	Student Accounts
Photocopy Tax Receipt.....	\$5	Student Accounts
Late Registration	\$50	Student Accounts
Reinstatement Fee	\$50	Student Accounts
Returned Cheque	\$20	Student Accounts
Distance Education Fee, per class.....	\$100	Student Accounts
Admission Deposit	\$200	Student Accounts
Change from Audit to Credit.....	\$25	Student Accounts
Confirmation of Fee Payment	\$5	Student Accounts
Leave of Absence Fee	\$25	Graduate Studies
Application Fee	*\$35	Registrar
Confirmation of Enrolment	\$5	Registrar/Grad. Studies
Late Graduation Application	\$50	Registrar
Letter of Permission per class		
- maximum of \$50.00	\$10	Registrar
Reassessment Fee	\$50	Registrar
Replacement ID	\$15	Registrar
Transcript	\$5	Registrar
Priority Transcript Fee.....	\$15	Registrar
Same Day Transcript Fee	\$25	Registrar
FAX Fees:		
Metro	\$5	Registrar
Canadian.....	\$10	Registrar
International.....	\$15	Registrar
Residence Application Fee.....	\$25	Residence

* Except for the following programmes which require payment of a \$60.00 application fee: Occupational Therapy, Pharmacy, Physiotherapy, Recreation, Social Work; Diploma programmes in Meteorology, Outpost and Community Health Nursing, and Health Services Administration; and all programmes in the Faculties of Medicine, Dentistry (including Dental Hygiene), Law, and Graduate Studies.

III. Residence Fees

PLEASE NOTE: The following are general statements. Given the diversity of residence facilities, available practices vary slightly from locale to locale.

Applications for accommodation in all residences are accepted on the understanding that the student will remain for the whole academic session.

When students who have chosen to live in residence and have secured a room withdraw from residence before the end of the school year, there are serious financial penalties. Written notice to withdraw is always required by the Residence Co-ordinator or Fenwick Facilities Coordinator. Complete information on withdrawal from residence is available from the Residence Co-ordinator or Fenwick Facilities Coordinator and is detailed in the residence agreement to be signed by all residence students. No refund will be made to any resident who is dismissed for misconduct. Discretionary power in exceptional circumstances remains with the Director of Housing and Conferences or designate. Residence Application Forms will not be distributed until the student has been accepted by the University for the coming session. To be considered for accommodation, a completed Residence Application Form and the \$125.00 residence application fee and deposit must be received. All residents, new and returning, who have accepted a room assignment, will be required to pay a second deposit of \$200.00 by June 15 to reconfirm the assigned space. Failure to make a second deposit by June 15 will result in automatic cancellation of room assignment. Once the \$200.00 deposit is paid it (along with the \$125.00) is not refundable; it is our guarantee of your intention to live in residence.

Deposits may be made by cheque, bank draft, or money order in Canadian funds and payable to Dalhousie University. No reservations will be held on post-dated or "NSF" cheques. Deposits cannot be deducted from scholarships, fellowships, or similar awards.

A. Payment of Residence Fees

Payment may be made in full at registration, or for an extra charge of \$10.00, in two instalments. Scholarships may be applied to residence charges only after tuition fees for the full session are paid. The first instalment must be paid in full by September 30. Interest at a monthly rate as set by the University will be charged on all accounts outstanding after September 30 and on any second instalment outstanding after January 29. At the time of printing the monthly rate of interest is 0.65% monthly (7.80% per annum). The student will not be permitted to register for another session until all accounts are paid in full. A student whose account is delinquent for more than 30 days will be denied university privileges including access to transcripts and records of attendance and Dalplex. The student will be reinstated upon payment of the fees outstanding, the arrears interest, and a \$50.00 reinstatement fee.

For Howe Hall, Eliza Ritchie Hall, Shirreff Hall and the Residence Houses fees are paid at the Student Accounts Office. For Fenwick Place and Glengary Apartments and O'Brien Hall fees are paid at Fenwick Place.

Students should make an appointment as soon as possible with the Associate Director of Residence Life, Fenwick Facilities Coordinator, or the Supervisor of Student Accounts if they are having financial difficulties.

B. Regulations and Additional Charges

The room and board session is defined as being from the Wednesday in September before classes begin in the College of Arts and Science to the last day of regularly-scheduled examinations in

Table II: Residence Rates - 1997-98 - Payment Alternatives

RESIDENCE TYPE	Deposits		Alternative 1		Alternative 2		Total Fees
	1st Deposit	2nd Deposit	Balance If Paid	Total Fees	Pay 1st Part by Sept. 30	Pay Balance by Jan. 31	
Traditional (1)							
Howe Hall							
Single Room	125	200	5,115	5,440	2,450	2,675	5,450
Double Room	125	200	4,740	5,065	2,275	2,475	5,075
Shirreff Hall and Eliza Ritchie Hall							
Single Room	125	200	5,095	5,420	2,420	2,685	5,430
Double Room	125	200	4,720	5,045	2,245	2,480	5,055
Residence House							
Single Room	125	200	2,810	3,135	1,320	1,500	3,145
Double room	125	200	2,405	2,730	1,130	1,285	2,740
Apartments							
Glengary							
Bachelor Apts.	125	200	4,005	4,330	1,880	2,135	4,340
3-person (3 bedroom)	125	200	3,250	3,575	1,525	1,735	3,585
Fenwick Place (2)							
2-person (2 bedroom)	125	200	3,605	3,930	1,803	1,803	3,930
3-person (3 bedroom)	125	200	3,265	3,590	1,633	1,633	3,590
4-person (4 bedroom)	125	200	2,880	3,205	1,440	1,440	3,205

Meals Only - Special Rate for session

Meal only plans may be purchased from Dalhousie Food Service Office, Killam Library.

19 meal Plan per Week	\$2,125
14 meal Plan per Week	\$2,050

PLEASE NOTE: The above fees will be superseded on July 1, 1998 when the 1998/99 residence fee schedule will be published.

(1) The residence rates include a residence council fee (Howe Hall \$50; Shirreff Hall and Eliza Ritchie Hall \$30). In addition the residence fees include the cost of a 19 meal plan per week. If the 14 meal plan option is chosen, the fees will be reduced by \$75.

(2) At Fenwick Place, \$100 of the \$125 prepaid is a damage deposit. See application form for details. The \$10 service charge is not applicable.

Residence Rates 1998-99

	Fall	Winter
O'Brien Hall		
Super Single room with 19 meals/week	2,780	2,645
Super Single room with 14 meals/week	2,670	2,565
Super Single room with 10 meals/week	2,515	2,380
Single room with 19 meals/week		
Single room with 14 meals/week	2,680	2,545
Single room with 10 meals/week	2,570	2,465
Double room with 19 meals/week		
Double room with 14 meals/week	2,435	2,310
Double room with 10 meals/week	2,325	2,230
Grad House		
Super Single room with 19 meals/week	2,780	2,645
Super Single room with 14 meals/week	2,670	2,565
Super Single room with 10 meals/week	2,515	2,380
Super Single room without meals	1,665	1,530

the College of Arts and Science in April. Please note that, except at Fenwick Place, students must vacate the residence twenty-four hours after their last exam and that residences are closed over the Christmas holidays.

No reduction in the board charge will be made for meals not taken, except that a rebate of \$200.00 per month may be considered in the case of illness or other cause necessitating absence of four weeks or more.

In Fenwick Place the rental period is based on a 34-week period beginning on Labour Day. For more specific details on dates of semesters, students should contact the accommodations office at Fenwick Place.

In all other cases, an additional fee is payable by all residents who are registered in a Faculty where the academic session commences before or continues after the session of the College of Arts and Science. Special arrangements are to be made with the Residence Co-ordinator or Fenwick Facilities Coordinator for accommodation for periods prior to or following the session as defined above.

C. Residence Rates 1998-99

The residence term for Howe Hall, Shirreff Hall, Eliza Ritchie Hall, O'Brien Hall, Glengary Apartments and the Residence Houses covers the time period from the Monday in September before classes begin in the College of Arts and Science to the last regularly scheduled examination in the College of Arts and Science in April (Christmas vacation excluded).

The residence term for Fenwick Place is as follows: First semester - Labour Day to December 31; second semester - January 1 to April 30. Those students wishing to stay beyond the residence term may do so for a daily or weekly rate. Please contact the appropriate residence for details.

The student has two alternatives for payment after the first deposit of \$125.00 and second deposit of \$200.00 has been paid (see Table V):

1. Pay the Total Fees by September 30th.
2. Pay the Total Fees in two equal parts, first half by September 30th and the second half by January 29th. A \$10.00 service charge will be added to the second instalment (Fenwick, Glengary, and O'Brien Hall are exempt from this charge).

IV. DalTech Residence Fees

The information on Residence Fees specified above is also applicable to residence accommodation at DalTech. However, the following information is worth noting and a separate fee schedule exists (see below).

Additional Fees

A Residence Fee of \$5.00 per session will be collected at the time fees are paid to support student-run programmes in residence. Residence fees include cable television. Ethernet is available at an additional charge.

Awards

PLEASE NOTE: The contents of this awards section are subject to change without notice.

The University reserves the right to publicize the recipients of merit awards.

I. Faculty of Dentistry

A. Scholarships in Dentistry

PLEASE NOTE: The University's scholarships described hereunder are credited to students' fee accounts automatically. If this should result in an overpayment of fees, the amount in excess will be rebated to the students by the Student Accounts Office about mid-November.

1. Entrance Scholarships

Students in the DDS programme are considered for scholarships by either of two committees. The Dental Admissions Committee assesses entering students for entrance scholarships. Scholarship applications are not required for entrance scholarship consideration. A supplementary application, however, will be required of those candidates whom the Committee will consider for the McGuigan Scholarship, which has a financial need component. The Academic Awards Committee considers continuing students for in-course scholarships which are tenable upon entering Second, Third or Fourth Year. No special application is required.

Dalhousie Entrance Dental Scholarship

A scholarship of \$1,000 will be awarded to the student entering the first year of Dentistry who has the highest scholastic standing. This achievement is to be in the imperative university classes which are required for admission into the Faculty of Dentistry. Dalhousie University standards are such that the successful candidate will have an academic record with an overall average of not less than 75% with no subject below 50% in his/her university experience.

The Dr. James P. McGuigan Memorial Scholarship

This fund was established in 1983 to provide an annual entrance scholarship to an academically accomplished student who is a resident of the Atlantic provinces and who shows evidence of actual financial need. A supplementary financial application will be sent by the Dental Admissions Committee to those who are to be given further consideration.

2. In-Course Scholarships

Dalhousie University Dental Scholarships

A scholarship of \$1,000 will be awarded to the student entering the Second Year of Dentistry who attained the highest scholastic standing in the first year of Dentistry at Dalhousie, provided that his/her grade point average was not less than 3.0 with no subject below a grade of "C". A scholarship of \$1,000 will be awarded to the student entering the Third Year of Dentistry who attained the highest scholastic standing in the second year of Dentistry at Dalhousie, provided that his/her grade point average was not less than 3.0 with no subject below a grade of "C".

The Dr. J.D. McLean Scholarship

An endowment has been established to fund the J.D. McLean Scholarship for student(s) in any year of dental study at Dalhousie provided that his/her grade point average is not less than 3.0, no subject below a grade of "C" and who, in the opinion of the Academic Awards Committee, merits the scholarship.

The Dr. I.K. Lubetsky Scholarship

An endowment has been established to fund the I.K. Lubetsky Scholarship for the student in third-year who has demonstrated the greatest proficiency in the practice of Clinical Oral Surgery, provided an overall grade point average of 3.0 has been achieved consecutively. The scholarship is tenable in the fourth year.

Dr. Don Stephenson Memorial Scholarship

This scholarship has been established in memory of Dr. Don Stephenson and is to be awarded to a third year student(s) entering fourth year, who has achieved academic excellence over the last three years of study and who demonstrated outstanding abilities to treat his/her patient family.

B. Prizes and Medals in Dentistry

Graduate Programme in Oral and Maxillofacial Surgery

John P. Laba Memorial Research Award

This award is provided through a fund established in memory of John P. Laba by family, friends, patients and colleagues, and may be given annually. The recipient is to be the dentist accepted in the Graduate Programme in Oral and Maxillofacial Surgery, and is intended exclusively for the presentation, dissemination and/or publication of research related to Oral and Maxillofacial Surgery. For further information, please contact the Department of Oral and Maxillofacial Surgery.

Doctor of Dental Surgery Programme

Students with advanced standing who have had the benefit of postgraduate study are ineligible for undergraduate prizes and awards in the Faculty of Dentistry.

1. Fourth Year Students

The American Association of Endodontists Prize

For exceptional ability in Endodontics, the Association sponsors an annual prize consisting of a one-year subscription to Oral Surgery, Oral Medicine and Oral Pathology, and a one-year Student Membership in the American Association of Endodontists.

The American Academy of Oral Medicine Prize

This prize, given for the greatest proficiency in Oral Medicine, Pathology and Radiology consists of a certificate, one-year membership and subscription.

The American Society of Dentistry for Children Prize

A membership in the Society and a one-year subscription to the ASDC Journal of Dentistry for Children constitute the annual prize which the Society sponsors to recognize an outstanding student in dentistry for children.

The Canadian Academy of Periodontology Prize

This book/cash prize with the approximate value \$100, is awarded to the student who has demonstrated the greatest proficiency in Periodontics.

The Canadian Associated Laboratories Limited Prize

Awarded in the final year, this book prize is selected by the donor and given to the student who demonstrates the greatest proficiency in Clinical Fixed Prosthodontics.

The Canadian Association of Oral and Maxillofacial Surgeons Prize

The Association awards a cash prize to the student who has achieved the highest standing in Oral and Maxillofacial Surgery on the aggregate of the person's third and fourth-year marks.

CDA President's Award

The Canadian Dental Association in 1986 established this award at each of Canada's ten Dental Schools. Candidates must be student members of CDA and must demonstrate outstanding qualities of leadership, scholarship, character and humanity during dental studies. Candidates must show promise of conducting a distinguished career in the dental profession and society at large. The Academic Awards Committee is responsible for selecting the recipient for Dalhousie. An award will not necessarily be made every year. The CDA President's Award consists of a cheque for \$250 (paid externally) and a scroll.

The Prince Edward Island Dental Association Prize

Each year the Association sponsors a prize of \$100 for the student who has demonstrated the greatest proficiency and interest in Dental Oncology. The prize is paid externally.

The Quintessence Award

A one-year subscription to the Quintessence Journal is awarded to the student with the greatest proficiency in Restorative Dentistry.

The Quintessence Award

A one-year subscription to the Quintessence Journal is awarded to the student for excellence in Clinical Achievement in Periodontics.

Quintessence Award for Research Achievement

A one-year subscription to the Quintessence Journal is awarded to the student who has demonstrated exceptional interest and research abilities during his/her four years of dental studies.

Teledyn Water Pik Canada Prize

A cash prize valued at \$500 is awarded to the student for excellence in Fixed Prosthodontics.

Teledyn Water Pik Canada Prize

A cash prize valued at \$500 is awarded to the student for excellence in Removable Prosthodontics.

University Medal in Dentistry

The University Medal in Dentistry will be awarded to the graduating student who has met the requirements for Graduation with Distinction and who in the opinion of the Faculty merits this award.

The Dr. Frank Woodbury Memorial Prize

This book/cash prize valued at approximately \$200 is awarded to the student who has attained the highest grade point average.

The Dr. Frank Woodbury Memorial Prize

This book/cash prize valued at approximately \$100 is awarded to the student who has attained the second-highest grade point average.

The Dr. Frank Woodbury Memorial Prize

A book/cash prize valued at approximately \$100 is awarded to the student demonstrating the greatest proficiency in Comprehensive Care.

The Dr. William W. Woodbury Memorial Prize

A cash prize is awarded for exceptional ability in Orthodontics on the third and fourth-year aggregate and on demonstrated interest in the specialty of Orthodontics.

2. Fourth and Third Year Students

American College of Dentists (Atlantic Provinces Section)

This is awarded to the student who has demonstrated exceptional dedication and genuine sensitivity in the dental care needs of his/her patient family, and has provided patient treatment in an ethical, compassionate and caring manner.

3. Third Year Students

The American Academy of Periodontology Prize

To the student who is outstanding in Clinical Periodontics, a one-year subscription to the Journal of Periodontics is awarded.

Atlantic Orthodontic Society Prize

The Society sponsors a book/cash prize valued at approximately \$100 to be awarded to the student who has shown the greatest proficiency in theoretical orthodontics.

The Dr. J. Stanley Bagnall Memorial Prize

This prize, in the form of books with an approximate value of \$200, is awarded to the student who has achieved the highest grade point average in all subjects.

The Dr. W.H.H. Beckwith Prize

This book prize is awarded to the student who has achieved the greatest proficiency in Clinical Operative Dentistry.

CDA/Dentistry Student Clinician Award

The Best Table Clinic Presentation Winner receives an expenses paid trip to the national convention of the Canadian Dental Association where the student will present his/her table clinic in a national competition, with entries from all Canadian Faculties of Dentistry.

Dr. Bruce N. Fergusson Prize

This \$125 prize is given to the Best Table Clinic Presentation and is donated by the Halifax County Dental Society.

The Dr. Bruce N. Fergusson Memorial Award

This award is made possible through a fund provided by family, friends, and colleagues, and may be awarded annually. The recipient will be a student entering the fourth year of Dental Studies who has demonstrated exceptional leadership, character, scholarship, and personal qualities during his/her first three years of Dental Study.

The Dr. F.A. Godsoe Prize

The New Brunswick Dental Society sponsors this cash award of \$200 which is awarded to the student who has demonstrated the greatest proficiency in Foundation Sciences in Clinical Practice.

The Halifax County Dental Society Prize

These prizes are for the second and third best table clinic presentation. The purses of these prizes are \$100 and \$75 respectively.

The International College of Dentists (Canadian a: Section) Award

The College sponsors a cash award of \$500 to the student who best combines scholastic achievement, general character and participation in extracurricular activities during the third year. The College pays the award directly to the student.

Modern Dental Laboratory Prize

A book prize in the approximate value of \$100 is awarded for greatest proficiency in Clinical Removable Prosthodontics.

Nova Scotia Dental Association Prizes

For the second highest grade point average in all subjects, books with the approximate value of \$100.

Table Clinic Fourth Prize

A cash award of \$60 is given to the student who makes the fourth best presentation in Table Clinic.

Third Year Comprehensive Patient Care III Prize

For the greatest proficiency in Clinical Comprehensive Patient Care III in the third year, a prize is awarded in the form of either cash or books.

Harcourt Brace Canada Prize

A selected book is awarded for the most significant improvement in third-year.

The Dr. D.E. Williams Prize

This book prize is awarded for the greatest proficiency in Clinical Pediatric Dentistry.

4. Second Year Students

The Atlantic Society of Periodontology

A one year subscription to the International Journal of Periodontics and Restorative Dentistry is awarded for the greatest proficiency in Periodontics.

The Charles Bell Memorial Prize

This prize, in the form of one or more books with the approximate value of \$300, is awarded to the student who has attained the highest grade point average in all subjects.

The Charles Bell Memorial Prize

This prize, in the form of one or more books with the approximate value of \$250, is awarded to the student who has attained the second highest grade point average in all subjects.

The Canadian Associated Dental Laboratories Prize

This book prize is awarded for the greatest proficiency in Occlusion & Neuromuscular Function II.

The Dr. David Manuel Memorial Prize

A book is awarded to the student for greatest proficiency in Patient Care II.

The Nova Scotia Dental Association Prize

The Association sponsors a book prize with the approximate value of \$100 for the student who has attained the highest grade in Cariology II.

Nova Scotia Dental Association Prize

The Association sponsors a book prize with the approximate value of \$100 for the student who has demonstrated the greatest proficiency in Growth and Development II.

Nova Scotia Dental Association Prize

The Association sponsors a book prize with the approximate value \$100 for the student who has demonstrated the greatest proficiency in Pharmacology.

Nova Scotia Dental Association Prize

The Association sponsors a book prize valued at approximately \$100 for greatest proficiency in Dental Biomaterials.

5. First Year Students

The Charles Bell Memorial Prize

This prize, in the form of one or more books with the approximate value of \$300, is awarded to the student who has attained the highest grade point average in all subjects.

The Charles Bell Memorial Prize

This prize, in the form of one or more books with the approximate value of \$250, is awarded to the student who has attained the second highest grade point average in all subjects.

The Dr. John W. Dobson Memorial Prize

This prize is awarded to the student who has demonstrated the greatest proficiency in Periodontics. The prize may be a cash award of \$100 or a book of approximately the same value.

The Dr. F.A. Godsoe Prize

The New Brunswick Dental Society sponsors a cash award of \$200 for the student who has shown the greatest proficiency in Patient Care I.

The Dr. F.A. Godsoe Prize

The New Brunswick Dental Society sponsors a cash award of \$200 for the student who has shown the greatest proficiency in Cariology I.

The Leonard Goldfarb Prize

This book prize is awarded to the student who has demonstrated the greatest proficiency in Infectious Diseases.

Nova Scotia Dental Association Prize

This book prize valued at approximately \$100 is awarded to the student who has demonstrated the greatest proficiency in Anatomy.

Nova Scotia Dental Association Prize

Association sponsors a book prize of approximately \$100 in value for the student who has demonstrated the greatest proficiency in Histology.

Nova Scotia Dental Association Prize

Association sponsors a book prize of approximately \$100 in value for the student who has demonstrated the greatest proficiency in Occlusion and Neuromuscular Function I.

The Saint John Dental Society Prize

The Society sponsors an annual book prize with the approximate value of \$100 for the student demonstrating the greatest proficiency in Physiology.

Harcourt Brace Canada Prize

Sponsors an annual selected book prize for greatest proficiency in Biochemistry.

C. Bursaries in Dentistry

This subsection should be read with reference to the general bursary portion of the Financial Aid section.

The Sidney D. Campbell Memorial Bursary

This bursary will be awarded annually out of the income generated by this fund. The award will go to the third-year dental student who has demonstrated financial need and who, by scholarship and character, appears deserving of this assistance.

The Elias Bursary

This endowment has been established to provide an annual bursary to a qualifying dental student beyond first year. Academic achievement of 70% is also required. This bursary will be of particular interest to a married student.

The Dr. I.K. Lubetsky Memorial Bursary

Friends and Colleagues of the late Dr. I.K. Lubetsky established an endowment to provide a bursary to a qualifying second-year dental student who has demonstrated financial need and who by scholarship and character appears deserving of this assistance.

The Dr. D. Brendan MacNeil Bursary

The family of the late Dr. Donald Brendan MacNeil established an endowment at the University to provide an annual memorial bursary to a fourth-year student in the School of Dentistry.

Arrabelle MacKenzie McCallum Bursary

Under the Will of the late Emelyn L. MacKenzie the University has been given a bequest for the purpose of funding a bursary to one or more students. The recipient must be a bona fide resident of and domiciled in the County of Victoria (as defined by the boundaries then extant in AD 1900), Nova Scotia. Character and need are the main criteria.

The Dr. F.L. Miller Memorial Bursary

The Fredericton Dental Society in 1979 endowed funds in memory of this distinguished graduate of Dalhousie who contributed so much to the community. A bursary from the annual income of the fund is to be awarded to a second-year dental student who has demonstrated financial need. Preference will be given to, but will not be strictly limited to, a New Brunswick student.

II. School of Dental Hygiene

A. In-Course Scholarships in Dental Hygiene

Dalhousie University Scholarships

Continuing students in the Dental Hygiene programme are eligible for in-course scholarships.

B. Prizes and Awards

1. Second Year Dental Hygiene Students

Nova Scotia Dental Hygienists Association Prize

A cash prize of \$200 is awarded for the highest grade point average in all subjects.

Newfoundland Dental Hygienists Association Prize

For the second highest grade point average in all subjects there is a cash award of \$150.

Columbia Dentoform Prize

For demonstrating the greatest proficiency in patient management and patient education, a Columbia Dentoform Model is awarded to the successful student.

Dental Hygiene Student Society

Sponsors cash award for the best table clinic presentation.

Nova Scotia Dental Hygienists' Association Prize

The association sponsors cash awards of \$150 and \$100, for the second and third best Table Clinic presentations, respectively (or half of these amounts in the case of two students working together).

Anne Rafuse Memorial Prize

There is a cash prize for the greatest academic and social contribution to the class.

Alice Hartlem Memorial Prize

There is a cash award for the student demonstrating the greatest originality and creativity in community projects in the health education course.

Halifax County Dental Society Prize

For the student demonstrating the greatest proficiency in Clinical Dental Hygiene, there is a cash award of \$100.

Aisling Brennan Memorial Award

Given to the student chosen as Valedictorian. A cash award of \$250.

2. First Year Dental Hygiene

Katie Lubetzki Memorial Prize

A cash prize of \$200 is awarded for the highest grade point average in all subjects.

Prince Edward Island and New Brunswick Dental Hygienist Association Prize

A cash award of \$150 is available to the student who achieves the second highest grade point average in all subjects.

Nova Scotia Dental Association Prize

A cash award of \$100 is awarded to the student who demonstrates the greatest proficiency in Pre-Clinical Dental Hygiene.

Lisa Van Alphen Memorial Award

A cash award is presented in recognition of sound standing and professional excellence, in tribute to a person of integrity and sincerity.

Anatomy/Neurobiology Prize

A book prize is presented to the student who achieves (a) the highest written component of Anatomy 1030 (b) highest lab component of Anatomy 1030

C. Bursaries Open to Students in Dental Hygiene

Students who are requesting consideration for any of the following funds are to submit an "Undergraduate Bursary Application" form. This is available from the office of the Registrar, Room 133, Arts & Administration Building.

University Bursaries

The university has a number of funds from which bursaries may be awarded to undergraduates, including Dental Hygiene students.

Kate MacDonald Bursary

The income from this fund will be used to provide a bursary to a first year Dental Hygiene student who has demonstrated financial need.

The Jennifer Wright Memorial Bursary

The income from this fund may be awarded annually to a second year Dental Hygiene student who has demonstrated financial need.

III. Faculty of Law

A. Scholarships in Law

The Student Awards Committee is responsible for the selection of scholars in the Bachelor of Laws programme and the combined LLB/MBA, LLB/MPA, LLB/MLIS, and LLB/MHSA programmes (Law portion). Application for the pure scholarships is not required, except for those of the Law Foundation of Nova Scotia (see entry below) and the Prince Edward Island Law Foundation (see entry below). Application for the hybrid scholarship-bursary awards is required, and this form is available from either the Office of the Registrar, Room 133, Arts & Administration Building or Faculty of Law, Second Floor Office, Weldon Building. Please note that it is University policy to credit scholarships automatically to fees. If this should result in an overpayment of fees, the portion in excess will be rebated to the students about mid-November.

1. Entrance Scholarships

The Law Foundation of Nova Scotia Scholarships

The Foundation sponsors seven scholarships, each in the amount of \$7,000, which are open to exceptionally capable students who are applying to the first year of the Bachelor of Laws degree at Dalhousie. Application literature may be obtained from either the Awards Office or the Law Admissions Office. The L.F.N.S. Scholarships application must be sent to the Admissions Office, Faculty of Law, Dalhousie University, Halifax, Nova Scotia, B3H

4H9, postmarked no later than 31 March. Scholarships are renewable to the extent of \$3,500 in each subsequent year if the recipient maintains an "A" average or places within the top 15 students in the class.

Ladner Downs Entrance Scholarship

A scholarship of \$1,000 established by the law firm of Ladner Downs, Vancouver, is to be awarded annually to a student entering the first year at the Dalhousie Law School, who intends to return to British Columbia to practice law and who either is a resident of British Columbia or has obtained an undergraduate degree in British Columbia. The scholarship is to be awarded on the basis of academic excellence and public service.

Law Foundation of Newfoundland

In honour of the 150th Anniversary of the Law Society of Newfoundland in 1984 (incorporated 1834), the Law Foundation of Newfoundland established funding for up to three annual law school entrance Scholarships. These Scholarships will be tenable for first year studies at Canadian law schools recognized by the Scholarship Board. The Scholarships will be in the amount of \$5,000.00 (five thousand dollars) payable in two instalments. Applications must be received by May 1st and the Scholarships will be awarded during the month of June. Awards will be made on the basis of academic ability.

A Candidate must: Be a Newfoundland resident; have achieved academic excellence; and not be the recipient of any other major Scholarship.

2. In-Course Scholarships

The Frederick P. Bligh Scholarship

A scholarship will be awarded to the student of the first year who, having made a high scholastic average, in the opinion of the Faculty shows the most promise of achieving high standards of professional and public service.

Canadian Bar Association (NS Branch) Scholarship

Through its more than 32,000 members the Canadian Bar Association is one of the Country's most prestigious and rapidly growing national professional associations. The objectives of the Association are to promote the administration of justice, encourage a high standard of legal education and training; uphold the honour of the profession; advance the science of jurisprudence; and foster harmonious relations and co-operation among law societies, and bench, and members of the Association. An annual scholarship of \$500 will be awarded on completion of second year to the student who has shown academic excellence by attaining a high scholastic average and who demonstrates, in the opinion of the faculty, the most promise of achieving the objects of the Association described above.

Frank M. Covert Scholarship

This is to be awarded at the end of the first year and is renewable at the end of the second year if at least an "A" average is maintained. Donated by friends, family and colleagues in memory of Frank M. Covert (now Stewart, McKelvey, Sterling & Scales) and public spirited citizen, this scholarship will be awarded chiefly on the basis of outstanding academic performance.

The Edward C. Foley Memorial Scholarship

This scholarship is in memory of the late Edward (Ted) C. Foley, LLB 1980. While at law school, Mr. Foley was particularly interested in marine, international and environmental law and was President of the John E. Read International Society. He was also active in provincial politics and in Amnesty International. The scholarship is to be awarded, on recommendation of the Dean, to a second or third year student who has completed at least two classes in the international, marine and environmental areas, and who has achieved an overall average of more than "B". Consideration will also be given to the personal qualities of the candidate including leadership roles assumed at law school and community involvement. This scholarship was established by donations from friends of Mr. Foley, from both inside and outside the Law School.

The Honourable Alistair Fraser Scholarships

The Honourable Alistair Fraser Fund was established in 1968 through the generosity of Mrs. Alistair Fraser and the executors of the Estate of the late Hon. Alistair Fraser, MC, QC, LL.D. The Fund commemorates a distinguished graduate of the Law School who served his Province and Canada with distinction as a soldier in the First World War, in business and as Lieutenant-Governor of Nova Scotia from 1952-1958. The Fund provides scholarships to assist students of superior academic ability who are likely to make a significant contribution to the legal profession. (The Fund also provides bursaries; see subsequent entry.)

Law Society of Prince Edward Island Scholarship

A scholarship will be awarded by the Law Society of Prince Edward Island to an Island student in law or who intends to study law. Applications must be received the Law Society by July 15, 1989 and should include curriculum vitae, including transcripts of a full year or more of law school or, if that is not available, the last three years' classes and marks, giving descriptions of classes.

Prince Edward Island Law Foundation Scholarship

The PEI Law Foundation in 1985 donated the sum of \$20,000 to establish an endowment from which the annual income will provide a major scholarship. This scholarship is tenable by a student who is entering Second Year of study in law, who is ordinarily a resident of Prince Edward Island, is in financial need, and has achieved a good academic record in the Law School. For the PEILF Scholarship use the University's "Professional Faculties Application for Financial Aid" form, appropriately marked.

3. Graduate Scholarships in Law

Graduate students are eligible for scholarships available to all students registered in the Faculty of Graduate Studies at the University, and for the Sir James Dunn Post-Graduate Scholarship available in the Faculty of Law. Any graduates who assist with the teaching programme at the Law School may qualify for a graduate teaching fellowship.

The Roy A. Jodrey Scholarship in Law

The will of the late Roy A. Jodrey established a fund, the income of which is to be awarded as an annual scholarship for post-graduate study at Dalhousie Law School to a student deemed by the faculty to be outstanding.

Fielding Sherwood Memorial Fund

The fund provides a bursary which is to be awarded to an LL.M or J.S.D. student whose work concerns the environment, or relates in some way to fisheries or ocean research studies. The intent is that the bursary be directed toward travel or research. The student will be selected by the Dean, on the advice of Faculty members in the areas concerned. The annual amount is to be determined by him/her. One award may be made annually. The fund will be self-perpetuating.

Viscount Bennett Fellowship

Under the terms of a deed gift to the Canadian Bar Association from the Right Honourable Viscount Bennett PC, KC, LL.D, DCL, the Viscount Bennett Trust Fund was established to encourage a high standard of legal education, training, and ethics. The annual income from this fund is administered by the Canadian Bar Association. An award to a maximum of \$12,000 may be paid annually to a student for graduate study at an institution of higher learning approved by the Viscount Bennett Fellowship Committee on the condition that the award be the only fellowship, scholarship or grant accepted by the winner for the graduate period. The fellowship is open to persons of either sex who are Canadian citizens and who have graduated from an approved law school in Canada or who, at the time of the application, are pursuing final year studies as undergraduate students at an approved law school. Applications shall be in writing to the Communications Director of the Canadian Bar Association and received not later than December 15 of the year previous to that in which the award is to be made. For application information write the Director of Communications, Canadian Bar Association, 1700-130 Albert Street, Ottawa, Ontario K1P 5C4.

B. Prizes and Medals

The Eunice W. Beeson Memorial Prize

This prize is to be awarded at the discretion of the Faculty to the qualifying woman student in the Law School who seems worthy on the basis of her academic performance in the School, qualities of personality and character, and financial need. The prize was established by Mrs. Mary Beeson Mobley and friends in memory of Miss Eunice W. Beeson, the first professional Librarian in the Law School, Sir James Dunn Law Librarian and Associate Professor, 1959-66.

The Honourable H.G. Puddester Prize

This annual prize of \$250 is funded by the St. John's law firm Orsborn, Benson, Myles, in memory of The Honourable Mr. Justice Harold G. Puddester, a Dalhousie Law School graduate, and former Deputy Minister of Justice of Newfoundland and Justice of the Supreme Court of that Province. The recipient shall be either a permanent resident of Newfoundland or have the evident intention to practice law in Newfoundland. The award will be made considering (a) demonstrated academic ability in public law; (b) leadership ability; and (c) extra-curricular activities beneficial to the Law School and/or the legal profession. Preference will be given to a third year student, with the prize being based on performance over all three years. Failing a suitable third year student, preference will be given to a second year student based on the student's performance in First and Second years. Failing a suitable second year student, preference will be given to a first year student based on performance in First Year only.

The G.O. Forsyth Prize

This prize is awarded to that student of the Law School whom the Faculty deems to be the most deserving in the sense of combining the qualities of scholarship, character, and economic need.

The Leonard A. Kitz, QC Prize

A book prize donated by Leonard A. Kitz, QC, will be awarded annually for skill in oral legal argument, in moot courts or as otherwise determined by the faculty.

The R. Graham Murray Prize

The Class of 1954 established an endowment in honour of Professor R. Graham Murray, QC, a distinguished teacher at the Law School. The prize is awarded to a deserving student in a subject to be designated by the Faculty.

The J.S.D. Tory Writing Awards

The fund was established by the law firm of Tory, Tory, DesLauriers & Binington in memory of the late J.S.D. Tory, to provide annually one or more awards to full-time students in the Faculty of Law to reward legal writing excellence, to encourage legal scholarship, and to provide the recipients with the financial ability to do additional research and writing on an outstanding piece of written work.

The George Isaac Smith Memorial Award

An award of \$500 is available to the student in any year of Law who has shown academic excellence by attaining a high scholastic average, and who has demonstrated in the opinion of Faculty the most promise of achieving exemplary standards of professional and public service.

1. Third Year Students

University Medal in Law

This medal may be awarded on graduation to the student who has achieved the highest cumulative average of those attaining First Class distinction in the studies of Third Year, and who has achieved a very high standard of excellence. (Please note that eligibility will be determined solely on the basis of law classes.)

Robert E. Bamford Memorial Award

The friends, colleagues and classmates of the late Robert E. Bamford, a graduate of the Class of 1975, have established this memorial prize in his honour. Robert Bamford was formerly the treasurer and president of the Dalhousie Law Students' Society and, at the time of his death, was a doctoral student in law at the University of

Edinburgh. The prize is awarded to the third-year student who best combines academic excellence with a commitment to the Law School community.

Borden & Elliot Prize

A prize of \$500 is awarded by the Toronto law firm of Borden & Elliot to the graduating student who has achieved the highest standing in the combination of Constitutional Law plus at least one other constitutional law class designated by the faculty.

Boyne Clark Prize

This prize is awarded to the third year student who has achieved outstanding performance in marine and environmental law subjects chosen by the faculty.

David M. Jones Memorial Award

Awarded to a third year student whose character has been a source of inspiration and optimism to his or her classmates and the Law School community. The fund also makes it possible to invite to the Law School visitors and speakers who would do honour to the principles and philosophy of David Jones' life.

The Edward C. Foley Memorial Prize

This prize is in memory of the late Edward (Ted) C. Foley, LLB 1980. While at law school, Mr. Foley was particularly interested in marine, international and environmental law and was President of the John E. Read International Society. He was also active in provincial politics and in Amnesty International. The prize is to be awarded, on recommendation of the Dean, to a second or third year student who has completed at least two classes in the international, marine and environmental areas, and who has achieved an overall average of more than "B". Consideration will also be given to the personal qualities of the candidate including leadership roles assumed at law school and community involvement. The prize was established by donations from friends of Mr. Foley, from both inside and outside the Law School.

G.D. Forsyth Prize

Awarded to the most deserving student, to be selected by the Dean.

Muriel Duckworth Award

This is a prize of \$100 to be awarded annually to a woman or women in the graduating class who best exemplifies the qualities of Muriel Duckworth by raising consciousness of women's issues and feminism in the legal community. The successful candidate shall be chosen by the Discretionary Awards Committee along with the Professor teaching Women, Inequality and the Law, and a representative chosen by the Dalhousie Law School Association of Women and the Law.

Carswell Prize

A book prize of the value of \$500 is awarded to the student with the highest average in the third year examinations.

The Sarah MacWalker MacKenzie Clinical Law Award

The Dalhousie Legal Aid Service established a prize, awarded in the discretion of the Director and staff, in recognition of the contributions and exemplary service of Sarah MacKenzie. The prize is open to a third-year student who has successfully completed the Clinical Law Programme at Dalhousie Legal Aid and who has made an outstanding contribution toward the DLAS goals of education, service, community development and law reform.

The A.S. Pattillo Prize for Advocacy

The Toronto firm of Blake, Cassels and Graydon sponsor this prize in memory of Mr. Arthur Pattillo, a renowned advocate. The prize is to be shared by the winners of the annual Smith Shield Moot Court competition.

The Henry B. Rhude Memorial Prize

In 1985 the law firm of Stewart, MacKeen and Covert (now Stewart McKelvey Stirling and Scales) set up this prize which is to be awarded to a student who attains the highest mark in Taxation III.

The Honourable W.A. Henry Prize

Awarded to the graduating student who has achieved the highest standing in Constitutional Law subjects chosen by the faculty.

Maritime Law Book Company Prize

Prizes of \$200 and \$100 will be awarded to the students who have attained the highest mark and the second highest mark, respectively, in The Legal Profession and Professional Responsibility.

2. Second or Third Year Students

The Ray Anderson Labour Law Prize

A prize of \$100 will be awarded to the student who has achieved the highest mark in Labour Law, in memory of Mr. Anderson, a former deputy minister of labour.

Robert Batt Memorial Award

Friends and associates of the late Robert John Batt (Class of 1936) have established a fund which provides a prize to the student who achieves excellent standing in the subject area of Constitutional Law.

The Blake, Cassels and Graydon Prize

The law firm of Blake, Cassels and Graydon sponsors an annual prize of \$500 to the student who has attained the highest standing in Business Associations.

Boyne Clark Prize in Taxation

This prize is awarded to the student who achieves the highest mark in Tax II.

Boyne Clark Prize in Property II

An annual prize which is to be awarded to the student who has attained the highest mark in Real Estate Transactions.

Canada Law Book Company Prize in Conflict of Laws

A book prize will be awarded to the student who receives the highest mark in Conflict of Laws.

Canada Law Book Company Prize in Family Law

A book prize will be awarded to the student who attains the highest mark in Family Law.

Canadian Petroleum Law Foundation Prize

A prize in the amount of \$1500 to be awarded to the student who has demonstrated outstanding performance in the Oil and Gas Law class.

Davies, Ward & Beck Prize

A prize of \$500 donated by the Toronto law firm of Davies, Ward & Beck, is to be awarded to the second or third year student who has achieved the highest combined mark in Business Associations, Commercial Law and Taxation I.

The Robert T. Donald Memorial Prize

Former students, colleagues and friends of the late Robert T. Donald, a teacher at the Law School and Dean from 1969 until his death in 1971, established an endowment fund. A portion of the net annual income is expended as a prize to the student who has achieved the highest standing in Corporate Transactions.

Robert T. Donald Prize in Insurance

The Carswell Company and colleagues of the late Dean Donald have established a fund to provide for an annual prize to recognize the achievement of that student who has attained the highest mark in Insurance.

The Milton and Carole Ehrlich Prize

Awarded in memory of the late Richard Weiner who was actively involved with the United Nations, this prize is given to recognize the student who has achieved the highest standing in Law of the Sea subjects.

The J. Gordon Fogo Prize

The income from a fund, established by the family of J. Gordon Fogo in memory of their father, provides an annual prize to be awarded to the student with the highest standing in Commercial Law.

Goldberg Thompson Prize in Business Taxation

This prize is offered to honour the student who has achieved the highest mark in Business Taxation.

The H. Carl Goldenberg, QC, Prize

An annual prize of \$100 is given to the student with the highest standing in Public Law subjects designated by the faculty.

Donald A. Kerr Memorial Prize in Admiralty Law

The Eastern Admiralty Law Association sponsors an annual prize to be awarded to the student who has achieved high standing in the subject area of Maritime Law.

Stuart Clarke Lane Memorial Prize

The Class of 1940 established an endowment fund in memory of their classmate. In 1978 the fund was supplemented by a generous bequest from the Estate of Pauline H. Lane in memory of her son. This annual prize is awarded to the student who has achieved the highest mark in Administrative Law.

Professor Ronald St. John Macdonald Prize in Public International Law

An endowment was established by the distinguished former Dean of Law to provide an annual prize awarded to the student who attains the highest mark in Public International Law.

The McInnes Cooper & Robertson Prize

A prize of \$500 to be awarded to the student with the highest mark in the McInnes Cooper & Robertson Seminar in International Trade Law.

McMillan Binch Prize

The sum of \$500 is awarded to the student who attains the highest mark in Securities Regulation.

Osgoode Society Book Prize in Legal History

Awarded annually to a student having demonstrated superior ability in legal history through the writing of a major paper.

Oslar, Hoskin and Harcourt Prize

This prize of \$300 is sponsored annually by the Toronto firm of Oslar, Hoskin and Harcourt and is awarded to the student who achieves the highest mark in Creditors' and Debtors' Rights.

Oyen Wiggo Green Prize in Intellectual Property

(Copyright, Industrial Designs, Trade Secrets, Semi-Conductor Chip Protection and Technology Transfers) A prize of \$500 established by this Vancouver law firm, is awarded each year to the student receiving the highest mark in the Copyright class.

The Elkanah Rafuse Prize in Admiralty Law

An endowment was established in memory of the late Elkanah Rafuse of Halifax to provide an annual prize to the student who achieves the highest standing in Maritime Law and Practice.

The Horace E. Read Legislation Prize

The establishment of a fund in memory of the late Dean Horace Read provides an annual prize to the student who attains the highest mark in Legislation.

The Rosenblum/Dubinsky Prize in Family Law

A prize established in 1987 by Simon L. Gaum, QC, in honour of his uncle, C.M. Rosenblum, QC, on his 60th year of distinguished service to the bar, and his uncle, Mr. Justice J. Louis Dubinsky, for his contributions to the bench and bar; to be awarded annually to the student with the highest standing in the basic class in Family Law.

Professor Robert A. Samek Memorial Prize

The establishment of a memorial fund by family, relatives and friends of the late Professor Robert A. Samek makes possible a book prize for the student who achieves the highest mark in Legal Philosophy or General Jurisprudence.

Stikeman Elliott/Carswell National Tax Award

The large national and international law firm of Stikeman, Elliott has joined with Carswell, one of Canada's leading publishers of essential information services since 1864, to set up this prestigious award. It will recognize academic excellence by means of a \$1000 prize for the Dalhousie Law student in second or third year who achieves the highest mark in Taxation I.

W.A. Tomblin Memorial Prize

A prize awarded to the second or third year student with the highest mark in Bankruptcy.

3. Second Year Students

Canada Law Book Company Procedure Prize

A book prize is awarded to the student who achieves the highest mark in Civil Procedure.

Carswell Prize

The company sponsors a \$250 book prize to the student who makes the highest mark in the second-year examinations.

The Honourable Richard B. Hanson Prize

Established by Mrs. R.B. Hanson, this endowment provides for an annual prize to the student who achieves the highest mark in Constitutional Law. The prize is in memory of a distinguished graduate of Dalhousie, lawyer and public servant.

Ladner Downs Prize (Second Year)

The law firm of Ladner Downs, Vancouver awards a prize annually in the amount of \$500 to a student standing first in the second year at the Dalhousie Law School, among those students who are either residents of British Columbia or have obtained an undergraduate degree in British Columbia.

Mr. Justice Vincent C. MacDonald Prize

A prize will be awarded to the student who, in the opinion of faculty, has shown the most satisfactory progress during second year and who has attained at least second-class standing.

4. First or Second Year Students

The John V. O'Dea Prize

A prize of \$150 is to be awarded annually to a student who was admitted as a special status or a mature applicant. The prize is to be awarded after the student has completed either first or second year on the combined basis of good academic standing and contribution to the Dalhousie Law School.

5. First Year Students

Carswell Prize

The company sponsors a \$250 book prize to the student who achieves the highest average in first-year examinations.

CCH Canadian Limited Prize in Legal Research and Writing

The company sponsors an annual prize which is to be awarded to the student who achieves the highest mark in the legal research and writing programme.

The Class of 1958 Prize

An endowment fund, the gift of the Law Class of 1958, provides a prize which is to be awarded to the student who achieves the highest mark in Criminal Justice: The Individual and the State.

The G.O. Forsyth Essay Prize

A prize is to be awarded to the student who submits the best essay on a legal topic, provided that the essay meets an approved standard of excellence.

The W. Donald Goodfellow, QC, Prize

This Calgary lawyer, a graduate of the Law School, sponsors an annual prize of \$200 to be awarded to the student who achieves the second highest standing among those in the first-year class.

Ladner Downs Prize (First Year)

The law firm of Ladner Downs, Vancouver awards a prize annually in the amount of \$500 to a student standing first in the first year at the Dalhousie Law School, among those students who are either residents of British Columbia or have obtained an undergraduate degree in British Columbia.

The Lang, Michener, Lawrence & Shaw Prize

This Toronto law firm sponsors an annual prize of \$300 to be awarded to the student who achieves the highest mark in Judicial Rule-making and the Law of Contracts.

The Honourable Angus L. Macdonald Prize

This prize is awarded to the student who has attained the highest mark in the class Tort Law and Damage Compensation.

The Clyde W. Sperry Prize

A prize from the income of a fund established in memory of Clyde W. Sperry, a graduate of the Law School, is to be awarded to the student who has attained the highest mark in the class Property in its Historical Perspective.

C. Bursaries

This subsection should be read with reference to the general bursary portion of the Financial Aid section.

Mary Bailey Memorial Bursary

To be awarded annually to a third year female law student in financial need, who has demonstrated an interest in Family Law.

Blake, Cassels & Graydon Scholarship

The Toronto law firm of Blake, Cassels and Graydon sponsors an annual award for a student (or two students) among first-year applicants who has shown both academic proficiency and financial need.

Cape Breton Barristers' Society Scholarship

Beginning in 1965 the Cape Breton Barristers' Society instituted an annual scholarship which is to be awarded, at the discretion of the Dean, to a student (or two students) from Cape Breton County, on a combined basis of academic performance and need.

The Mary C. Cleyle Bursary

The family, friends, colleagues and classmates of the late Mary C. Cleyle, a graduate of the class of 1972, established in 1976 a bursary fund in her memory. The accrued annual interest of the fund is used as a bursary to assist students in their second or third year of studies who are in need of financial assistance.

The R.T. Donald Memorial Bursary

An endowment fund was established to provide bursaries (and a prize) in memory of the late Robert T. Donald, a former dean of the Law School. Bursaries are available to students in any year who have demonstrated financial need.

The George O. Forsyth Entrance Bursaries

Students who are academically sound and engaged in first-year studies at the Dalhousie Law School may be considered for financial assistance.

The Honourable Alistair Fraser Bursaries

A generous bequest from the Estate of the Honourable Alistair Fraser endowed a fund to provide annual bursaries. That income which is available for bursaries is to be expended on law students in any year of study who have demonstrated, in the opinion of the selecting body, financial need. Recipients shall also have a satisfactory level of academic standing as determined by that committee.

The Walter and Duncan Gordon Charitable Foundation Bursary

The Foundation provides an annual bursary which is available to IBM students who are in financial need and committed to public service. Preference will be given to those intending to act as legal advocates for the interests of the disadvantaged in society.

The Ellorient, Donald and Hugh Fraser Memorial Scholarship

The Fraser family has established a fund in memory of their parents, to provide an annual award to an undergraduate law student in any year of study who has been a resident anywhere in Yarmouth County for at least seven years prior to the receipt of the award. The recipient will be the student who, in the opinion of the Faculty, is the most capable student so resident in that county.

The John Wilfred Godfrey Scholarship [Bursary]

Established by Joan Godfrey MacKenzie in memory of her father, a former lecturer at Dalhousie Law School and member of the Nova Scotia Bar, to reward merit as well as assist need.

Reg Hamm Memorial Bursary

An endowment fund was established to provide an annual bursary in memory of Reginald Hamm, the warm-hearted and dedicated custodian of the Weldon Law Building. The bursary is open to students in any year who have demonstrated financial need.

Emelyn L. MacKenzie Bursary

The University was given a generous bequest under the Will of the late Emelyn L. MacKenzie to benefit students in Arts & Science, Dentistry and Law equally. Applicants are to be bona fide residents of Victoria County, Cape Breton (as defined by the boundaries then extant in AD 1900). Financial need and character are the main criteria.

The R. Graham Murray Bursary

In commemoration of their 25th anniversary the Law Class of 1954 established an endowment in honour of Professor R. Graham Murray, QC, a distinguished teacher in the Faculty of Law. A portion of the annual income is awarded as a prize to a deserving student and the remainder is allocated as financial assistance to students who have shown financial need.

The MacIntosh Bursary

The fund is established by A.J. MacIntosh in memory of his parents Mr. Ross MacIntosh and Mrs. Katherine MacIntosh. It is to be used to assist students who are experiencing financial difficulty. The principal criterion for any award shall be the needs of the student, rather than the achievement of academic excellence. Preference will be given to any candidate who has demonstrated a significant interest in public affairs.

Nova Scotia Barristers' Society Centennial Bursary

In honour of the Law School's hundredth birthday, the Barristers' Society has instituted the Nova Scotia Barristers' Society Centennial Bursaries, to be awarded to deserving students.

The Jack and Barbara Rafuse Bursary

This bursary fund was set up in 1977 by Jack and Barbara Rafuse of Halifax. The income of this fund is awarded annually by the Law School to a needy student, normally resident in the Province of Nova Scotia who has been accepted into the first year of the LLB programme. The bursary may be renewable, depending on the financial position of the holder of the award. Preference in awarding the bursary will be given to black students.

The George W.W. Ross Memorial Scholarship

This endowed scholarship, established in memory of the late George W.W. Ross by his family, is awarded annually by the Faculty of Law to a law student entering second or third year who has placed in the top third of his or her class and who, in the opinion of the Faculty, is deserving of financial assistance.

The Rod Shoveller Memorial Bursary

The bursary has been established by the Student Union of DalTech and is supported by students, alumni, family, friends and colleagues. Mr. Shoveller was the Athletic Director of DalTech from 1980 to 1991 and acted as counsellor, mentor, and friend to hundreds of students who came to know his compassion and understanding. The award of \$500 is made to a student who is maintaining an acceptable academic standard in the penultimate term of study in any faculty at DalTech. Award is made on the basis of participation in DalTech athletics, with an emphasis on intramurals and financial need. Selection is carried out by the Scholarships & Awards Committee of the Faculty of Engineering. Application deadline: September 30.

The Honourable G.I. Smith Memorial Trust Bursary (external)

The trust has established a bursary to perpetuate the memory of a distinguished Nova Scotian, the Honourable George Isaac Smith, QC, M.B.E., M.L.D., E.D., D.C.L., officer of the Order of Nassau (Netherlands), Premier of Nova Scotia, decorated military officer, and distinguished lawyer, who was known for his dedication to excellence in the legal profession.

The Gordon S. and Mary C. Walker Memorial Bursary

An endowment fund was established to provide financial assistance from the net annual income to one or more students. The fund is a gift from the Estates of Gordon S. and Mary C. Walker. The late Mr. Walker was the owner of Walker Financial Company, the last privately owned bank in Canada, situated in Port Hawkesbury, N.S.

The Grace Wambolt Scholarship

This award is open to native Nova Scotians to assist one or more to attend the first year of law at Dalhousie. The assessment criteria consist of academic performance and financial need. A winner may be reconsidered in subsequent years of the law programme. Where two students qualify equally and one is a woman, preference is to be given to the woman. The fund was established in 1978 by Grace Wambolt, the fifth woman to have graduated from the Faculty of Law at Dalhousie University. She was the first woman to have been elected to the Council of the Nova Scotia Barristers' Society and the first woman to be awarded a certificate for 50 years of active service at the Bar of Nova Scotia.

D. Research Assistantships in Law

Several research assistantships are under consideration or have recently been put in place to honour the memory of distinguished alumni of Dalhousie Law School.

W.J. MacInnes, QC, Research Assistantship

The family and friends of the late W. John MacInnes, QC have set up a fund to support a summer research assistantship for an LLB student with high academic standing who will be carrying out research for a member of the Law Faculty in the areas of either Corporate and Commercial Law or Media and Communications Law.

W. John MacInnes, QC, graduated from Dalhousie Law School in 1943, and was that year's Gold Medalist. He lectured at the Law School in the early 1960's, for which he was recognized by being appointed a Special Lecturer. He was a pre-eminent solicitor in Nova Scotia, practising mainly in the area of corporate and commercial law.

He was for many years a senior partner of the law firm MacInnes Wilson Flinn Wickwire.

George Tamaki, QC, Memorial Research Assistantship

The Toronto law firm of Stikeman, Elliott has set up a fund to honour the memory of George Tamaki, QC. The fund will support an annual research assistantship for a Dalhousie LLB student working under the supervision of a professor doing research in the area of taxation law. In selecting the student recipient, consideration will be given to academic merit and financial need.

George T. Tamaki, QC, graduated from the Dalhousie Law School in 1941. He was a partner with the firm Stikeman, Elliott in Toronto, where he practiced in the area of taxation law. In recognition of the high esteem with which Mr. Tamaki was held by members of the firm, and the taxation bar generally, this prize was endowed in his memory by Stikeman, Elliott.

John M. Barker, QC, Memorial Research Assistantship

The Halifax law firm of Cox Downie, in memory of John M. Barker, QC funds a summer research assistantship for a Dalhousie LLB student working in the area of civil legislation, civil procedure, insurance, or tort law, the preferred areas of practice of Mr. Barker. John M. Barker was a senior partner in the law firm of Cox Downie where he had practised since 1968. While at Dalhousie Law School, he held the Sir James Dunn Scholarship in Law for three years and graduated with the University Medal in Law in 1964. He was a Viscount Bennett Fellow in 1964. He graduated from the London School of Economics, with a Masters of Law in 1966, and was appointed a Queen's Council in 1983. He had a distinguished career in civil litigation, being one of only five active legal practitioners in Nova Scotia to be made a Fellow of the American College of Trial Lawyers, membership in which is limited to trial lawyers who are "unquestionably and eminently qualified". He was a member of the Council of the Nova Scotia Barristers' Society, a lecturer at Dalhousie Law School, and a member of the Federal Advisory Committee on Judicial Appointments.

IV. Faculty of Medicine

A. Scholarships

The Medical Admissions Committee is responsible for the selection of entering scholars. The prescribed application form is available from the Admissions Office, Room C-132, Clinical Research Centre. The Scholarships & Awards Committee is responsible for the selection of in-course scholars. No application is required.

B. Entrance Scholarships and Bursaries

A variety of scholarships and bursaries are offered to all students who have been offered a place in Medicine. There are varying residence requirements. While selection depends primarily upon scholastic ability, the Admissions Committee may go beyond this in making bursary awards. Applications should be returned no later than two weeks after receiving your acceptance letter, addressed to Dr. Margaret Casey, Director of Admissions, Faculty of Medicine, Room C-132, Lower Level, Clinical Research Centre, Halifax, Nova Scotia, B3H 4H7.

The awards are made as soon as possible, subject to the acceptance of the applicant by the University for admission to the first year of the medical course in the year of award, and her/his registration as a student at the regular date in August.

1. Scholarships/Bursaries Limited to or Preference Given to Residents of the Three Maritime Provinces

James A. Wardrope Entrance Scholarship

This scholarship is the income of an endowment given by the late Dr. M.J. Wardrope in memory of his son. The scholarship is to be awarded to a student of high standing entering the first year of Medicine at Dalhousie University. (Applications are made under the same regulations as for University Entrance Scholarships above, deleting the first paragraph.)

Etta and Frederick Ross Memorial Bursary

A fund has been established by Dr. James F. Ross in memory of his parents, the income of which is to be used to enable a deserving student to attend the Faculty of Medicine of Dalhousie University.

The Dr. A. Gaum Bursary

This bursary, in memory of Dr. A. Gaum of Sydney, Cape Breton is to be awarded to an entering medical student who has demonstrated financial need, with preference to be given to residents of Cape Breton.

Dr. J.J. Carroll Scholarships

In memory of Dr. J.J. Carroll, the earnings from the fund will be used annually to provide two entrance scholarships to students enrolled in the Faculty of Medicine at Dalhousie University. These scholarships will be renewable at the same rate for years two and three of study in the MD programme provided that the recipient(s) maintains satisfactory academic standing. Preference will be given to applicants who are residents of Eastern Nova Scotia.

Dr. D.A. Gillis Entrance Scholarship

This scholarship in honour of Dr. D.A. Gillis was established by Faculty members of the Department of Surgery, Dalhousie University. This award is to be given to a student from the Maritime Provinces on the basis of all-round excellence of the candidate, including both academic and non-academic factors.

Leslie Ann Campbell Entrance Scholarship

This memorial award in the amount of \$1000.00 will be given annually to a resident of Nova Scotia. The recipient will have demonstrated satisfactory academic standing and financial need. The award will be renewable for years two through four of the academic programme, provided the recipient maintains satisfactory academic standing and demonstrates continued financial need. While this award is being held on a continuing basis, it will not be available as an entrance scholarship.

Dr. John Quinlan Memorial Bursary

This fund has been established in memory of Dr. John J. Quinlan and is to be awarded to a student(s) from the Maritime Provinces entering Dalhousie University Medical School. The recipient(s) will

have demonstrated financial need and satisfactory academic standing. The recipient may retain the bursary in year two of the programme leading to the degree of Doctor of Medicine.

The Barbara L. Blauvelt Entrance Bursary

This bursary, in honour of Barbara L. Blauvelt, a forty-five year employee of Dalhousie, is to be awarded to a student from the Maritime Provinces in financial need. The award is to go to the student who is not in the top 25% of the applicants accepted into the programme.

Dalhousie University Entrance Scholarships

\$10,000 is available annually for disbursement by the Committee to deserving students.

2. Scholarships/Bursaries Open to All Entering Students

Etta and Frederick Ross Memorial Bursary

A fund has been established by Dr. James F. Ross in memory of his parents, the income of which is to be used to enable a deserving student to attend the Faculty of Medicine at Dalhousie University.

Dalhousie Medical Alumni Association Entrance Scholarship

This scholarship, established by the Dalhousie Medical Alumni Association, is to be awarded to an entering student on the basis of all-round excellence both academic and non-academic.

Dr. E. James Gordon Scholarship

This fund, in memory of Dr. E. James Gordon who graduated from Dalhousie in 1941, will be used annually to provide an entrance scholarship to a student enrolled in the Faculty of Medicine. The recipient will have demonstrated all-round excellence in both academic and non-academic factors.

Halifax Medical Society Entrance Scholarship

Through the generosity and support of the physicians in the Halifax Medical Society, an Entrance Scholarship was established to recognize academic excellence, extracurricular activities, leadership and personal qualities. Need will also be one of the elements that may be considered along with the qualities of excellence.

Dr. R.C. Robb Memorial Scholarship

This fund is to be used annually to provide a scholarship for a student entering the programme leading to the Doctor of Medicine degree. The recipient will have demonstrated high academic standing.

C. Medals, Prizes and In-Course Scholarships/Awards - Medicine; In-Course Scholarships

Dr. C.B. Stewart Gold Medal in Medicine

This medal is awarded annually, on graduation, to the student standing highest in the regular medical course who has reached the high standard set by the Faculty for that purpose.

MD with Distinction

This honour is awarded to students who have, on graduation, reached a high standard set by the Faculty for that purpose.

Dr. Clara Olding Prize

This prize, the interest of an endowment, given by the late Dr. A.M. Hebb, of Dartmouth, as a memorial to his wife, is awarded annually to the graduating student achieving the highest standing in the clinical years, character and previous scholarship being taken into consideration.

Dr. John F. Black Prize

This prize, from the income of a bequest by the late Dr. John B. Black, a former Professor of Surgery, is awarded at the completion of the fourth year to the student who reaches the highest standing in Surgery.

Andrew James Cowie, MD Memorial Medal

This medal, founded by the late Miss Florence J. Cowie in memory of her father, is awarded each year to the member of the fourth-year class having the highest standing in Obstetrics, provided his/her standing in other subjects is sufficiently high to justify an award.

The Dr. J. Donald Hatcher Award

Through funds donated in honour of Dr. J. Donald Hatcher on his retirement as Dean of the Faculty of Medicine, an endowment fund has been established to finance an annual award to the final year undergraduate medical student, who at graduation is considered to have carried out the most meritorious and significant research project during the undergraduate programme including summer electives.

Dr. Richard B. Goldbloom Award in Paediatrics

The award consisting of a medal and a cheque for \$300 is to be given annually to the graduating medical student "who shows the most outstanding combination and balance of scientific medical knowledge, clinical skill and sensitivity to the social and emotional needs of children and their families".

The Dr. Juan A. Embil Award for Excellence in Infectious Diseases Research

This prize is awarded to the graduating student who has completed the best research project in Infectious Diseases during his/her four years of medicine. The goal of the prize is to stimulate and encourage interest and excellence in Infectious diseases and Medical Research.

Dr. J.C. Wickwire Award

This award, established by Dr. J.C. Wickwire, is to be awarded to the graduating student who has displayed high competence in Patient Contact over the four year course.

Poulenc Prize

A prize, the interest on an endowment given by Poulenc Limited, will be awarded to the student standing highest in the final examination in Psychiatry in the fourth year.

Dr. Robert C. Dickson Prize

A prize is awarded to the student at the completion of fourth year who has had the highest standing in all examinations in Medicine in Second, Third and Fourth Years.

Dr. John W. Merritt Prize

A prize presented by Mrs. Merritt in memory of her husband, Dr. John W. Merritt, Associate Professor of Surgery. This prize is offered to the student standing highest in Surgery throughout the four years in medicine.

The Dr. R.O. Jones Prize in Psychiatry

This prize in memory of Dr. R.O. Jones is to be awarded to the new graduate who has achieved the highest grade in Psychiatry for the four years in medical school.

Dr. Frederick S. Goodins Scholarship

A scholarship established by the Carleton Memorial Hospital, Woodstock, N.B. is to be awarded annually to a fourth-year medical student from New Brunswick, who has shown outstanding interest or proficiency in family medicine during the clerkship year.

Dr. Leo Horowitz Prize in Diagnostic Radiology

A prize, established by Dr. Leo Horowitz, is to be presented at graduation to the fourth year student judged by the Department of Radiology, to have shown the greatest interest and greatest degree of inclination towards the study of Radiology.

Dr. W.H. Hattie Prize in Medicine

A prize initiated anonymously by the late Dr. Hattie when he was Assistant Dean, and perpetuated in his memory by Dr. Carl K. Pearlman of California, who was a recipient of the award in 1937, will be awarded at the completion of fourth year to the student who achieves the highest standing in Medicine.

Dr. Frank G. Mack Prize in Urology

An annual prize presented in memory of the late Frank G. Mack, Professor of Urology (1922-1950). The prize is to be awarded by the Department of Urology to the fourth-year student achieving excellence in Urology.

Dr. Lawrence Max Green Memorial Award

This award to be presented to the student who, during his/her clerkship in obstetrics and gynecology, has best displayed the characteristics of compassion and clinical competence. Selection of this student is the responsibility of the Department of Obstetrics and Gynecology.

Dr. S.G. Burke Fullerton Award

An award provided by the Nova Scotia Chapter of CFPC to the student who shows the greatest promise in Family Medicine in fourth year.

Dr. Harold Ross McKean Award in Ophthalmology

This prize, in memory of Dr. Harold Ross McKean, is to be awarded annually to a fourth year medical student (preferably from Nova Scotia), who has demonstrated the highest skills in Ophthalmology in the third year course.

D. University Prizes

William Isaac MacDougall Scholarship Fund

Under the will of the late Andrena Frances MacDougall, a fund was set up to provide "scholarships in the Medical School of the University." Further particulars of the terms and conditions of this award may be obtained from the Dean.

Charles E. Frosst Scholarship

The award of \$1000, contributed by Charles E. Frosst and Company of Montreal, is awarded annually at the completion of the third year to a student entering the fourth year who has shown general proficiency throughout the course.

Dr. Joan Crosby Scholarship

A scholarship of \$2,000 has been established by a group of parents in honour of Dr. Joan Crosby for her exceptional dedication to the care of children. It is awarded to two deserving medical students in the third year of study.

Dr. James S. Hammerling Prize in Otolaryngology

A prize to honour Dr. James S. Hammerling on his 80th birthday to be awarded to the student who has attained the highest standing in the otolaryngology clerkship.

The Dr. Harry Poulos Prize

This prize is to be awarded to the second year student in the Faculty of Medicine who has the highest standing in Psychiatry.

J. Randolph Murchison Memorial Scholarship

A scholarship donated in memory of the late J. Randolph Murchison of Prince Edward Island is to be given to a needy medical student from Prince Edward Island.

The Dr. Walter Templeman Bursary

The income from this endowment is to be awarded to a needy medical student.

Harold Barnett Prize

This prize is to be awarded annually to the student who has attained the highest standing in Respiratory Physiology.

Arthur F. Icton Memorial Scholarship

This scholarship, in memory of Arthur F. Icton, is to be awarded to a student in the Faculty of Medicine who is competing in the athletic programme at the varsity level. The scholarship will be renewed for a subsequent year should the recipient continue to qualify under its terms.

Dr. Mabel E. Goudge Prize

The prize, established by the late Dr. Mabel E. Goudge, is to be awarded to the top female medical student in fourth year.

Bristol Laboratories Prize

Bristol Laboratories of Canada has made available to a third year student an annual prize for the purchase of books. Both need and academic performance are to be considered in the award. The fields of therapy and pharmacology are to be covered in the selection of the books.

Department of Surgery Prize

A prize is awarded to the student in the third year with the highest standing in the final examination in Surgery.

Dr. Carl K. Pearlman Prize in Urology

An annual award presented to the student in the fourth year judged by the Department of Urology as having the greatest aptitude and interest in Urology.

Merck, Sharp and Dohme Award

An award of \$1000 is awarded annually to the medical student in the clinical years judged most promising in the field of therapeutics.

Morris and Sarah Gold Award

This award is to be presented to an undergraduate medical student who most distinguishes himself in the field of medical literature.

The L.B. MacPherson Memorial Award

This prize in Medical Biochemistry is awarded to an undergraduate medical student who has shown the greatest competency in the Biochemistry component of the undergraduate medical curriculum.

The Annie Hamilton Scholarship

In honour of the first female graduate in medicine and Master of Surgery in Nova Scotia (MD 1894), this fund provides an annual scholarship to a second year medical student.

Dr. J.V. Graham Prize

A prize, the income of a bequest by the late Dr. J.V. Graham, will be awarded to a student at the end of the second year who has attained high standing in the first and second year Anatomy course.

Professor John Cameron Prize in Anatomy

This prize is the interest on an endowment given by the late Dr. John Cameron, former Professor of Anatomy. It is awarded to the student who attains the highest marks in Anatomy.

Roberta Bond Nichols Memorial Prize

This prize represents the interest in a fund initiated by the Nova Scotia Branch of the Federation of Medical Women of Canada as a memorial to Dr. Roberta Bond Nichols, and is awarded annually to the female medical student who achieved the highest standing in Anatomy.

Dr. Graham Gwyn Memorial Prize in Neurology

This prize, in memory of Dr. Graham Gwyn, a distinguished Professor, and Head of the Department of Anatomy, is to be awarded to the student in fourth year who expresses interest and achieves excellence in neurology. The recipient must be recommended by the clinicians involved in teaching and supervising said student.

Upjohn Company Award

An award presented by Upjohn Company of Canada, to be presented to the student in Second Year Medicine who has attained the highest standing in Infectious Diseases.

Lange Book Awards

Lange Medical Publications offers book awards to one outstanding student in either first, second or third year and one to a graduating student.

Dalhousie Medical Students' Society Prize

Four prizes of books are awarded annually to students of the second, and fourth years in Medicine upon application to the Dalhousie Medical Students' Society. Financial need, academic standing, and activity in student affairs are considered.

The Dr. I.Roy Gold Endowment for Medical Journalism

Established by Mrs. Babs Gold, widow of the late Dr. I. Roy Gold, MD 1938, this fund provides an annual stipend to the student who serves as Editor of the Dalhousie Medical Journal. Dr. Gold was the founder and first editor of the journal, established in 1936.

The Max Forman Research Prize

This prize awarded by the Dalhousie Medical Research Foundation recognizes excellence in medical research with the aim of promoting and encouraging its pursuit in the Faculty of Medicine, Dalhousie University. The Max Forman Research Fund honours the memory of Mr. Forman, a successful Halifax businessman and philanthropist

who cared about the community in which he lived. The Max Forman (Junior) Prize, awarded every other year, is open to all junior investigators including graduate and PhD students, residents and fellows. For further information, visit the Foundation's website at www.dmr.org or contact the office at 494-3502, Room 22, 15th floor Tupper Building.

E. Bursaries

It is necessary to apply for these awards. Information may be obtained at the Office of the Dean of Medicine or at the Awards Office, Arts and Administration Building. Please refer also to the general financial section of this calendar.

The IODE John Stewart Chapter Bursary

A bursary awarded to a Nova Scotia student who at the completion of the second year shows proper academic standing and need of financial assistance.

The A.B. Wiswell Scholarship

This scholarship, established by the late Dr. A.B. Wiswell of Halifax, is to be awarded to a student completing the first year of the regular medical course. Character and financial need are to be considered, but the standing of the candidate in his class is the primary consideration.

Dr. and Mrs. Edward Murray MacDonald Bursary

This bursary, in memory of Dr. and Mrs. Edward Murray MacDonald, is awarded to a first-year medical student who is a resident of Cape Breton. The student must demonstrate to the satisfaction of the Scholarships and Awards Committee of the Faculty of Medicine, financial need.

The Dr. Hector J. Pothier Bursary

A bursary donated in memory of the late Dr. Hector J. Pothier of Beaver River, Nova Scotia, is to be given to a needy student in medicine who has expressed an interest in spending time as a family physician in a rural community.

The Charles J.W. Hinman Memorial Bursary

A bursary which was established to assist an undergraduate medical student of any year in the Faculty of Medicine who demonstrates satisfactory academic progress and who provides to the Faculty clear evidence of the need for financial assistance.

The Dr. Elizabeth Catherine Weld Memorial Bursaries

A bursary or bursaries of approximately \$1000 to be awarded each year to medical students of any year with preference to be given, but not restricted to, minorities and those in need.

Order of the Eastern Star, Halifax Chapter 7 - Medical Student Bursary

A bursary to be awarded to a needy medical student.

Marion E. and Frank A. Seaman Bursary

This bursary, in memory of the late Marion E. and Frank A. Seaman, is to be awarded to a student who has completed the first year of medicine. The primary considerations are to be need and scholastic standing.

C.T. Gillespie Bursary Fund

This bursary, in honour of Dr. C.T. Gillespie, will provide financial assistance to a medical student who is enrolled in the first year of the programme leading to the degree of Doctor of Medicine.

The A.R. Merle Smith Bursary

A bursary or bursaries to be presented to a student(s) who has or have graduated from Bathurst High School who, having completed the first year in the Faculty of Medicine, is or are enrolled on a full-time basis in the second or a subsequent year in the faculty.

Dr. R.M. Pendrigh Scholarship

The income from an endowment to be awarded to the student from New Brunswick who, in the opinion of the University, has demonstrated need and merit with preference given to students who reside in West Saint John, New Brunswick.

Georgina M. Odell Bursary Award

This award, in memory of Georgina M. Odell, is to be awarded to a needy medical student(s) by the Financial Aid Committee/Awards Committee of the Faculty of Medicine. In the event that all the income is not disbursed in any one year, the same may be accumulated that year or from year to year to be paid out as bursaries in subsequent years if required for that period.

The MD Class of 1971 Memorial Bursary Fund

Established in memory of deceased classmates, this fund provides an annual bursary to a medical student in good standing who demonstrates financial need.

F. Financial Aid

The John George and Emily MacDougall Bursaries

Under the terms of the will of the late Doctor John George MacDougall, formerly a senior surgeon of the Faculty of Medicine and at the Victoria General Hospital, a perpetual trust fund was established, the income from which is to be used for "such deserving persons who being... undergraduates of the Medical School of Dalhousie are...most entitled to assistance on the grounds of worth and necessity."

The R.S. Smith Medical Scholarships

By Deed of Gift and subsequent generous bequests, Dr. James Ross Smith and his wife, Eliza Cochran Smith, established an endowment as a memorial to their son, Ross Stewart Smith. A portion of the Fund's annual income is to be expended in the form of general scholarships to students in the MD programme upon such conditions as the Faculty of Medicine, from time to time, may prescribe.

Dr. Annie Anderson Gilchrist Dickson Bursary Fund

This bursary is in memory of Dr. Annie A.G. Dickson, a graduate of Dalhousie University who was prominent in public health work. It is to be awarded annually to a third year female medical student at Dalhousie University who has demonstrated financial need. If, in any given year, there are no female applicants the bursary may be awarded to a third year male medical student.

Faculty of Medicine Loan Funds

Any medical student in financial need may apply for loan assistance, but ordinarily preferred consideration is given to students in the Second, Third, and Fourth Years. Forms are available in the Office of the Dean of Medicine. A loan made becomes due on May 31st of the graduating year and bears interest from that date until paid. Since the amount available in each year to loan to medical students is dependent on what is annually returned to the Fund, students are earnestly requested to plan to make the repayment of these loans their first financial priority after graduation, in order that other students may have the use of the funds. The capital of the Loan Fund, as well as coming from University sources, has been substantially built up through the generosity of the W.K. Kellogg Foundation and The Pfizer Canada Division of the Pfizer Corporation. Additional sums were made available in the Dr. J.V. Graham Memorial Loan Fund, established by the family of the late Dr. J.V. Graham for a student in First or any subsequent year; the Malcolm B. Dockerty, MD Loan Fund, preferably given to a student in Fourth Year who is a native of Prince Edward Island; and the Dr. S. Barton Sklar Loan Fund, established by Carl Wellish (MD Dalhousie, 1963) for "qualified medical students of limited financial resources."

G. Loan Funds

Maude Abbott Memorial Scholarship Loan Fund

Information regarding these loans, to female medical students, may be obtained from: The Secretariat, Federation of Medical Women of Canada, CMA House, 1867 Alta Vista Drive, P.O. Box 9502, Ottawa, Ontario, K1G 3U2

H. Postgraduate Medical Prizes and Fellowships

The Ross Stewart Smith Memorial Fellowship in Medical Research

This fellowship, being a portion of the income from a generous bequest to Dalhousie University, was established by Dr. James Ross Smith and his wife, the late Mrs. Eliza Cochran Smith, as a memorial

to their son, Ross Stewart Smith, who died while attending Dalhousie. It is open to students of exceptional ability following graduation from the Faculty of Medicine at Dalhousie. The research may be in clinical medicine or in the basic medical sciences. Application should be made to the Dean of Medicine.

Killam Postgraduate Medical Scholarships

These scholarships were established by the late Mrs. Izaak Walton Killam. They are awarded to postgraduate students in the third, fourth, or fifth year of training in a clinical department of the Faculty of Medicine at Dalhousie or elsewhere. Selection by the Faculty Awards Committee is based on the recommendation of the department head that the candidate is likely to contribute to the advancement of learning or to win distinction in his/her specialty and could be recommended for appointment to the faculty of a medical school on completion of the person's training.

Dalhousie Medical Research Foundation - Fellowship Programme

Medical graduates and graduates of recognized PhD programmes are welcome to apply to Dalhousie Medical Research Foundation fellowship competitions. The purpose of the DMRF Fellowship Programme is to enable medically qualified individuals or doctoral graduates to undertake training at Dalhousie in basic or clinical science. Fellowship support is available for periods of one to three years.

To obtain a DMRF competition schedule and terms of reference for the DMRF Fellowship Programme, visit our website at: www.dmrff.org or contact the office at 494-3502 Room 22, 15th floor Tupper Building.

I. Research Fellowships

Foundation Fellows

These fellowships are available to medical graduates or graduates of recognized PhD programmes to undertake postgraduate training at Dalhousie in basic and clinical science for a period of two to three years. Support will also be extended to postdoctoral fellows already at Dalhousie when such support would advance research in the Faculty of Medicine and the research programmes of a faculty member. Preference will be given to candidates who have potential to contribute to academic medicine in the Maritime provinces of Canada. The level of support will be determined by the number of years of training following graduation based on MRC scales for fellowships (for PhD's) or on resident scales of pay for MD's. Deadline for receipt of applications is 1 May and 1 October or as funds and circumstances permit.

V. Faculty of Graduate Studies Scholarships and Fellowships

A. General Disciplines

1. Dalhousie Graduate Scholarships

Each department has a limited number of scholarships for students pursuing a degree programme on a full-time basis. Scholarships are not offered to anyone on leave from a job with salary continuation. In order to be eligible for a Dalhousie Graduate Scholarship, a student is expected to hold at least the equivalent of a Dalhousie honours degree in an appropriate field of study. Those wishing to be considered for scholarship assistance are strongly advised to submit their completed applications by January 31, and no later than March 1. Maximum eligibility for scholarships is two Master's years and the first four Doctoral years, but some departments may have shorter maxima.

In general, the Dalhousie Graduate Scholarship will be paid to the student in regular monthly payments on the 27th of each month, after University fees have been deducted. Cheques are available from the students' department upon presentation of a current valid Dalhousie Student identification card. Where warranted, with permission of the Dean of Graduate Studies, a student may receive scholarship funding for a maximum of 12 months while pursuing research off-campus.

Applicants for graduate scholarships should write to the graduate coordinator of the department concerned in addition to making their official application to the Registrar.

Very well qualified scholars who receive awards from federal agencies may also receive Dalhousie supplements within the limits set down by the agencies offering the awards.

The Izaak Walton Killam Memorial Scholarships

Shortly before her death, Mrs. Dorothy J. Killam set aside a substantial portion of her estate for the purpose of founding the Izaak Walton Killam Fund for Advanced Studies at Dalhousie University.

Her purpose in so doing was not only to establish a perpetual memorial in his native province to her late husband, Izaak Walton Killam, industrialist and financier, but also "to help in the building of Canada's future by encouraging advanced study." It was her hope that she might thereby in some measure "develop and expand the work of Canadian Universities, and promote sympathetic understanding between Canadians and the people of other countries." It is in accordance with Mrs. Killam's wishes that Dalhousie University offers the Izaak Walton Killam Memorial Scholarships.

Killam scholars are selected on the basis of nominations made by departments. It is expected that nominees will also have applied for funding from relevant national or international agencies. Canadian students are eligible for nomination for the Killam Scholarships only if they have applied for the relevant national scholarship (NSERC, SSHRC, MRC, etc.).

Only those students registered in a programme with a thesis requirement are eligible to hold the Izaak Walton Killam Memorial Scholarship.

Scholarships may be renewed annually upon evidence of satisfactory completion of work leading toward the Master's or Doctoral degree, subject to the following maxima: Masters students may hold a Killam Scholarship for 12 months and PhD students for up to 36 months. The scholarships are valued at \$16,000 (1998-99) for a Master's programme and \$19,500 (1998-99) for a Doctoral programme. No remission of fees accompanies the scholarships, but additional funds to assist with transportation to Halifax will be supplied. Killam scholars may perform instructing or demonstrating duties, and, if they do, will be given additional remuneration for these services.

Killam scholarships are open to both Canadians and non-Canadians. PLEASE NOTE: Candidates do not apply for these Scholarships. On the basis of the information in a completed application for admission the graduate department concerned may nominate the student to the selection committee.

The Izaak Walton Killam Postdoctoral Fellowships

Killam funds also provide for postdoctoral fellowships in most fields of study. The annual stipend is \$33,000 (1998-99) plus travel and research grants. There are no restrictions regarding nationality of applicants, but non-Canadian candidates must meet all Canadian Immigration requirements. Qualifying applicants should have recently completed a PhD degree at a recognised university and should not hold a permanent academic position to which they will return. Since these Fellowships are intended to attract new scholars to Dalhousie, scholars already at Dalhousie and DalTech are not eligible to apply, including Dalhousie and DalTech PhDs, Dalhousie, DalTech or King's employees, and researchers using Dalhousie, DalTech or King's facilities. These awards may be taken up between July 1st and January 15th but preferably in September or October. Fellows may engage in limited teaching duties in the University. A graduate seeking a Killam Memorial Postdoctoral Fellowship must contact the appropriate Dalhousie department and indicate the scholar or researcher with whom she/he wishes to work or be associated by October 15, enclosing a c.v. and a brief description of the proposed research. Prospective applicants with suitable research proposals will be invited to apply on forms mailed to them, which should be returned to the Dean of Graduate Studies no later than December 15. Supporting documents should be returned to the Department, no later than December 15. The results of the competition are usually announced in mid-February, and all applicants are notified of the results.

Eliza Ritchie Doctoral Scholarship for Women

The Eliza Ritchie Doctoral Scholarship was established to commemorate Women's Centennial Year (1985) and to recognise the contribution to Dalhousie of one of its most important nineteenth-century graduates. After completing her undergraduate studies at Dalhousie in 1887, Eliza Ritchie (1856-1933) became one of the first Canadian women to receive a PhD degree (Cornell University, 1889). She cut short her professional career at Wellesley College to return to Halifax in 1899, where she devoted her energies to feminist and cultural causes, and to Dalhousie, for the rest of her life. She was the first warden of a Dalhousie women's residence (Forrest Hall, 1912-13), the first woman to serve as a member of the Dalhousie Board of Governors (1919-25), a founding member of the editorial board of the *Dalhousie Review*, and the first woman to receive an honorary degree from Dalhousie (LL.D, 1927). Scholarships will be awarded to Canadians and permanent residents only and preference will be given to candidates from the Atlantic Provinces. Among such applicants preference will be given to those in disciplines in which women are underrepresented. The award will have a value of \$18,000 (1998-99) for a 12-month academic period at Dalhousie. One scholarship may be awarded each year. The deadline for receipt of the prescribed applications is 15th March. Additional information and application forms are available from the Faculty of Graduate Studies, Dalhousie University.

James Robinson Johnston Graduate Scholarship for African Canadians

The James Robinson Johnston Graduate Scholarship is supported by the Endowment for the James Robinson Johnston Chair in Black Canadian Studies at Dalhousie as part of the commitment of the Johnston endowment and the university to support the development of Black Canadian scholars in graduate studies and the professions. James R. Johnston was Dalhousie's first black graduate in the Law Faculty in 1898 and was a major figure in the legal profession and the Black community throughout his short life. Today young African Canadians can be found pursuing studies in the arts, sciences, health professions and management as well as the traditional professions of law, dentistry and medicine. This scholarship is intended to provide an opportunity for promising African Canadian students to pursue their work at the graduate level.

To be eligible, applicants must have been accepted by the application deadline into a programme of study in any discipline in which Dalhousie offers a graduate degree. Successful applicants are normally expected to have attained high standing in an honours programme.

Successful candidates for an initial award and for renewals will be identified by the Faculty of Graduate Studies Scholarship Committee. The general rules for Dalhousie Graduate Scholarships will be applied except that, in the case of this scholarship, the award must be taken up initially in the first year of the degree program.

The master's-level scholarship is currently valued at \$11,200 for one twelve-month academic year of full-time study. The doctoral level scholarship is valued at \$13,700 for a twelve-month academic year of full-time study and may be renewed, subject to an annual progress review (first-class standing required) by the Faculty of Graduate Studies Scholarship Committee, for a total of 36 months of full-time study, including initial award. Fees are not waived and must be paid out of the award. The deadline for receipt of the prescribed applications is April 30. Additional information and application forms are available from the Faculty of Graduate Studies, Dalhousie University.

B. Specific Disciplines

1. Architecture

a) Programme Awards

Connor Architects and Planners/CBCL Limited Scholarship

Field of Study: Architecture

Eligibility: Registration in the initial year of the MArch (First Professional) programme.

Number and Value: One; \$1,000.

Tenure: One year.

Basis of Award: The scholarship is awarded primarily on the basis of the applicant's academic record. Other factors, such as personality, initiative, community involvement, and other awards held by the applicant, may also weigh in the decision.

Donor or Awarding Agency: CBCL Limited, Consulting Engineers, and Connor Preston, Architects.

Selection: Faculty of Architecture.

Application: Application not required.

Jonathan Hart Memorial Fund

This fund was established in memory of Jonathan Hart, MArch '96, by Mr. Justice Gordon Hart and Mrs. Catherine Hart, following Jonathan's request to support architecture in the community. Proceeds from this fund is used periodically to bring architectural work to the public, and to encourage young architects and businesses to work together on projects for the betterment of the community. Selection is made by the Faculty of Architecture.

Nova Scotia Association of Architects Scholarship

Field of Study: Architecture.

Eligibility: A student entering the final year of the MArch (First Professional) programme who is a native of Nova Scotia or has had his/her permanent residence in Nova Scotia for some years, and who plans to enter the architectural profession upon graduation.

Number and Value: One, \$1,000 (subject to annual review).

Basis of Award: Record of academic excellence.

Donor or Awarding Agency: Nova Scotia Association of Architects.

Selection: Faculty of Architecture.

Application: Application not required.

The William Nycum & Associates Limited Scholarship

Field of Study: Architecture

Eligibility: A student who has successfully completed the first term of the MArch (First Professional) programme.

Number and Value: One, \$1,000.

Tenure: One year.

Basis of Award: This scholarship is awarded to the student who most strongly demonstrates creative thinking and a passion for architecture. The scholarship is given to assist the recipient's studies. Candidates are requested to submit a one-page application demonstrating commitment to architecture.

Donor or Awarding Agency: William Nycum & Associates Limited.

Selection: Faculty of Architecture.

Application: Apply to Dean, Faculty of Architecture.

Application Deadline: December 1.

Bruce and Dorothy Rosetti Scholarships

Field of Study: Architecture.

Eligibility: One or more students in the first year of the MArch (First Professional) programme with a consistently high record of performance in the programme at DalTech.

Number and Value: Up to six per year, up to \$3,500 each (subject to annual review).

Basis of Award: To assist students in carrying out supervised research.

Donor or Awarding Agency: Estate of Bruce and Dorothy Rosetti.

Selection: Faculty of Architecture.

Application: Apply to Dean, Faculty of Architecture.

Application Deadline: Third Friday in November.

The Ernest Wilby Memorial Scholarship

Field of Study: Architecture.

Eligibility: A student entering the penultimate year receives this award. The award is given annually, commencing with the most easterly school in Canada and continuing each year to the most westerly, then repeating. (The scholarship was last awarded to a DalTech student in 1994, and is expected to be awarded again in 2004.)

Number and Value: One, \$1,000.

Basis of Award: Financial need, as well as definite promise and talent.

Donor or Awarding Agency: The Royal Architectural Institute of Canada, on behalf of the Wilby Foundation.

Selection: Faculty of Architecture.

Application: Application not required.

b) Architecture or Urban and Rural Planning

The Henry Adams Medal and The Henry Adams Certificate

Field of Study: Architecture.

Eligibility: Students graduating from the MArch (First Professional) programme.

Number and Value: One medal with a certificate, and one certificate of merit.

Basis of Award: Top-ranking students who have achieved general excellence throughout the four years of the professional programme.

Donor or Awarding Agency: American Institute of Architects, Washington, DC.

Selection: Faculty of Architecture.

Application: Application not required.

Adjeleian Award in the Aesthetics of Structures

Field of Study: Architecture or Structural Engineering.

Eligibility: A graduating student in either the MArch (First Professional) programme or the Civil Engineering degree programme. The award alternates between Architecture and Civil Engineering. (It will be made to Architecture next in 2001.)

Number and Value: One, \$1,000 (subject to annual review).

Tenure: One year.

Basis of Award: The award will be granted to the graduating student who demonstrates in a project both aesthetic principles in buildings and bridges, and unified roots of Architectural and Structural Engineering.

Donor or Awarding Agency: Dr. John Adjeleian.

Selection: Scholarships and Awards Committee of the Faculty of Engineering, on the recommendation of one Professor of Structural Engineering, one Professor of Architecture, one Consulting Structural Engineer, and one Consulting Architect.

Application: For Architecture, an application is not required.

The Alpha Rho Chi Medal

Alpha Rho Chi, National Social-Professional Fraternity of Architecture, awards the Alpha Rho Chi Medal to a graduating senior of the School of Architecture who has shown an ability for leadership, performed willing service for the School, and gives promise of real professional merit through attitude and personality.

The Alumni Memorial Award

This award, which was initiated in 1984 in the memory of Mr. Michael Kravosky, B.Arch. '83, is awarded each year to a graduating student elected by the graduating class for outstanding service to the school in student activities and affairs. The award is made from the proceeds of the Architecture Alumni Memorial Fund, and is subject to annual review.

Atlantic Planners Institute Student Award

Value: A trophy or plaque engraved with the recipient's name supplemented by a cash award of no more than \$500 per annum.

Tenure: Awarded annually.

Eligibility: The award will be available to full-time students attending a planning school accredited by the Canadian Institute of Planners in the Atlantic Provinces. The recipient must be in his/her graduating year. The award will be based on merit in terms of the academic achievement and contribution to planning in the community.

Field of Study: Urban and Rural Planning.

Selection: Each eligible planning school should submit a recommendation for one of their students, whom they believe is most deserving of the award, to the Atlantic Planners Institute.

Donor or Awarding Agency: Atlantic Planners Institute.

Submission Deadline: April 15, unless otherwise determined by API Council.

Canadian Institute of Planners Student Scholarship

Value: A certificate bearing the CIP seal and a book prize.

Basis: The award is made on the basis of academic excellence.

Eligibility: The award will be available to a full-time student member of the Canadian Institute of Planners who has achieved the highest academic standing over the length of the MURP program.

Field of Study: Urban and Rural Planning.

Selection: Award is given on the recommendation of the department of Urban and Rural Planning to a graduating student.

Canadian Institute of Planners Student Scholarship

Value: \$2,000.

Basis: Will be awarded annually in recognition of a thesis, practicum, or major research paper which may be proposed or in progress.

Eligibility: An individual or team may apply. Applicant or team leader must be a student member in good standing with the CIP and must be enrolled full-time in a recognized planning program.

Field of Study: Planning.

Selection: Submission will be judged on the basis of its potential contribution to the planning profession (in theory or practice) or its potential service to a community or a community group.

Apply to: Application forms may be obtained from the Department of Urban and Rural Planning and must be received in the CIP national office by the date specified on the application form.

Mobil Oil Canada Scholarship: Impact and Design Studies

Field of Study: Architecture or Planning.

Eligibility: Students registered in a Master's programme of the Faculty of Architecture who are undertaking studies pertaining to the physical, social, economic or administrative impacts of energy-related developments.

Number and Value: One or more, at the discretion of the Scholarship Committee, not exceeding \$5,000 in total value per year (subject to annual review).

Tenure: One year.

Basis of award: Written application and detailed outline of the proposed study.

Donor or Awarding Agency: Mobil Oil Canada Ltd.

Selection: Faculty of Architecture.

Application: Apply to Dean, Faculty of Architecture.

Application Deadline: Last Friday in June.

The Nova Scotia Association of Architects Prize

The Nova Scotia Association of Architects gives a prize to a student who, in the final year of the MArch (First Prof.) program, displays an outstanding awareness of the architect's responsibility to society by demonstration in his/her scholarly and design work.

Bruce and Dorothy Rosetti Scholarships

Field of Study: Architecture or Planning.

Eligibility: Students registered in the Master of Urban and Rural Planning programme or the Master of Architecture (Post-Professional) programme.

Number and Value: One or more, \$6,000 total (subject to annual review).

Basis of Award: To assist students in carrying out their programmes of study. Awards will be given on the basis of academic excellence.

Donor or Awarding Agency: Estate of Bruce and Dorothy Rosetti.

Selection: Faculty of Architecture.

Application: Apply to Dean, Faculty of Architecture.

Application Deadline: January 15.

The Royal Architectural Institute of Canada Honour Roll

The Royal Architecture Institute of Canada awards a certificate to the top ten percent of graduating students in each School of Architecture in Canada.

The Royal Architectural Institute of Canada Medal

The Royal Architectural Institute of Canada offers the RAIC Student Medal annually to a graduating student in each School of Architecture in Canada who, in the judgement of the faculty of the respective School, has completed the outstanding final design/thesis for that academic year.

School of Architecture Thesis Prize

The School of Architecture awards a book prize to one or more students who have completed an outstanding design thesis in the M.Arch. (First Prof.) program.

Walter Gardner Stanfield Scholarships

Field of Study: Architecture or Planning.

Eligibility: Students entering the first term of a graduate programme in the Faculty of Architecture.

Number and Value: One or more, \$2,000 total.

Basis of Award: Applicants will be expected to have demonstrated, in the quality of work submitted in support of their application, both academic excellence and outstanding preparedness for the programme to be undertaken in the Faculty.

Donor or Awarding Agency: Estate of Walter Gardner Stanfield.

Selection: Faculty of Architecture. Selection will be made by the appropriate admissions committee. All applications for graduate study received by the first day of the summer term prior to entering the programme will be considered automatically, and recipients will be notified two weeks later.

Application: Application not required.

2. Business Administration

Goldberg-Schulich Award for Entrepreneurship

The Nevada Capital Corporation in 1984 donated the sum of \$29,000 to establish an award in memory of Meyer Goldberg of Halifax, NS. This award is available to a student entering the second year of Dalhousie University's MBA programme. Deadline for receipt of application is March 15th.

The Department of External Affairs Fellowships in International Business

Fellowships of \$4,000 per annum are awarded to full-time second-year students specializing in the field of International Business. Candidates must be Canadian citizens or permanent residents, and have a strong academic record. Fellowship recipients will be selected on the basis of a career interest in international business and academic performance to date. For further information contact the Centre for International Business Studies, School of Business Administration.

3. Computer Science

Bruce and Dorothy Rosetti Engineering Research Scholarships

Number and Value: Varies / up to \$6,000 (Subject to annual review).

Tenure: One year, may be renewed subject to satisfactory progress.

Basis of Award: The Scholarship is awarded on the basis of the student's academic achievement and on letters of reference. Normally a foreign student is not eligible for this scholarship during the first year of graduate study at the University. In the awarding of this Scholarship the level of other financial support for each applicant will be considered in order to ensure the broadest distribution of scholarship funds.

Eligibility: Accepted in a recognized graduate programme in the Faculty of Engineering or Computer Science.

Field of Study: Engineering, Computer Science, Food Science.

Selection: Selection will be carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: Bruce and Dorothy Rosetti Bequest.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

4. Chemistry

Douglas E. Ryan Prize for Excellence Graduate Studies in Chemistry

This prize honours the contributions made by Professor Douglas Ryan to Dalhousie University and to analytical chemistry.

The prize winners receive \$1000 supplement to their stipend for one year. It is awarded on the basis of merit for work carried out in the graduate programme in Chemistry at Dalhousie University, including class work, research, the preliminary oral examination and demonstrating duties.

Kenneth T. Leffek Prize for the Best PhD Thesis in Chemistry

This prize was established in recognition of Professor Leffek's contribution to Dalhousie University and to the profession of chemistry in Canada. One award is made in the Fall each year.

Anna Wilson Scholarship in Chemistry

An endowment has been established to award a scholarship to a female graduate student studying for the MSc or PhD degree in Chemistry at Dalhousie University. The Scholarship commemorates the distinguished career of Anna Wilson (BSc '27; MSc '28), a long-time employee of Merck in Montreal and a founding member of the Canadian Institute of Food Science and Technology.

5. Economics

Professor George A.B. Kartsaklis Memorial Scholarship

Family, friends and colleagues of Professor Kartsaklis established this fund to provide financial assistance to one or more graduate students from Third World countries currently enrolled in the Department of Economics, Dalhousie University.

6. English

C.L. Bennet Memorial Scholarship

The Department of English has designated that one University scholarship in the amount of \$500 be awarded annually as a memorial to the late Professor of English, Dr. C.L. Bennet. This award will be made to an outstanding graduate of a Maritime or Newfoundland university (other than Dalhousie) who wishes to pursue an MA in English at Dalhousie. Eligible students should apply for graduate study in English in the usual way, by March 31st, indicating a desire to be considered for the Bennet award. Further details may be obtained from the Department of English, Dalhousie University, Halifax, NS, B3H 3J5.

The James W. Tupper Graduate Fellowship in English

This fellowship, of an annual value of approximately \$7,500 is awarded by the faculty of the Department of English to a student who proposes to do graduate work in English at a university approved by the faculty. The award need not be held at Dalhousie. Further information may be obtained from the Department of English.

7. Engineering

APENS Engineering Centennial Scholarship

Number and Value: One, \$3000 (subject to annual review)

Tenure: Normally two years (may be extended to a third year).

Basis of Award: The scholarship is awarded on the basis of the applicant's academic achievement in the Bachelor of Engineering programme at DalTech.

Eligibility: The candidate must be a Nova Scotian who has graduated with a Bachelor of Engineering from DalTech and who has been accepted into a graduate programme in a field of engineering related to space technology.

Field of Study: Engineering

Selection: Selection is carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: The Association of Professional Engineers of Nova Scotia established this Scholarship as an on-going reminder and celebration of the 1887 to 1987 Centennial of Canadian Engineering.

Apply to: Associate Principal, Graduate Studies and Research

Deadline: March 31.

Bligh Research Assistantships

Number and Value: Varies.

Tenure: One year, may be renewed for an additional year in the case of master's students and two additional years for Ph.D. candidates.

Basis of Award: Research Assistantships are available to support outstanding graduate students in Food Science and Fisheries

Engineering. Priority will be given to Canadian citizens or landed immigrants. In exceptional cases, assistantships will be offered to candidates who are not scholarship holders.

Eligibility: Accepted as a full-time student in the Department of Food Science and Technology.

Field of Study: Food Science and Technology.

Selection: Selection will be carried out by the DalTech Graduate Studies Council with recommendations by the Department of Food Science.

Donor or Awarding Agency: Department of Food Science and Technology.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

The Dr. L.F. Kirkpatrick Scholarship

Number and Value: One/\$1,000.

Tenure: One year.

Basis of Award: The award is based on the academic record of the applicant during the final two years of the undergraduate engineering curriculum at a recognized university. Preference will be given to a candidate with an interest in doing research in the power utility field.

Eligibility: Accepted as a full-time graduate student in engineering at DalTech.

Field of Study: Power Engineering.

Selection: Selection will be carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: The Nova Scotia Power Inc.

established this scholarship in 1982 in recognition of dedicated service rendered by Dr. L.F. Kirkpatrick as President of Nova Scotia Power Inc.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

The Dr. S.K. Malhotra Graduate Scholarship

Number and Value: One, \$2,500. (Subject to annual review)

Tenure: One year.

Eligibility: Accepted in the Civil Engineering Graduate Program, Faculty of Engineering. The area of research carried out shall be in the field of Structural Engineering. First preference will be given to a student from India.

Selection: Selection is carried out by the DalTech Graduate Studies Council.

Donor: The scholarship was established in memory of Dr. S.K. Malhotra, former Dean of Graduate Studies and Professor of Civil Engineering at TUNS from 1965 to 1990, by his family and friends.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

The Medjuck Scholarship in Energy Studies

Number and Value: One/approximately \$1,000. (Subject to annual review)

Tenure: One year, may be renewed subject to satisfactory progress.

Basis of Award: The scholarship is awarded on the student's academic achievement.

Eligibility: Accepted in a recognized graduate programme in the Faculty of Engineering with a research project in the area of Energy Studies.

Field of Study: Engineering.

Selection: Selection will be carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: Scotia Energy Resources Limited, and affiliate of The Centennial Group of Companies Limited.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

G.G. Meyerhof Graduate Fellowship

Number and Value: One/approximately \$4,000 per year. (Subject to annual review)

Tenure: One year; possibility of renewal subject to satisfactory performance.

Eligibility: Accepted in a graduate programme in Civil Engineering in the Faculty of Engineering. Preference is given to Canadian citizens who are graduates in engineering of recognized Canadian Universities.

Field of Study: The subject of research carried out shall be in the field of Geotechnical Engineering.

Selection: Selection will be carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: Board of Governors of DalTech.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

George C. Reid and Lucille M. Reid Scholarships

Number and Value: 5/\$5,000 maximum each. (Subject to annual review)

Tenure: One year renewable.

Basis of Award: The Scholarships are open to students who are accepted into the graduate programme in the Department of Mechanical Engineering. The field of study within Mechanical Engineering is not limited although the student must be registered

in a research degree program. Preference will be given to new applicants for the M.A.Sc. degree. The scholarship may be renewed based on satisfactory performance, one for the M.A.Sc. degree and twice for the Ph.D. degree.

Selection: The decision of the award will be made by the Associate Principal, Graduate Studies and Research, based on recommendations from the Department of Mechanical Engineering.

Application Deadline: October 15.

Bruce and Dorothy Rosetti Engineering Research Scholarships

Number and Value: Varies/up to \$6,000. (Subject to annual review)

Tenure: One year, may be renewed subject to satisfactory progress.

Basis of Award: The Scholarship is awarded on the basis of the student's academic achievement and on letters of reference.

Normally a foreign student is not eligible for this scholarship during the first year of graduate study at the University. In the awarding of this Scholarship the level of other financial support for each applicant will be considered in order to ensure the broadest distribution of scholarship funds.

Eligibility: Accepted in a recognized graduate programme in the Faculty of Engineering or Faculty of Computer Science.

Field of Study: Engineering, Computer Science, Food Science.

Selection: Selection will be carried out by the DalTech Graduate Studies Council.

Donor or Awarding Agency: Bruce and Dorothy Rosetti Bequest.

Apply to: Office of the Associate Principal, Graduate Studies and Research.

Application Deadline: March 31.

8. Environmental Studies

The Gerald and Margaret Godsoe Scholarship

This scholarship has been established by the Godsoe family to support a highly qualified and motivated individual entering the Master of Environmental Studies (MES) programme at Dalhousie. The recipient must hold an honours degree in natural or social sciences, engineering, architecture or its equivalent, and have first class standing in his/her course of study or have proof of exceptional merit. Further, the recipient must have made significant contributions through community service, leadership, and education on environmental issues. Eligibility is limited to Canadian citizens and permanent residents of Canada living in the country. The award is valued at \$10,000 per year and may be renewable. The recipient will be selected by the Admissions Committee at the School for Resource and Environmental Studies. Additional information about application procedures is available from the School for Resource and Environmental Studies.

9. Library and Information Studies

Alumni Scholarship

Annual scholarship in the amount of \$200 established by the School's Associated Alumni. Factors considered are academic excellence and evidence of a commitment to a career in librarianship. All incoming students are automatically considered; no application is necessary.

John R.T. Ettlinger Scholarship

Annual scholarship in the amount of \$1000 presented by the School to an outstanding incoming or continuing full-time student whose previous work and/or interests lie primarily in historical studies or collections management. No application is necessary.

H.W. Wilson Foundation Award

This award, valued at \$1,700, is presented by the School to an outstanding incoming student, and is renewable for the second year of the programme. All incoming students are automatically considered for the scholarship, so no separate application is necessary.

10. Marine Affairs Programme

The HMCS King's Memorial Scholarship in Marine Affairs

This is an annual scholarship in the amount of \$5,000 established by the Maritime Awards Society of Canada (MASC), through the generosity of LCdr. Bent G. Sivertz, OBE, RCNR (Ret'd), for a Canadian citizen to pursue the Master of Marine Management (MMM) degree. The criteria for conferral of the scholarship include the following: Applicants must be Canadian citizens; must demonstrate superior academic records; and may undergo a

financial needs assessment. Qualified applicants to the MMM are automatically considered for this scholarship upon completion of their application; no separate application is necessary.

11. Nursing

Alexandra Hirth Award for Excellence in Nursing Research

This award was established in memory of and in recognition of Alexandra Hirth's commitment to excellence. The award will provide financial support for students in the thesis stream of the Master of Nursing programme. The annual award will be made to an outstanding student whose thesis has the potential to contribute to the development of nursing knowledge and whose research is focused on issues related to individuals or families living with chronic illness.

Electa MacLennan Memorial Scholarship

The scholarship pays tribute to Dr. MacLennan's outstanding contribution to nursing education. Applicants must be a graduate of the School of Nursing, Dalhousie University, have a grade point average of 3.66 or greater, clearly state her/his career and educational goals and how the particular program will contribute to their development, be accepted as a full-time student or have completed 3 full credits in a recognized School of Nursing, and demonstrate potential for or show active involvement in advancing the nursing profession in Canada. Deadline for application is May 31st. Information is available from the School of Nursing.

Katherine and Robert MacDonald Scholarship

The scholarship is intended to provide financial assistance to a student who is studying in a non-thesis option of the Master of Nursing programme at Dalhousie University and who has demonstrated excellence in clinical nursing practice at the end of the first year of study. The applicant must have a grade point average of 3.6 or greater, have completed a minimum of one credit of nursing clinical classes and demonstrated excellence in nursing practice, and must supply a statement of career goals explaining how the selected graduate programme will contribute to excellence in clinical nursing practice. Deadline for application is May 31st. Information is available from the School of Nursing.

Margaret Cragg Award

This award was established by the family and friends in honour of Margaret M. Cragg, who pioneered the movement against violence toward women and in the practice of preventative interdisciplinary health care. An annual financial award is made available in alternate years to a graduate student in Nursing or Social Work. Master of Nursing students are eligible to apply in the Fall of 1999. Further information is available from the School of Nursing.

12. Occupational Therapy

Psychiatry Practicum Award

The Department of Psychiatry, Dalhousie, will fund a \$2000.00 per year Psychiatry Practicum Award for a Master of Science (Occupational Therapy) student. The student must make a practicum contribution in any of the mental health services which are associated with the Department of Psychiatry in any of the three Maritime provinces (New Brunswick, Nova Scotia, or Prince Edward Island). If you wish to apply for this award, include a separate letter with your application materials which outlines the practicum contribution you will be making to a mental health service associated with the Department of Psychiatry. The letter must be sent to the Graduate Coordinator, School of Occupational Therapy.

13. Oceanography

The Professor F. Ronald Hayes International Scholarship

This scholarship fund was established in memory of Professor F. Ronald Hayes, founder and first director of the Institute of Oceanography of Dalhousie University, and in commemoration of the Joint Oceanographic Assembly which was held at Dalhousie during August, 1982. The purpose of the scholarship is to provide financial support for a new graduate student in the first year of a MSc or a PhD programme in the Department of Oceanography. The recipient must be from a developing country ("developing country" shall be defined as one belonging to the United Nations Group of 77), from a state of the former Soviet Union, or from an economically

disadvantaged country such as: Albania, Bulgaria, Romania and the former Yugoslavia. The recipient will be nominated through the normal screening process by the Departmental Graduate Admission Committee. For further information contact the Department of Oceanography.

14. Oral and Maxillofacial Surgery

John P. Laba Memorial Research Award

The income, earned from a fund established in memory of John P. Laba by family, friends, patients and colleagues, will provide for this award which may be given annually. The recipient will be the dentist accepted in the Graduate Programme in Oral and Maxillofacial Surgery and will be given exclusively for the presentation, dissemination and/ or publication of research related to Oral and Maxillofacial Surgery. For further information please contact the Department of Oral and Maxillofacial Surgery.

15. Physics

The William Leiper Memorial Scholarship

An endowment has been established to provide an annual scholarship to a deserving graduate student in physics. Awarded at the discretion of the Physics Department, the scholarship is normally granted to a student already engaged in graduate study at Dalhousie.

The James Gordon MacGregor Memorial Teaching Fellowship in Physics

One fellowship valued at \$2,500 is offered. To be eligible, the candidate must have the necessary qualifications for admission to the Master's programme in Physics. The holder of this fellowship is expected to give instruction in the laboratory during the academic session. Nominees will be selected by the Department from those students being considered for a Dalhousie Graduate Fellowship; no application is necessary.

The Dr. A. Stanley MacKenzie Teaching Fellowship in Physics

One fellowship valued at \$600 is offered. To be eligible, the candidate must have the necessary qualifications for admission to the Master's programme in Physics. The holder of this fellowship is expected to give instruction in the laboratory during the academic session. Nominees will be selected by the Department from students being considered for Dalhousie Graduate Fellowships; no application is necessary.

The OZ Optics Ltd. Graduate Scholarship in Physics

One scholarship valued at \$1,500 is offered. To be eligible, the candidate must be doing graduate work in the area of fibre optics or a related field in Physics. The holder of this scholarship is expected to give instruction in a teaching laboratory during the academic session. Nominees will be selected by the Department from those students being considered for a Dalhousie Graduate Fellowship; no application is necessary.

16. Psychology

The Dr. Mabel E. Goudge Scholarship in Psychology

In her Will, the late Dr. Mabel Goudge bequeathed a sum of money with which to endow scholarships to qualifying graduate psychology students at Dalhousie. The scholarship in graduate studies is restricted to experimental or clinical psychology.

The D.O. Hebb Post-Graduate Prize

To honour the memory of Donald Olding Hebb (BA 1925), Professor Emeritus (1977-1985), valued at \$1,000, the Psychology Department established the D.O. Hebb Post-Graduate Prize, which is awarded by the Graduate Programme Committee, to an entering Masters or PhD student who has demonstrated the best potential to make a significant scientific contribution to the field of psychology.

17. Social Work

The Kavanaugh Scholarship

The Kavanaugh Scholarship was established by the Social Action Commission of the United Baptist Convention of the Atlantic Provinces to provide financial assistance in an annual amount of \$500.00 to a Master of Social Work student. Terms of reference and application forms are available to registered MSW students in early fall from the main office of the School.

The Lawrence T. Hancock Scholarship

The Hancock Scholarship was established to honour Dr. Lawrence T. Hancock for his devoted work as the first full time director of the Maritime School of Social Work, 1949 to 1973, and for his service to the profession and community. The scholarship is awarded annually to a student in the Master of Social Work programme who has demonstrated a high level of academic achievement and a potential for leadership in the field of social work. Application forms are available in early fall from the office of the Maritime School of Social Work.

Margaret Cragg Award

This award was established by family and friends in honour of Margaret M. Cragg, who pioneered the movement against violence toward women and in the practice of preventative, interdisciplinary health care. An annual financial award is made available in alternate years to a graduate student in Nursing or Social Work. MSW students are eligible to apply in the fall of 1998. Further information is available from the Maritime School of Social Work.

Raul Leger Memorial Humanitarian Awards

This award was established to honour the memory of Raoul Leger, who received a Master's degree in Social Work from Dalhousie University in 1977. His work at home and abroad exemplified his commitment to community development, peace and social justice. The award is presented to a graduating BSW or MSW student, who is nominated on the basis of achievement with a continued involvement in critical social issues.

18. Urban and Rural Planning

(See also Graduate Awards under Architecture)

Atlantic Planners Institute Student Award

Field of Study: Urban and Rural Planning.

Eligibility: A full-time student in his/her graduating year in a planning school accredited by the Canadian Institute of Planners in the Atlantic Provinces.

Number and Value: One, a trophy or plaque engraved with the recipient's name, supplemented by a cash award of no more than \$500.

Tenure: One year.

Basis of Award: Academic achievement and contribution to planning in the community.

Donor or Awarding Agency: Atlantic Planners Institute.

Selection: Atlantic Planners Institute

Application: Each eligible planning school should submit a recommendation for the student it believes is most deserving of the award.

Application Deadline: April 15, unless otherwise determined by API Council.

Canadian Institute of Planners Student Award for Academic Excellence

Field of Study: Urban and Rural Planning

Eligibility: A full-time student member of the Canadian Institute of Planners.

Number and Value: One, a certificate bearing the CIP seal and a book prize.

Basis of Award: The award is made to the student who has achieved the highest academic standing over the length of the MURP programme.

Donor or Awarding Agency: Canadian Institute of Planners.

Selection: Department of Urban and Rural Planning

Application: Application is not required.

VI. Bursaries

A. Dalhousie Graduate Bursaries

Students who unexpectedly find themselves in financial need may apply to the Graduate Studies Office for university bursaries made available through the student assistance programme.

The Faculty of Graduate Studies also administers the John and Lina Graham bursary for Commonwealth students and the Dr. P. Anthony Johnstone Memorial bursary for a graduate student with a record of involvement in social justice and human rights.

Bursaries are for only those students who can prove their need. Students eligible for government loans must have applied for them before a bursary application can be considered. Normally, students in year one of their programme are not eligible for bursaries. Please note there are no appeals on bursary decisions. Please contact the Faculty of Graduate Studies office for further information.

The John and Lina Graham Commonwealth Bursary

The donors established this fund to mark the 75th anniversary in 1988 of the Association of Commonwealth Universities. The net annual income may be used to assist one or more graduate students who find themselves in need of financial aid while in Nova Scotia. Recipients will be residents of Commonwealth countries, other than Canada, who in the opinion of the selecting body demonstrate need.

The Dr. P. Anthony Johnstone Memorial Bursary

The donors established this fund in 1994 to honour the memory of P. Anthony (Tony) Johnstone (1931-1989), scholar, educator and director of the Nova Scotia Human Rights Commission, 1985-1989. The net income may be used to assist a humanities or social science graduate student who has a record of interest and involvement in social justice and human rights.

Sonja R. Weil Memorial Bursary

Family and friends established this endowment in memory of Sonja Weil and in tribute to her work as a social worker and psychotherapist. This bursary is open to students in the BSW and MSW programmes, although first priority is given to graduate students who demonstrate financial need, satisfactory academic standing and interest in those areas which most closely reflect Sonja Weil's work in child and family therapy. Information and application forms are available in early fall from the office of the Maritime School of Social Work.

Hanna G. Matheson Bursaries

These bursaries are available to students enrolled in the BSW or MSW degree programmes on the basis of need. The fund is administered by the Registrar's Office, from which application forms are available.

VII. Teaching Assistantships

Most departments offer Teaching Assistantships. The number, amounts and conditions vary. Please enquire of your department or school.

The President's Graduate Teaching Assistant Awards

Dalhousie University recognizes and applauds the important contributions of Graduate Teaching Assistants to the educational mission of the University. The work of TAs, both in the classrooms or laboratories and behind the scenes, provides crucial support for faculty members and greatly enhances the learning process for undergraduate students. Each year, the President's Graduate Teaching Assistant Awards are presented to those TAs who have achieved outstanding success in the area of undergraduate instruction.

Nominations are accepted at the Office of Instructional Development and Technology. The winners are chosen in the Spring of each year, and the presentation of awards is made by the President during Convocation.

VIII. Research and Travel Grants

A. Research Grants

Small research grants to assist thesis research can be applied for by graduate students in the Social Sciences and Humanities. (The expenses of most science students are covered out of operating grant or departmental funds). Forms available in the Graduate Studies Office, also contain the required format for application to the Human Ethics Committee. Awards granted to students will be set up under their supervisor's signing authority. Students in other disciplines may also apply to the Faculty of Graduate Studies for small grants if and only if their departments are unable to help them because of an unforeseen emergency. A letter from the Department Chair/Graduate Coordinator to this effect must accompany the application.

B. Travel Grants

Travel grants for presentation of a paper or poster at scholarly meetings can be applied for by graduate students in thesis programmes using forms available in the Graduate Studies Office. Students are eligible to apply for one travel grant during the period of their graduate degree programme at Dalhousie, and should be presenting a paper or poster based on their thesis research. Departmental approval must be given to these applications. Applications will not be accepted retroactively or for conferences which occur after graduation. DalTech students requesting assistance for such travel should apply directly to the Associate Principal, Graduate Studies and Research, DalTech.

IX. Awards on Graduate Transcripts

A select number of Dalhousie Scholarships/Awards are recorded on the students official Dalhousie transcript. They are:

- Killam and Honorary Killam Scholarships,
- Eliza Ritchie and honorary Eliza Ritchie Scholarship,
- J. R. Johnston and honorary J. R. Johnston Scholarship,
- Governor General's Gold Medal.

An official letter confirming other Dalhousie scholarships (e.g. Dalhousie Graduate Scholarships) can be obtained upon request from the Faculty of Graduate Studies Office. An administrative fee of \$5.00 will be charged.

Students in DalTech programmes can obtain official letters on request from the DalTech Graduate Studies Office. There is no administrative charge.

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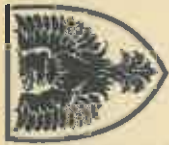
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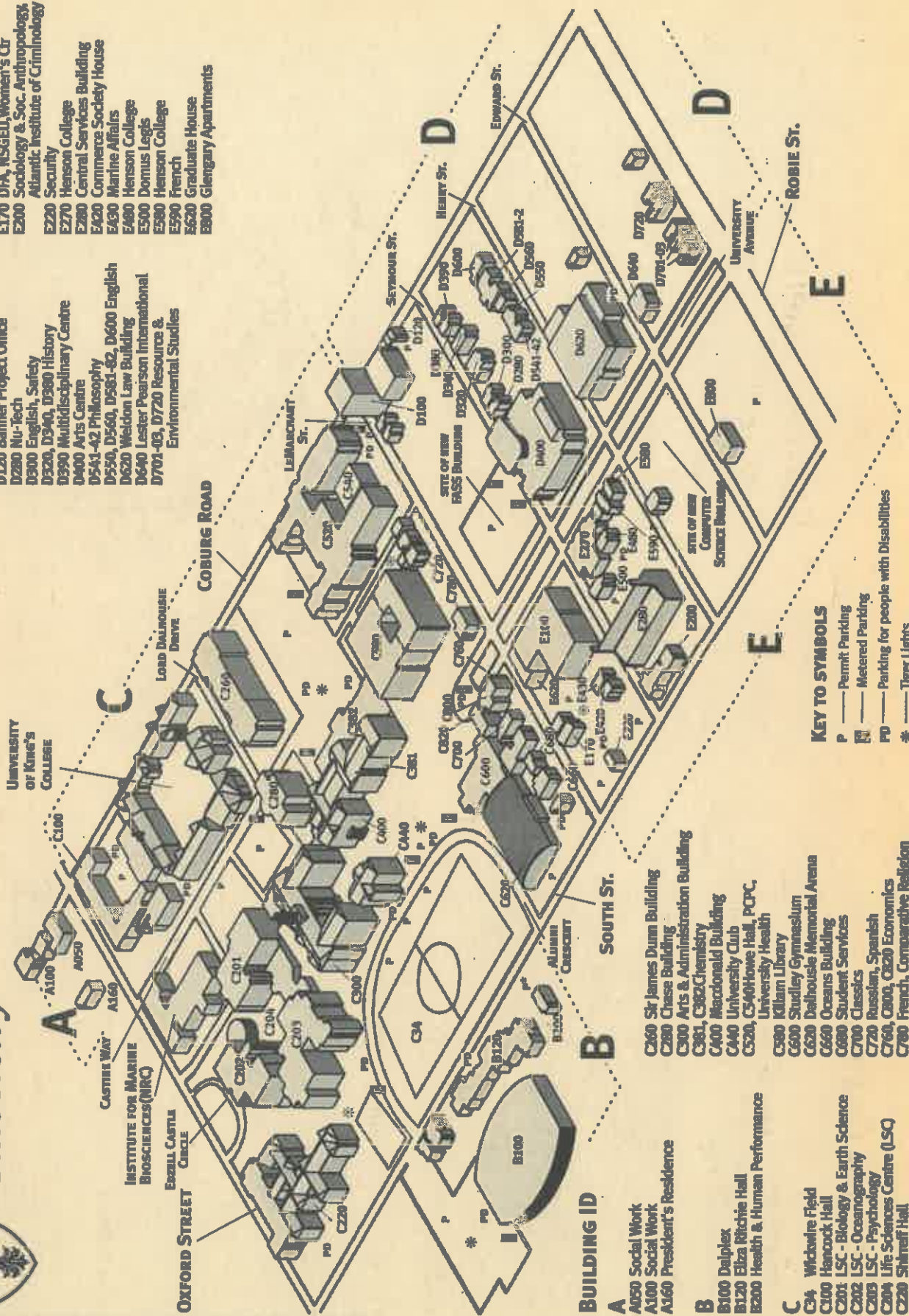
Please see campus maps on following pages.



DALHOUSIE STUDLEY CAMPUS University

- E**
- E100 Student Union Building (SUB)
 - E170 DFA, NSGELL, Women's Ctr
 - E200 Sociology & Soc. Anthropology
 - Atlantic Institute of Criminology
 - E220 Security
 - E270 Henson College
 - E280 Central Services Building
 - E420 Commerce Society House
 - E490 Marine Affairs
 - E460 Henson College
 - E500 Domus Legis
 - E580 Henson College
 - E590 French
 - E620 Graduate House
 - E800 Glengary Apartments

- D**
- D100 Management Building
 - D120 Banner Project Office
 - D280 Nu-Tech
 - D300 English, Safety
 - D340, D360 History
 - D390 Multidisciplinary Centre
 - D400 Arts Centre
 - D541-42 Philosophy
 - D550, D560, D581-82, D600 English
 - D620 Weidon Law Building
 - D640 Lester Pearson International
 - D701-03, D720 Resource & Environmental Studies



- KEY TO SYMBOLS**
- P — Permit Parking
 - M — Metered Parking
 - PD — Parking for people with Disabilities
 - * — Tiger Lights

BUILDING ID

- A**
- A050 Social Work
 - A100 Social Work
 - A160 President's Residence
- B**
- B100 Dalplex
 - B120 Eliza Ritchie Hall
 - B200 Health & Human Performance
- C**
- C34 Wickwire Field
 - C100 Hancock Hall
 - C201 LSC - Biology & Earth Science
 - C202 LSC - Oceanography
 - C203 LSC - Psychology
 - C204 Life Sciences Centre (LSC)
 - C220 Shinniff Hall

- C260 St James Dunn Building
- C280 Chase Building
- C300 Arts & Administration Building
- C361, C382 Chemistry
- C400 MacDonald Building
- C440 University Club
- C520, C540 Howe Hall, PCPC, University Health
- C580 Kilmuir Library
- C600 Stuelley Gymnasium
- C620 Dalhousie Memorial Arena
- C660 Oceans Building
- C680 Student Services
- C700 Classics
- C720 Russian, Spanish
- C760, C800, C820 Economics
- C780 French, Comparative Religion

UNIVERSITY OF KANE'S COLLEGE

INSTITUTE FOR MARINE BIOSCIENCES (MRC)

OXFORD STREET

LOAD DELIVER DRIVE

COBURG ROAD

SOUTH ST.

UNIVERSITY AVENUE

ROBIE ST.

EDWARD ST.

HENRY ST.

SEYMOUR ST.

LEMARCHANT ST.

CASTLE WAY

ESZELL CASTLE CIRCLE

ALUMNI CIRCUS

B120

B100

C620

C280

C300

C400

C520

C600

C700

C100

C160

C200

C260

C320

C380

C440

C500

C560

C620

C680

C740

C800

C860

C920

C1000

C1060

C1120

A100

A050

A160

C201

C202

C203

C204

C205

C206

C207

C208

C209

C210

C211

C212

C213

C214

C215

A100

A050

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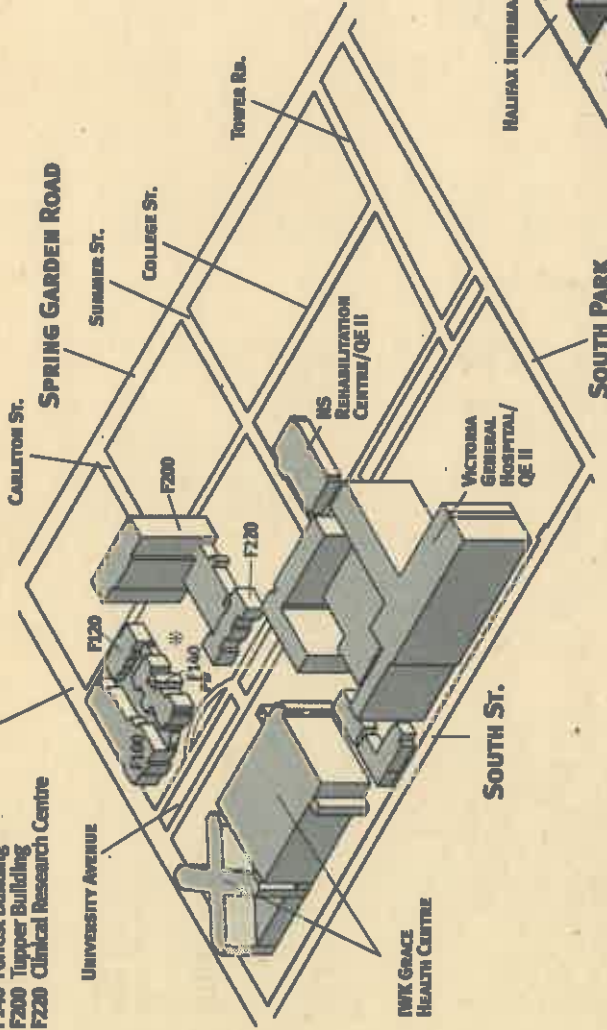
C214

C215

CARLETON CAMPUS

F

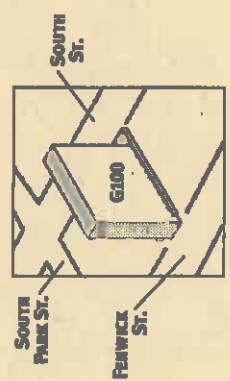
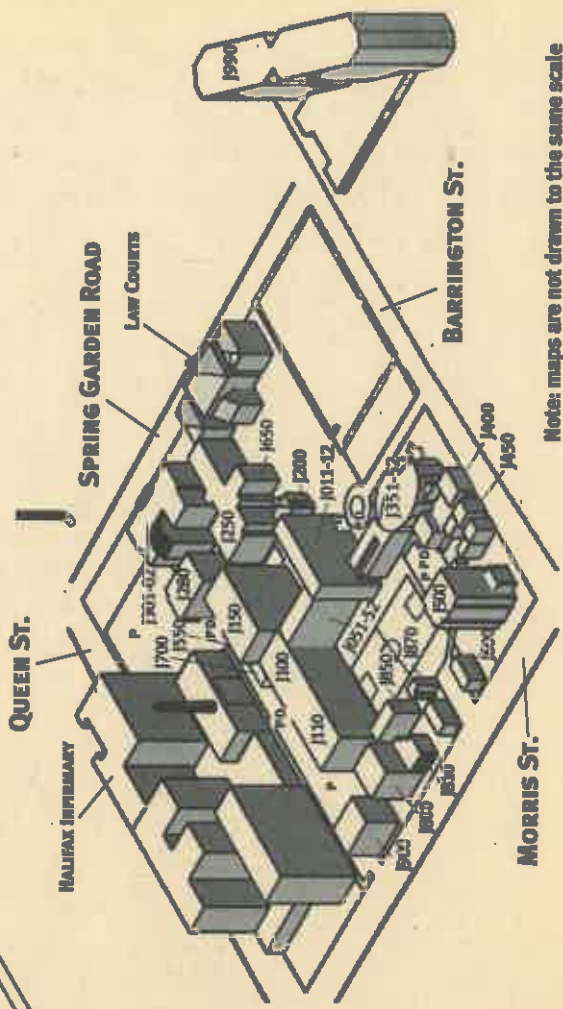
- F100 Dentistry Building
- F120 Burbridge Building
- F140 Forrest Building
- F200 Tupper Building
- F220 Clinical Research Centre



SEXTON CAMPUS (DALTECH)

Sexton Campus houses DalTech. Many DalTech buildings are labelled both by name and letter (which appears in brackets in the listings where appropriate).

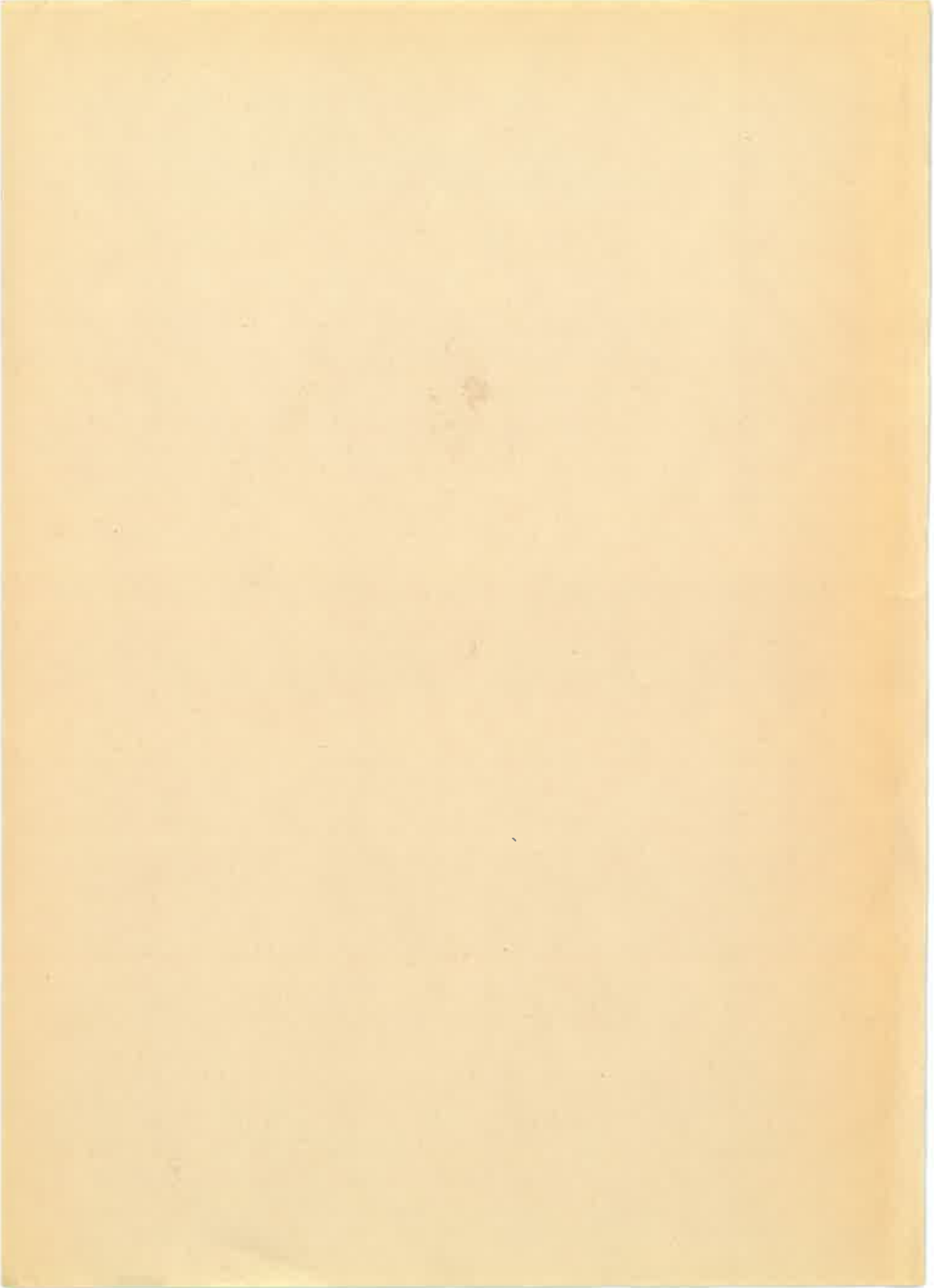
- J011-12 Ira MacNab Building (A)
- J051-52 B Building
- J100 Electrical Engineering (C)
- J110 H.R. Theakston Building (C1)
- J150 A.L. Macdonald Building (D)
- J200 Sexton House (E)
- J250 F Building
- J280 G.H. Murray Building (G)
- J301-02 Architecture Building
- J351-52 F.H. Sexton Memorial Gymnasium
- J400 Hart House (K)
- J450 University House (L)
- J500 M.M. O'Brien Hall (M)
- J550 N Building
- J600 Graduate Student Residence (O)
- J650 A.E. Cameron Building (P)
- J700 Bernard N. Cain Building (Q)
- J800 R1 Building
- J810 R2 Building
- J850 Dust Explosion Lab (T)
- J870 Metallurgy Research Lab (U)
- J900 Morroy Building
- J990 Maritime Centre

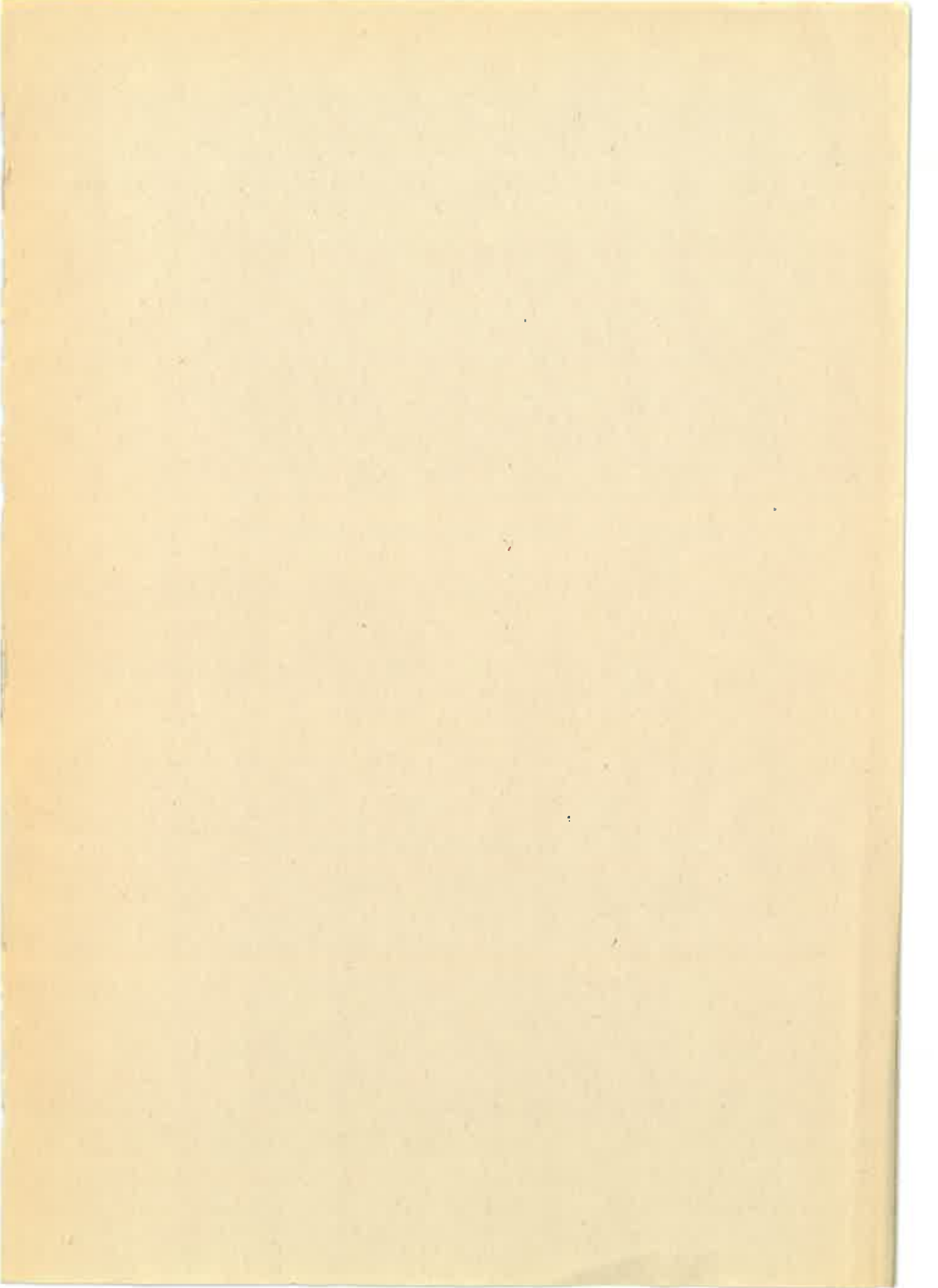


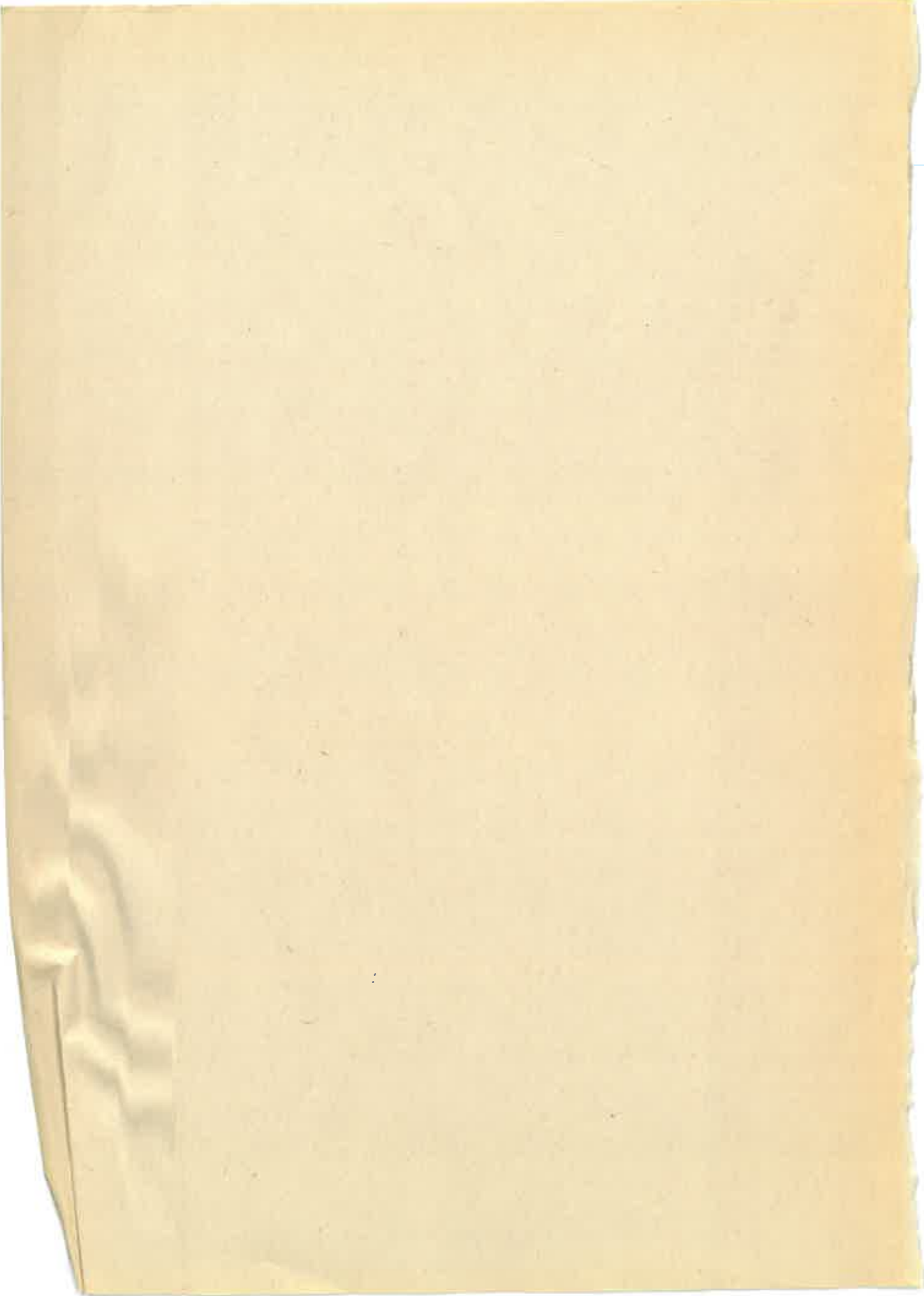
G100 Fenwick Place:
off-campus student residence,
5599 Fenwick St.

- KEY TO SYMBOLS**
- P — Permit Parking
 - PD — Metered Parking
 - Parking for people with Disabilities
 - * — Tiger Lights

Note: maps are not drawn to the same scale







1999

JANUARY							FEBRUARY							MARCH							APRIL						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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							31																							

2000

JANUARY							FEBRUARY							MARCH							APRIL						
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30	31																			30							

MAY							JUNE							JULY							AUGUST														
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					1	2	3	4	5	6						1	2	3						1							1	2	3	4	5
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12								
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19								
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26								
28	29	30	31				25	26	27	28	29	30	23	24	25	26	27	28	29	27	28	29	30	31											
														30	31																				

SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER																	
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S											
					1	2	3	4	5	6	7						1	2	3	4						1	2	3	4						1	2	3	4
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9											
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16											
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23											
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30		24	25	26	27	28	29	30												
																				31																		



FOR FURTHER INFORMATION

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