

Undergraduate Calendar

1988/89

Arts and Science
Dental Hygiene
Health Professions
Management Studies

DALHOUSIE UNIVERSITY

DALHOUSIE UNIVERSITY

Undergraduate Calendar 1988/89



Founded in 1818
Halifax, Nova Scotia, Canada

Notices

All readers and prospective 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.

Any reference to courses or classes contained herein is a statement of courses or classes that have been taught at Dalhousie University in the past. Dalhousie University assumes no obligation to continue to teach such courses or classes and prospective students are asked to consult with the respective Faculty to determine any changes to a course or class description contained herein.

Students are advised that the contents of this calendar are 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.

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.

The University reserves the right to limit enrollment in any program. Prospective students should note carefully the application deadlines indicated for the various programs. They should be aware that enrollment in most programs is limited and that students who are admitted to programs 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 program in question. While the University will make every reasonable effort to offer classes as required within programs, prospective students should note that admission to a degree or other program does not guarantee admission to any given class, except those specified as required, within that program. 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.

Inquiries regarding Academic Matters should be directed to:
The Registrar
Dalhousie University
Halifax, Nova Scotia
Canada
B3H 4H6
(902)424-2450.

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Almanac 1988-89

Most classes offered at Dalhousie have one of the letters "A," "B," "C" or "R" following the number. "A" classes are those given in the fall term or in the first three weeks of a summer session, "B" classes are those given in the winter term or the second three weeks of a summer session, and "R" and "C" classes are given throughout the regular year or a summer session ("R" classes carry one full credit or more, "C" classes less than one full credit).

May 1988

Monday, 2: Level I fieldwork (second year, 4 weeks) and Level II fieldwork (third year, 8 weeks) begins, School of Occupational Therapy.

Friday, 6: Senate meeting to consider candidates for the award of degrees in Arts and Science, Management Studies, Health Professions and Graduate Studies.

Wednesday, 11: Last day to register for first summer session.

Thursday, 12: University Convocations — Management Studies, Health Professions and Graduate Studies.

Friday, 13: University Convocations — Arts and Science and Graduate Studies.

Monday, 16: Summer session begins.

Tuesday, 17: Outpost Nursing internship begins.

Thursday, 19: Last day for cancelling summer school registration in "A" classes.

Friday, 20: Senate meets to consider candidates for the award of degrees in Dentistry.
Last day for cancelling summer registration in "R" and "C" classes.

Monday, 23: Victoria Day.

Tuesday, 24: Last day to add "A" classes, first summer session, all faculties.

Wednesday, 25: University Convocations — Dentistry, Dental Hygiene, and Graduate Studies.

Last day for withdrawal without academic penalty from "A" classes first summer session, all faculties.

Last day to add "R" and "C" classes, first summer session, all faculties.

Monday, 30: Last day for withdrawal without academic penalty from "R" and "C" classes first summer session, Arts and Science, Health Professions, and Management Studies.

Tuesday, 31: Last day for withdrawing from "A" classes, first summer session, Arts and Science, Health Professions and Management Studies.

June

Monday, 13: Last day for cancelling registration in "B" classes, first summer session.

Wednesday, 15: Last day to add "B" classes, first summer session, all faculties.

Thursday, 16: Last day for withdrawal from "B" classes without academic

penalty, first summer session, all faculties.

Last day for withdrawal from "R" and "C" classes first summer session, Arts and Science, Health Professions and Management Studies.

Tuesday, 21: Last day for withdrawal from "B" classes first summer session, Arts and Science, Health Professions, and Management Studies.

Tuesday, 28: Last day to register for second summer session.

Wednesday, 29: Summer School ends (first session).

July

Friday, 1: Canada Day.

Monday 4: Summer School (second session) classes begin.

Field work Level III (8 weeks) begins, School of Occupational Therapy.

Thursday, 7: Last day for cancelling registration in "A" classes, second summer session, all faculties.

Friday, 8: Last day for cancelling registration in "R" and "C" classes, second summer session, all faculties.

Monday, 11: Last day to apply for supplemental examinations in Arts and Science, Health Professions and Management Studies to be written in August or September.

Last day to add "A" classes, all faculties.

Tuesday, 12: Last day for withdrawing without academic penalty from "A" classes, second summer session, all faculties.

Friday, 15: Last day for withdrawal from "A" classes, Arts and Science, Health Professions and Management Studies.

Last day to add "R" and "C" classes, all faculties.

Last day to apply for supplementals in Dental Hygiene.

Monday, 18: Last day for withdrawal without academic penalty from "R" and "C" classes, second summer session, Arts and Science, Health Professions and Management Studies.

Thursday, 28: Last day for cancelling registration in "B" classes, second summer session, all faculties.

August

Monday, 1: Halifax Natal Day and Dartmouth Natal Day — no classes

Tuesday, 2: Last day to add "B" classes, second summer session, all faculties.

Fieldwork Level I (4 weeks) begins, School of Occupational Therapy.

Last day for withdrawal from "R" and "C" classes, second summer session, Arts and Science, Health Professions and Management Studies.

Wednesday, 3: Last day for withdrawal from "B" classes without academic penalty, second summer session, all faculties.

Monday, 8: Supplementals examinations begin in Dental Hygiene.

Wednesday, 10: Last day for withdrawal from "B" classes, second summer session, Arts and Science, Health Professions and Management Studies.

Monday, 15: Last day to apply to graduate in October.

Wednesday, 17: Final day of classes, Summer School.

Tuesday, 30: Orientation week begins in Dental Hygiene.

September

Monday, 5: Labour Day.

Tuesday, 6: Supplemental examinations begin, Arts and Science, Health Professions and Management Studies.

Registration ends and classes begin in Outpost Nursing, Dental Hygiene, Medicine I and II, School of Human Communication Disorders, MBA and Dentistry.

Friday, 9: Last day to register for fall session.

Monday, 12: Classes begin in Arts and Science, Health Professions, Graduate Studies (unless otherwise specified), and Management Studies.

Monday, 26: Last day for adding classes (except "B" classes), Arts and Science, Health Professions, Management Studies and Graduate Studies.

October

Monday, 3: Last day for cancelling registration, Faculties of Arts and Science, Health Professions and Management Studies.

Monday, 10: Thanksgiving Day.

Saturday, 15: Fall Convocation.

Monday, 24: Last day for withdrawing from "A," "R" and "C" classes without academic penalty, Arts and Science, Management Studies, Health Professions and Graduate Studies.

November

Friday, 11: Remembrance Day, no classes.

Monday, 14: Last day for dropping "A" classes, Arts and Science, Health Professions and Management Studies.

December

Thursday, 1: Last day to apply to graduate in February.

Friday, 2: Classes end in Dental Hygiene.

Monday, 5: Examinations begin in Dental Hygiene.

Thursday, 8: Last day of classes in Arts and Science, Health Professions and Management Studies.

Monday, 12: Examinations begin in Arts and Science, Health Professions, Management Studies and Graduate Studies.

Tuesday, 20: Examinations end in Arts and Science, Health Professions, Management Studies and Graduate Studies.

Wednesday, 21: Student holidays begin.

Sunday, 25: Christmas Day.

Monday, 26: Boxing Day.

January 1989

Sunday, 1: New Year's Day.

Tuesday, 3: Last day to register for winter term.

Classes resume in all faculties.

Fieldwork (4th year) begins, School of Occupational Therapy.

Outpost Nursing Internship begins.

Monday, 16: Last day for adding "B" classes, Arts and Science, Health Professions (except fourth year, Occupational Therapy), Management Studies and Graduate Studies.

Last day for cancelling registration, those registered in "B" classes only.

Monday, 25: Last day for students in Arts and Science, Health Professions

and Management Studies to apply for supplemental examinations in "A" classes.

February

Friday, 3: Munro Day, no classes.

Monday, 13: Supplemental examinations begin, Arts and Science and Management Studies.

Last date to drop "B" classes without academic penalty, Arts and Science, Management Studies, Health Professions (except fourth year, Occupational Therapy) and Graduate Studies.

Monday, 15: Last day to apply to graduate in May.

Monday, 20: Study break begins.

Monday, 27: Classes resume.

March

Friday, 3: Last day for adding "B" classes, fourth year, Occupational Therapy, (except 4418B).

Friday, 10: Last day for withdrawal from "B," "C" and "R" classes, Arts and Science, Health Professions (except fourth year, Occupational Therapy) and Management Studies.

Last day for dropping "B" classes (except OT4418B) without academic penalty, fourth year Occupational Therapy.

Friday, 24: Good Friday.

April

Saturday, 1: Examinations begin in Dental Hygiene.

Saturday, 8: Last day of classes in Arts and Science, Health Professions, Management Studies and Graduate Studies.

Monday, 10: Examinations begin in Arts and Science, Health Professions, Graduate Studies and Management Studies.

Monday, 24: Intra-session clinical practica begin in the School of Nursing. Summer clinical practicum begins in the School of Physiotherapy (second year).

Last day for withdrawal without academic penalty is three days after practicum begins.

Summer clinical practicum begins, School of Physiotherapy, (third year) (18 weeks).

Third term Dental Hygiene (first year) begins.

Final Dates for Receipt of Applications for Admission

Arts and Science

Students entering from Canada or US	August 1
Foreign Students (except USA)	May 1
Transfer Students	July 1
BEEd Program	May 30

Health Professions

Recreation, Physical and Health Education & Kinesiology	July 15
BSc (Nursing)	March 1
BSc (Nursing) for Post RN ¹ (Full-time)	June 1
(Part-time)	August 1
Outpost and Community Health Nursing ²	April 15
Occupational Therapy	March 1
Physiotherapy	January 28
Pharmacy	March 1
Social Work	March 1

Management Studies

Students entering from Canada or US	August 1
Transfer Students	July 1
Non-American Foreign Students	May 1

Dentistry December 1

Dental Hygiene February 1

Medicine

MD	December 15
Post-Graduate	December 1

Law³ February 28

Graduate Studies (except as below)

Non-Canadian Students (except as below)	August 1
Health Services Administration	May 30
Human Communication Disorders and Social Work	May 15
Marine Affairs	March 1
Nursing	January 1
Nursing	May 30
Oral and Maxillofacial Surgery ⁴	June 30

Winter Term

BA⁵BSc (part-time and transfer students)⁶ and BCom programs only November 15

Early registration and registration by mail is possible for more students, and is advised.

¹ Subject to change depending on numbers applying

² Application date for class entering in January is October 1

³ Late applications may be considered

⁴ All supporting documentation must be submitted by appropriate deadline

⁵ Of year preceding commencement of program

⁶ Part-time and transfer students only

1988

April						
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May						
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June						
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July						
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August						
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30	31					

November						
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December						
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1989

January						
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February						
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26	27	28				

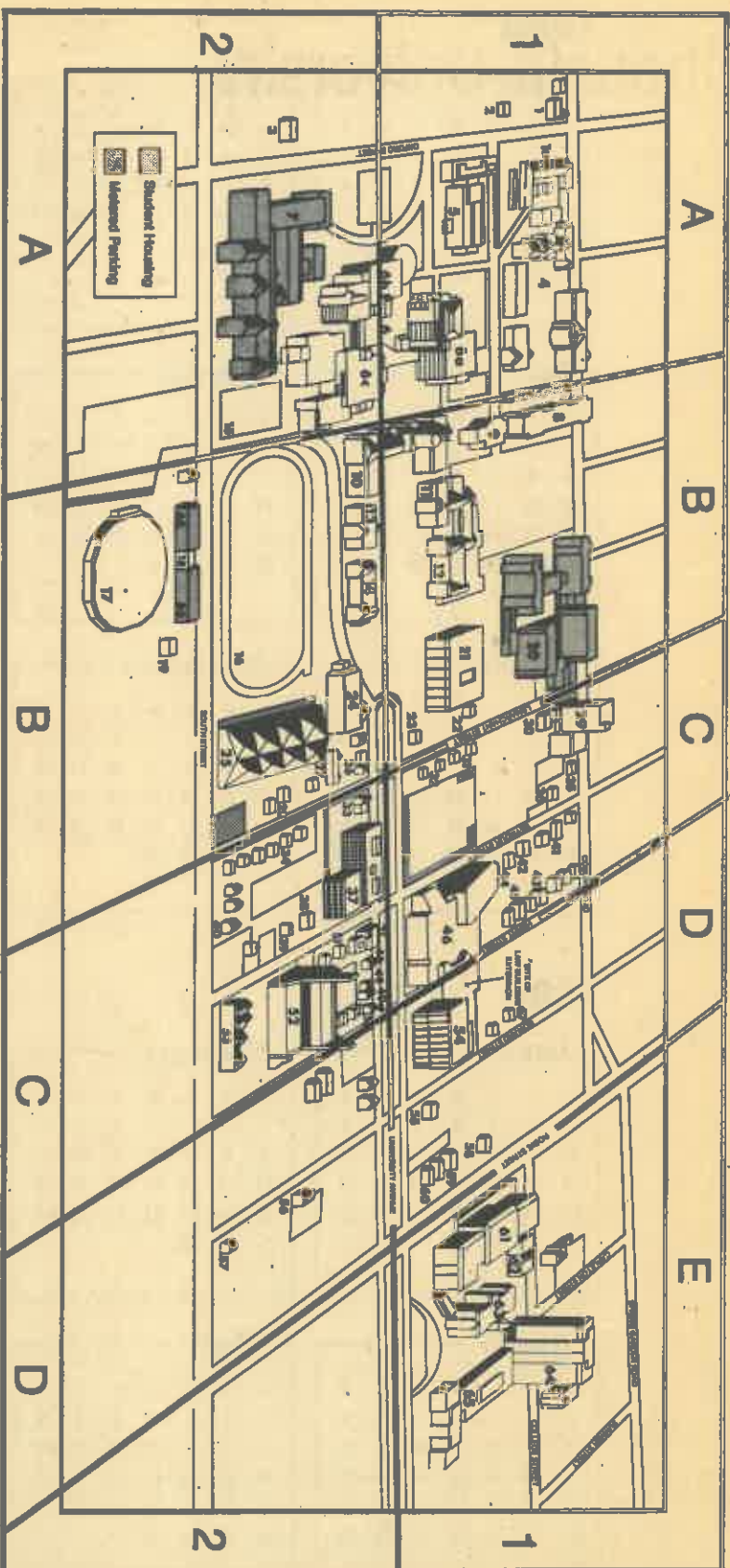
March						
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April						
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May						
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June						
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25	26	27	28	29	30	

The Campus Map



- Admissions — 10 (B1, B2)
- Alumni Office — 18 (B2)
- Arts and Administration Building — 10 (B1, B2)
- Arts Centre — 46 (C1)
- Biology — 6a (A1)
- Bookstore — 37 (C2)
- Burdidge Building — 62 (E1)
- Business Administration, School of — 29 (C1)
- Central Services Building — 52 (C2)
- Chase Building — 9 (B1)
- Chemistry — 11, 12 (B1)
- Classics — 27 (C2)
- Comparative Religion — 8 (B1)
- Computer Centre — 21 (B1)
- Counselling and Psychological Services — 37 (C2)
- Dalplex — 17 (A1)
- Day Care — 1a (A1)
- Dentistry and Dental Hygiene — 61 (E1)

- Development Office — 35 (C1)
- Dunn Building — 8 (B1)
- Economics — 26 (B2)
- Education — 14 (B2)
- Engineering — 8 (B1)
- Eliza Ritchie Hall — 66 (B2)
- English — 42, 43 (C1)
- Forestry Building — 63 (E1)
- French — 32 (C1)
- Geology — 6b (A2)
- German — 31 (C1)
- Graduate House — 33 (C2)
- Hanson College — 47, 48 (C2)
- History — 41 (C1)
- Housing Office — 37 (C2)
- Home Hall — 20 (B1)
- International Student Centre — 67 (D1)
- Kilham Library — 21 (B1)
- King's College — 4 (A1)
- Law Building — 54 (D1)
- Life Sciences Centre — 6a, b, c (A1, A2)

- Macdonald Science Library — 11 (B1)
- Mathematics, Statistics, Computing Science — 9 (B1)
- Medicine — 64 (E1)
- Nursing, School of — 63 (E1)
- Occupational Therapy, School of — 63 (E1)
- Oceanography — 6b (A2)
- Part-time Studies and Extension — 48 (C2)
- Pharmacy, College of — 62 (E1)
- Philosophy — 45 (C1)
- Physics — 8 (B1)
- Physiotherapy, School of — 63 (E1)
- Political Science — 10 (B1, B2)
- Psychology — 6c (A2)
- Public Administration, School of — 34 (C2)
- Public Relations — 21 (B1)
- Registrar's Office — 10 (B1, B2)
- Recreation, Physical and Health Education, School of — 19 (B2)

- Resource and Environmental Studies — 60 (D2)
- Rink — 25 (B2)
- Russell — 22 (B1)
- Security and Traffic — 40 (C2)
- Shirreff Hall — 7 (A2)
- Social Work — 1 (A1)
- Sociology and Social Anthropology — 53 (C2)
- Spanish — 22 (B1)
- Student Union Building — 37 (C2)
- Studey Gymnasium — 24 (B2)
- Theatre — 46 (C1)
- Transition Year Program — 30 (C1)
- Tupper Building — 64 (E1)

For specific locations of offices and departments, consult the university switchboard, 424-2211, or the Halifax-Dartmouth telephone directory, or the Dalhousie telephone directory.

Dalhousie University

Dalhousie University is a non-denominational co-educational university. Founded in 1818, the University is a member of the Association of Universities and Colleges of Canada, the Atlantic Association of Universities, and the Association of Commonwealth Universities.

Dalhousie's enrolment stands at over 10,000 students. To accommodate them, in a wide variety of undergraduate, professional, and graduate programs, Dalhousie occupies more than 60 acres in a residential area of Halifax. University facilities include buildings for teaching and research, libraries, residential housing for students, a Student Union Building, an Arts Centre for music, theatre, and an art gallery and facilities for physical recreation. The Nova Scotia Archives building, the Atlantic Regional Laboratory of the National Research Council, major provincial hospitals, and the Dr. D.J. MacKenzie Laboratories are located close to the University. Dalhousie benefits from a variety of arrangements for teaching and research collaboration with hospitals and federal and provincial research laboratories.

The University of King's College, situated adjacent to 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 courses and services, and by agreement with the Technical University of Nova Scotia there are co-operative arrangements for engineering, engineering-physics, and computer science studies. By arrangement with the Nova Scotia Teachers College, graduates of that institution may complete education degree requirements at Dalhousie. Co-operation in a number of academic programs, 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 cooperation with the College.

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 Senate consists of the President, Vice-Presidents, Deans of faculties and academic department heads, Registrar, full professors, other members of the academic staff elected from and by each faculty, six students elected by students, and certain other persons.

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.

Subject to the general approval of the Senate, seven faculties are responsible for supervision of programs of study, of teaching and research, and for the recommendation of candidates for degrees, diplomas, and university prizes.

Faculties

Faculty of Arts and Science (the humanities, the physical, life and social sciences, some performing arts, education, introductory years in engineering);

Faculty of Health Professions (nursing, occupational therapy, pharmacy, recreation, physical and health education, physiotherapy, human communication disorders, social work and health services administration);

Faculty of Management Studies (commerce and business administration, public administration, library and information studies);

Faculty of Medicine (basic medical sciences, medicine, medical internship and clinical specializations, continuing medical education);

Faculty of Law (law);

Faculty of Dentistry (dentistry, dental hygiene, and continuing dental education);

Faculty of Graduate Studies (advanced study in the humanities, the physical, life, social, and medical sciences, and a number of professions).

Henson College of Public Affairs and Continuing Education is responsible for coordinating continuing education programs both for degree credit and part-time studies, including the Summer School, and for community education activities.

Schools and Colleges

Business Administration
Dental Hygiene
Health Services Administration
Human Communication Disorders
Library and Information Studies
Maritime School of Social Work
Nursing
Occupational Therapy
Pharmacy
Physiotherapy
Public Administration
Recreation, Physical and Health Education
Resource and Environmental Studies

Institutes and Centres

Atlantic Institute of Biotechnology
Applied Microelectronics Institute
Atlantic Institute of Criminology
Atlantic Region Magnetic Resonance Centre
Atlantic Research Centre for Mental Retardation
Centre for African Studies
Centre for Foreign Policy Studies
Centre for International Business Studies
Centre for Marine Geology
International Institute for Transportation and Ocean Policy Studies
Lester B. Pearson Institute for International Development
Trace Analysis Research Centre

Academic Programs and Information Sources

In 1988-89 Dalhousie will offer the following academic programs. The normal years of full-time study are shown. Information about each may be found in the relevant University calendar.

Faculty of Arts and Science

Bachelor of Arts (Major 3 years, Honours 4 years)*
Bachelor of Science (Major 3 years, Honours 4 years)*
Diploma in Engineering (2 years)
Bachelor of Education (Sequential) (1 year post BA, BSc)
Bachelor of Education (Integrated) (4 years for BA or BSc with BEd, 5 years for BPE with BEd)
Bachelor of Music (4 years)
Bachelor of Music Education (4 years)
Certificate in Costume Studies (2 years)
Diploma in Costume Studies (3 years)
Diploma in Meteorology (1 year)
Certificate in Educational Administration (minimum 1 year)

*Twenty credit Major Bachelor of Arts and Bachelor of Science programs are also available in some disciplines.

Faculty of Management Studies

Bachelor of Commerce (Major and Honours 4 years)
Certificate in Public Administration (1 year)

Faculty of Health Professions

Bachelor of Physical Education (4 years)
Bachelor of Recreation (4 years)
Bachelor of Science (Health Education) (4 years)
Bachelor of Science (Kinesiology) (4 years)

Bachelor of Science (Nursing) (4 years)
Bachelor of Nursing (with previous RN) (3 years)
Bachelor of Science in Pharmacy (4 years)
Residency Program Pharmacy (1 year) (post BSc Pharm)
Bachelor of Science (Physiotherapy) (3 years Physiotherapy following one year of Arts and Science or minimum 2 years post Diploma program)
Bachelor of Science (Occupational Therapy) (3 years Occupational Therapy following one year of Arts and Science)
Bachelor of Social Work (3 years Social Work study following one year general study, a wide choice permitted)

Faculty of Dentistry

Doctor of Dental Surgery (4 years)
Postgraduate Certificate in Periodontics (2 years)
Diploma in Dental Hygiene (2 years)

Faculty of Law

Bachelor of Laws (3 years)
Bachelor of Laws with Master of Business Administration (4 years)

Faculty of Medicine

Doctor of Medicine (4 years)
Intern Year (1 year)
Residencies (various programs ranging from 2-8 years post-intern)

Faculty of Graduate Studies

Master of Arts (1 or 2 years, with thesis) in Classics, Computing Science, Economics, Education, English, French, German, Health Education, History, Leisure Studies, Mathematics, Philosophy, Political Science, Psychology, and Sociology
Master of Science (1 or 2 years with thesis) in Anatomy, Biochemistry, Biology, Chemistry, Computing Science, Geology, Health Education, Human Communication Disorders, (Audiology or Speech Pathology), Kinesiology, Mathematics, Microbiology, Oceanography, Oral Surgery (4 years), Pathology, Pharmacology, Pharmacy, Physics, Physiology and Biophysics, Psychology
Doctor of Philosophy (2 or 3 years, with thesis) in Anatomy, Biochemistry, Biology, Chemistry, Classics, Economics, Education, English, French, Geology, History, Interdisciplinary Studies, Mathematics, Microbiology, Oceanography, Pharmacology, Pharmacy, Philosophy, Physics, Physiology and Biophysics, Political Science, Psychology
Doctor in the Science of Law (2 or 3 years, with thesis)
Master of Arts in Teaching (French) (2 years)
Master of Business Administration (2 years)
Master of Business Administration with Bachelor of Laws (4 years)
Master of Education (1 year)
Master of Environmental Studies (1 or 2 years)
Master of Health Services Administration (2 years)
Master of Laws (1 year)
Master of Library and Information Studies (2 years)
Master of Public Administration (2 years)
Master of Development Economics (2 years)
Master of Nursing (2 years)
Master of Social Work (1 or 2 years)
Diploma in Aquaculture (1 year)
Diploma in Marine Affairs (1 year)
Diploma in Public Administration (1 year)

Honorary Degrees

The degree of Doctor of Laws may be conferred *honoris causa tantum* upon approval of the Senate in recognition of significant contributions to society.

Special Institutes

A number of special institutes for study and research in specific fields are based at the University. Among these are:

The Atlantic Institute of Criminology

Director: R. C. Kall, BA, MDiv, MA, PhD

The Atlantic Institute of Criminology has been established to provide a criminological research and career-development facility in the Atlantic Region, equivalent to those existing in other regions of the country. Scholarships for graduate students in Criminology are available.

Policy for the Atlantic Institute of Criminology is the responsibility of an Advisory Board comprising twelve representatives from the academic and professional community of the region.

Associate memberships are available to interested and qualified persons. Workshops and training courses provide opportunities for professional development for employees of the Criminal Justice system in the Atlantic Region.

The Atlantic Research Centre for Mental Retardation

Director: M.W. Spence, MD, PhD

Established in 1967, the Centre conducts basic biomedical research and population studies in the fields of mental retardation and human genetics. 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 mental retardation 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 grants from agencies such as the Medical Research Council of Canada, the Department of National Health and Welfare, the Dalhousie Medical Research Foundation, the governments of the three Maritime provinces, and by private donations.

The Atlantic Region Magnetic Resonance Centre

Director: J.C.T. Kwak, BSc, MSc, PhD

Manager: D.L. Hooper, BSc, PhD

Established in 1982 with assistance from the Natural Sciences and Engineering Research Council, the Centre is concerned with teaching and research programs in magnetic resonance. The Centre has modern nuclear magnetic resonance (NMR) and electron spin resonance (ESR) instruments including a 360 MHz Narrow Bore Nicolet NMR instrument and a Bruker MSL 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 of eleven universities and research institutes in the Atlantic Region.

The Centre for Foreign Policy Studies

Director: D. W. Middlemas, BA, MA, PhD

Established in 1971 with the assistance of a grant from the Donner Canadian Foundation, the Centre is concerned with teaching, research and other professional activities in various aspects of foreign policy and international politics. The work of the Centre is concentrated in the following areas: Canadian Foreign Policy, Maritime and Strategic Studies, and International Political Economy and Developmental Studies. Geographical specializations include Canadian, African, Soviet, European, and American foreign policy.

The Centre is affiliated with the Department of Political Science at Dalhousie University. Centre faculty offer courses in the Department on international relations, foreign and defence policy at both undergraduate and graduate levels. They also supervise masters and doctoral students in these fields.

The 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.

The Centre for African Studies

Director: T.M. Shaw, BA, 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 offers its own interdisciplinary BA degree and cooperates with the International Development Studies programme and with the Pearson Institute and International Students Centre.

The Centre for International Business Studies

Director: P.J. Reason, DipMS, MA, PhD

The Centre was established in 1975 with the aid of a grant from the Department of Industry, Trade and Commerce. Its purposes include the provision of specialist training in international business studies and research in international business. It carries out these functions within the administrative framework of the School of Business Administration.

Lester Pearson Institute for International Development

Interim Director: B.D. Lesser, BA, MA, PhD

The Pearson Institute was founded in 1985 to promote Dalhousie's involvement in international development activities. In mid-1987, the Institute was merged with the Centre for Development Projects and, at the same time, was given responsibility for oversight of all externally financed development programs and projects at Dalhousie. In addition to its administrative functions in the university, the major activities of the Institute include development education activities for the community, a lecture and seminar series, conferences, research, and input to public policy on Canada's role in international development. The Institute does not participate directly in academic degree programs but does seek to advance such programs in the field of international development and hosts the Lester B. Pearson University Chair in Development Studies. The Institute may directly undertake non-degree training activities and operate and manage international development projects.

The Atlantic Institute of Biotechnology

Director: R. Bidwell, BSc, BA, MA, PhD

The Atlantic Institute of Biotechnology was established in 1985 with funding from the Department of Regional Industrial Expansion. Its purpose is to assist industry in Atlantic Canada to improve biologically-based processes, and to develop new manufacturing and industrial techniques.

The Institute's main areas of specialization are agricultural and forest technology, fermentation, aquaculture and microbial mining technology. In addition, work is undertaken for any industry on biological systems, including food production and processing, chemical production, biomass conversion, plant and animal nutritional systems and bio-pollution related problems.

Centre for Marine Geology

Director: M. Sallsbury, 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 Geology, Oceanography and Physics and others. 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.

International Institute for Transportation and Ocean Policy Studies

Executive Director: John Gratwick, BSc, FCIT

Associate Director: Edgar Gold, BA, LLB, PhD, ACI/Arb, MCIT, FNI, MRIN

IITOPS is a federally incorporated, not for profit organization resulting from the amalgamation of the Dalhousie Ocean Studies Programme (DOSP) and the Canadian Marine Transportation Centre (CMTC) in 1986. IITOPS was established to maintain the momentum generated by DOSP and CMTC, which together helped establish Dalhousie as a recognized Canadian centre of excellence in the areas of marine transportation, marine and environmental law, ocean law policy and management studies.

Although IITOPS is an independent organization, it maintains a close affiliation with Dalhousie University and has links with several schools and institutes within the University. These include the Law School's Marine and Environmental Law Programme, the School of Business Administration, and the School for Resource and Environmental Studies.

IITOPS activities encompass four areas: research; professional development and training; information and publications (including the newsletter *New Directions*), and workshops and conferences. These activities are supported by the University as well as external grants, contracts and subscribers.

General Information

Libraries

The Dalhousie University Library System is organized to accommodate the needs of the undergraduate teaching programs, graduate and faculty research projects, and professional schools. The system is made up of the following components: the University Library (Killam Library — Humanities, Social Science, and Mathematics; Macdonald Library — Sciences), the Sir James Dunn Law Library (temporarily located in the Killam Library), and the Kellogg Health Sciences Library.

As of April 1, 1987, the total Dalhousie University Library System holdings include over 1,264,000 volumes of books, bound periodicals, documents, and bound reports, 240,500 microfiche and microcards, and 64,900 data cards, maps, musical scores, and other media. Approximately 12,000 serials titles are currently received, and dead title holdings number over 6,000.

The University Library alone has a collection of over 659,000 volumes of books and bound serials, as well as a periodical collection of more than 5,900 current subscriptions, and a government documents collection of over 323,000 items. In addition to the traditional printed materials, the library is developing its resources in forms such as records and microforms.

University Computing and Information Services

University Computing and Information Services (UCIS) is responsible for all centrally managed computing and communications facilities and services. These are available to faculty, staff and students for instructional, research and administrative purposes.

UCIS has four divisions. "Facilities and Operations," located in the basement of the Killam Library building, is responsible for operating and managing the central mainframe and minicomputers. "Communications Services," also located in the basement of the Killam, is responsible for voice (telephone) and data communications and related hardware services. "Academic Computing Services" provides consulting, education and documentation services for users of central and some departmental computers. It is responsible for support and maintenance of applications software for academic users. It also manages a Personal Computer Centre where micro computer users may obtain advice and assistance. Academic Computing Services is located in the basement of the Killam Library building. "Administrative Computing Services" is responsible for the selection, installation, development and maintenance of administrative computing systems, for providing advice and education to users of administrative systems, and for office systems support. Administrative Computing Services and the Office of the Executive Director of UCIS are located in Rooms 21A to 21K in the Arts & Administration Building.

UCIS manages a Digital VAX 8800 mainframe computer which is used primarily for academic purposes, an IBM 4381 computer for administrative systems, several Digital VAX minicomputers for Computing Science and the School of Business, and microcomputer laboratories in the Computer Centre (basement of the Killam), Engineering, English and in the Dentistry building. A wide range of computer languages and applications software is available and supported by UCIS on these systems. Access to on and off-campus computing facilities is provided by means of a campus data communications network of data switches and ethernet connections. Dalhousie is attached to the Canadian Universities network NetNorth.

Microcomputer Information Centre

The Microcomputer Information Centre no longer exists. At Dalhousie, its services have been, at least partially, absorbed by Purchasing (price info) and the Personal Computer Information Centre (demonstration machines & software).

Student Services

Located in Room 124 of the Arts and Administration Building, this office provides a point of referral for any student concerns. The Dean co-ordinates

the administration of Chaplaincy, Counselling and Psychological Services, University Health, the *Writing Workshop*, the Ombud Office, the International Student Centre, and is the International Student Adviser. Through the Council of Student Life, the Dean acts in liaison with the Deans of Residences and the Student Union. Active participation exists among the various divisions and the officials of Housing, Recreation, and the Federal Employment Office located on campus.

The Dean can assist students with any University related concern and can offer direction in class or program selection to ensure compliance with the degree requirements of Dalhousie University. A special program has been developed for students requiring academic assistance. All divisions of Student Services co-operate in the program together with a number of departmental faculty advisers. Students who may experience difficulties are encouraged to consult with the Dean who reviews their situation and advises them of the various services available.

Many students, particularly those in their first year, experience difficulty in organizing and presenting written work. In an attempt to respond to this problem, the University provides a *Writing Workshop*. Attendance is on a voluntary basis. For further information call 424-3379.

Non-Canadian students should look to this office for assistance in matters related to immigration status, medical insurance or any matter of special concern to visa students. An International Students Centre, located at 1394 Edward Street, serves as a meeting place for all International Students.

Information about CUSO, WUSC and CBIE can be had through the Office of the Dean.

Student Counselling Service

The Counselling and Psychological Services Centre offers programs for personal, career and educational concerns. Counselling is provided by professionally trained, male and female, Counsellors and Psychologists. Strict confidentiality is ensured. Counselling is available both individually and on a group basis. Topics covered by regularly offered group programs include Study Skills, Career Decision Making, Exam Anxiety Reduction, Public Speaking Anxiety Reduction, Assertiveness Training and Shyness Clinic, Resume Writing and Job Search Skills. Information on a wide variety of careers and academic programs is available in the 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 program.

The Counselling and Psychological Services offices and the Frank G. Lawson Career Information Centre are located on the 4th Floor of the Student Union Building. Inquire or make appointments by dropping in or calling 424-2081.

Advisory Committee on Sexual Harassment

Dalhousie University is committed to an environment free of sexual harassment. A policy and procedures exist to deal with complaints of sexual harassment at Dalhousie. If a student feels she or he may be involved in a situation of sexual harassment, or if a student is concerned about such a situation, the Sexual Harassment Advisory Committee can be consulted, confidentially, through the Sexual Harassment phone line, 422-0884. The Student Counselling service can also provide advice.

Chaplaincy at Dalhousie

The University provides facilities for chaplains appointed by various churches. There are four full-time chaplains at Dalhousie, representing the Anglican, Roman Catholic, Lutheran, and United Church traditions. In addition, contact ministers are designated by the Baptist, Jewish, and Presbyterian traditions and can be reached through the Chaplains' Office on campus. The Chaplains' Office is located on the third floor of the Student Union Building. Office hours are Monday to Friday 9-5. Appointments can be made for other convenient times. The chaplains are available at any time for emergencies. Outside office hours, chaplains may be reached by calling 429-1834, or via the SUB Enquiry Desk 424-2140.

University Health Service

The university operates an out-patient service, in Howe Hall, at Coburg Road and LeMarchant Street staffed by general practitioners and a

psychiatrist. Further specialists' services are available in local hospitals 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.

In the event of emergency, students should telephone the University Health Service at 424-2171 or appear at the clinic in person. The university maintains health services on a 24-hour basis with a physician on call. The offices are closed from 10 p.m. to 8:30 a.m.

All students must have medical and hospital coverage approved by the Health Service. 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 University Health Service prior to registration. Any student who has had a serious illness within the last 12 months, or who has any chronic medical condition, should contact and advise the Health Service, preferably with a statement from his doctor.

The cost of any medication prescribed by a physician is recoverable under a prepaid drug plan administered by the Student Union.

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 very low. It is therefore very important that students planning to attend Dalhousie think well in advance about their accommodation needs. It is fair to say two things about housing for Dalhousie students: first, early application for University residence is essential and second, students seeking off-campus housing should also begin to investigate that process well in advance of the beginning of term.

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.

The information below gives a description of A. traditional on-campus residences, B. off-campus housing owned by the university and C. the services offered by the off-campus housing office listing service. In each case the name of the person responsible is listed and telephone number provided.

Please Note: Academic acceptance by the University, i.e., admission to a course of study, DOES NOT IN ANY WAY 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.

Early application for university residences and housing is strongly recommended. Applications will be received commencing January 1. Students are encouraged to complete their applications before March 1.

A. Traditional Style On Campus Residence

Howe Hall — Men (located on corner of Coburg Rd. at LeMarchant St.)

Residence life offers a major opportunity to meet many students of diverse backgrounds, beliefs, opinions and cultures. The challenge of group living can be both rewarding and educational.

In order to encourage closer bonds within a fraternal atmosphere, Howe Hall Men's Residence is divided into five houses: Henderson, Studley, Smith, Bronson and Cameron. Each house has its own identity and yearly elects a President who sits on the Howe Hall Residence Council.

Howe Hall provides fully furnished accommodation for 525 male students in single and double rooms. The double rooms constitute 50 per cent of the accommodation and are normally filled by first year students. The majority of other rooms are assigned to undergraduates and for this reason graduate students may wish to seek accommodation elsewhere. Central dining is provided in two dining rooms. Television lounges, a games room, squash courts, weight room, and laundry facilities are readily available. A

comprehensive intramural sports program is administered by the Residence Council.

Applications should be submitted early since accommodation is limited. Direct inquiries to: Patrick J. Donahoe, Dean of Men, Howe Hall, Dalhousie University, Halifax, Nova Scotia B3H 4J5. Phone (902) 424-2107.

Shirreff Hall — Women (located at the corner of South and Oxford Streets)

The residence provides opportunities for students to become a part of a community and to participate in a variety of educational, cultural and recreational experiences. Residential living is an integral part of a student's development, where leadership, responsibility and other pertinent life skills are enhanced. To achieve this, senior students (Residence Assistants, Floor Presidents and Vice-Presidents) are trained to work with the residents in their areas to create a communal environment that contributes to their intellectual, social and personal growth.

There are 3 sections in Shirreff Hall — Old Eddy, New Eddy and Newcombe — which accommodate 445 students in single and double rooms. One-half of the residence is reserved for first-year students and the other half for more senior students in undergraduate programs. First-year students are normally assigned to double rooms. In the centre of the building is the dining room, providing full meal services. The building also contains a library, a games room, television lounges, study hall, exercise room, kitchenettes and laundry rooms. Student rooms are furnished as study bedrooms.

A varied and active social and sports program is co-ordinated under the auspices of the self-governing Residence Council.

Early application for all accommodation is advisable. Inquiries should be directed to: Mrs. Pamela Stonehouse, Dean of Women, Shirreff Hall, Dalhousie University, Halifax, Nova Scotia B3H 4J4. Phone (902) 424-2577.

B. Off Campus, University Owned Housing

Co-Ed Residence — Fenwick Place (5599 Fenwick Street, a 15 minute walk from campus—also on City Transit Route).

Fenwick Place is Dalhousie University's 33 storey high-rise apartment residence. Several one and two bedroom apartments, as well as the two bachelor apartments per floor, are rented to married and single students respectively as conventional apartments. These apartments have a full kitchen with refrigerator, stove and ample cupboard space, a full bathroom and balcony. There is also a storage room in every apartment. Except for the stove and refrigerator the above apartments are unfurnished. Heat and hot water are included in the rent but tenants must make their own arrangements for electricity and telephone. Drapery tracks, draperies and carpets are not provided.

The remaining apartments in Fenwick Place are furnished to accommodate students in groups of two, three or four. Priority will be given to those who apply in complete groups of two, three or four. A four person apartment consists of four single bedrooms. A three person apartment consists of one single bedroom and one double (shared) bedroom. A two person apartment consists of two single bedrooms. All apartments have full kitchen with refrigerator and stove, a full bathroom, furnished living room and dining room and a balcony. All beds are single, bunk-style with a folding backboard that allows the bed to be used as a settee. Dresser drawers (built in under the bed), a desk with a bookcase and ample closet space are provided. Please note that meals, maid or room service are not provided. Dishes, cooking utensils, cleaning equipment and small appliances must all be provided by the students. Students must make their own arrangements for telephone; however electricity is included in the residence fees.

All inquiries and applications should be directed to: Mrs. Janice Irving, Manager, Fenwick Place, 5599 Fenwick Street, Halifax, Nova Scotia B3H 1R2. Phone (902) 424-2075.

The Women's Residence Houses (within walking distance of campus)

The women's residence houses are former single family dwellings each with their own kitchen and living room/lounge and full baths. All single and double rooms are furnished as study-bedrooms. Students must supply their own cooking utensils, small appliances, china and cutlery for use in the student kitchens. Each student is responsible for cleaning her room. Common rooms and facilities are cleaned by staff. These houses are reserved for students in the professional schools and graduate studies, but a few of the 100 spaces are available for undergraduate students. Each house has a House Co-ordinator, a trained senior student who liaises with

the office of the Dean in order to provide administrative and student-related services.

Early application for all accommodation is advisable. Inquiries should be directed to: Mrs. Pamela Stonehouse, Dean of Women, Shirreff Hall, Dalhousie University, Halifax, Nova Scotia B3H 4J4

Glengary Apartments — Women (situated on Edward Street, 5 minutes walk from main campus)

Glengary Apartments is a furnished building with accommodation for 52 students in 12-4 person apartments and 4 bachelor apartments. It is situated within walking distance of the campus. Preference for the four person apartments will be given to students in their third or second year of an undergraduate program, who apply in groups of four. These apartments contain 2 single rooms, 1 double room, kitchen, living room and bathroom. The Glengary Co-ordinators are available for security and administrative services, as well as a resource to residents in need of extra assistance.

Early application for all accommodation is advisable. Inquiries should be directed to: Mrs. Pamela Stonehouse, Dean of Women, Shirreff Hall, Dalhousie University, Halifax, Nova Scotia B3H 4J4.

Eliza Ritchie Hall — Women (located at 6250 South Street, in front of the Complex, and a two-minute walk to Shirreff Hall)

Eliza Ritchie Hall is the most recent addition to the women's residence complex. It accommodates 84 students in fully-furnished single and double rooms. One-half of the residence is reserved for first-year students, and the other half for more senior students in undergraduate programs. The building contains a multi-purpose room, study rooms, laundry facilities, and leisure lounges with kitchenettes attached for light snack preparation. Meal services are provided in the Shirreff Hall dining room.

Residence life is fostered by an Independent Residence Council and trained Residence Assistants who work cooperatively in providing programs that enhance student development and facilitate communal living.

Inquiries should be directed to: Mrs. Pamela Stonehouse, Dean of Women, Shirreff Hall, Dalhousie University, Halifax, Nova Scotia, B3H 4J4.

International Student Housing (5 minutes walk from main campus)
(Available only to students arriving in Canada for their first year at Dalhousie).

Dalhousie University provides off-campus housing in three rooming houses. The rooming houses consist mainly of single rooms, with some cooking facilities, but shared bath. The rooms are furnished with a bed, desk, drapes and chairs. Most of the single rooms have a common bath and kitchen area. Paper towels, toilet tissue, garbage bags and light bulbs are supplied, COOKING UTENSILS ARE NOT. Heat, hot water, and electricity are supplied, but tenants must make their own arrangements for telephone. MEALS, MAID OR ROOM SERVICE ARE NOT PROVIDED.

Inquiries should be directed to: Mrs. Janice Irving, Manager, Fenwick Place, 5599 Fenwick Street, Halifax, Nova Scotia B3H 1R2.

Apartment Units — Co-Ed (5 minutes walk from main campus)

Dalhousie University offers off campus housing in two apartment buildings on University Avenue consisting of bachelor, one and two bedroom units.

The apartments have a fridge and stove, ample cupboard space, and a full bathroom. The apartments are unfurnished except for the stove and fridge. Heat and hot water are included in the rent but tenants must make their own arrangements for electricity and telephone. Drapery tracks, drapes and carpets are not provided.

Inquiries should be directed to: Mrs. Janice Irving, Manager, Fenwick Place, 5599 Fenwick Street, Halifax, Nova Scotia B3H 1R2.

General Information

All application forms must be accompanied by an application fee and deposit in Canadian funds. No applications will be processed until the fee and deposit are received. Amounts will be stated on the application forms.

Students living in residence MUST maintain FULL TIME status at Dalhousie University.

C. Off Campus Listing Service

The Off-Campus Housing Office acts as a listing service for privately-owned, local accommodation. Landlords who have various types of housing

for rent (apartments, rooms, houses, etc.) call the office and provide details of available units. This information is categorized and posted on bulletin boards outside the office. This allows students to "shop" for accommodation that best suits their needs. The Off-Campus Housing Office does not arrange, inspect or guarantee housing. This is up to the prospective tenant.

Telephones are available at the office for use in calling landlords. City maps, bus schedules, utility information, landlord/tenant regulations and a variety of other housing-related material are all available from the Off-Campus Housing Office. The staff will do their best to answer any questions about housing in the Halifax area.

Inquiries should be directed to: Mrs. Sheila Fougere, Manager, Off-Campus Housing, Room 120, Dalhousie Student Union Building, Halifax, Nova Scotia B3H 4J2, (902) 424-3831.

Dalhousie Student Union

President, Student Union: Caroline Zayid

Vice-President: Ian MacCarthy

Treasurer: Shane Ferancek

General Manager, Student Union: A.P. Beckett, BCom, CA

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, students who live in residence and international students also elect their own representatives because they are uniquely affected by certain university policies. 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 on 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. Every student has the opportunity to take advantage of the Union's financial, physical and organizational resources. To use that opportunity you should know who represents you on Council and who are the members of the Executive. The Student Council office is located on the second floor of the SUB and is open from 8:30 a.m. to 5:00 p.m. Monday through Friday. Council members have mail boxes located in that office. Union Executive officers also have offices in the SUB.

Student Clubs and Organizations

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.

The Student Handbook publishes a list of clubs, societies and organizations, and every fall new students are encouraged to select and participate.

Dalhousie Arts Centre

The region's major performing arts theatre and the highly regarded Dalhousie Art Gallery, housed in the Dalhousie Arts Centre, are active places indeed.

The 1,041 seat Rebecca Cohn Auditorium presents a wide variety of programs ranging from ballet to rock, classical music to children's performances.

The Dalhousie Art Gallery offers the public access to national and international touring exhibitions and initiates many ambitious and exciting exhibition programs.

Athletics

Athletics and Recreational Services offers a wide range of programs for every Dalhousie student. More than sixty clubs and intramural programs

offer fun, fitness and companionship while 13 varsity sports provide excitement for players and spectators alike. For those who prefer less competitive activities, there is a great number of fitness, leisure and aquatic instructional programs.

Alumni Association

The Alumni Association membership is composed of over 37,500 former students.

The group coordinates a number of programs including reunions, branch meetings, sports events, information lectures, a tutoring service, a Student Leadership Conference, Scholarships and Bursaries, and the Alumni Award for Teaching Excellence. The Association publishes the *Dalhousie Alumni Magazine* which is sent to all alumni and friends.

The alumni play a vital role in the University in a wide variety of ways including representation on the Board of Governors.

Canadian Armed Forces

The Regular Officer Training Plan (ROTP), Medical Officer Training Plan (MOTP) and the Dental Officer Training Plan (DOTP) are completely subsidized university plans covering tuition, books, medical services, monthly pay and summer employment for up to four years of undergraduate study. Successful applicants serve as commissioned officers in the Canadian Armed Forces for varying compulsory periods after graduation.

For further information on above plans, contact a Canadian Forces recruiting centre.

Awards Office

Director: G.G. Steedman, BA

The Awards Office is the campus centre for information and processing of merit awards and financial aid for Dalhousie students. With reference particularly to undergraduate students, the Office administers entrance and in-course scholarships, prizes and bursaries. There is also available a short-term loan plan to assist students with certain types of cash-flow problems. Another major function of the Awards Office is the signing of documents relating to the Canada Student Loan Plan and to the Provincial Bursary/Loan programs. Among other services are awards information, financial counselling, budget planning and disbursement of various financial aid application kits. On behalf of students the Office is deeply engaged in data gathering, form processing, computer coding of awards, and report preparations to internal and external users. In order to facilitate the serving of 10,000 students by a staff of four people the Office reserves certain hours for Personal Service. These are posted (as are any changes) at the entrance to the Office, Room 125, Arts & Administration Building, Studley Campus. During these same hours the telephone line (424-2416) is in service. Outside these hours but within the Office workday, the telephone line has short recorded messages and provides for the leaving of brief messages from callers. For that helping hand with enquiries or problems concerning awards and finances, Dal Awards is the place to come.

University Regulations

General

1. 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.
2. **Place of Residence of Students.** 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.
3. No person under sixteen years of age is admitted to any class except by special permission of the Senate.
4. All students must agree to obey all the regulations of the University already made or to be made, and pay the required fees and deposits before entering any class or taking any examinations.
5. Students taking classes in another Faculty as part of an affiliated course must conform to the regulations of that Faculty with respect to these classes.
6. Late registration requires the approval of the Dean of the Faculty.
7. **Withdrawal:** See the individual faculty regulations and the Dalhousie University Fees Handbook.
8. **Tuberculin Test:** In the interests of public health in the University, students are encouraged to have a tuberculin test. This is compulsory for Dental, Dental Hygiene and Physiotherapy students. Facilities for testing are arranged by the University Health Services.
9. **Transcript of Record:** Except for university purposes, transcripts, official, or unofficial, will be issued only on the request of the student. A student may receive only an unofficial transcript. Official transcripts will be sent at a student's request to other universities, or to business organizations, etc. on payment of the required fee. If a student so requests, copies of a medical certificate will be enclosed with the transcripts.
10. 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 Governors. Within the general policies approved by Senate, academic requirements are administered by the Faculty concerned.
11. 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.
12. If a student is required to withdraw from a Faculty because of failure to maintain adequate academic standing, such a student may apply to another Faculty. However, in assessing the application, previous performance may be taken into consideration.
13. **Degree in Absentia:** Any graduating student who is unable to appear at the convocation is expected to notify the Registrar in writing prior to May 6, for Spring convocations (or October 12 for Fall convocations), giving the address to which the diploma is to be mailed. In any case where notification is not received by the required date, and a student does not appear at the convocation, a fee will be charged.

14. Students whose accounts are delinquent on March 15 may not be eligible, at the sole discretion of the university, for graduation at the May convocation. For October or February graduation the dates are Sept. 1 and Jan. 1 respectively.

15. In addition to the above university regulation, students must also comply with the regulations of the Faculty in which they are registered.

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 offences (which is delegated to the Senate Discipline Committee), as well as certain other offences.
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.

5. Examples of Academic Offences

(a) Plagiarism

Plagiarism is considered a serious academic offence which could lead to loss of credit and suspension from the University. Plagiarism may be defined as the presentation by an author of the work of another author, in such a way as to give one's reader reason to think that the other author's work is one's own. A student who is in any doubt as to what constitutes plagiarism is urged to discuss the matter with the instructor concerned before completing an assignment.

(b) Irregularities in Admissions Procedures

A member of the University 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.

(c) 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 program, 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:

- (i) arranging for or availing oneself of the results of any personation at any examination or test, or,
- (ii) attempting to secure or accepting assistance from any other person at any examination or test, or,
- (iii) having in one's possession or using any unauthorized material during the time that one is writing any examination or test, or,
- (iv) without authorization procuring a copy of an examination, test or topic for an essay or paper, or,
- (v) 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,

(vi) 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 program.

Senate Discipline Committee

1. Composition

Academic Offences are dealt with by the Senate Discipline Committee, which consists of five members, three of which are members of the Senate and two of which are students.

2. Terms of Reference

(a) The Senate Discipline Committee is vested with original jurisdiction to consider all complaints or allegations respecting offences or irregularities of an academic nature, including those relating to admissions procedures and evaluation procedures, and to impose penalties in cases where the Committee finds an offence or irregularity has occurred.

(b) The Senate Discipline Committee shall 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.

(c) The Senate Discipline Committee shall report its findings and any penalty imposed to the Secretary of the Senate. The Secretary of the Senate shall forward a copy of the report to any member of the University community whom the Senate Discipline Committee has found to have committed an offence or irregularity and if the member concerned be other than a student a copy shall also be sent to the Vice-President (Academic).

(d) If the member of the University found to have committed an offence or irregularity is a student, he may appeal to Senate any finding or any penalty imposed by the Senate Discipline Committee by advising the Secretary of the Senate in writing within 30 days of receipt of the report by the student.

(e) The Senate Discipline Committee, when it finds that a member of the University who is a student has committed an academic offence or irregularity may impose one or more of the following penalties:

- (i) loss of all credit for any academic work done during the year in which the offence occurred;
- (ii) suspension of rights to attend the University for a specified period;
- (iii) dismissal from the University;
- (iv) such lesser penalty as the Committee deems appropriate where mitigating circumstances exist.

Definitions

Full-time Students: those registered for three full-credit classes or more, or the equivalent of three half-credit classes or more in either first or second term.

Matriculation Standing: Senior Matriculation designates the level of studies attained by students who have successfully completed Grade XII in public high school in Nova Scotia or its equivalent elsewhere.

Special Students: students who are not candidates for a degree or diploma but who wish to take one or more university classes which may be allowed for credit. This is not the same as auditing a class. Special students must satisfy normal admission requirements.

University Exploration: Students admitted under the mature student category who are not candidates for a degree.

Part-time Students: students registered for fewer than three full-credit classes or the equivalent of three half-credit classes in either first term or second term.

A full credit class is equivalent to 6 credit hours.

Undergraduates: students who are candidates for an undergraduate qualification.

Academic sessions

Fall session:	September — December
Winter session:	January — April
Summer School (first session):	May — June
Summer School (second session):	July — August

Fees

Academic Fees

The final step in the registration process at Dalhousie is the payment of fees. A student is considered registered only after financial arrangements have been made at the Student Accounts office. Information on the payment of fees, refund policy, etc., is contained in the Dalhousie University Fees Handbook, which will be included in the student's registration package.

In order to provide you with an idea of the costs involved, we have outlined on page 20 fees for the 1987/88 academic year.

Residence Charges

Please note that the following are general statements. Because of the diversity of the residence facilities available practices do 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 succeeded in securing a room, withdraw from residence before the end of the school year, there are serious financial penalties. One month's written notice must be given to the Dean or Manager. Complete information on withdrawal from residence is available from the residence Dean, or Manager. No refund will be made to any resident who is dismissed for misconduct. Discretionary power in exceptional circumstances remains with the Director of Housing. Confirmation of accommodation will not be granted until the student has been accepted by the University for the coming session and the \$120.00 residence application fee and deposit has been received.

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.

Payment of Residence Charges

Payment may be made in full at registration or, for an extra charge of \$10.00, in two installments as per rate schedule. Scholarships may be applied to residence charges only after tuition fees for the full session are paid. The first installment must be paid in full by September 30. To all accounts outstanding after September 30 interest of 1.25% per month will be charged. On second installments outstanding after February 1 interest of 1.25% per month will be charged. A student whose account is delinquent for more than 30 days will be denied University privileges including access to transcripts and records of attendance, Dalplex and the libraries. The student will be reinstated upon payment of the fees outstanding, the arrears interest, and a \$50.00 reinstatement fee.

ACADEMIC FEES 1987-88 — All fees for graduate students are listed ONLY in the section headed Graduate Studies
 Payment of fees may be made at the Student Accounts Office, located on the basement level of the Arts and Administration Building.

	University Fee	Student Union Fee (Inc. Year Book In graduating yr.)	Society Fee	TOTAL
Arts and Science				
King's (Payable to Dalhousie)	1,585.00	—	5.00	1,590.00
Engineering	1,875.00	103.00	10.00	1,988.00
Health Professions				
Nursing	1,875.00	103.00	20.00	1,998.00
Outpost Nursing, 2nd year	1,875.00	—	20.00	1,895.00
Pharmacy	1,875.00	103.00	31.50	1,909.50
Clinical Residence - Pharmacy	405.00	—	—	405.00
Phys. Ed., Health Ed., Rec.	1,875.00	103.00	10.00	1,988.00
Physio. Occ. Therapy	1,875.00	103.00	13.00	1,991.00
B S W	1,585.00	103.00	10.00	1,698.00
Management Studies				
B Com.	1,875.00	103.00	30.00	1,908.00
CPA	1,585.00	103.00	10.00	1,698.00
Graduate Studies				
Full time	1,700.00	103.00	20.00	1,823.00
Full time MBA	1,700.00	103.00	35.00	1,838.00
Part time for Degree	585.00	40.00	10.00	635.00
Part time for Degree - MBA	585.00	40.00	17.50	642.50
Thesis-only Full-time	265.00	103.00	20.00	388.00
Thesis-only or Cont. Part-time	265.00	50.00	10.00	325.00
MSc Oral and Maxillofacial Surgery	1,975.00	103.00	20.00	2,098.00
LL M. (Full-time); J.S.D	1,815.00	103.00	20.00	1,938.00
LL M (Part-time for Degree)	910.00	50.00	10.00	970.00
Law	1,815.00	103.00	20.00	1,938.00
Medicine				
M D	1,975.00	103.00	25.00	2,103.00
Postgraduate, Interns, Residents	405.00	—	—	405.00
Dentistry				
DDS	1,975.00	103.00	150.00	2,228.00
DDS Advanced Standing ¹	3,950.00	103.00	150.00	4,203.00
Dental Hygiene	1,875.00	103.00	35.00	1,913.00
Dental Hygiene Advanced ¹	3,350.00	103.00	35.00	3,488.00
Standing				
Postgraduate Periodontics	1,975.00	103.00	150.00	2,228.00
Full Time - One Term Only (Undergraduate)				
more than 3 one-half credits	785.00	50.00	—	835.00
Part Time - Session and Term ² (Undergraduate)				
All Faculties - Per Course				
1 Full Credit Course	340.00	22.00 ³	3	362.00(+)
2 Full Credit Courses	650.00	44.00	3	694.00(+)
3 Full Credit Courses	965.00	103.00	3	1,068.00(+)
1/2 Credit Course	170.00	11.00	—	181.00
1/3 Credit Course	110.00	11.00	—	121.00
Audit - Session and Term ⁴ (Undergraduate)				
1 Full Audit Course	170.00	—	—	170.00
1/2 Course for Audit	85.00	—	—	85.00
1/3 Course for Audit	55.00	—	—	55.00

Foreign Students (additional charge):

Visa Students (those who are not Canadian citizens or permanent residents) who commenced their current program of study prior to the 1985/86 academic year are required to pay a Differential Fee of \$1,550.00.

For those Visa students who commenced their program of study during or after the 1985/86 academic year, the Differential Fee is \$1,700.00. There is a proportionate charge for part time.

THE DIFFERENTIAL FEE IS PAYABLE EACH YEAR WITH THE PAYMENT OF THE FIRST INSTALLMENT OF FEES.

Graduate Students see Regulation 2.7 of Graduate Studies Calendar to determine number of years of differential fee requirement.

¹ Candidates with advanced standing admitted to special programs in DDS and DENTAL HYGIENE to meet Provincial Professional Qualifications, are required to pay double the University fee paid by students in regular programs.

² Registered for a total of three (3) credits, or less for session; or three one-half credits, or less for term.

³ Society Fee for the appropriate faculty is an additional charge. (+)

⁴ Course NOT for credit, for interest only. If during session a charge from audit to credit is desired, an additional charge of \$25.00 plus the difference in fee for credit course is charged. See Regulation 16 of the Undergraduate Calendar for deadline.

Residence Fees and Meal Charges 1987/88

Period September 3, 1987 to the day in April of the last examination in the Faculty of Arts and Science (exclusive of Christmas vacation).
Does not apply to Ferwick Place.

SUBJECT TO CHANGE

	Prepaid Total	In Full Deposit	Payable At Reg	Balance At Reg	January ⁶
Howe Hall¹					
Single Room	\$3,670.00	\$125.00	\$3,570.00	\$1,800.00	\$1,780.00
Double Room	3,365.00	125.00	3,265.00	1,800.00	1,475.00
Shirreff Hall²					
Single Room	3,655.00	125.00	3,555.00	1,800.00	1,765.00
Double Room	3,450.00	125.00	3,350.00	1,800.00	1,560.00
Residence Houses³					
Single Room	2,135.00	125.00	2,035.00	1,050.00	985.00
Double Room	1,860.00	125.00	1,760.00	1,050.00	720.00
Glengary Apartments⁴					
Single Room	2,190.00	125.00	2,090.00	1,080.00	1,020.00
Double Room	1,935.00	125.00	1,835.00	1,080.00	765.00
Bachelor Apartments	3,000.00	125.00	2,900.00	1,500.00	1,410.00
Ferwick Place⁵					
Student shared rates					
2 person	2,620.00	125.00	2,620.00	1,310.00	1,310.00
3 person	2,060.00	125.00	2,060.00	1,030.00	1,030.00
4 person	2,130.00	125.00	2,130.00	1,065.00	1,065.00
Meals Only					
Special rate for session:					
3 meals per day	1,570.00				
2 meals per day	1,510.00				

¹ Charges include residence membership fee of \$25.00 and key deposit of \$6.00. The prepaid deposit includes a \$25.00 application fee which is non-redeemable.

² Charges include residence membership fee of \$30.00 and key deposit of \$10.00. The prepaid deposit includes a \$25.00 application fee which is non-redeemable.

³ Charges include key deposit of \$10.00. The prepaid deposit includes a \$25.00 application fee which is non-redeemable.

⁴ Charges include caution deposit \$45.00 and key deposit of \$15.00. The prepaid deposit includes a \$25.00 application fee which is non-redeemable.

⁵ The \$125.00 prepaid deposit is a damage deposit — see application for details. The \$10.00 service charge is not applicable. Ferwick fees cover the following time period: September 7, 1987 — April 17, 1988 (Christmas vacation included).

⁶ Charges include service charge of \$10.00.

Continuing Studies

Henson College of Public Affairs and Continuing Education

Henson College offers Adult and Part-time Students:

- assistance in planning credit and degree programs
- information about evening and summer classes
- non-credit, general interest classes
- training for managers in the private sector and for municipal administrators
- labour studies
- correspondence courses in business
- and much more . . .

Henson College is Dalhousie's newest academic unit. Named in honour of Guy Henson, one of Nova Scotia's leading adult educators, the College has been created to serve the needs and promote the interests of adult and part-time learners, both those who are pursuing degree programs and those interested in non-credit classes. The foundation of Henson College signals Dalhousie's commitment to make itself more accessible to those who have special educational needs: those who can study only on a part-time basis; those who cannot attend classes during the working day; those who are returning to study after an absence from formal education; those seeking to improve skills and qualifications through credit, non-credit or special programs.

Henson College brings together two existing Dalhousie units: the Institute of Public Affairs and the Office of Part-time Studies. The latter has had the responsibility for Summer School, general interest extension classes and the expansion of part-time studies. The former has been concerned with social policy studies, a variety of community service activities and non-credit programs in public administration, management and labour leadership. To these has been added a new division for credit studies, charged with expanding evening credit programs, developing certificates and other new types of part-time offerings. The College supports a unit devoted to the development of modern educational technologies for the delivery of off-campus instruction. Henson College also offers cooperative support to Dalhousie's professional schools in their programs of continuing professional education.

Part-time and adult students are encouraged to contact Henson College in order to take advantage of the services which we can offer. In addition to pre-admission counselling on an individual basis, the College sponsors a "Returning to Learning" orientation each September, in cooperation with Counselling Services. The Centre for Continuing Studies offers advice to those with special needs and our hours have been extended to assist those who work during the day. A variety of brochures are available, describing summer school and evening credit classes, non-credit and general interest courses, and all of the other continuing education offerings of Henson College.

Henson College is located at the corner of University Avenue and Seymour Street. The main telephone number is 424-2526.

Officers

(Note: For general information, particularly with regard to credit

studies and degree programs, students may call the Centre for Continuing Studies, 424-2375.

Dean, Douglas Myers, BA, BEd, MA, PhD (Edinburgh), Professor of Education

Advanced Management Centre
Director, John H. Dougall, BA (Dalhousie), MBA (Western Ontario)

Distance Education and Educational Technology
Director, Katharine Rice, BBA (Mt. St. Vincent), MA (McGill)

Research Unit
Research Coordinator, Stephen Macdonald, BA, MA (Dal)

Centre for Continuing Studies
Director, Stephen Frick, BA (Toronto), PhD (Cornell)
Associate Director, Lloyd Fraser, BA, BEd (Mt. Allison), MEd (Dal)

Community Development and Outreach
Director, Mary Morrissey, BA (Western Ont.), MSW (Dal)

Municipal Administration Program
Director, Jack Novack, BComm, MPA (Dalhousie)

Academic Credit Programs

Part-time students are admitted to many of Dalhousie's credit programs, either to work toward a degree or simply to take individual classes. Admission requirements and regulations generally are the same for all students, although special provision is made for the admission of mature persons. For information on admission and registration procedures, degree requirements, fees, etc. see the entries elsewhere in this Calendar. For regulations concerning graduate study, consult the calendar of the Faculty of Graduate Studies.

Scholarships and Financial Aid

Certain awards and scholarships are available for part-time students who qualify. Details may be found in the booklet "Scholarships, Prizes and Financial Aid" available from the Awards Office.

Special Opportunities for Study and Development

A wide variety of non-credit courses is available in such areas as computers, language programs, (Mini-Immersion in French, plus a variety of self-instructional programs), the arts, law, health, social issues, career development and career change. Call the Centre for Continuing Studies at 424-2375.

Correspondence Courses

The Advanced Management Centre, in cooperation with Dalhousie's School of Business Administration, has developed a series of credit and non-credit correspondence courses in over 15 areas of business administration: accounting, business law, marketing management, finance, plus many others. Call the Advanced Management Centre at 424-2410 or 424-2526.

Henson College, in cooperation with Dalhousie's School of Public Administration offers a series of credit courses by correspondence leading to a certificate in Public Administration. For additional information call 424-8885 or 424-2526.

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Lady Beaverbrook, LLD

President and Vice-Chancellor

Howard C. Clark, BSc, MSc, PhD, ScD.

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 Medicine: T.J. (Jock) Murray, MD, FRCP(C)

Henson College of Public Affairs and Continuing Education

Dean: J. Douglas Myers, BA, BEd, MA, PhD

Other Administrative Officers

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 Director of Admissions: William D. Courier, BSc, MSc, PhD
 University Librarian: William F. Birdsall, MA, PhD
 Executive Director, Computer and Information Services: Peter Jones, MSc
 Director of the Dalhousie Arts Centre: Murray Farr
 Director of Alumni Affairs: TBA
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 Director, Physical Plant and Planning: William Lord, BAsc, PEng
 Director, University Health Services: Rosemary Gill, MD
 University Secretary and Legal Counsel: Brian C. Crocker, BA, LLB

Faculty of Arts and Science

Introduction

The Faculty of Arts and Science consists of several groups of persons: some four thousand undergraduate students who typically spend three or four years in the faculty, over four hundred teaching and research faculty members most of whose positions are more or less permanent as well as a number of part-time teachers, and a third important element consisting of the support staff of secretaries, technicians, etc. Academically, the student's almost exclusive role is to learn — from teachers, from laboratory experience, from books, from other students and from solitary contemplation. Students learn not only facts but concepts, and most important, learn how to learn. Almost all of what undergraduate students learn of fact, concepts and methods, although new to them, is not new to the world.

Through intellectual interaction with other members of the academic community, undergraduate students should gain the background knowledge, the ability and the appetite for independent discovery. This point is marked formally by the award of a Bachelor's degree.

The academic faculty have two equally important roles: to teach the same facts, concepts and methods that the student must learn; and to contribute to human knowledge through research, scholarly or artistic activities.

The Faculty of Arts and Science at Dalhousie is divided into twenty-three departments representing at least that number of intellectual disciplines. Most of the departments are devoted either to the liberal arts or the pure sciences. In addition, at Dalhousie this Faculty contains a second group of quasi-professional departments including Music, Theatre, Education and Engineering. An important role of these professional departments is to prepare students for employment in the corresponding profession.

Much less well understood is the role of the liberal arts and pure science departments. The Bachelor's degrees of BA or BSc are not intended to signify that the student is qualified for any particular job. The goal of such programs is simply to produce educated persons with competence in one or more subjects. Such competence includes not only factual knowledge but more importantly the ability to think critically, to interpret evidence, to raise significant questions and solve problems. A BA or a BSc often plays a second role as a prerequisite to a professional program of study or as a step towards a PhD in an arts or science discipline.

The non-professional departments in Dalhousie's Faculty of Arts and Science comprise the humanities, including languages, social sciences, life sciences, physical sciences and mathematical sciences. Students in BA programs should sample classes across these areas to have a better appreciation of the nature of a variety of disciplines. The section of the year which follows describes the nature of the subjects which can be studied in the Faculty of Arts and Science at Dalhousie, the content of the classes offered, the regulations governing admission, and the nature of the degrees. It is designed to help those who wish to enrol in the Faculty of Arts and Science as those who are already enrolled, to make informed decisions about their programs of study.

The associate deans and assistant dean of Arts and Science and the directors of the departments and other members designated as advisors are available for general consultation and are ready to help students choose their programs of study. In the latter activity they are assisted by the Director of Admissions, and all new students are invited to discuss their proposed academic programs with him before registration. The Dean of the Faculty of Arts and Science, the Director of Admissions, and the Registrar are prepared to answer questions about the Faculty of Arts and Science and to answer general questions about the University Regulations and to answer general questions about the Faculty of Arts and Science. The Director of Awards is available for advice and information regarding awards, scholarships, and other financial aid. Students who wish to take a postgraduate degree should consult the Director of Postgraduate Studies before they intend to specialize before finally deciding on the general and an honours undergraduate program.

Officers of the Faculty

Dean of the Faculty of Arts and Science

D.D. Betts, BSc, MSc (Dal), PhD (McG), FRSC, Professor of Physics

Associate Deans of the Faculty

A.R. Andrews, BA, Dipl. Ed., MA (Leeds), PhD (Ill.), FRSA, Professor of Theatre.

T.S. Cameron, BA, MA, DPhil (Oxon.), Professor of Chemistry

Assistant Dean of the Faculty

M.M. Furrow, BA (Dal), MA, MPhil, PhD (Yale), Assistant Professor of English

Secretary of the Faculty

E.W. Angelopoulos, BSc, BA, MS, PhD (Minn.), Associate Professor of Biology

Administrator

D.G. Miller, BComm (Acadia)

Note: These regulations remain in force only for those students whose first registration in Arts and Science was for the academic year 1987/88 or earlier. Any such students wishing to pursue 20-credit (Advanced Major) degrees should consult their academic advisor and the Office of the Registrar as soon as possible.

1. Definitions

For definitions of some commonly used terms, see page 18.

2. Departments of the Faculty of Arts and Science

Biochemistry (also in the Faculty of Medicine)
 Biology
 Chemistry
 Classics
 Comparative Religion
 Economics
 Education
 Engineering
 English
 French
 Geology
 German
 History
 Mathematics, Statistics and Computing Science
 Microbiology (also in the Faculty of Medicine)
 Music
 Oceanography
 Philosophy
 Physics
 Political Science
 Psychology
 Russian
 Sociology and Social Anthropology
 Spanish
 Theatre

3. Subject Grouping

The various subjects in which instruction is offered are grouped as follows:

A. Languages: French, German, Russian, Spanish, as well as Greek and

Latin (see: Classics)

B. Humanities: Classics, Comparative Literature, Comparative Religion, English, History, Medieval Studies, Music, Philosophy, and Theatre.

C. Social Sciences: African Studies, Economics, Education, History, International Development Studies, Political Science, Psychology, and Sociology and Social Anthropology.

D. Sciences: Biochemistry, Biology, Chemistry, Computing Science, Geology, Mathematics, Microbiology, Neuroscience, Oceanography, Physics, and Statistics.

Classes are also offered in Architecture, Education, Engineering.

4. Programs Offered

Programs leading to the following qualifications are offered: Bachelor of Arts, Bachelor of Science, Bachelor of Education, Bachelor of Music, Bachelor of Music Education, Diploma in Engineering, Certificate in Costume Studies, Diploma in Costume Studies, Diploma in Meteorology, and Certificate in Educational Administration.

Many of the classes offered may be taken on a non-degree basis by persons who do not wish to study for a degree.

5. Admission Requirements

Applications are available at the Registrar's office, Arts and Administration Building, Dalhousie University, Halifax, Nova Scotia B3H 4H6.

5.1 Students from Nova Scotia High Schools

At least five senior level university preparatory classes should be taken in the grade XII year as follows:

- English.
- At least two of Biology, Chemistry, French, German, History, Latin, Mathematics and Physics.
- The remaining classes may be from those listed above or from Economics, Geography, Geology, Law, Modern World Problems, Music, Political Science, Sociology, Spanish.

Any special or experimental classes must have been previously approved by Dalhousie if acceptance for credit for admission is to be assured.

A passing grade of at least 50% is required in each class, with an average of at least 60%. Special consideration will be given to grades in English and Mathematics.

For certain programs there are additional requirements. These include the following:

Bachelor of Science; Grade XII Mathematics 441;

Diploma in Engineering; Grade XII Mathematics 441, Chemistry and Physics.

Mathematics 441 is required for admission to Mathematics and Computing Science classes.

For special requirements in Music and Education, see the department entries.

The University does not apply criteria rigidly. Students who do not meet the above requirements, particularly those with high standing, are invited to apply and will be given consideration as special cases.

5.2 Admission from Outside Nova Scotia Students are accepted from other provinces and countries at levels as shown below, which are considered equivalent for the purpose of admission to Nova Scotia Grade XII:

New Brunswick, Newfoundland, Labrador, Prince Edward Island, Manitoba, Saskatchewan, Alberta, British Columbia: Grade XII, with subject distribution as for Nova Scotia.

Quebec: Two years at CEGEP. In special cases, one year CEGEP (high

standing in a strong program required).

Ontario: Grade XIII or very high standing in Grade XII.

U.S.A.: Outstanding students may be admitted from U.S.A. Grade XII on the basis of advanced placement work or high SAT or CEEB scores; transfer credits will be considered for such outstanding students if they have completed a full year of study with good standing (minimum: 30 semester hours) at a recognized university. Other students from the U.S.A. can normally be admitted only after completing a first year at a recognized university or junior college (minimum: 30 semester hours). Credit, if any, for that year's work is determined on an individual basis.

The United Kingdom, West Indies, West Africa: General Certificate of Education (GCE) with pass standing in at least five subjects, of which one must be English and at least two must be at Advanced Level.

Hong Kong: GCE as for Great Britain, or University of Hong Kong Matriculation Certificate under same conditions as for GCE.

Bangladesh, India, Pakistan: Bachelor's degree with first or second-class standing from a recognized university; or in certain circumstances, first-class standing in the Intermediate examinations in Arts and Science, provided the candidate has passed at the university level in English, Mathematics, and a language other than English. Note: This standing is not sufficient for admission to the sequential BEd program at Dalhousie.

Countries not mentioned above: Write to the Admissions Office, Dalhousie University, Halifax, N.S. B3H 4H6, for further information.

5.3 Transfers from Colleges and other Universities

Students who have begun their post-secondary studies elsewhere, and who are in good standing, may be considered for admission. Credit for work completed may be granted, subject to the conditions given in section 13, page 28.

5.4 Transfer Credits from Dental Hygiene

Students who hold a diploma in Dental Hygiene under the present two-year program may be admitted to a BSc or a BA with advanced standing of five full credits.

5.5 Mature Students

Students who do not meet the usual admission requirements may be considered under the *mature student* category provided that

- they are at least 23 years old, and
- they have been absent from full-time high school study for at least four years

Prospective students should submit to the Admissions Committee an application form together with a letter outlining their work experience and other activities. Normally, high school transcripts are required and interviews may be required.

Under exceptional circumstances, the Admissions Committee may agree to admit the student directly to a degree program if the student's background is deemed sufficient preparation for such admission. Otherwise, the Admissions Committee may admit mature students initially to the *University Exploration* category until they have achieved grades of C- or better in at least three full-year classes (or equivalent) taken. At that time, they are eligible to apply for admission as regular undergraduate students.

Mature students are advised to contact Henson College at 424-2526 for pre- and post-admission counselling (see page 22).

5.6 Proficiency in English

Applicants for admission whose native language is not English must give evidence that they are proficient in spoken and written English. Evidence may be provided by the English Language Test of the University of Michigan, or the Test of English as a Foreign Language (TOEFL) (normally with a score of at least 550). Both of these tests are administered in various centres throughout the world. Information may be obtained by writing to the

English Language Institute, Testing and Certification Service, Ann Arbor, Michigan 48104, U.S.A. or TOEFL Box 899, Princeton, New Jersey 08540, U.S.A.

Certified copies of original documents, or relevant sections of documents (e.g. calendar pages) are acceptable in lieu of originals. Certificates in languages other than English or French must be accompanied by certified translation into English or French.

5.7 January Admissions

Admission to Dalhousie is normally for classes beginning in September, and the University does not admit full-time, first year students in January. Part-time students and transfer students, however, may be admitted for classes beginning in January. The deadline for application for January admission is November 15.

6. Student Aid, Scholarships and Other Awards

A separate booklet, Scholarships, Prizes and Financial Aid, is available, on request, from the Director of Awards and Student Aid, Dalhousie University.

7. Admission to Classes

7.1 Numbering of Classes

Classes are numbered to indicate their general level. Those in the 1000 series are introductory and can normally be taken by fully matriculated students without any previous classes at Dalhousie, while classes in the 2000, 3000, and 4000 series are usually first available to students in the second, third, and fourth years, respectively. Often these classes have prerequisites. Some departments have minimum grade requirements for entry into classes above the 1000-level. Such requirements are listed in the calendar entries for the departments concerned.

The letter following a class number indicates the session in which the class is offered. The letters A and B denote classes given in the first and second terms respectively. The symbol A/B indicates a class given in the first term and/or in the second term. Students should consult timetables to verify whether a particular class will be offered in the A or B term in a given academic year. The letters C and R denote classes spread over both terms, i.e., given for the full academic year. An R class carries one full credit or more, and a C class less than one full credit. For summer sessions, A denotes a class given in the first three weeks, B a class given in the second three weeks, and R and C classes continuing for six weeks.

Classes with numbers below 1000 do not carry credits but may be prerequisites for entry to credit classes for students whose matriculation backgrounds are deficient.

7.2 Academic Advice

At Dalhousie all students are offered academic advice prior to registration. First-year students, particularly those in BA and BSc programs, may wish to consult with the Director of Admissions or Registrar, or with a Faculty advisor in an academic department of particular interest. After the first year, students plan their programs in consultation with Faculty advisors in their major departments. Each student must complete a Class Approval Form, obtainable from academic departments or the Office of the Registrar. This form must be completed before registering.

Students can be registered only after the Class Approval Form is completed and submitted.

NOTE THAT THE COMPLETION AND SUBMISSION OF A CLASS APPROVAL FORM DOES NOT CONSTITUTE REGISTRATION.

Registration is complete only after the registration form, which will be provided to each eligible student, is submitted to the Office of the Registrar and financial arrangements have been made with the Student Accounts office.

8. Registration

Registration material and detailed information will be sent to all eligible students except those admitted late, in which cases documentation must be completed in person. After the Class Approval Form has been completed (see above) students may register, either in person or by mail. Late registration requires approval of the Dean. In Arts and Science, such approval will be automatic during the month of September. Thereafter, up to and including October 15 the Dean of Arts and Science will grant approval only when compelling reasons for the applicant's lateness can be given. After October 15 approval is extremely unlikely.

A STUDENT IS REGISTERED ONLY AFTER FINANCIAL ARRANGEMENTS HAVE BEEN MADE AT THE ACCOUNTS OFFICE.

9. ID Card

Upon registration; a receipt which is also a requisition for an ID Card will be issued by the accounts office. An ID Card which gives the student access to many campus services and activities may then be obtained at the ID Unit. The Unit is open during special registration periods, of which all students are notified, and at other times as posted by the Unit, which is located in the basement of the Arts and Administration Building.

NOTE: It is University Policy that all students requesting the release of funds from the Awards Office must present a current valid Dalhousie University Student Identification Card.

10. Withdrawal and Change of Registration

10.1 Responsibility of Registered Students

Students who have registered are responsible for fees. Those who withdraw from the University may be entitled to refunds of fees. Withdrawals are not effective until notification is received at the Office of the Registrar.

NON-ATTENDANCE DOES NOT, IN ITSELF, CONSTITUTE WITHDRAWAL.

10.2 Class Changes

It is recognized that some students may wish to make changes in programs already arranged. Class changes will normally be completed during the second week after the beginning of the class. (For summer session information see the Summer School Calendar.) No change is effective until a change form, available at the Office of the Registrar, is received by that Office.

See the almanac for deadlines for adding and dropping classes, and the Dalhousie University Fees Handbook for the schedule of refunds.

Old 11. Degree, Certificate and Diploma Requirements

11.1 Bachelor of Arts, Bachelor of Science — Major Programs

(a) First Year. In the first year full-time students normally take five full-credit classes or the equivalent in half-credit classes, chosen from subject groups A, B, C, and D listed in section 3 on page 24. (The King's Foundation Year Program is equivalent to four credits for BA candidates or three credits for BSc candidates. This program is only available to King's students.) For part-time students the first five credits taken constitute the work of the first year.

Students in the first year may not take for credit more than the equivalent of two full-credit classes in a single subject from the subject groups given in section 3 on page 24.

One of the five classes chosen must be selected from a list of classes in which written work is considered frequently and in detail. These writing classes are approved by the Curriculum Committee and are listed below.

Chemistry 1000, Classics 1000, 1010, 1100, Comparative Religion 1301, English 1000, German 1000, 1050, History 1400, 1990, Philosophy 1010, 1030, Political Science 1103, Spanish 1100A/B and 1110A/B. (The King's Foundation Year Program also satisfies this requirement.)

In order to qualify for a BSc degree candidates are required to complete successfully at least one full University credit in Mathematics other than Mathematics 1020 and Mathematics 1100 and 1110.

Students should seriously consider choosing a class from a list of classes which deal with a formal subject. Classes which are recognized as formal are:

Chemistry 1100, 1110, 1120, 1200, Computing Science (all classes), Economics 1106A/B, 1107A/B, 2222A, 2223B, 2228 Mathematics (all classes), Philosophy 2110, 2130A, 2140B, 2190A/B, 2660, Physics 1000, 1100, 1300, Political Science 2494, 3495A/B.

Students should consider becoming fluent in French.

It is recommended that one class be chosen from each of the groups, A, B, C, and D listed in section 3 on page 24. (This recommendation does not apply to students entering the King's Foundation Year Program.)

For students enrolled at the University of King's College, the King's Foundation Year Program offers first-year students in Arts and Science an integrated introduction to the humanities and social sciences through study of some of the principal works of western culture. Details are to be found in the calendar of the University of King's College, and advice may be obtained from the Director of the Program.

If students who have not completed their first year wish to enrol for further study, they must complete the first-year requirements at the first opportunity.

(b) **Second and Third Years.** Before registering for the second year, each student must declare a major, or area of concentration, and obtain program advice and approval from a faculty advisor in the major department. (This may be done before registering for the first year, at the option of the student.)

Ten full credits, or the equivalent in half-credit classes, make up the course for the second and third years. These must meet the following requirements:

- (a) at least seven credits shall be beyond the 1000 level.
- (b) at least one credit or two half-credits shall be in each of at least two subjects other than the major field.
- (c) at least four and no more than eight credits beyond the 1000 level shall be in a single area of concentration (the major).
- (d) up to four of the credits in the major subject must be selected in accordance with departmental or interdepartmental requirements.

For the BA, the major may be chosen from African Studies, Classics, Comparative Religion, Economics, English, French, German, Greek, History, International Development Studies, Latin, Music, Philosophy, Political Science, Russian, Sociology and Social Anthropology, Spanish, Theatre, Women's Studies or from any of the BSc major subjects.

For the BSc the major subject may be chosen from Biology, Chemistry, Computing Science, Geology, Mathematics, Neuroscience, Physics, Psychology, or Statistics.

For the standing required for a BSc or BA see section 22.

11.2 Arts and Science Electives

Students may choose electives from any of the classes listed by departments offering major or honours programs in the Faculty of Arts and Science. Up to three classes may be taken from the following:

- (a) Architecture 1000, and Comparative Literature 1000;
- (b) Education Foundation Offerings (Education classes with numbers below 4400).
Note: Education classes numbered 4400 and above are not available as Arts and Science electives;
- (c) Classes in Engineering and Oceanography.
Note: The restriction on Engineering electives does not apply to students in the Diploma in Engineering Program who combine their studies with a program leading to a BSc in Biology, Chemistry, Computing Science, Geology, Mathematics, Physics, or Statistics. (See

the entry for the Department of Engineering page 76).

(d) Classes in Music. Note: Music classes 1000, 1001A, 1002B, 2007, 2008, 2087, 2010, 2011, 2012, and 2013, and 2021 are available as electives for students not enrolled in Music degree programs.

Note: Other classes in Music may be taken by special permission of the Department of Music.

(e) The following approved classes from other faculties and institutions: Commerce 1101A/B, 1102A/B, 1401A/B, 2201A/B, 2301A/B, 2302B, 2601A/B, 3203A/B, 3304A/B, 3306A/B, 3308B, 3501A/B, 4120A/B and Health Education 4412.

Note: Students enrolling in elective classes must meet normal class prerequisites.

11.3 Individual Programs: In cases where students feel that their academic needs are not satisfied under the above requirements, individual programs may be submitted to the Curriculum Committee. The Dean shall act as advisor for such students.

11.4 Bachelor of Arts and Bachelor of Science — Honours Programs

Second, Third and Fourth Years. Able and ambitious students are urged to enter Honours Programs. These programs require a higher quality of work than is required by major programs.

For the BA, the Honours subject may be chosen from Classics, Economics, English, French, German, History, International Development Studies, Philosophy, Political Science, Russian, Social Anthropology, Sociology, Spanish and Theatre or any of the BSc Honours subjects.

For the BSc, the Honours subject may be chosen from Biochemistry, Biology, Chemistry, Computing Science, Geology, Marine Biology, Mathematics, Microbiology, Neuroscience, Physics, Psychology and Statistics.

There are three types of honours programs: major, combined and unconcentrated.

Applications for admission to honours programs must be made to the departments concerned on forms available in departments and at the Office of the Registrar. The Registrar may be consulted by those considering unconcentrated honours.

Students should apply before registering for the second year. If application is made later, it may be necessary to make up some work not previously taken.

For each individual student the entire honours program, including elective credits, is subject to supervision and approval by the department or departments concerned, or in the case of unconcentrated honours, by an interdisciplinary committee approved by the Committee on Studies.

All of the regulations for the BA or BSc major program must be satisfied, and there are additional requirements as follows:

Honours in a major program is based on the general requirement that the 15 credits beyond the first year of study comprise:

- (a) A normal requirement of nine credits beyond the 1000-level in one subject (the major subject). Students may, with the approval of the department concerned, elect a maximum of eleven credits in this area. In this case (c) below will be reduced to two or three credits.
- (b) Two credits in a minor subject satisfactory to the major department.
- (c) Four elective credits not in the major field.
- (d) An additional grade (see Honours Qualifying Examination below).

Honours in a combined program is based on the general requirement that the 15 credits beyond the first year of study comprise:

- (a) A normal requirement of eleven credits beyond the 1000-level in two allied subjects, not more than seven credits being in either of them. Students may, with the approval of the departments concerned, elect a maximum of thirteen credits in two allied subjects, not more than nine credits being in either of them. In this case the requirement in (b) below is reduced to two or three credits.
- (b) Four elective credits in subjects other than the two offered to satisfy

the requirement of the preceding clause.

(c) An additional grade (see Honours Qualifying Examination below).

Details of specific departmental honours programs are given under departmental listings of Programs of Study.

Unconcentrated Honours programs are based on the general requirement that the 15 credits, beyond the first year of study comprise:

(a) Twelve credits beyond the 1000-level in three or more subjects. No more than five of these may be in a single subject; no less than six nor more than nine may be in two subjects.

(b) Three elective credits.

(c) For an Unconcentrated BA (Honours), at least ten credits of the twenty selected must be selected from subject groups A, B, C and D listed on page 24 and 25.

(d) For an Unconcentrated BSc (Honours); at least eight credits of the twenty required must be selected from Biochemistry, Biology, Chemistry, Computing Science, Geology, Mathematics, Microbiology, Neuroscience, Physics, Psychology, and Statistics, and at least six additional classes must be selected from subject groups C and D listed on page 25.

(e) An additional grade (see Honours Qualifying Examination below).

Honours Qualifying Examination. At the conclusion of an Honours program a student's record must show a grade which is additional to those for the required twenty classes. This grade may be obtained through a comprehensive examination, the presentation of a research paper (which may be an extension of one of the classes), or such other method as may be determined by the committee or department supervising the student's program. The method by which this additional grade is obtained is referred to as the Honours Qualifying Examination. Departments may elect to use a pass-fail grading system for this examination.

For the standing required for honours see section 22.3 on page 31.

11.5 Conversion of a BA or BSc to an Honours Degree

A person who holds a BA or BSc may apply through his/her department advisor for an honours program. On completion of the required work with proper standing, a certificate will be awarded which has the effect of upgrading the degree to honours status.

11.6 Co-operative Education Programs

Certain departments, currently Chemistry, Physics and Mathematics, Statistics and Computing Science, offer integrated programs of academic study and supervised work terms. On completion of the programs, Honours degrees in the relevant disciplines are awarded. For details, see the entries for the departments named above.

11.7 Joint Honours: Dalhousie-Mount Saint Vincent

Special arrangements exist under which students may be permitted to pursue an honours program jointly at Dalhousie and Mount Saint Vincent Universities. Interested applicants should consult the appropriate department of their own university at the beginning of the second year. Prospective joint honours students must be accepted by the major departments concerned at both institutions. These departments supervise the entire program of study of accepted applicants. Students should be aware that not all classes available for credit at Mount Saint Vincent can be given credit at Dalhousie and vice versa. In order for students to obtain a joint honours degree they must satisfy all requirements of both institutions.

11.8 Bachelor of Music and Bachelor of Music Education

For the special requirements of these degrees, see the entry for the Music Department, page 111.

11.9 Diploma in Engineering

For details of the requirements for the diploma, see the entry for the Department of Engineering on page 76.

11.10 Bachelor of Education

Admission to this program normally requires that the applicant holds a prior undergraduate degree, or is simultaneously enrolled for one. There is, however, an arrangement under which it is possible to obtain a BEd in association with the Nova Scotia Teachers' College as a first degree.

For details about BEd programs, see the entry for the Department of Education, page 71.

11.11 Certificate and Diploma in Costume Studies

Study for these credentials is entirely within the Department of Theatre. See the entry for that department for detailed information, page 154.

11.12 Certificate in Educational Administration

For details about this program, see the entry for the Department of Education, page 73.

11.13 Diploma in Meteorology

Details of the requirements for this diploma may be found in the entry of the Department of Physics, page 125.

11.14 Transition Year Program

For details about the program, see the entry on page 154.

Old 12. Counting of Classes for Two Undergraduate Degrees

Students who hold one undergraduate degree from Dalhousie and who wish to gain a second undergraduate degree must fulfil the requirements of the second degree and meet the following stipulations:

- (a) Only classes that are applicable to the course for the second degree may be counted for credit.
- (b) Each class carried forward must have a grade of C or higher.
- (c) A minimum of six new full-credit classes must be taken, (11 for a 20-credit program,) four of which must be above the 1000 level in a new area of concentration and two normally in other subjects.
- (d) A minimum of five new full-credit classes must be taken at Dalhousie itself and may not be transfer credits (10 for a 20-credit program).
- (e) Merit points must be scored on the new classes as required by Regulation 22 below.

Students intending to gain a second undergraduate degree should consult with the department in which the new major classes will be taken to plan their program of studies. Application must be made to the Registrar prior to enrolment in any of the classes which constitute the minimum additional requirement. This application must give details of the proposed program and must be supported by the new major department.

Students who hold one undergraduate degree from another recognized university, and who wish to gain a second undergraduate degree from Dalhousie University, must complete at least half of the classes for that degree at Dalhousie. Accordingly, they must meet the requirements set out above but must take a minimum of seven and one-half credits for a 15-credit program, at least four of which must be above the 1000 level in a new area of concentration, and at least two in other subjects. At least 10 credits must be taken at Dalhousie for a 20-credit program.

13. Transfer Credit

- (a) Students from another college or university who are not eligible for readmission to that college or university will not be admitted to Dalhousie.
- (b) No credit will be given for any work used as the basis for admission.
- (c) No transfer credit will be granted for any class in which a final mark of less than C (or the equivalent in Dalhousie terms) was obtained, or for any class in which a final mark was granted conditionally.
- (d) To obtain a first degree or diploma in the Faculty of Arts and Science, at least half of the classes, including at least half in the field of concentration, must normally be taken at Dalhousie.
- (e) Students in Arts and Science who wish to complete honours

programs must attend Dalhousie for the last ten credits unless special permission to the contrary is obtained from the Committee on Studies.

(f) No classes taken at another institution will be counted towards fulfillment of the concentration requirement of the Bachelor's degree or the principal subject requirement of an honours program without specific advance approval from the department concerned at Dalhousie.

(g) Transfer credits may be granted only for classes which are offered by a recognized university or equivalent institution of higher learning and which are judged to be of comparable standard to classes offered at Dalhousie and to be appropriate to an academic program of the faculty.

(h) Transfer credits for classes that lie within the scope of Dalhousie departments are subject to approval by those departments.

(i) Transfer credits are not normally granted for classes that are not within the scope of any Dalhousie department. Students may, however, apply to the Committee on Studies for credit for such classes but they must justify the inclusion of such classes in their proposed program.

(j) No credit will be given for any classes taken at another university while a student is inadmissible at Dalhousie. Students who have been permitted to reregister, after having been declared ineligible at Dalhousie, cannot take classes at another institution for Dalhousie credit until they have taken further Dalhousie classes.

(k) No grades are recorded for transfer credits awarded on admission to Dalhousie. However, for classes taken on Letters of Permission while a student is registered at Dalhousie, grades are recorded.

14. Advanced Placement

Students possessing advanced knowledge of a subject which was acquired other than at a university will be encouraged to begin their studies in that subject at a level appropriate to their knowledge, as determined by the department concerned, and will be exempted from any classes which are normally prerequisites for the one to which they are admitted. However, such students must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e. they must complete at Dalhousie the full number of credits required for the particular credential being sought).

15. Part-Time Students

Part-time students are admitted to most of the programs offered in the Faculty. Admission requirements and regulations generally are the same for all students. For part-time students the first five credits taken constitute the work of the first year. Part-time students are encouraged to consult with the Dean of Henson College for advice on their academic programs and other matters.

16. Audit of Classes

Students who have been admitted to the faculty are permitted to audit many of the classes offered. For those who are not full-time students, fees are payable as indicated in the Dalhousie University Fees Handbook. A class may not be changed from credit to audit or from audit to credit status after the last date for dropping classes without penalty (see the almanac, page 4). In order to change from audit to credit prior to the deadline an additional fee is required. Permitted changes require that the procedures as given in section 10.2 on page 26 be followed.

17. Duration of Undergraduate Studies

Students are normally required to complete their undergraduate studies within ten years of their first registration, and to comply with the regulations in force at the time of that registration. This is also the normal limit for transfer credits. However, the Committee on Studies may grant permission to continue studies for a reasonable further period, subject to such conditions as the Committee deems appropriate and with the stipulation that the student must meet the degree requirements in force when the extension is granted.

18. Preparation for Other Programs

Work in the Faculty of Arts and Science is prerequisite for various programs in other faculties and other institutions. A brief summary of the academic work required for admission to certain programs is given here. Further

information may be found later in this calendar, or in the separate faculty calendars, or in the calendars of other institutions.

Occupational Therapy or Physiotherapy: One year of work in the Faculty of Arts and Science, or the equivalent elsewhere, is required for admission to these two programs. For details, see the entries in this calendar for the School of Occupational Therapy and the School of Physiotherapy.

Medicine: At least two years of work at Dalhousie, or the equivalent elsewhere, including English 1000, Biology 1000 or 2000, one of Chemistry 1100, 1110, 1120, or 1200, Chemistry 2400, Physics 1000, or 1100, or 1300 or equivalent classes.

Dentistry: See Faculty of Dentistry calendar.

Law: At least two years of work leading to one of the degrees of BA, BSc, BCom.

Engineering: The Diploma in Engineering qualifies a student for entry to the Technical University of Nova Scotia to study Engineering.

Architecture: Two years of work, including at least one class in mathematics, are required for entry to a program in Architecture at the Technical University of Nova Scotia. For details, apply to the Faculty of Architecture at TUNS.

Engineering Physics: A degree in Engineering Physics is offered by the Technical University of Nova Scotia in cooperation with Dalhousie. The Diploma in Engineering is prerequisite for admission to this program at TUNS.

Design: Students completing one year in the Faculty of Arts and Science of Dalhousie may be admitted into the second year of the four-year program leading to the Bachelor of Design degree in Communication Design or Environmental Design at the Nova Scotia College of Art and Design.

Veterinary Medicine: Normally three years of work at Dalhousie are required for admission to the Atlantic Veterinary College of the University of Prince Edward Island. Dalhousie classes should normally include Computing Science 1400, Mathematics 1000 and 1080, one of Chemistry 1100, 1110, or 1200, Chemistry 2400, Biochemistry 2000, one of Physics 1000, 1100 or 1300, English 1000, Biology 1000, 2012, 2030, 2100 and 3323 and an additional two and a half classes from the humanities and social sciences.

Graduate Studies: The normal requirement for admission to a graduate program is an honours degree in an appropriate discipline, or the equivalent.

19. Assessment

19.1 Method

Examinations may be oral, written (closed or open book) under supervision, or take-home. To gain credit toward a degree or diploma, students must appear at all examinations, prepare such essays, exercises, reports, etc., as may be prescribed, attend the classes of their prescribed course to the satisfaction of the instructors and, in classes involving field or laboratory work, complete such work satisfactorily.

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 including information on the availability of a supplemental examination and the proportion of the grade to which such an examination would apply; within four weeks after the beginning of each term the department chairperson must report to the Dean the method of evaluation to be used by each instructor in each class.

19.2 Examinations and Tests

Periods of approximately two weeks in the spring and one and one-half weeks in December are set aside for the scheduling of formal written examinations by the Registrar. Instructors wishing to have examinations scheduled by the Registrar for their classes must so inform the Registrar at the beginning of the third week of classes in the fall and spring terms. Instructors may also arrange their own examinations at times and places of

their choosing during the formal examination periods, with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority. No tests or examinations covering the work of a whole term shall be held during the last two weeks of classes in the term. No tests may be held between the end of classes and the beginning of the official examination period. Students may contact the Dean's Office for assistance if they are scheduled for more than two examinations on the same day.

19.3 Grades

A letter-grade system is used to evaluate performance. Grades in the A range represent excellent performance, grades in the B range represent very good performance, and those in the C range represent satisfactory performance. A grade of D represents marginally acceptable performance except in programs where a minimum grade of C is specified. See the calendar entries for specific programs where a minimum grade of C is specified. F and FM indicate failure, marginal in the case of FM. Grades in the ranges of A, B, C, D and P are passing grades. Other grades, including W, NP, ILL, INC, F and FM, are non-passing grades (see section 26).

19.4 Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar, such grades to be based on the instructor's evaluation of the academic performance of the students in the class in question. Christmas grades must be submitted to the Registrar in all 1000-level classes in which enrollment on October 1 exceeded 25. Christmas grades are normally submitted in other full-year classes.

19.5 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 within four weeks of the required date for submission of grades in that class to the Registrar's Office.

Exceptions to this rule will normally be extended only to classes which require field work during the summer months. At present the list of these classes consists of Biology 4800 and 4900, Music 3470C and 4470C and Education 8490. Students taking any of these classes in their final year should note that they will not be able to graduate at the spring convocation.

19.6 Correction of Errors in Recorded Grades

Correction of errors in the recording of a grade may be made at any time. Otherwise changes will only be made as in Regulation 19.7 below.

Students are not entitled to appeal for any grade change more than six months after the grades are sent from the Registrar's Office.

19.7 Reassessment of a Grade

On payment of a fee, a student may appeal to the Registrar for reassessment of a grade in a class. The Registrar will direct the request to the head of the academic unit concerned, who will ensure that the reassessment is carried out and reported to the Registrar. Written applications for reassessment must be made to the Registrar within two months of the date the grade is sent from the Registrar's Office. Students have a right to view their marked examination papers by appointment for a period of two months from the date the grades are sent to students from the Registrar's Office.

19.8 Special Examinations

Special examinations may be granted to students in the case of illness supported by a medical certificate, or in other exceptional circumstances. Medical certificates must be submitted to the Office of the Registrar at the time of the illness and will not normally be accepted after a lapse of one week from the date of the examination. Arrangements for special examinations should be made with the instructor concerned and the Registrar at the time the illness or other exceptional circumstance arises, or as soon thereafter as possible.

19.9 Supplemental Examinations

One full-credit supplemental examination (or two half-credit supplemental examinations) may be written by any student on the work of any one year, provided that

- (a) the student has obtained a final grade of FM in that class,

- (b) the student has satisfied the requirements for the class,

(c) a single compulsory final examination or test in the class in question accounted for at least forty per cent of the final grade (the supplemental examination should — at the discretion of the department — constitute the same proportion of the final grade as did the final examination during the regular session), and

- (d) the student has not been required to withdraw from the Faculty.

Apart from the case of "A" classes (given in the fall term), the supplemental examinations must be written in the following September. For "A" classes, supplemental examinations must be written in February immediately following the failure. Supplemental examinations may not be deferred.

An eligible student who wishes to write a supplemental examination must submit to the office of the Registrar a completed application form (which may be obtained from that office) and the required fee by July 10 for the September examination, and January 25 for the February examination.

A student who fails to pass the supplemental examination can obtain credit for that class only by repeating it.

A student may not write both a supplemental examination and an examination at the end of Summer School in the same class in the same year. No supplemental examinations are allowed for classes taken at Summer School. No more than five credits obtained as a result of supplemental examinations may be counted toward a degree.

20. Repeating Classes for Which a Passing Grade has been Awarded

With the permission of the department concerned and the endorsement of the Committee on Studies, a student may repeat any class for which a passing grade has previously been awarded. The original passing grade will nevertheless remain on the transcript and a second entry will be recorded with the new grade and the notation "repeated class." No additional credit will be given for such a repeated class, but the higher grade, or point count appropriate to it, will be used for degree purposes. Note that both grades are used in calculating the merit point total when a degree with distinction is awarded.

21. Merit Points

21.1 Scale

Merit points are awarded for each class as follows:

Grade	Points
A+, A, A-	3
B+, B, B-	2
C+, C, C-	1
D	0

For merit points for transfer credits see 21.2 below

Note that although D is a passing grade, no merit points are awarded. For fractional credit classes, corresponding fractional merit points are awarded (e.g. in a half-credit class, a B would yield one point).

21.2 Merit Points for Classes Transferred From Other Institutions

One merit point is awarded for each class transferred from another institution except where:

(a) the external classes are taken to pursue a program of study approved in advance by the Faculty (at the present time this refers only to the programs at Stirling University, Université de Provence (Aix-Marseille), the Pushkin Institute, Leningrad State University and the Colegio de España,

(b) the performance in the external class is first class, and

(c) these classes are approved by the Committee on Studies for that purpose for the particular student.

In these cases merit points may be awarded on the basis of equivalent Dalhousie standing. Departmental advice on the equivalent Dalhousie grade for a particular class is sought where necessary.

Old 22. Required Standing

22.1 For a BA or BSc Degree

A minimum of twelve merit points on the fifteen credits offered is required for the awarding of a BA or BSc.

22.2 For a BA or BSc with Distinction

At least 40 merit points are required. This number is prorated upward if more than fifteen credits appear on the student's record. For the purpose of determining a BA or BSc with distinction all Dalhousie classes, including repeated classes, and classes for which non-passing grades were obtained, are included. At least 10 Dalhousie classes must be included. The Committee on Studies will monitor the records of graduating students having transfer credits and will bring to Faculty appropriate recommendations for a degree with distinction in any case where the regulations regarding transfer credits appear to create injustice.

22.3 BA or BSc with Honours and First Class Honours

Students who have not obtained a grade of B- or better in five advanced classes, that is, classes other than electives, will not be admitted to the fourth Honours year without explicit Departmental recommendation and prior approval of the Committee on Studies.

To count towards an Honours degree each advanced class, i.e., each class of the second, third, and fourth years, except electives, must be passed with a grade of at least C. Should D or C- be received, it must be made good by repeating the class and achieving a C or better grade or by taking an additional advanced class (preferably in the same subject). Otherwise the student must transfer out of the Honours program.

In five of the advanced classes in a student's Honours program, a grade of B or better must be achieved, and in three additional advanced classes, a grade of B- or better is required. For first class Honours, students must achieve either:

- (a) grades of A or better in four advanced classes and of A- or better in four additional advanced classes, or
- (b) grades of A or better in six advanced classes and of B or better in all advanced classes.

The Honours Qualifying Examination as prescribed by the department(s) concerned must be passed. This is the additional grade referred to in section 11. Unless Pass-Fail grading is employed, the grade must be B- or better and for first class Honours, A- or better.

23. Graduation

In order to be graduated students must submit a Request to Graduate to the Registrar's office by the deadlines indicated below.

Graduation Month	Application Deadline
February	December 1
May	February 15
October	August 15

In cases where requests can be accommodated after the deadline, a \$50. fee will be charged.

24. Change from BA to BSc program and vice versa

According to present regulations all students who have completed all the requirements for a BSc degree have automatically completed all the requirements for a BA degree. Similarly most students who have completed all requirements for a BA degree in a science subject will have automatically completed all requirements for a BSc degree. However, students who are registered for a BSc degree and wish to be awarded a BA degree or vice versa must do so by changing their registration at the Office of the Registrar.

25. Workload

25.1 Regular Year

Five full credits per academic year shall be regarded as constituting a

normal workload for a student. Written permission from the Committee on Studies is required if this workload is to be exceeded, or if the planned workload in any term would amount to the equivalent of six half-credit classes. In no case may the workload exceed this. Applications from students who give good reasons for wishing to take an overload, and who in the preceding year completed a full program in good standing, will be considered. Such permission will not normally be granted to any student in the first year of study, or to any student who, in the preceding academic year, earned fewer than ten merit points. Applications from students who were part-time during the preceding year will be considered if they have completed at least five classes and earned on average at least two merit points per class.

25.2 Summer Sessions

Students may not normally take more than one full credit in any summer session, nor may the workload in any one week exceed one sixth of a credit. Exceptions will normally be granted by the Committee on Studies only with respect to attendance at a university which operates a trimester system or its equivalent. Students may apply in advance to the Committee on Studies to increase the workload to a maximum of 2.5 credits by summer school in any one year with a maximum of 1.5 credits in any one summer session.

26. Required Withdrawal

Any student who has accumulated more non-passing grades than the number of merit points earned (see section 19.3 and 21 page 30), is required to withdraw from the Faculty. This regulation applies once students have enrolled for four full credits after admission or readmission.

27. Readmission after Required Withdrawal

Students who have been required to withdraw from the Faculty of Arts and Science may apply to the Admissions Committee to be considered for readmission.

A student who has been required to withdraw from the Faculty of Arts and Science for the first time will be ineligible for readmission for a period of one academic year.

A student who has been required to withdraw twice will be ineligible for readmission to the Faculty as either a full-time or a part-time student. Ordinarily an appeal is allowed only if illness has seriously interrupted the student's studies and this is established by submission to the Registrar of a medical certificate from the physician attending the student at the time of the illness.

28. Off-Campus, Summer School and Correspondence Classes, and Classes Taken at Other Universities under Concurrent Registration

Students should note the special limitations that apply.

28.1 Off-Campus Classes

A maximum of three credits may be taken by off-campus classes, whether offered by Dalhousie or taken from another university under concurrent registration.

28.2 Summer School

Dalhousie currently offers two summer sessions of approximately six weeks each, one in May-June and the other in July-August. See Regulation 25.2 for permitted work-load. The maximum number of credits that may be gained by summer school and correspondence classes combined is five.

Those interested in summer school may request a summer school calendar from the Office of Continuing Education, Dalhousie University.

28.3 Correspondence Classes

At present no correspondence classes are offered by the Faculty of Arts and Science. Students who wish to take correspondence classes from other institutions may apply as in 28.4 below. See the limitation referred to in 28.2 above.

28.4 Classes Taken at Other Universities Under Concurrent Registration

A student who wishes to take classes at other institutions while registered at Dalhousie, whether in the academic year or in summer sessions, or by correspondence, must obtain approval in advance on a form available in the office of the Registrar. A letter of permission will be provided if approval for the classes is given. The workload at the other institution must conform to Dalhousie's limitations.

The departments of French, German, Russian, and Spanish have special arrangements whereby up to a total of 5 full-credit classes taken at other universities may be considered as part of a student's major program at Dalhousie.

The class fee will be paid by Dalhousie if:

- (a) the student is registered and has paid fees as a full-time student at Dalhousie,
- (b) the classes are approved as part of the student's program, and
- (c) the class is not part of a summer school program.

Note that classes taken elsewhere under Concurrent Registration are treated as transfer classes for purposes of record. Merit points are awarded in accordance with 21.2 and not more than half of the work for any credential may be by transfer credit.

29. Coordinated Programs

Students may in their second and third years follow a two-year integrated program, or two one-year integrated programs, of study. If two one-year programs are chosen, they may be in different departments. All such coordinated programs have been explicitly approved by the Curriculum Committee. A department or group of departments offering coordinated programs may structure them as it wishes, consistent with sound academic practice and subject to the following guidelines:

- (a) that the equivalent of five class units constitute a normal year,
- (b) that the function of each program form part of the Calendar description of each program,
- (c) that each two-year program permits students at least one class of their own choice in each of the second and third years,
- (d) that two-year programs normally not be exclusively in a single discipline,
- (e) that the normal prerequisite for entry into a department one-year or two-year program be the introductory class of the department in question, or an equivalent that the department considers acceptable, and not more than one introductory class in a related subject.

A student considering a Coordinated Program should consult as early as possible with the departments concerned.

30. Experimental Classes

Experimental classes, on any subject or combination of subjects to which arts or sciences are relevant, and differing in conception from any of the classes regularly listed in departmental offerings, may be formed on the initiative of students or faculty members.

If formed on the initiative of students, the students concerned shall seek out faculty members to take part in the classes.

Whether formed on the initiative of students or on the initiative of faculty members, the faculty members who wish to take part must obtain the consent of their department.

The class may be of one-year length or half-year length.

A class shall be held to be formed when at least one faculty member and at least eight students have committed themselves to taking part in it for its full length.

Classes may be formed any time before the end of the second week of classes in the fall term to run the year or first half-year, or any time before the end of the second week of classes in the spring term. If they are formed long enough in advance to be announced in the Calendar, they shall be so

announced, in a section describing the Experimental Program, if they are formed later, they shall be announced (a) in the Dalhousie Gazette, (b) in the Dal News, (c) on a central bulletin board set aside for this purpose.

One faculty member taking part in each experimental class shall be designated the rapporteur of the class with responsibility for (a) advising the Curriculum Committee of the formation and content of the class; (b) obtaining from the Curriculum Committee a ruling as to what requirement or requirements of distribution and concentration and credit the class may be accepted as satisfying; (c) reporting to the Registrar on the performance of students in the class; (d) reporting to the Curriculum Committee, after the class has finished its work, on the subjects treated, the techniques of instruction, and the success of the class as an experiment in pedagogy (judged so far as possible on the basis of objective comparisons with more familiar types of classes).

Students may have five one-year length experimental classes (or some equivalent combination of these with half-year length classes) counted as satisfying class for class any of the requirements for the degree, subject to the rulings of the Curriculum Committee (above) and (where relevant) to the approval of the departments.

31. International and Exchange Programs

The Faculty of Arts and Science offers a number of programs which enable students to pursue part of their studies in a foreign-language environment. These include:

- (a) One term of study at the Pushkin Institute, Moscow Pedagogical Institute, or Leningrad State University, U.S.S.R. (for details see the entry of the Russian Studies Program, page 140).
- (b) One term of study at Colegio de España, Salamanca, Spain (see the entry for the Spanish Department, page 147).
- (c) Up to one full year of study in a foreign-language environment. In recent years students have studied at the Université de Provence (Aix-Marseille) in France (consult the appropriate Language department).
- (d) Up to one full year of study at a francophone university in Quebec (consult the Department of French).

There is currently one exchange program. This is for third year honours students in various disciplines, at the University of Stirling in Scotland. (For further information, consult Dr. David McNeil, Department of English.)

32. Appeals

Any students who believe they will suffer undue hardship from the application of any of the regulations of the Faculty may appeal for relief to the Committee on Studies. Students wishing to appeal a decision based on Faculty regulations may obtain copies of the document "How to appeal a Faculty of Arts and Science regulation." Briefly, such appeals must be addressed in writing to the Chair of the Committee on Studies, c/o Registrar's Office and must clearly state the arguments and expectations of the petitioners. An appeal arising from a required withdrawal from the faculty for academic reasons should be addressed to the Admissions Committee.

Students who wish to appeal on matters other than those dealt with by faculty regulations can obtain copies of the document "A Procedure for special Academic appeals in the Faculty of Arts and Science".

Both documents can be obtained from the Office of the Registrar or any departmental office.

33. Changes in Regulations

In general, any change which affects a currently registered student adversely will not apply to that student. Any student suffering *undue hardship* from application of any of the regulations may appeal for relief to the Committee on Studies as in Section 32 above.

Faculty of Arts and Science

Introduction

The Faculty of Arts and Science consists of several groups of persons: some four thousand undergraduate students who typically spend three or four years in the faculty, over four hundred teaching and research faculty members most of whose positions are more or less permanent as well as a number of part-time teachers, and a third important element consisting of the support staff of secretaries, technicians, etc. Academically, the student's almost exclusive role is to learn — from teachers, from laboratory experience, from books, from other students and from solitary contemplation. Students learn not only facts but concepts, and most important, learn how to learn. Almost all of what undergraduate students learn of fact, concepts and methods, although new to them, is not new to the world.

Through intellectual interaction with other members of the academic community, undergraduate students should gain the background knowledge, the ability and the appetite for independent discovery. This point is marked formally by the award of a Bachelor's degree.

The academic faculty have two equally important roles: to teach the same facts, concepts and methods that the student must learn; and to contribute to human knowledge through research, scholarly or artistic activities.

The Faculty of Arts and Science at Dalhousie is divided into twenty-three departments representing at least that number of intellectual disciplines. Most of the departments are devoted either to the liberal arts or the pure sciences. In addition, at Dalhousie this Faculty contains a second group of quasi-professional departments including Music, Theatre, Education and Engineering. An important role of these professional departments is to prepare students for employment in the corresponding profession.

Much less well understood is the role of the liberal arts and pure science departments. The Bachelor's degrees of BA or BSc are not intended to signify that the student is qualified for any particular job. The goal of such programs is simply to produce educated persons with competence in one or more subjects. Such competence includes not only factual knowledge but more importantly the ability to think critically, to interpret evidence, to raise significant questions and solve problems. A BA or a BSc often plays a second role as a prerequisite to a professional program of study or as a stage towards a PhD in an arts or science discipline.

The non-professional departments in Dalhousie's Faculty of Arts and Science comprise the humanities, including languages, social sciences, life sciences, physical sciences and mathematical sciences. Students in BA and BSc programs should sample classes across these areas to have some appreciation of the nature of a variety of disciplines. The section of the Calendar which follows describes the nature of the subjects which can be studied in the Faculty of Arts and Science at Dalhousie, the content of each of the classes offered, the regulations governing admission, and the awarding of degrees. It is designed to help those who wish to enrol in the Faculty, as well as those who are already enrolled, to make informed choices about their programs of study.

The dean, associate deans and assistant dean of Arts and Science and the chairpersons of the departments and other members designated as faculty advisors, are available for general consultation and are ready to help in the planning of programs of study. In the latter activity they are assisted by the Director of Admissions, and all new students are invited to discuss their proposed academic programs with him before registration. The Dean of Student Services, Director of Admissions, and the Registrar are prepared to help in the interpretation of University Regulations and to answer general questions, while the Director of Awards is available for advice and assistance concerning awards, scholarships, and other financial aid.

Students planning to take a postgraduate degree should consult the department in which they intend to specialize before finally deciding on the choice between a general and an honours undergraduate program.

Officers of the Faculty

Dean of the Faculty of Arts and Science

D.D. Betts, BSc, MSc (Dal), PhD (McG), FRSC, Professor of Physics

Associate Deans of the Faculty

A.R. Andrews, BA, Dipl. Ed., MA (Leeds), PhD (Ill), FRSA, Professor of Theatre.

T.S. Cameron, BA, MA, DPhil (Oxon.), Professor of Chemistry

Assistant Dean of the Faculty

M.M. Furrow, BA (Dal), MA, MPhil, PhD (Yale), Assistant Professor of English

Secretary of the Faculty

E.W. Angelopoulos, BSc, BA, MS, PhD (Minn.), Associate Professor of Biology

Administrator

D.G. Miller, BComm (Acadia)

Note: These regulations apply to all students registering for the first time in the faculty of Arts and Science for the academic year 1988/89. Students registered earlier who wish to pursue 20-credit (Advanced Major) degrees should consult their academic advisor and the Office of the Registrar as soon as possible to ensure that their programs of study will satisfy the degree requirements.

1. Definitions

For definitions of some commonly used terms, see page 18.

2. Departments of the Faculty of Arts and Science

Biochemistry (also in the Faculty of Medicine)

Biology

Chemistry

Classics

Comparative Religion

Economics

Education

Engineering

English

French

Geology

German

History

Mathematics, Statistics and Computing Science

Microbiology (also in the Faculty of Medicine)

Music

Oceanography

Philosophy

Physics

Political Science

Psychology

Russian

Sociology and Social Anthropology

Spanish

Theatre

New 3. Subject Groupings

The various subjects in which instruction is offered are grouped as follows:

A. Languages and Humanities

Classics, Comparative Literature, Comparative Religion, English, French, German, Greek, History, Latin, Medieval Studies, Music, Philosophy, Russian, Spanish, and Theatre

B. Social Sciences

African Studies, Economics, Education, History, International Development Studies, Political Science, Psychology, and Sociology and Social Anthropology

C. Life Sciences and Physical Sciences

Biochemistry, Biology, Chemistry, Computing Science, Geology, Mathematics, Microbiology, Neuroscience, Oceanography, Physics, Psychology, and Statistics

In cases where a subject is listed in more than one of the groupings, A, B,

and C, any class taken in that subject can only be used to satisfy one of the grouping requirements. (See Regulation 1.1.1. (a) below). A second class in the same subject cannot be used to satisfy another subject grouping requirement.

4. Programs Offered

Programs leading to the following qualifications are offered: Bachelor of Arts, Bachelor of Science, Bachelor of Education, Bachelor of Music, Bachelor of Music Education, Diploma in Engineering, Certificate in Costume Studies, Diploma in Costume Studies, Diploma in Meteorology, and Certificate in Educational Administration.

Many of the classes offered may be taken on a non-degree basis by persons who do not wish to study for a degree.

5. Admission Requirements

Applications are available at the Registrar's office, Arts and Administration Building, Dalhousie University, Halifax, Nova Scotia B3H 4H6.

5.1 Students from Nova Scotia High Schools

At least five senior level university preparatory classes should be taken in the grade XII year as follows:

- (a) English.
- (b) At least two of Biology, Chemistry, French, German, History, Latin, Mathematics and Physics.
- (c) The remaining classes may be from those listed above or from Economics, Geography, Geology, Law, Modern World Problems, Music, Political Science, Sociology, Spanish.

Any special or experimental classes must have been previously approved by Dalhousie if acceptance for credit for admission is to be assured.

A passing grade of at least 50% is required in each class, with an average of at least 60%. Special consideration will be given to grades in English and Mathematics.

For certain programs there are additional requirements. These include the following:

- Bachelor of Science; Grade XII Mathematics 441.
- Diploma in Engineering; Grade XII Mathematics 441, Chemistry and Physics.
- Mathematics 441 is required for admission to Mathematics and Computing Science classes.

For special requirements in Music and Education, see the department entries.

The University does not apply criteria rigidly. Students who do not meet the above requirements, particularly those with high standing, are invited to apply and will be given consideration as special cases.

5.2 Admission from Outside Nova Scotia Students are accepted from other provinces and countries at levels as shown below, which are considered equivalent for the purpose of admission to Nova Scotia Grade XII:

New Brunswick, Newfoundland, Labrador, Prince Edward Island, Manitoba, Saskatchewan, Alberta, British Columbia: Grade XII, with subject distribution as for Nova Scotia.

Québec: Two years at CEGEP. In special cases, one year CEGEP (high standing in a strong program required).

Ontario: Grade XIII or very high standing in Grade XII.

U.S.A.: Outstanding students may be admitted from U.S.A. Grade XII on the basis of advanced placement work or high SAT or CEEB scores; transfer credits will be considered for such outstanding students if they have completed a full year of study with good standing (minimum: 30 semester hours) at a recognized university. Other students from the U.S.A. can normally be admitted only after completing a first year at a recognized university or junior college (minimum: 30 semester hours). Credit, if any, for that year's work is determined on an individual basis.

The United Kingdom, West Indies, West Africa: General Certificate of Education (GCE) with pass standing in at least five subjects, of which one must be English and at least two must be at Advanced Level.

Hong Kong: GCE as for Great Britain, or University of Hong Kong Matriculation Certificate under same conditions as for GCE.

Bangladesh, India, Pakistan: Bachelor's degree with first or second-class standing from a recognized university; or in certain circumstances, first-class standing in the intermediate examinations in Arts and Science, provided the candidate has passes at the university level in English, Mathematics, and a language other than English. Note: This standing is not sufficient for admission to the sequential BEd program at Dalhousie.

Countries not mentioned above: Write to the Admissions Office, Dalhousie University, Halifax, N.S. B3H 4H6, for further information.

5.3 Transfers from Colleges and other Universities

Students who have begun their post-secondary studies elsewhere, and who are in good standing, may be considered for admission. Credit for work completed may be granted, subject to the conditions given in section 13, page 37.

5.4 Transfer Credits from Dental Hygiene

Students who hold a diploma in Dental Hygiene under the present two-year program may be admitted to a BSc or a BA with advanced standing of five full credits.

5.5 Mature Students

Students who do not meet the usual admission requirements may be considered under the *mature student* category provided that

1. they are at least 23 years old, and
2. they have been absent from full-time high school study for at least four years

Prospective students should submit to the Admissions Committee an application form together with a letter outlining their work experience and other activities. Normally, high school transcripts are required and interviews may be required.

Under exceptional circumstances, the Admissions Committee may agree to admit the student directly to a degree program if the student's background is deemed sufficient preparation for such admission. Otherwise, the Admissions Committee may admit mature students initially to the *University Exploration* category until they have achieved grades of C- or better in at least three full-year classes (or equivalent) taken. At that time, they are eligible to apply for admission as regular undergraduate students.

Mature students are advised to contact Henson College at 424-2526 for pre- and post-admission counselling (see page 22).

5.6 Proficiency in English

Applicants for admission whose native language is not English must give evidence that they are proficient in spoken and written English. Evidence may be provided by the English Language Test of the University of Michigan, or the Test of English as a Foreign Language (TOEFL) (normally with a score of at least 550). Both of these tests are administered in various centres throughout the world. Information may be obtained by writing to the English Language Institute, Testing and Certification Service, Ann Arbor, Michigan 48104, U.S.A. or TOEFL Box 899, Princeton, New Jersey 08540, U.S.A.

Certified copies of original documents, or relevant sections of documents (e.g. calendar pages) are acceptable in lieu of originals. Certificates in languages other than English or French must be accompanied by certified translation into English or French.

5.7 January Admissions

Admission to Dalhousie is normally for classes beginning in September, and the University does not admit full-time, first year students in January. Part-time students and transfer students, however, may be admitted for classes beginning in January. The deadline for application for January admission is November 15.

6. Student Aid, Scholarships and Other Awards

A separate booklet, Scholarships, Prizes and Financial Aid, is available, on request, from the Director of Awards and Student Aid, Dalhousie University.

7. Admission to Classes

7.1 Numbering of Classes

Classes are numbered to indicate their general level. Those in the 1000 series are introductory and can normally be taken by fully matriculated students without any previous classes at Dalhousie, while classes in the 2000, 3000, and 4000 series are usually first available to students in the second, third, and fourth years, respectively. Often these classes have prerequisites. Some departments have minimum grade requirements for entry into classes above the 1000-level. Such requirements are listed in the calendar entries for the departments concerned.

The letter following a class number indicates the session in which the class is offered. The letters A and B denote classes given in the first and second terms respectively. The symbol A/B indicates a class given in the first term and/or in the second term. Students should consult timetables to verify whether a particular class will be offered in the A or B term in a given academic year. The letters C and R denote classes spread over both terms, i.e., given for the full academic year. An R class carries one full credit or more, and a C class less than one full credit. For summer sessions, A denotes a class given in the first three weeks, B a class given in the second three weeks, and R and C classes continuing for six weeks.

Classes with numbers below 1000 do not carry credits but may be prerequisites for entry to credit classes for students whose matriculation backgrounds are deficient.

7.2 Academic Advice

At Dalhousie all students are offered academic advice prior to registration. First-year students, particularly those in BA and BSc programs, may wish to consult with the Director of Admissions or Registrar, or with a Faculty advisor in an academic department of particular interest. After the first year, students plan their programs in consultation with Faculty advisors in their major departments. Each student must complete a Class Approval Form, obtainable from academic departments or the Office of the Registrar. This form must be completed before registering.

Students can be registered only after the Class Approval Form is completed and submitted.

NOTE THAT THE COMPLETION AND SUBMISSION OF A CLASS APPROVAL FORM DOES NOT CONSTITUTE REGISTRATION.

Registration is complete only after the registration form, which will be provided to each eligible student, is submitted to the Office of the Registrar and financial arrangements have been made with the Student Accounts office.

8. Registration

Registration material and detailed information will be sent to all eligible students except those admitted late, in which cases documentation must be completed in person. After the Class Approval Form has been completed (see above) students may register, either in person or by mail. Late registration requires approval of the Dean. In Arts and Science, such approval will be automatic during the month of September. Thereafter, up to and including October 15 the Dean of Arts and Science will grant approval only when compelling reasons for the applicant's lateness can be given. After October 15 approval is extremely unlikely.

A STUDENT IS REGISTERED ONLY AFTER FINANCIAL ARRANGEMENTS HAVE BEEN MADE AT THE ACCOUNTS OFFICE.

9. ID Card

Upon registration, a receipt which is also a requisition for an ID Card will be issued by the accounts office. An ID Card which gives the student access to many campus services and activities may then be obtained at the ID Unit. The Unit is open during special registration periods, of which all students are notified, and at other times as posted by the Unit, which is located in the basement of the Arts and Administration Building.

NOTE: It is University Policy that all students requesting the release of funds from the Awards Office must present a current valid Dalhousie University Student Identification Card.

10. Withdrawal and Change of Registration

10.1 Responsibility of Registered Students

Students who have registered are responsible for fees. Those who withdraw from the University may be entitled to refunds of fees. Withdrawals are not effective until notification is received at the Office of the Registrar.

NON-ATTENDANCE DOES NOT, IN ITSELF, CONSTITUTE WITHDRAWAL

10.2 Class Changes

It is recognized that some students may wish to make changes in programs already arranged. Class changes will normally be completed during the second week after the beginning of the class. (For summer session information see the Summer School Calendar.) No change is effective until a change form, available at the Office of the Registrar, is received by that Office.

See the almanac for deadlines for adding and dropping classes, and the Dalhousie University Fees Handbook for the schedule of refunds.

New 11. Degree, Certificate and Diploma Requirements

11.1 Bachelor of Arts, Bachelor of Science — Major Programs (15 credits)

(a) **First Year.** In the first year full-time students normally take five full-credit classes or the equivalent in half-credit classes. (The King's Foundation Year Program is equivalent to four credits for BA candidates or three credits for BSc candidates. This program is only available to King's students.) For part-time students the first five credits taken constitute the work of the first year.

Students are required to include, in their first ten credits, one full-credit class or two half-credit classes from each of the subject groupings on page 33. (Note: Students enrolled in Honours programs in Biochemistry, Computing Science and Microbiology need not include these credits among their first ten credits, but must include them among the 20 earned to qualify for the degree.)

Students in the first year may not take for credit more than the equivalent of three full-credit classes in a single subject from the subject groups given in section 3 on page 33.

One of the five classes chosen must be selected from a list of classes in which written work is considered frequently and in detail. These writing classes are approved by the Writing Across Curriculum Committee and are listed below:

Chemistry 1000R, Classics 1000, 1010, 1100, Comparative Religion 1301, English 1000, German 1000, 1050, History 1400, 1990, Philosophy 1010, 1030, Political Science 1103, Spanish 1100A/B and 1110A/B. (The King's Foundation Year Program also satisfies this requirement.)

In order to qualify for a BSc degree candidates are required to complete successfully at least one full University credit in Mathematics other than Mathematics 1020R, 1100, and 1110A/B. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from Subject Grouping C.

Students may satisfy this requirement by passing the test which is administered by the Department of Mathematics, Statistics & Computing Science under the supervision of the Curriculum Committee. Such students must nevertheless complete 15 or 20 credits in order to graduate.

Students should seriously consider enrolling a class from a list of classes which deal with a formal subject. Classes which are recognized as formal are:

Chemistry 1100, 1110, 1120, 1200, Computing Science (all classes); Economics 1106A/B, 1107A/B, 2222A, 2223B, 2225 Mathematics (all classes); Philosophy 2110, 2130A, 2140B, 2190A/B, 2650; Physics 1000, 1100, 1300; Political Science 2494, 3495A/B.

Students should consider becoming fluent in French. BA students are required to obtain one credit from the following language classes: Classics 1700R, 1800R, 2700R; French 1000R, 1001A/2001B, 1020R, German 1000R, 1010R, 1050R, 1060R; Russian 1000R, 1050R; Spanish 1020R, 2000A, 2010B. For students with advanced language skills, upper-level language classes may be substituted. Consult the Office of the Registrar if you require further information. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from Subject Grouping A.

Students may satisfy this requirement by passing one of the tests administered by the language departments under the supervision of the Curriculum Committee. Such students must nevertheless complete 15 or 20 credits in order to graduate.

BA students who choose to major in African Studies, Economics, International Development Studies, Philosophy, Political Science, Psychology or Sociology and Social Anthropology may substitute for a language class at least one full class in Mathematics or Statistics, other than Mathematics 1020R or Mathematics 1100A/1120B, to meet this requirement, or they may meet it by passing the test administered by the department of Mathematics, Statistics & Computing Science under the supervision of the Curriculum Committee. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from Subject Grouping C.

For students enrolled at the University of King's College, the King's Foundation Year Program offers first-year students in Arts and Science an integrated introduction to the humanities and social sciences through study of some of the principal works of western culture. Details are to be found in the calendar of the University of King's College, and advice may be obtained from the Director of the Program.

If students who have not completed their first year wish to enrol for further study, they must complete the first-year requirements at the first opportunity.

(b) **Second and Third Years.** Before registering for the second year, each student must declare a major, and obtain program advice and approval from a faculty advisor in the major department. (This may be done before registering for the first year, at the option of the student.)

Ten full credits, or the equivalent in half-credit classes, make up the course for the second and third years. These must meet the following requirements:

- (a) at least seven credits shall be beyond the 1000 level.
- (b) at least one credit or two half-credits shall be in each of at least two subjects other than the major field.
- (c) at least four and no more than eight credits beyond the 1000 level shall be in a single area of concentration (the major), and at least two of these must be beyond the 2000 level.
- (d) up to four of the credits in the major subject must be selected in accordance with departmental or interdepartmental requirements.

For the BA, the major may be chosen from African Studies, Classics, Comparative Religion, Economics, English, French, German, Greek, History, International Development Studies, Latin, Music, Philosophy, Political Science, Russian, Sociology and Social Anthropology, Spanish, Theatre, Women's Studies or from any of the BSc major subjects.

For the BSc the major subject may be chosen from Biology, Chemistry, Computing Science, Geology, Mathematics, Physics, Psychology, or Statistics.

For the standing required for a BSc, or BA see section 22.

11.2 Arts and Science Electives

Students may choose electives from any of the classes listed by departments offering major or honours programs in the Faculty of Arts and Science. In addition up to three classes may be taken from the following:

- (a) Architecture 1000 and Comparative Literature 1000;
- (b) Education Foundation Offerings (Education classes with numbers

below 4400)

Note: Education classes numbered 4400 and above are not available as Arts and Science electives.

(c) Classes in Engineering and Oceanography.

Note: The restriction on Engineering electives does not apply to students in the Diploma in Engineering Program who combine their studies with a program leading to a BSc in Biology, Chemistry, Computing Science, Geology, Mathematics, Physics, or Statistics. (See the entry for the Department of Engineering page 75)

(d) Classes in Music. Note: Music classes 1000, 1001A, 1002B, 2007, 2008, 2010, 2011, 2012, 2013, 2021 and 2067 are available as normal electives, but other classes in Music may be taken by special permission of the Department of Music.

(e) The following approved classes from other faculties and institutions: Commerce 1101A/B, 1102A/B, 1401A/B, 2201A/B, 2301A/B, 2302B, 2601A/B, 3203A/B, 3304A/B, 3306A/B, 3308B, 3501A/B, 4120A/B, and Health Education 4412.

Note: Students enrolling in elective classes must meet normal class prerequisites.

11.3 Bachelor of Arts, Bachelor of Science — Advanced Major Programs (20 credits)

Students are encouraged to enter Advanced Major degree programs, and are advised to consult the department in which they wish to major for detailed information. The requirements for such programs are consistent with requirements for Major degree programs (see 11.1 above). The five additional credits required must all be obtained at an advanced level.

In order to satisfy the requirements for the Advanced Major degree, at least 12 of the 20 credits must be beyond the 1000-level. A minimum of six and a maximum of nine classes beyond the 1000-level are to be in the Major, and three of them must be beyond the 2000-level.

11.4 Individual Programs. In cases where students feel that their academic needs are not satisfied under the above requirements, individual programs may be submitted to the Curriculum Committee. The Dean shall act as advisor for such students.

11.5 Bachelor of Arts and Bachelor of Science — Honours Programs

Second, Third and Fourth Years. Able and ambitious students are urged to enter Honours Programs. These programs require a higher quality of work than is required by major programs.

For the BA, the Honours subject may be chosen from Classics, Economics, English, French, German, History, International Development Studies, Philosophy, Political Science, Russian, Social Anthropology, Sociology, Spanish and Theatre or any of the BSc Honours subjects.

For the BSc, the Honours subject may be chosen from Biochemistry, Biology, Chemistry, Computing Science, Geology, Marine Biology, Mathematics, Microbiology, Neuroscience, Physics, Psychology and Statistics.

There are three types of honours programs: major, combined and unconcentrated.

Applications for admission to honours programs must be made to the departments concerned on forms available in departments and at the Office of the Registrar. The Registrar may be consulted by those considering unconcentrated honours.

Students should apply before registering for the second year; if application is made later, it may be necessary to make up some work not previously taken.

For each individual student the entire honours program, including elective credits, is subject to supervision and approval by the department or departments concerned, or in the case of unconcentrated honours, by an interdisciplinary committee approved by the Committee on Studies.

All of the regulations for the BA or BSc major program must be satisfied, and there are additional requirements as follows:

Honours in a major program is based on the general requirement that the 15 credits beyond the first year of study comprise:

- (a) A normal requirement of nine credits beyond the 1000 level in one

subject (the major subject). Students may, with the approval of the department concerned, elect a maximum of eleven credits in this area. In this case (c) below will be reduced to two or three credits.

- (b) Two credits in a minor subject satisfactory to the major department.
- (c) Four elective credits not in the major field.
- (d) An additional grade (see Honours Qualifying Examination below).

Honours in a combined program is based on the general requirement that the 15 credits beyond the first year of study comprise:

- (a) A normal requirement of eleven credits beyond the 1000 level in two allied subjects, not more than seven credits being in either of them. Students may, with the approval of the departments concerned, elect a maximum of thirteen credits in two allied subjects, not more than nine credits being in either of them. In this case the requirement in (b) below is reduced to two or three credits.
- (b) Four elective credits in subjects other than the two offered to satisfy the requirement of the preceding clause.
- (c) An additional grade (see Honours Qualifying Examination below).

Details of specific departmental honours programs are given under departmental listings of Programs of Study.

Unconcentrated Honours programs are based on the general requirement that the 15 credits beyond the first year of study comprise:

- (a) Twelve credits beyond the 1000 level in three or more subjects. No more than five of these may be in a single subject; no less than six nor more than nine may be in two subjects.
- (b) Three elective credits.
- (c) For an Unconcentrated BA (Honours), at least ten credits of the twenty selected must be selected from subject groups A, B, and C listed on page 33.
- (d) For an Unconcentrated BSc (Honours), at least eight credits of the twenty required must be selected from Biochemistry, Biology, Chemistry, Computing Science, Geology, Mathematics, Microbiology, Neuroscience, Physics, Psychology, and Statistics, and at least six additional classes must be selected from subject groups B and C listed on page 33.
- (e) An additional grade (see Honours Qualifying Examination below).

Honours Qualifying Examination. At the conclusion of an Honours program a student's record must show a grade which is additional to those for the required twenty classes. This grade may be obtained through a comprehensive examination, the presentation of a research paper (which may be an extension of one of the classes), or such other method as may be determined by the committee or department supervising the student's program. The method by which this additional grade is obtained is referred to as the Honours Qualifying Examination. Departments may elect to use a pass-fail grading system for this grading examination.

For the standing required for honours see section 22.3 on page 40.

11.6 Conversion of a BA or BSc to an Honours Degree

A person who holds a BA or BSc may apply through his/her department advisors for an honours program. On completion of the required work with proper standing, a certificate will be awarded which has the effect of upgrading the degree to honours status.

11.7 Programs in Co-operative Education (20 credits)

The aim of Co-op degree programs is to enable students to combine their studies with work experience. The programs are thus year-round, including Summer Schools, and will normally require from 48 to 52 months for completion.

Co-op degree programs conform to the requirements for either the Advanced Major or Honours degrees.

The following departments currently offer Co-op programs: Chemistry, Mathematics, Statistics and Computing Science, and Physics. For details of these programs, consult the Calendar entries for the departments.

11.8 Joint Honours: Dalhousie-Mount Saint Vincent

Special arrangements exist under which students may be permitted to pursue an honours program jointly at Dalhousie and Mount Saint Vincent Universities. Interested applicants should consult the appropriate department of their own university at the beginning of the second year. Prospective joint honours students must be accepted by the major departments concerned at both institutions. These departments supervise the entire program of study of accepted applicants. Students should be aware that not all classes available for credit at Mount Saint Vincent can be given credit at Dalhousie and vice versa. In order for students to obtain a joint honours degree they must satisfy all requirements of both institutions.

11.9 Bachelor of Music and Bachelor of Music Education

For the special requirements of these degrees, see the entry for the Music Department, page 111.

11.10 Diploma in Engineering

For details of the requirements for the diploma, see the entry for the Department of Engineering on page 76.

11.11 Bachelor of Education

Admission to this program normally requires that the applicant holds a prior undergraduate degree, or is simultaneously enrolled for one. There is, however, an arrangement under which it is possible to obtain a BEd in association with the Nova Scotia Teachers' College as a first degree.

For details about BEd programs, see the entry for the Department of Education, page 71.

11.12 Certificate and Diploma in Costume Studies

Study for these credentials is entirely within the Department of Theatre. See the entry for that department for detailed information, page 154.

11.13 Certificate in Educational Administration

For details about this program, see the entry for the Department of Education, page 73.

11.14 Diploma in Meteorology

Details of the requirements for this diploma may be found in the entry of the Department of Physics, page 125.

11.15 Transition Year Program

For details about the program, see the entry on page 154.

New 12. Counting of Classes for Two Undergraduate Degrees

Students who hold one undergraduate degree from Dalhousie and who wish to gain a second undergraduate degree must fulfil the requirements of the second degree and meet the following stipulations:

- (a) Only classes that are applicable to the course for the second degree may be counted for credit.
- (b) Each class carried forward must have a grade of C or higher.
- (c) For the Major degree (15 credits), a minimum of six new full-credit classes or the equivalent must be taken. At least four of these are to be beyond the 1000 level in a new major subject, and at least two of the four must be beyond the 2000 level. Normally, two of these classes will be in a subject other than the new major.
For the Advanced Major (20-credit) degree, a minimum of eleven new full-credit classes, or the equivalent, must be taken. At least six of these are to be beyond the 1000 level in a new major subject, and at least three of the six must be beyond the 2000 level.
For the Honours degree, a minimum of eleven new classes are to be taken, in accordance with Regulation 11.5 (a) and (b) above.
- (d) Merit points must be scored on the new classes as required by Regulation 22 below.

13. Transfer Credit

(a) Students from another college or university who are not eligible for readmission to that college or university will not be admitted to Dalhousie.

(b) No credit will be given for any work used as the basis for admission.

(c) No transfer credit will be granted for any class in which a final mark of less than C (or the equivalent in Dalhousie terms) was obtained, or for any class in which a final mark was granted conditionally.

(d) To obtain a first degree or diploma in the Faculty of Arts and Science, at least half of the classes, including at least half in the field of concentration, must normally be taken at Dalhousie.

(e) Students in Arts and Science who wish to complete honours programs must attend Dalhousie for the last ten credits unless special permission to the contrary is obtained from the Committee on Studies.

(f) No classes taken at another institution will be counted towards fulfillment of the concentration requirement of the Bachelor's degree or the principal subject requirement of an honours program without specific advance approval from the department concerned at Dalhousie.

(g) Transfer credits may be granted only for classes which are offered by a recognized university or equivalent institution of higher learning and which are judged to be of comparable standard to classes offered at Dalhousie and to be appropriate to an academic program of the faculty.

(h) Transfer credits for classes that lie within the scope of Dalhousie departments are subject to approval by those departments.

(i) Transfer credits are not normally granted for classes that are not within the scope of any Dalhousie department. Students may, however, apply to the Committee on Studies for credit for such classes but they must justify the inclusion of such classes in their proposed program.

(j) No credit will be given for any classes taken at another university while a student is inadmissible at Dalhousie. Students who have been permitted to reregister, after having been declared ineligible at Dalhousie, cannot take classes at another institution for Dalhousie credit until they have taken further Dalhousie classes.

(k) No grades are recorded for transfer credits awarded on admission to Dalhousie. However, for classes taken on Letters of Permission while a student is registered at Dalhousie, grades are recorded.

14. Advanced Placement

Students possessing advanced knowledge of a subject which was acquired other than at a university will be encouraged to begin their studies in that subject at a level appropriate to their knowledge, as determined by the department concerned, and will be exempted from any classes which are normally prerequisites for the one to which they are admitted. However, such students must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e. they must complete at Dalhousie the full number of credits required for the particular credential being sought).

15. Part-Time Students

Part-time students are admitted to most of the programs offered in the Faculty. Admission requirements and regulations generally are the same for all students. For part-time students the first five credits taken constitute the work of the first year. Part-time students are encouraged to consult with the Dean of Henson College for advice on their academic programs and other matters.

16. Audit of Classes

Students who have been admitted to the faculty are permitted to audit many of the classes offered. For those who are not full-time students, fees are payable as indicated in the Dalhousie University Fees Handbook. A class may not be changed from credit to audit or from audit to credit status after the last date for dropping classes without penalty (see the almanac, page 4). In order to change from audit to credit prior to the deadline an additional fee is required. Permitted changes require that the procedures as given in section 10.2 on page 35 be followed.

17. Duration of Undergraduate Studies

Students are normally required to complete their undergraduate studies within ten years of their first registration, and to comply with the regulations in force at the time of that registration. This is also the normal limit for transfer credits. However, the Committee on Studies may grant permission to continue studies for a reasonable further period, subject to such conditions as the Committee deems appropriate and with the stipulation that

the student must meet the degree requirements in force when the extension is granted.

18. Preparation for Other Programs

Work in the Faculty of Arts and Science is prerequisite for various programs in other faculties and other institutions. A brief summary of the academic work required for admission to certain programs is given here. Further information may be found later in this calendar, or in the separate faculty calendars, or in the calendars of other institutions.

Occupational Therapy or Physiotherapy: One year of work in the Faculty of Arts and Science, or the equivalent elsewhere, is required for admission to these two programs. For details, see the entries in this calendar for the School of Occupational Therapy and the School of Physiotherapy.

Medicine: At least two years of work at Dalhousie, or the equivalent elsewhere, including English 1000, Biology 1000 or 2000, one of Chemistry 1100, 1110, 1120, or 1200, Chemistry 2400, Physics 1000, or 1100, or 1300 or equivalent classes.

Dentistry: See Faculty of Dentistry calendar.

Law: At least two years of work leading to one of the degrees of BA, BSc, BCom.

Engineering: The Diploma in Engineering qualifies a student for entry to the Technical University of Nova Scotia to study Engineering.

Architecture: Two years of work, including at least one class in mathematics, are required for entry to a program in Architecture at the Technical University of Nova Scotia. For details, apply to the Faculty of Architecture at TUNS.

Engineering Physics: A degree in Engineering Physics is offered by the Technical University of Nova Scotia in cooperation with Dalhousie. The Diploma in Engineering is prerequisite for admission to this program at TUNS.

Design: Students completing one year in the Faculty of Arts and Science of Dalhousie may be admitted into the second year of the four-year program leading to the Bachelor of Design degree in Communication Design or Environmental Design at the Nova Scotia College of Art and Design.

Veterinary Medicine: Normally three years of work at Dalhousie are required for admission to the Atlantic Veterinary College of the University of Prince Edward Island. Dalhousie classes should normally include Computing Science 1400, Mathematics 1000 and 1060, one of Chemistry 1100, 1110, or 1200, Chemistry 2400, Biochemistry 2000, one of Physics 1000, 1100 or 1300, English 1000, Biology 1000, 2012, 2030, 2100 and 3323 and an additional two and a half classes from the humanities and social sciences.

Graduate Studies: The normal requirement for admission to a graduate program is an honours degree in an appropriate discipline, or the equivalent.

19. Assessment

19.1 Method

Examinations may be oral, written (closed or open book) under supervision, or take-home. To gain credit toward a degree or diploma, students must appear at all examinations, prepare such essays, exercises, reports, etc., as may be prescribed, attend the classes of their prescribed course to the satisfaction of the instructors and, in classes involving field or laboratory work, complete such work satisfactorily.

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 including information on the availability of a supplemental examination and the proportion of the grade to which such an examination would apply; within four weeks after the beginning of each term the department chairperson must report to the Dean the method of evaluation to be used by each instructor in each class.

19.2 Examinations and Tests

Periods of approximately two weeks in the spring and one and one-half weeks in December are set aside for the scheduling of formal written examinations by the Registrar. Instructors wishing to have examinations scheduled by the Registrar for their classes must so inform the Registrar at the beginning of the third week of classes in the fall and spring terms. Instructors may also arrange their own examinations at times and places of their choosing during the formal examination periods, with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority. No tests or examinations covering the work of a whole term shall be held during the last two weeks of classes in the term. No tests may be held between the end of classes and the beginning of the official examination period. Students may contact the Dean's Office for assistance if they are scheduled for more than two examinations on the same day.

19.3 Grades

A letter-grade system is used to evaluate performance. Grades in the A range represent excellent performance, grades in the B range represent very good performance, and those in the C range represent satisfactory performance. A grade of D represents marginally acceptable performance except in programs where a minimum grade of C is specified. See the calendar entries for specific programs where a minimum grade of C is specified. F and FM indicate failure, marginal in the case of FM. Grades in the ranges of A, B, C, D and P are passing grades. Other grades, including W, NP, ILL, INC, F and FM, are non-passing grades (see section 26).

19.4 Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar, such grades to be based on the instructor's evaluation of the academic performance of the students in the class in question. Christmas grades must be submitted to the Registrar in all 1000-level classes in which enrollment on October 1 exceeded 25; Christmas grades are normally submitted in other full-year classes.

19.5 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 within four weeks of the required date for submission of grades in that class to the Registrar's Office.

Exceptions to this rule will normally be extended only to classes which require field work during the summer months. At present the list of these classes consists of Biology 4800 and 4900, Music 3470C and 4470C and Education 8490. Students taking any of these classes in their final year should note that they will not be able to graduate at the spring convocation.

19.6 Correction of Errors in Recorded Grades

Correction of errors in the recording of a grade may be made at any time. Otherwise changes will only be made as in Regulation 19.7 below.

Students are not entitled to appeal for any grade change more than six months after the grades are sent from the Registrar's Office.

19.7 Reassessment of a Grade

On payment of a fee, a student may appeal to the Registrar for reassessment of a grade in a class. The Registrar will direct the request to the head of the academic unit concerned, who will ensure that the reassessment is carried out and reported to the Registrar. Written applications for reassessment must be made to the Registrar within two months of the date the grade is sent from the Registrar's Office. Students have a right to view their marked examination papers by appointment for a period of two months from the date the grades are sent to students from the Registrar's Office.

19.8 Special Examinations

Special examinations may be granted to students in the case of illness supported by a medical certificate, or in other exceptional circumstances. Medical certificates must be submitted to the Office of the Registrar at the time of the illness and will not normally be accepted after a lapse of one week from the date of the examination. Arrangements for special examinations should be made with the instructor concerned and the Registrar at the time the illness or other exceptional circumstance arises, or as soon thereafter as possible.

19.9 Supplemental Examinations

One full-credit supplemental examination (or two half-credit supplemental examinations) may be written by any student on the work of any one year, provided that:

- the student has obtained a final grade of FM in that class,
- the student has satisfied the requirements for the class,
- a single compulsory final examination or test in the class in question accounted for at least forty per cent of the final grade (the supplemental examination should — at the discretion of the department — constitute the same proportion of the final grade as did the final examination during the regular session), and
- the student has not been required to withdraw from the Faculty.

Apart from the case of "A" classes (given in the fall term), the supplemental examinations must be written in the following September. For "A" classes, supplemental examinations must be written in February immediately following the failure. Supplemental examinations may not be deferred.

An eligible student who wishes to write a supplemental examination must submit to the office of the Registrar a completed application form (which may be obtained from that office) and the required fee by July 10 for the September examination, and January 25 for the February examination.

A student who fails to pass the supplemental examination can obtain credit for that class only by repeating it.

A student may not write both a supplemental examination and an examination at the end of Summer School in the same class in the same year. No supplemental examinations are allowed for classes taken at Summer School. No more than five credits obtained as a result of supplemental examinations may be counted toward a degree.

20. Repeating Classes for Which a Passing Grade has been Awarded

With the permission of the department concerned and the endorsement of the Committee on Studies, a student may repeat any class for which a passing grade has previously been awarded. The original passing grade will nevertheless remain on the transcript and a second entry will be recorded with the new grade and the notation "repeated class." No additional credit will be given for such a repeated class, but the higher grade, or point count appropriate to it, will be used for degree purposes. Note that both grades are used in calculating the merit point total when a degree with distinction is awarded.

21. Merit Points

21.1 Scale

Merit points are awarded for each class as follows:

Grade	Points
A+, A, A-	3
B+, B, B-	2
C+, C, C-	1
D	0

For merit points for transfer credits see 21.2 below

Note that although D is a passing grade, no merit points are awarded. For fractional credit classes, corresponding fractional merit points are awarded (e.g. in a half-credit class, a B would yield one point).

21.2 Merit Points for Classes Transferred From Other Institutions

One merit point is awarded for each class transferred from another institution except where:

- the external classes are taken to pursue a program of study approved in advance by the Faculty (at the present time this refers only to the programs at Stirling University, Université de Provence (Aix-Marseille), the Pushkin Institute, Leningrad State University and the Colegio de España),
- the performance in the external class is first class, and
- these classes are approved by the Committee on Studies for that purpose for the particular student.

In these cases merit points may be awarded on the basis of equivalent Dalhousie standing. Departmental advice on the equivalent Dalhousie grade for a particular class is sought where necessary.

New 22. Required Standing

22.1 For a BA or BSc Degree

A minimum of twelve merit points on the fifteen credits offered is required for the awarding of a BA or BSc (Major). A minimum of sixteen merit points on the twenty credits offered is required for the awarding of a BA or BSc (Advanced Major).

22.2 For a BA or BSc with Distinction

At least 40 merit points are required for a BA or BSc (Major), with Distinction. This number is prorated upward if more than fifteen credits appear on the student's record. Thus, at least 53.5 merit points are required for a BA or BSc (Advanced Major), with Distinction. Again, the number is prorated upward if more than twenty credits appear on the student's record. For the purpose of determining a BA or BSc with distinction, all Dalhousie classes, including repeated classes, and classes for which non-passing grades were obtained, are included. At least 10 Dalhousie classes must be included for the BA or BSc (Major) with Distinction; at least 15 Dalhousie classes must be included for the BA or BSc (Advanced Major) with Distinction. The Committee on Studies will monitor the records of graduating students having transfer credits and will bring to Faculty appropriate recommendations for a degree with distinction in any case where the regulations regarding transfer credits appear to create injustice.

22.3 BA or BSc with Honours and First Class Honours

Students who have not obtained a grade of B- or better in five advanced classes, that is, classes other than electives, will not be admitted to the fourth Honours year without explicit Departmental recommendation and prior approval of the Committee on Studies.

To count towards an Honours degree each advanced class, i.e., each class of the second, third, and fourth years, except electives, must be passed with a grade of at least C. Should D or C- be received, it must be made good by repeating the class and achieving a C or better grade or by taking an additional advanced class (preferably in the same subject). Otherwise the student must transfer out of the Honours program.

In five of the advanced classes in a student's Honours program, a grade of B or better must be achieved, and in three additional advanced classes, a grade of B- or better is required. For first class Honours, students must achieve either:

- (a) grades of A or better in four advanced classes and of A- or better in four additional advanced classes, or
- (b) grades of A or better in six advanced classes and of B or better in all advanced classes.

The Honours Qualifying Examination as prescribed by the department(s) concerned must be passed. This is the additional grade referred to in section 11. Unless Pass-Fail grading is employed, the grade must be B- or better and for first class Honours, A- or better.

23. Graduation

In order to be graduated students must submit a Request to Graduate to the Registrar's office by the deadlines indicated below:

Graduation Month	Application Deadline
February	December 1
May	February 15
October	August 15

In cases where requests can be accommodated after the deadline, a \$50. fee will be charged.

24. Change from BA to BSc program and vice versa

According to present regulations all students who have completed all the requirements for a BSc degree have automatically completed all the requirements for a BA degree, provided they have included a language

class. Similarly most students who have completed all requirements for a BA degree in a science subject will have automatically completed all requirements for a BSc degree. However, students who are registered for a BSc degree and wish to be awarded a BA degree or vice versa must do so by changing their registration at the Office of the Registrar.

25. Workload

25.1 Regular Year

Five full credits per academic year shall be regarded as constituting a normal workload for a student. Written permission from the Committee on Studies is required if this workload is to be exceeded, or if the planned workload in any term would amount to the equivalent of six half-credit classes. In no case may the workload exceed this. Applications from students who give good reasons for wishing to take an overload, and who in the preceding year completed a full program in good standing, will be considered. Such permission will not normally be granted to any student in the first year of study, or to any student who, in the preceding academic year, earned fewer than ten merit points. Applications from students who were part-time during the preceding year will be considered if they have completed at least five classes and earned on average at least two merit points per class.

25.2 Summer Sessions

Students may not normally take more than one full credit in any summer session, nor may the workload in any one week exceed one sixth of a credit. Exceptions will normally be granted by the Committee on Studies only with respect to attendance at a university which operates a trimester system or its equivalent. Students may apply in advance to the Committee on Studies to increase the workload to a maximum of 2.5 credits by summer school in any one year with a maximum of 1.5 credits in any one summer session.

26. Required Withdrawal

Any student who has accumulated more non-passing grades than the number of merit points earned (see section 19.3 and 21 page 39), is required to withdraw from the Faculty. This regulation applies once students have enrolled for four full credits after admission or readmission.

27. Readmission after Required Withdrawal

Students who have been required to withdraw from the Faculty of Arts and Science may apply to the Admissions Committee to be considered for readmission.

A student who has been required to withdraw from the Faculty of Arts and Science for the first time will be ineligible for readmission for a period of one academic year.

A student who has been required to withdraw twice will be ineligible for readmission to the Faculty as either a full-time or a part-time student. Ordinarily an appeal is allowed only if illness has seriously interrupted the student's studies and this is established by submission to the Registrar of a medical certificate from the physician attending the student at the time of the illness.

28. Off-Campus, Summer School and Correspondence Classes, and Classes Taken at Other Universities under Concurrent Registration

Students should note the special limitations that apply.

28.1 Off-Campus Classes

A maximum of three credits may be taken by off-campus classes, whether offered by Dalhousie or taken from another university under concurrent registration.

28.2 Summer School

Dalhousie currently offers two summer sessions of approximately six weeks each, one in May-June and the other in July-August. See Regulation 25.2 for permitted work-load. The maximum number of credits that may be gained by summer school and correspondence classes combined is five.

Those interested in summer school may request a summer school calendar from the Office of Continuing Education, Dalhousie University.

28.3 Correspondence Classes

At present no correspondence classes are offered by the Faculty of Arts and Science. Students who wish to take correspondence classes from other institutions may apply as in 28.4 below. See the limitation referred to in 28.2 above.

28.4 Classes Taken at Other Universities Under Concurrent Registration

A student who wishes to take classes at other institutions while registered at Dalhousie, whether in the academic year or in summer sessions, or by correspondence, must obtain approval in advance on a form available in the office of the Registrar. A letter of permission will be provided if approval for the classes is given. The workload at the other institution must conform to Dalhousie's limitations.

The departments of French, German, Russian, and Spanish have special arrangements whereby up to a total of 5 full-credit classes taken at other universities may be considered as part of a student's major program at Dalhousie.

The class fee will be paid by Dalhousie if:

- (a) the student is registered and has paid fees as a full-time student at Dalhousie,
- (b) the classes are approved as part of the student's program, and
- (c) the class is not part of a summer school program.

Note that classes taken elsewhere under Concurrent Registration are treated as transfer classes for purposes of record. Merit points are awarded in accordance with 21.2 and not more than half of the work for any credential may be by transfer credit.

29. Coordinated Programs

Students may in their second and third years follow a two-year integrated program, or two one-year integrated programs, of study. If two one-year programs are chosen, they may be in different departments. All such coordinated programs have been explicitly approved by the Curriculum Committee. A department or group of departments offering coordinated programs may structure them as it wishes, consistent with sound academic practice and subject to the following guidelines:

- (a) that the equivalent of five class units constitute a normal year,
- (b) that the function of each program form part of the Calendar description of each program,
- (c) that each two-year program permits students at least one class of their own choice in each of the second and third years,
- (d) that two-year programs normally not be exclusively in a single discipline,
- (e) that the normal prerequisite for entry into a department one-year or two-year program be the introductory class of the department in question, or an equivalent that the department considers acceptable, and not more than one introductory class in a related subject.

A student considering a Coordinated Program should consult as early as possible with the departments concerned.

30. Experimental Classes

Experimental classes, on any subject or combination of subjects to which arts or sciences are relevant, and differing in conception from any of the classes regularly listed in departmental offerings, may be formed on the initiative of students or faculty members.

If formed on the initiative of students, the students concerned shall seek out faculty members to take part in the classes.

Whether formed on the initiative of students or on the initiative of faculty members, the faculty members who wish to take part must obtain the consent of their department.

The class may be of one-year length or half-year length.

A class shall be held to be formed when at least one faculty member and at least eight students have committed themselves to taking part in it for its full length.

Classes may be formed any time before the end of the second week of classes in the fall term to run the year or first half-year, or any time before the end of the second week of classes in the spring term. If they are formed long enough in advance to be announced in the Calendar, they shall be so announced, in a section describing the Experimental Program, if they are formed later, they shall be announced (a) in the Dalhousie Gazette, (b) in the Dal News, (c) on a central bulletin board set aside for this purpose.

One faculty member taking part in each experimental class shall be designated the rapporteur of the class with responsibility for (a) advising the Curriculum Committee of the formation and content of the class; (b) obtaining from the Curriculum Committee a ruling as to what requirements or requirements of distribution and concentration and credit the class may be accepted as satisfying; (c) reporting to the Registrar on the performance of students in the class; (d) reporting to the Curriculum Committee, after the class has finished its work, on the subjects treated, the techniques of instruction, and the success of the class as an experiment in pedagogy (judged so far as possible on the basis of objective comparisons with more familiar types of classes).

Students may have five one-year length experimental classes (or some equivalent combination of these with half-year length classes) counted as a satisfying class for class any of the requirements for the degree, subject to the rulings of the Curriculum Committee (above) and (where relevant) to the approval of the departments.

31. International and Exchange Programs

The Faculty of Arts and Science offers a number of programs which enable students to pursue part of their studies in a foreign-language environment. These include:

- (a) One term of study at the Pushkin Institute, Moscow Pedagogical Institute, or Leningrad State University, U.S.S.R. (for details see the entry of the Russian Studies Program, page 140).
- (b) One term of study at Colegio de España, Salamanca, Spain (see the entry for the Spanish Department, page 147).
- (c) Up to one full year of study in a foreign-language environment. In recent years students have studied at the Université de Provence (Aix-Marseille) in France (consult the appropriate Language department).
- (d) Up to one full year of study at a francophone university in Quebec (consult the Department of French).

There is currently one exchange program. This is for third year honours students in various disciplines, at the University of Stirling in Scotland. (For further information, consult Dr. David McNeil, Department of English.)

32. Appeals

Any students who believe they will suffer undue hardship from the application of any of the regulations of the Faculty may appeal for relief to the Committee on Studies. Students wishing to appeal a decision based on Faculty regulations may obtain copies of the document "How to appeal a Faculty of Arts and Science regulation." Briefly, such appeals must be addressed in writing to the Chair of the Committee on Studies, c/o Registrar's Office and must clearly state the arguments and expectations of the petitioner. An appeal arising from a required withdrawal from the faculty for academic reasons should be addressed to the Admissions Committee.

Students who wish to appeal on matters other than those dealt with by faculty regulations can obtain copies of the document "A Procedure for special Academic appeals in the Faculty of Arts and Science".

Both documents can be obtained from the Office of the Registrar or any departmental office.

33. Changes in Regulations

In general, any change which affects a currently registered student adversely will not apply to that student. Any student suffering *undue hardship* from application of any of the regulations may appeal for relief to the Committee on Studies as in Section 32. above.

African Studies

Director

Timothy M. Shaw, BA, MA, PhD

Emeritus Professors

K.A. Heard, PhD (Political Science)

Z.A. Konczacki, PhD (Economics)

Professors

J.H. Barkow, PhD (Sociology & Social Anthropology)*

E.M. Borgese, PhD (Political Science)

J.E. Flint, PhD (History)*

E. Gold, LLB, PhD (Law)*

R.I. McAllister, MA (Economics)*

L. Osberg, PhD (Economics)

T.M. Shaw, PhD (Political Science, Dir., African Studies)*

D. Shires, MD, MPH (Family Medicine)

R.J. Smith, PhD (English)

J.B. Webster, PhD (History)*

Associate Professors

D.C. Cherry, MBA, CMA (Business)*

B. Lesser, PhD (Economics)

J.L. Parpart, PhD (History)*

Assistant Professors

D.F. Luke, PhD (Political Science)*

B. Jamieson, PhD (Economics & Public Administration)

M. Welton, PhD (Education)*

* denotes member of Executive Committee

This Centre, established in 1975, co-ordinates teaching, seminar, research and publications programs in African Studies. Its staff holds primary appointments in departments in the social sciences and the humanities and in several professional schools. It encourages interdisciplinary interaction at all levels on African subjects and concepts and organises occasional workshops on topical African issues. In recent years the latter have focused on the African crisis: development strategies, alternative futures, and women and development.

The undergraduate program in African Studies offers an opportunity to integrate classes from a number of disciplines. The major focus is Africa; the minor focus is development. Five classes beyond the first year deal with African cultures, economics, history, literature and politics; the remaining classes are concerned with development and change.

Students wishing to read towards a BA with a concentration on African Studies should note the following recommendations and regulations:

1. It is strongly recommended that in the first year students should read three of: Economics 1100 or 1120, English 1000, History 1400, Political Science 1100, 1101 or 1103, Sociology 1000 or 1100, or Spanish 1110A/B.

2. In the second and third years at least seven of the ten required for a degree must be chosen according to the following regulations:

(a) African Studies 2000A/2001B (compulsory)

(b) Four classes to be chosen from List I below (Direct focus on Africa)

(c) A further two classes must be chosen from List I or List II, the latter list being classes concerned with the problems of development and underdevelopment.

(d) Two of the ten classes must be at the 3000 level.

2000A Pre-Independence Inheritances: This class provides an overview of Africa's pre-colonial and colonial legacies: the culture, history, sociology and technology of pre-independence changes, constraints and contradictions up to 1960.

2001B Post-Independence Issues: This seminar constitutes an introduction to Africa's post-colonial development: the economics,

environment, literature, politics and prospects of independence. The continent's experience over the last 25 years is mixed. Informed analyses of Africa's political economy suggest some explanations and alternative projections.

List I

(See respective disciplinary sections of the calendar for class descriptions.

Note that not every class is offered each year).

Economics 2250, Applied Development Economics

English 2211, Commonwealth Literature

History 2410, Tropical Africa before 1800

History 2421A, Colonial Africa

History 2422B, Independent Africa

History 3440, African History from Oral Tradition

History 3450A/B, Southern Africa

History 3461A/B Women and Development in Africa

History 3462A/B, African Economic History

Political Science 3315A/B, African Politics

Political Science 3345A, South Africa: The Dynamics of Political Groups and Group Domination

Political Science 3540A/B, Foreign Policies of African States

Political Science 3544A/B, Conflict and Cooperation in Southern Africa

Political Science 3590, Politics of the Sea

List II

Comparative Religion 2002A/B, Christianity

Comparative Religion 2003A/B, Islam

Comparative Religion 2012A/B, Chinese Religions

Comparative Religion 2013A/B, Buddhism

Comparative Religion 3011, Religion and Culture in India

Comparative Religion 3012, Comparative Study of Christianity and other Religions

Development Studies 2000A/2001B, Introduction to Development Studies

Development Studies 2100A/2101B, Special Topics in Development Studies

Development Studies 3010A/3011B, Seminar in Development Studies

Development Studies 3100A/3101B, Special Topics in Development Studies

Development Studies 4010, Honours Essay Practicum

Development Studies 4001A/4002B, Special Topics in Development Studies

Economics 3317B, Poverty and Inequality

Economics 3300A/B, International Trade

Economics 3333A/B, Theories of Economic Development

Economics 3334A/B, Economic Development: Recent Debates, Controversies and Conflicts

Economics 3341A, Urban Economics: Growth and Development of Urban Areas

Economics 3355R Marxian Economics

Economics 4431A/B, International Payments

History 2130, British Empire and Commonwealth

History 2370, Age of Imperialism, 1870-1970

History 2380, Latin America: Independence and after

History 2501A/B, Middle East before/after WW1

History 2600, Modern East Asia

History 3075A/B History of Tropical Medicine

History 3360, Enslavement and Emancipation: Afro-Americans in the U.S. South up to 1900

History 3390A/B, Empire and Revolution in the Caribbean

History 3612A/B, Women in Socialist Countries

Political Science 2300, Comparative Politics

Political Science 2500, World Politics

Political Science 2505, International Politics in the Post-War World

Political Science 3301B, Comparative Development Administration

Political Science 3303A/B, Human Rights and Politics

Political Science 3340A, Problems of Development

Political Science 3380B, Politics of Latin America

Political Science 3531A, United Nations in World Politics

Political Science 3535B, Towards a New World Order

Political Science 3585B, Politics of the Environment

Sociology 2020, Comparative Sociology and Social Anthropology
 Sociology 2370/2380, Peoples and Cultures of the World I/II
 Sociology 2400, Medicine and Health Across Cultures
 Sociology 3080B, Modernisation and Development
 Spanish 2070A/B, Area Studies on Mexico and Central America
 Spanish 2090A/B, Women in Latin America
 Spanish 2110A/B, The Cuban Cultural Revolution
 Spanish 2130A/B, Latin American Dictators
 Spanish 2230A/B, Contemporary Latin American Prose
 Spanish 3070A/B, Contemporary Latin American History

W.F. Doolittle, AB (Harv.), PhD (Stan.)
 M.W. Gray, BSc, PhD (Alta.)
 C.W. Helleiner, BA, PhD (Tor.)
 C.B. Lazier, BA (Tor.), MSc (UBC), PhD (Dal)
 C. Mezel, MSc, PhD (UBC)
 F.B.St.C. Palmer, BSc, PhD (W.Ont)
 D.W. Russell, BPharm, PhD, DSc (Lond.), BEd (Dal)
 M.W. Spence, MD (Alta.), PhD (McG.)
 J.A. Verpoorte, BSc, Drs (Utrecht), DSc (Pretoria)
 S.D. Wainwright, BA (Cantab.), PhD (Lond.)

Associate Professors

R.G. Fenwick, BA (Miami), PhD (Tennessee)
 F.I. Maclean, BA, MA (Tor.), DPhil (Oxon.)
 R.A. Singer, AB (Princeton), PhD (Harv.)

Assistant Professor

M.H. Tan, BSc, MD (Dal)

Lecturers

D.M. Byers, BSc, MSc (Dal), PhD (Alta.)
 D.E.C. Cole, BSc, MD (Tor.), PhD (McG.)
 H.W. Cook, BSc, MSc (McG.), PhD (Dal)

Biochemistry is the study of biological function at the molecular level. Although biochemical processes follow the basic laws of physics and chemistry, living organisms, because of their complexity, operate on a set of distinct principles that are not found in simple isolated chemical systems. The goal of biochemistry is to elucidate these principles. The department offers an integrated series of classes that will provide students with an up-to-date view of modern biochemistry ranging from structure-function relationships in macromolecules to the dynamic aspects of metabolism and genetic information transfer, including the exciting new biological and biochemical vistas opened up by recombinant DNA technology.

Degree Programs

Note: Students interested in a Biochemistry degree should obtain from the department a special booklet which is kept up-to-date and which describes all of the programs available and the special requirements relating to them. Degree programs should be planned in consultation with the undergraduate coordinator (Dr. D.W. Russell), or another faculty advisor (Dr. F.B. Palmer, Dr. J.A. Verpoorte).

There is no three-year program with a Biochemistry major. Students wishing to include Biochemistry in other three-year programs are welcomed. They should take Biochemistry 2000 and 2600 (Biology 2015 and 2012), or Biology 2020 and 2110, in their second year. Note that all Biochemistry classes have prerequisites.

BSc Advanced Major in Biochemistry

The department offers a four-year program of study leading to an Advanced Major Degree. The program, while not designed as a preparation for graduate study in Biochemistry, nevertheless introduces students to all main aspects of the subject. As well as meeting the general degree requirements of the faculty (Section 11) students must complete the following classes with a grade of C- or better: Chemistry 1100 (or equivalent), 2200 and 2400; Biology 1000; Biochemistry 2000, 2600, 3200, 3300, 3400; and at least three full credits in Biochemistry at the fourth-year level. Students who have not passed Nova Scotia grade 12 Physics or its equivalent must include a 1000-level Physics class among their first ten credits.

BSc with Honours in Biochemistry

This is a special concentrated Honours Program. Because Biochemistry and Chemistry are closely interwoven both conceptually and experimentally, the list of major classes required (see Section 11) includes both subjects to a total of 10½ credits. Additional chemistry classes may be taken as electives, or by choosing Chemistry as a minor subject. Students are strongly urged to include Mathematics 1060 or 2070 and Biology 2030 and

Ancient History

See under Classics

Anthropology

See under Sociology and Anthropology

Architecture

1000 introduction to Architecture: lecture/seminar 1 hour, practical 2 hours, staff. An introductory class showing architecture as a bridge between the Arts and Science providing an insight into professional architectural studies. In the first term discussion centres around some components of architectural design; in the second term, architecture in present day life. Available as an elective in the general degree programs in Arts and Science.

Biochemistry

Head of Department
 R.W. Chambers

Professors

A.H. Blair, BA, MSc (UBC), PhD (Calif.)
 W.C. Breckenridge, BSc (Queen's), MSc, PhD (Tor.)
 R.W. Chambers, BA, PhD (Calif.)
 P.J. Dolphin, BSc, PhD (Southampton)

2100 in their programs, and should consider also Biology 3070 and (for students interested in molecular biology) Microbiology 3033. Honours students must meet the general degree requirements of the faculty (Section 11).

Year I: Chemistry 1100 or equivalent; Biology 1000; Physics 1100; Mathematics 1000 & 1010, or 1050; a "Writing Class" (see Section 11).

Year II: Biochemistry 2000 and 2600; Chemistry 2200, 2310, 2320, & 2400; and one full credit in the minor subject.

Year III: Biochemistry 3200, 3300, & 3400; Chemistry 3410 & 3430; one half-credit elective (any subject); one full credit elective (not Biochemistry nor minor); and one full credit in the minor subject.

Year IV: Biochemistry 4602; three more full credits in Biochemistry, including at least one half-credit in each of the following areas: Metabolism (43xx), Molecular Biology (44xx), and Physical Biochemistry (47xx); one full credit elective (not Biochemistry nor minor).

A minor subject (see Section 11) should be chosen in consultation with the department's Academic Advisor. Elective and minor classes need not be taken in the order stated.

BSc with Combined Honours in Biochemistry and another science

Biochemistry may be chosen along with one of Biology, Chemistry, Microbiology (see Section 11), Physics, or possibly another subject, for a Combined Honours Program. Consult the Department for details.

Classes Offered

The Department also teaches students in Dental Hygiene, Dentistry, Medicine, and Nursing; these classes are described in the appropriate sections of the Calendar.

Classes marked * are not offered every year; please consult the current timetable.

142B Introductory Biochemistry: lecture 3 hours, lab 2 hours, F.I. Maclean. Prerequisite: Chemistry 1410A or consent of instructor. This class cannot be used as a prerequisite for any other Biochemistry class. This class also serves as part of Chemistry/Biochemistry 143R of the School of Nursing. Topics discussed are structure, biosynthesis, and function of carbohydrates, lipids, proteins and nucleic acids; enzyme kinetics; genetic engineering; nutrition. Medical aspects are stressed.

2000 (Biology 2015) Cell Biology and Biochemistry: lecture 3 hours, tutorial 1 hour, Biology and Biochemistry faculty members. Prerequisites: Biology 1000 and Chemistry 1100 or its equivalent. Described under Biology 2015.

2600 A or B (Biology 2012 A or B) Laboratory Techniques for Cell and Molecular Biology: lecture 1 hour, tutorial 1 hour, lab 3 hours, Biology Department members. Prerequisites: Biology 1000 and Chemistry 1100 or its equivalent. Described under Biology 2012.

3100 Biochemistry for Students of Pharmacy: lecture 3 hours, lab 3 hours, D.W. Russell. For pharmacy students in their third year, this class provides a basic knowledge and understanding of the three main areas of modern biochemistry: the chemistry of cell constituents, metabolism, and biological information.

Biochemistry 3200, 3300, and 3400 are half-credit classes, each of which deals with one important aspect of biochemistry. The level of instruction is such that adequate preparation is essential. Common Prerequisites: Chemistry 2400; plus either (a) Biochemistry 2000 and 2600 (Biology 2015 and 2012) or (b) Biology 2020 and 2110.

3200A (Biology 3012A) Introduction to Biological Chemistry: lecture 3 hours, A.H. Blair, J.A. Verpoorte; lab 3 hours, C. Mezel. Prerequisites: see above. This class deals with chemical principles governing biochemical

systems. We discuss the factors that determine how readily a given metabolic reaction proceeds and describe how these factors may be expressed quantitatively. This is followed by a discussion of basic principles governing the structure of carbohydrates, lipids, and proteins. We also deal with the ways in which proteins bind other molecules, often with high affinity and specificity. A discussion of enzyme catalysis emphasizes relationships between macromolecular structure and biochemical function, enabling us to explain the striking effectiveness and high specificity with which these catalytic proteins carry out their functions.

3300B (Biology 3013B) Intermediary Metabolism: lecture 3 hours, W. Kimmins, C. Mezel; lab 3 hours, P.J. Dolphin. Prerequisites: see above. Emphasis is chiefly on metabolic pathways common to all organisms, notably the reductive synthesis and oxidative catabolism of carbohydrates, lipids, and some nitrogen compounds. Other pathways, significant in certain tissues or organisms, are included. Metabolic regulation is surveyed, and factors influencing the rate at which compounds flow through selected pathways are examined. Students learn how pathways are compartmentalized, interrelated, and affected by abiotic chemical changes in the environment. Laboratory exercises demonstrate the strategies and techniques used to study metabolic pathways.

3400B (Biology 3014B) Nucleic Acid Biochemistry and Molecular Biology: lecture 2 hours, tutorial 1 hour, C.W. Helleiner, J.M. Wright, lab 3 hours, M.J. O'Halloran. Prerequisites: see above. This class focuses on the relationship of structure to function in RNA and DNA. Methods for studying the primary, secondary, and tertiary structures of nucleic acids are explored in lectures and in the laboratory. Enzymic mechanisms for biosynthesis, rearrangement, degradation, and repair of nucleic acid molecules are studied, as are the processes of replication and transcription. In this context, nucleic acid biochemistry is emphasized as a basis for understanding storage and transfer of biological information.

4300 Series: Intermediary Metabolism and Control: These half-credit classes continue the study of metabolism begun in Biochemistry 3300, and introduce also some specialized topics of particular interest. Emphasis is on how metabolic systems are related and how the systems and their relations are controlled. Appraisal of experimental evidence and interpretation of data are stressed.

4300B Metabolic Organization and Regulation: lecture 2 hours, W.C. Breckenridge and F.B. St.C. Palmer. Prerequisites: Biochemistry 3200 and 3300 (Biology 3012 and 3013) or equivalent. A functioning organism must control and integrate its metabolism. In this class, topics include enzyme localization, mitochondrial permeability, modified oxidative cycles, and a detailed consideration of the ways in which flux through metabolic pathways is directed and regulated. Emphasis is placed on interpretation of experimental data and on problem-solving.

4301B Biochemical Communication: Membranes, Neurotransmitters, and Hormones: lecture 2 hours, C. Lazier, C. Mezel. Prerequisites: Biochemistry 3200, 3300, and 3400 (Biology 3012, 3013, 3014) or equivalent, or special permission of the instructors. First, the class examines evidence for current concepts of membrane structure and assembly. Then several membrane-related phenomena are studied. These include ways for transporting solutes across membranes, and effects, such as neurotransmission and peptide hormone action, that depend on membrane-associated receptors. Regulation that does not depend on membranes, such as steroid hormone action, is considered in detail.

4302A Biochemistry of Lipids: lecture 2 hours, F.B. St.C. Palmer and H.W. Cook. Prerequisites: Biochemistry 3200 and 3300 (Biology 3012 and 3013). The chemistry and physics of insoluble lipids in an aqueous environment are explored. Current evidence for the physical state of lipids in organisms is examined, and problems in the interaction of insoluble lipids with soluble and insoluble enzymes are considered. Metabolism of a variety of lipids is studied, especially of those, such as glycolipids, eicosanoids, steroids, phospholipids, etc. that may have specialized physiological functions.

4303A Biochemical Energetics: lecture 2 hours, F.I. Maclean. Prerequisites: Biochemistry 3200 and 3300 (Biology 3012 and 3013).

Approximately equal time is given to the following topics: thermodynamic principles of special importance to biochemistry; fermentations; autotrophy and photosynthesis; oxidative phosphorylation; energy metabolism of protozoa and invertebrates.

*4400 Protein Synthesis and Control Mechanisms: lecture 2 hours, S.D. Wainwright. Prerequisite: permission of the instructor. The class deals with the cell components and reactions involved in the biosynthesis of proteins, with special reference to mechanisms controlling the rate of synthesis and the spectrum of proteins made. Students' individual study of research reports is emphasized.

4403A & 4404B Molecular Biology of the Gene: These half-credit classes consider the duplication, transfer, and expression of genetic material. The experimental evidence for current concepts of gene structure and function is stressed. Students study the language of molecular biology and learn about the experimental techniques peculiar to it. Lectures adopt a historical perspective so that students come to appreciate how the discipline of molecular biology has developed.

4403A (Microbiology 4403A) Structure, Organization, and Replication of Genes: lecture 2 hours, R.G. Fenwick. Prerequisite: Biochemistry 3400 (Biology 3014). Topics include basic molecular genetics; evaluation of genetic complexity and gene arrangement; chromosome structure; identification and enumeration of specific genes; mechanisms of replication, recombination, and repair; and manipulation of genes *in vivo* and *in vitro* ("genetic engineering").

4404B (Microbiology 4404B) Gene Expression: lecture 2 hours, R.A. Singer. Prerequisite: ordinarily, Biochemistry 4403A (Microbiology 4403A). The different mechanisms for regulation of gene expression in bacterial and eukaryotic cells, and their viruses, are emphasized. Particular topics include genomic, transcriptional, and post-transcriptional modes of regulation.

4802 Honours Project & Thesis: lab 6 hours, J.A. Verpoorte. Before receiving approval for this class, students must secure the agreement of a faculty member in the Biochemistry Department to act as a supervisor. The class requires laboratory research and a written final report. If the research is to be done outside the department, prior approval must be obtained from the class coordinator.

4700A Proteins: lecture 2 hours, tutorial 1 hour, J.A. Verpoorte. Prerequisites: Biochemistry 3200 (Biology 3012) plus a basic class in physical chemistry or permission of the instructor. Selected aspects of the chemistry of proteins are considered. Topics include relationships of structure to bioactivity, the forces that stabilize protein structure, and chemical and physical methods used to isolate and study proteins and other macromolecules.

4701B Enzymes: lecture 2 hours, tutorial 1 hour, A.H. Blair. Prerequisite: Biochemistry 3200 (Biology 3012). Our current understanding of enzymic catalysis and its experimental basis are examined. The relationship between structures of catalytic and regulatory sites and their functions is considered for selected enzymes. The kinetics of enzyme-catalysed reactions are studied, as is the way in which binding of regulatory molecules influences kinetic behaviour and thereby regulates cellular metabolism.

*4800 (Pathology 501) Clinical Medical Biochemistry: lecture 2 hours, lab 3 hours, Pathology faculty members. Prerequisite: Biochemistry 3200 (Biology 3012). Examines the application of chemical concepts and techniques to the prevention, detection, diagnosis, understanding, and treatment of diseases.

4801 (Biology 4401) Introduction to Pharmacology: lecture 2 hours, lab 3 hours, M. Karmazyn (Pharmacology). Prerequisite: permission of coordinator. Described under Biology 4401.

*4802 (Pathology 503) Principles of Instrumentation: lecture 3 hours, lab 4 projects, Pathology faculty members. Prerequisite: Biochemistry 3200 (Biology 3012). Examines the theory and practice of a wide range of modern instrumental techniques for clinical biochemical analysis.

8880 Honours Qualifying Examination: Honours students must fulfil the requirements of this class (see Section 11) by presenting two additional reports on their work in Biochemistry 4802. The first is a Progress Report, and the second an oral presentation at a special year-end Departmental Seminar.

Biology

Chair
W.C. Kimmins

Emeritus Professor
D. Pelluet, MA (Toronto), PhD (Bryn Mawr), LL.D. (Hon. Dal)

Professors
R.G. Brown, MSc (McG), PhD (Rutgers)
M.L. Cameron, MSc (Dal), PhD (Cantab.)
A.R.O. Chapman, PhD (Liv.)
R.W. Doyle, MSc (Dal), PhD (Yale)
J. Farley, MSc (W.Ont), PhD (Man.)
J.C. Fentress, PhD (Cantab.) — (Psychology)
E.T. Garside, MA, PhD (Tor.)
L.E. Haley, MSA (Tor.), PhD (Calif.)
B.K. Hall, PhD, DSc (UNE), FRSC
O.P. Kamra, MS (N.Car.State), PhD (Wash. State)
W.C. Kimmins, PhD (Lond.)
P.A. Lane MSc (SUNY Binghamton), PhD (SUNY Albany)
K.E. von Maltzahn, MS, PhD, (Yale) — Carnegie Professor, King's
I.A. McLaren, MSc, (McG), PhD (Yale) — George S. Campbell Professor
E.L. Mills, MS, PhD (Yale) — (Oceanography)
R.K. O'Dor, PhD (UBC)
J.G. Ogden, III, MA (Tenn.), PhD (Yale)
L.C. Vining, MSc (Auck), PhD (Cantab.), FRSC, Killam Research Professor
E. Zouros, MSc PhD (Agrl. Coll. Athens), PhD (Chic.)

Associate Professors
E.W. Angelopoulos, MS, PhD (Minn.)
B. Freedman, MSc, PhD (Tor)
A.J. Hanson, MSc (UBC), PhD (U. Mich.) IES
M.J. Harvey, PhD (Dunelm)
G.S. Hicks, MSc (Carl.), PhD (Sask.)
R.W. Lee, MA (Mass.), PhD (SUNY Stony Brook)
T.H. MacRae, MSc, PhD (Windsor)
R.P. McBride, MSc (UBC), PhD (Edin.)
J.A. Novitsky, PhD (Ore. S.U.)
D.G. Patriquin, MSc, PhD (McG)
M.R. Rose, MSc (Queens), PhD (Sussex), University Research Fellow
R.E. Scheibling, PhD (McG)
J.H.M. Willison, PhD (Nottingham)

Associate Professor (Research)
G.F. Newkirk, PhD (Duke)

Assistant Professors
R.G. Boutlier, MSc (Acadia), PhD (East Anglia), University Research Fellow
W. Pohaidek, MSc, PhD (Manitoba)
H. Whitehead, PhD (Cantab), University Research Fellow
J.M. Wright, PhD (MUN)

Adjunct Professors
R.G.S. Bidwell, MA, PhD (Queens), FRSC, Director, Atl. Inst. Biotech.
J.D. Castell, MSc (Dal), PhD (Oregon St.), Fish. & Mar. Serv.
J.S. Craigie, MSc, PhD (Queens), Atl. Reg. Lab, NRC

K.H. Mann, PhD (Reading), DSc (Lond.), FRSC Mar. Ecol. Lab, BIO
 J.L. McLachlan, MA, PhD (Oregon State College), Atl. Reg. Lab, NRC
 M. Schrempf, PhD (Stuttgart-Hohenheim)
 M. Silver, PhD (Syracuse)

Honorary Research Associates

D.E. Alken, PhD (Alberta), D.F.O., St. Andrews
 J. Bubar, MS (Penn St.), PhD (McG), N.S. Agric. Coll.
 W.D. Bowen, PhD (UBC), Fisheries & Oceans
 S.E. Campana, PhD (UBC), BIO
 C.D. Caldwell, PhD (East Anglia), BIO
 D.K. Cone, MSc (Guelph), PhD (UNB), St. Mary's Univ.
 M.L. Connor, PhD (U. of Man.), N.S. Agric. Coll.
 R. Conover, PhD (Yale), Mar. Ecol. Lab, BIO
 D.C. Crober, PhD (UBC), N.S. Agric. Coll.
 K.T. Frank, PhD (Toledo), BIO
 J. Fraser, MSc (Aberdeen), PhD (Lincoln College, Univ. of Canterbury),
 N.S. Agric. Coll.
 A.H. Freeden, PhD (McGill), NSAC
 B.T. Hargrave, MSc (Dal), PhD (UBC), Mar. Ecol. Lab, Fisheries and
 Environment
 F.H. Harrington, PhD (New York at Stony Brook), Mount Saint Vincent
 University
 W.G. Harrison, PhD (North Carolina, Raleigh), Mar. Ecol. Lab, BIO
 Haw-Yoon Ju, PhD (McGill), NSAC
 J.J. Kerekes, MSc (Alberta), PhD (Dal), Canadian Wildlife Environment
 Canada
 S.R. Kerr, MSc (Queens), PhD (Cal), Mar. Ecol. Lab, BIO.
 J.P. LeBlanc, PhD (McG), N.S. Agric. Coll.
 C.A. Leesman, PhD (Minnesota), St. FXU
 J. McGlade, PhD (Guelph), Bedford Inst. Oceanography
 I.A. Meinertzhagen, PhD (St. Andrews), Psychology Dept., Dalhousie
 P.V. Mladenov, PhD (Alberta), Mt. Allison University
 J. Nowak, PhD (Olaszyn), PhD Habil. (Olaszyn) N.S. Agric. Coll.
 A.R. Olson, PhD (Alberta) N.S. Agric. Coll.
 T.C. Platt, MA (Tor.), PhD (Dal), Mar. Ecol. Lab, BIO
 R.K. Prange, MSc (UBC), PhD (Guelph), Ag. Canada Res. Sta., Kentville.
 J.D. Pringle, MSc (Victoria), PhD (Dal), Fisheries and Oceans.
 S. Shaw, PhD (St. Andrews), Dept. of Psychology, Dalhousie
 M. Sinclair, PhD (U. of Cal.), Fisheries & Oceans
 D.B. Stoltz, PhD (McM), Dept. of Microbiology, Dalhousie
 G.W. Stratton, MSc, PhD (Guelph), N.S. Agric. Coll.
 T. Tennessen, PhD (U. of Alta.), N.S. Agric. Coll.
 J.P. van der Meer, PhD (Cornell), Atl. Res. Lab, NRC
 J. van der Meulen, PhD (U. of Cal.), BIO
 P.R. Warman, PhD (Guelph), N.S. Agric. Coll.
 R.J. Wassersug, PhD (Chic.), Dept. of Anatomy, Dalhousie.
 J.L.C. Wright, PhD (Glasgow), Atl. Reg. Lab, NRC

Cross-listed Faculty

J.C. Fentress, BA (Amherst), PhD (Cantab)
 I.A. Meinertzhagen, BSc (Aberdeen), PhD (St. Andrews)
 E.L. Mills, BSc (Carl), MS, PhD (Yale), FLS

Senior Instructors

C. Beauchamp BSc., MSc (Memorial)
 J. Breckenridge, BSc (Queen's)
 P. Collins, BSc, MSc (Dal)
 P. Gerdes, BSc (McG), MSc (UWO)
 P. Harding, BA (Tor.), MSc (Dal)
 A. Mills
 M.J. O'Halloran, BSc (South), BEd, MSc (Dal)

Instructors

C. Corkett, PhD (London)
 D. Gill, MSc (Dal)
 B. Hill, BSc (Carleton)
 E. Staples, BSc (Dal), BEd (Mt. St. Vincent)

Postdoctoral Fellows

J. Doull, PhD (Dal)

T. Kantomaa, PhD (Oulu), DDS (Turku)
 R. Lowell, PhD (U of A)
 S. Shapiro, PhD (WFEB)
 M. Snyder, PhD (Colorado)
 C. Taggart, PhD (McG)
 B. Tufts, PhD (UBC)

The program offered by the department gives a basic training in the biological sciences which may serve as a preparation for graduate and professional work in biology, medicine, dentistry, pharmacy, the health professions, bio-engineering and education, agriculture, marine sciences, fisheries, aquaculture, forestry and environmental architecture and engineering.

Degree Programs

The department offers classes leading to the BA and BSc degrees, to concentrated or combined Honours BSc and BA programs and a BSc Honours in Marine Biology program. A student intending to study biology as his main subject should consult the department early in his course so that a proper program can be worked out.

Areas of Specialization — Major and Honours

Many classes are available to students wishing to concentrate their studies in particular areas of biology. In some cases, the order in which classes are taken is important, but cannot be rigidly specified here because students may vary widely in their interests and requirements. For this reason, students are strongly urged to consult with an adviser in the biology department, whether they are planning a 3-year, 2-year or only 1-year program in biology. Faculty advisers are available in the following fields (among others): Molecular Biology, W.C. Kimmins, L.C. Vining; Microbiology, R.G. Brown, J. Novitsky; Genetics, R.W. Doyle, R.W. Lee, O.P. Kamra, E. Zouros; Ecology/Environmental Studies, R.W. Doyle, B. Freedman, P. Lane, I. McLaren, J.G. O'Gden; Physiological/Cell Biology, M.L. Cameron, T. MacRae, R.K. O'Dor, D. Patriquin, M. Willison; Developmental Biology, B.K. Hall, G.S. Hicks; General Studies, J. Farley, R.P. McBride, K.E. von Maltzahn; Plant Biology, M.J. Harvey, A.R.O. Chapman, M. Willison; Animal Biology, E.T. Garalde; Entomology & Parasitology, E. Angelopoulos.

Honours in Biology

Advisors: W. Kimmins, R.P. McBride, R. Schelbling

For entrance to graduate school an honours degree or equivalent four-year background is required. Some graduate schools require a reading knowledge of French, German or Russian. A thorough grounding in mathematics and physical sciences is as important as advanced undergraduate training in biology.

Students reading for Bachelors degrees with honours in biology must satisfy the general requirements for honours degrees (see general faculty regulations, referring to academic programs) and should register for their honours program before signing up for the second year classes. In the fourth year students will write a thesis and enrol in Biology 4900. Normally all honours students in Biology must complete Biology 2015, 2046, 2030 and 2050 or their equivalents by the end of the third year. Students must attain a B grade average in these classes, with no mark lower than a B-

Selecting an Honours Program

The basic Biology Honours Program provides a broad background in the biological sciences and enough flexibility to allow some degree of specialization in a variety of sub-disciplines. A suitable program of this kind (e.g. cellular and developmental biology, cellular biology and genetics, ecology and evolution, environmental biology, molecular biology, human biology, etc.) worked out with an adviser and leading to a thesis in that area is excellent preparation for advanced studies.

Some students may wish to choose a Combined Honours Program with Biochemistry, Chemistry, Economics, Geology, Mathematics, Microbiology, Psychology or Physics. These programs must be worked out with the two departments. Special combined programs exist with some departments. A program with Economics is particularly applicable to students with an interest in ecology. Students interested in such a program should take Biology 1000 and Economics 1100 in their first year.

The departments of Biology and Microbiology offer both an Honours and a 2-year coordinated program in Microbiology. These programs are designed for students entering their second year of study. Students interested in these programs are advised to consult either of the departments concerned at their earliest opportunity. Faculty advisors are R.G. Brown (Biology) and D.B. Stoltz (Microbiology). Note that classes which are cross listed between these two departments can be taken for either Microbiology or Biology credits.

Students may be interested in programs that are not oriented toward a traditional discipline but rather emphasize a broad knowledge. For them, an Unconcentrated Honours Program may offer the best preparation. Advice on these matters may be obtained in the department.

Honours in Marine Biology

Advisor: A.R.O. Chapman

The Biology Department recognizes the special needs of the rapidly expanding marine field and offers a BSc Honours Degree in Marine Biology.

Details of the program will be found under a separate listing for Marine Biology on page 100

Classes Offered

Please note that Biology 1000 with a minimum grade of C is the prerequisite for all other classes in the biology department.

A class number that is suffixed by one of the letters A, B, or C is a half-credit class. See comments on these classes under the heading Numbering of Classes under General Undergraduate Information and Regulations.

Biology classes may be grouped into four general types:

1. Introductory Biology Principles: Biology 1000. This class is designed as an introductory university-level class in biology for the student who has no previous training in the subject as well as for those who have taken high school biology. This class, with a minimum grade of C, is required for entrance to all other classes in the department.

2. Intermediate Classes-2000-Level Classes. The study of life (Biology) occurs on several levels. Our everyday experience with life is with units called organisms which come in an amazing variety of forms including dogs and trees and even ourselves. All of these forms are composed of cooperating cells, and many of the activities of cells are now understood at a molecular level. The diversity of life results from interactions among organisms and populations of organisms as well as interactions with the environment. Understanding any problem in Biology requires knowledge of all of these levels of interaction. *The class requirements in the Department are designed to insure that every Biology student takes at least one intermediate class at each level of organization.* Some of the major themes of Biology transcend all three levels, and it is also important that each student be exposed to at least one of these integrative themes, thus these make up the fourth category, Biological Processes. *All students registered in Biology are required to take at least one-half credit class in each of the four categories below.*

The full credit equivalent classes may be required as prerequisites for advanced classes in a particular area. Students should be aware of such prerequisites and discuss their programs with their faculty advisor to insure that the classes they take are appropriate to their goals. Good performance in a half-credit equivalent is usually acceptable as a prerequisite for an advanced class with the instructor's permission.

Category I: Cells and Molecules; Biology 2015R, 2110B, 2020A.

Category II: Organisms; Biology 2001A, 2002B, 2100A/B

Category III: Populations and Ecosystems; Biology 2046R, 2080A/B, 2086A/B.

Category IV: Biological Processes; Biology 2030, 2035R, 2050A/B.

Students may not take more than one full credit in Categories I and III. Biology 2012A or B is a half-credit class which is not a member of the core thus cannot be counted toward fulfilling the core requirement but can be used as a credit toward a major or honours.

3. 3000-Level Classes. These classes are mainly for second and third year students. No biology major will be allowed to register in any 3000 or 4000-level class without having completed, or being registered in 2000-level classes in biology totalling at least two full credits.

4. 4000-Level Classes. These classes are primarily for honours and graduate students. They are open to others with the permission of the instructor. Where biology classes are identified as being given in another department (e.g. Anatomy), that department should be consulted for details.

1000-Level

1000 Principles of General Biology: Study centre 3 hours, (for lab and problems), tutorial 1 hour/2 weeks, lecture 1 hour, I.A. McLaren, L.C. Vining, Hicks and others. Instructors, C. Corkett, A.H. Mills, P. Harding. The subject matter of Biology 1000 puts emphasis on those features common to all organisms. The class starts by considering the cell: structures, chemistry, energy needs, the coding system and protein synthesis. This leads to the topics of genetics, organization and control of the individual, evolution, ecology, development and systematics. Biology 1000 is the basic introductory class in biology suitable for students who may have had no previous training in biology. *If you are a biology major, Biology 1000 is the prerequisite for all other classes in the biology department, regardless of previous background in biology.* Under exceptional circumstances, students may apply to be exempted from taking Biology 1000.

1984 A Citizens Guide to the Biological Issues of our Times: lecture 2 hours, tutorial 1 hour, R.P. McBride. For BA students only and cannot be used as a prerequisite for other biology classes. An awareness and comprehension of major developments in biology sufficient for citizen involvement in science-society controversies. Studying topics with major social impact such as genetic engineering, environmental health hazards and modern agriculture, students acquire a scientific vocabulary, insight into the strengths and limitations of science, and an understanding of basic biological concepts.

2000-Level

2001A Marine Diversity: lecture 2 hours, tutorial 1 hour, lab 3 hours, R.E. Scheibling, A.R.O. Chapman. Instructor, C. Corkett and staff (Category II). *The sea was the cradle of life and the origin of most phyla.* This class explores the enormous variety of living and fossil organisms from the sea and looks at the special problems and adaptations of benthic, planktonic and nektonic species. It examines functional and taxonomic relationships using lectures, laboratories with living organisms, field trips and computer.

2002B Terrestrial Diversity: lecture 2 hours, tutorial 1 hour, lab 3 hours, D.G. Patriquin, R. Scheibling, Instructor, A.H. Mills (Category II). A survey of the terrestrial organisms. The class emphasizes the restrictions imposed on terrestrial adaptations by the aquatic origins of the colonizers, discusses the physiology of living in a terrestrial environment, and finally looks at the domestication of plants and animals by man and speculates on the future diversification of the earth environment and its inhabitants.

2012A/B Laboratory Techniques for Cell and Molecular Biology: lecture 1 hour, tutorial 1 hour, lab 3 hours, W.C. Kimmins, J.M. Wright. Instructors, P. Gerdes and B. Hill. An introduction to techniques, equipment and the experimental approach to solving biological problems in the laboratory. Lectures present the theoretical background to laboratory experimentation. Tutorials aim mainly at developing an appreciation of experimental design and data analysis. Students intending to take more advanced biochemistry/molecular biology classes next year need this class and Biology 2015 as prerequisites. Biology 2012A/B can be used as a credit toward a major or honours but does not meet the requirement of a class in Category I.

2015R Cell Biology and Biochemistry: lecture 3 hours, tutorial 1 hour, W.C. Kimmins, T.H. MacRae, (co-ordinator), J.H.M. Willison (Biology); C.W.

Helleiner, R.A. Singer (Biochemistry) and staff. Instructors, P. Gerdes and B. Hill (Category I). Members of the Biochemistry and Biology Department, join in offering this introductory class which explores the full range of contemporary ideas in cell and molecular biology. The class deals with topics such as the transmission of genetic information, gene expression, growth, adaptation, cell division and differentiation at a mechanistic level and provides a broad perspective of metabolic processes associated with energy production, biosynthesis, transport and communication. It also seeks to explain the integration of these and other forms of biological activity through regulation of gene expression and the diverse cellular and metabolic control systems. Students who intend to take more advanced biochemistry and molecular biology classes next year need this class and Biology 2012A/B as prerequisites. Biology 2015R and 2012A/B may be substituted for Biology 2020 and/or 2110 as prerequisites, but credit may not be given for both 2015 and either 2110 or 2020.

2020A Cell Biology: Structure and Function: lecture 3 hours, lab 3 hours, T.H. MacRae. Instructor, P. Gerdes (Category 1): An introduction to the eukaryotic cell through lectures and laboratories. Major cell components and activities are described at ultra-structural and molecular levels. The concept of the cell as an integrated structural/functional unit is developed. Credit will not be given for both Biology 2020 and 2015.

2030A Genetics: lecture 3 hours; tutorial 1 hour, open lab; O.P. Kamra. Instructor, E. Staples (Category IV). Credit will not be given for both 2030 and 2035. This class examines a broad range of topics from the rapidly expanding field of genetics. Major organizational sections include: Chemical and structural features of genes and chromosomes, gene transmission, gene function and gene variation in populations and through time. Tutorials deal mainly with problem solving. All students must do a laboratory project involving *Drosophila* crosses.

2035R Principles of Genetics: lecture 2 hours, tutorial 1 hour, open lab, R.W. Lee, O.P. Kamra and E. Zouros. Instructors, Edna Staples, Christine Beauchamp (Category IV). Credit will not be given for both 2035 and either 2030 or 2040. The great power of modern genetics and its prominence in biology have grown from a blend of classical and molecular techniques. This full class is designed to provide students with a comprehensive exposure to these approaches while considering a broad collection of topics from the field of genetics. The major topics to be considered include nucleic acids and chromosomes, transmission genetics, gene function, population genetics, and molecular evolution. The application and relevance of recombinant DNA technology to these topics will be emphasized. A strong evolutionary perspective will be maintained throughout. This class is the prerequisite for most higher level classes in genetics. All students must do a time-flexible laboratory project.

2046R General Evolution and Ecology: lecture 2 hours, lab/tutorial 3 hours, R.W. Doyle. Instructor, C. Beauchamp (Category III). Credit will not be given for both 2046 and either 2080 or 2086. The growth and regulation of population size, the genetic structure of populations and the ecological structure of plant and animal communities. Principles which apply on a short (ecological) time scale will be developed in parallel with the analogous principles which apply over much longer stretches of evolutionary time. Much of the laboratory and about one-quarter of the lectures are concerned with applied ecology; in particular, with the biological basis of fisheries and environmental management. This full year class provides a good foundation for further work in ecology and marine biology.

2050A Developmental Biology: lecture/discussion 3 hours, lab 3 hours, G.S. Hicks, B.K. Hall, P. Collins (Category IV). The lectures describe development as a sequence of programmed events, in which 'simple' structures such as the fertilized egg are progressively transformed into complex organisms. These events are governed by a set of developmental 'rules.' Our knowledge of these rules comes from experimental study of a variety of developing systems such as sea urchins, frogs, peas, carrots, chick embryos and humans. Laboratories stress the use of live material and give students practice with such techniques as test tube fertilization in echinoderms.

2080 Introductory Ecology: lecture 3 hours, lab 3 hours, I. McLaren, J.G. Ogden. Instructor, D. Gill (Category III). Ecology is the study of the

interrelationships of organisms and their environments. The broad subject of ecology focuses upon the interactions of plants and animals with each other and with their non-living world. Three levels of ecology are studied: (1) Individuals, (2) Populations, and (3) Communities and Ecosystems. Labs and tutorials enlarge upon concepts presented in lecture. Students are instructed in elementary computer techniques and use the computer for some laboratories. This class provides a good foundation for further work in ecology and marine biology. Credit will not be given for both Biology 2080 and either 2046 or 2086.

2086B Human Ecology: lecture 2 hours, lab 2 hours, tutorial 1 hour, alternate weeks, P.A. Lane. Instructor, D. Gill (Category III). This class examines the principles of ecology with a focus on humans as a part of nature. Lectures will begin with an examination of how individuals are morphologically, physiologically and genetically adapted to their environment. Sociobiology and its ramifications for human behaviour will also be discussed. From the ecology of individuals, the topics will advance to an appreciation of population ecology. The importance of agricultural crops and renewable resources to the growth and regulation of human populations will be examined to develop an understanding of worldwide demography. Pests are major competitors while disease pathogens are the main predators of humans. These types of species interactions will be studied. Communities and ecosystems form a higher level of ecological organization and these levels will be studied in the second part of the class. How humans have polluted their environment will conclude the class. In the laboratory, students will begin from basic principles to learn how mathematical/statistical techniques and the computer can be useful to ecologists. Variability among individuals, population growth, and modelling of whole ecosystems are examples of exercises that will be presented in the laboratory. Students will attend a tutorial alternate weeks. The tutorial will relate the applied laboratory exercises to the lecture topics by discussing current papers in the ecological literature. These may include areas such as climatic adaptation, IQ testing, epidemiology, the dilemma of world population growth, building models of human ecosystems, resource management and pollution control. Credit will not be given for both Biology 2086 and either 2046 or 2080. This course is especially designed for pre-medical students.

2100A/B Introductory Microbiology: lecture 2 hours, lab 3 hours, D.B. Stoltz (course co-ordinator), R.G. Brown, G.C. Johnston, J. Novitsky. Instructor, J. Breckenridge (Category II). An introduction to the basic concepts of microbiology through lectures, laboratory sessions, demonstrations and films. Subjects include the uniqueness of microorganisms, their structure, growth and genetic regulation, as well as their involvement in other fields such as medicine, industry and ecology.

2110B (Microbiology 2110B) Biochemistry and Physiology of Microorganisms: lecture 3 hours, lab 3 hours, B. Pohajdak, instructor, B. Hill (Category I). An introduction to the organization and function of microorganisms. This class complements Biology 2100 in dealing with broad aspects of growth and metabolism, energy transfer, transmission and expression of genetic information, and cell structure in microorganisms at a biochemical level. It aims to develop an integrated understanding of biological activity in the microbial world and its relationship to other life processes. The class is oriented towards students interested in microbiology and offers a suitable preparation for 3000-level classes in that subject. However, if taken with Biology 2020A it also satisfies the prerequisites for 3000-level biochemistry/molecular biology classes. Students taking Biology 2110 may not also take Biology 2015 or Biology 2012.

Advanced Classes

These classes are for second, third and fourth-year students. They may be taken before completion of the intermediate classes described above. Please notice, however, prerequisites for the classes listed below. Students registering for these classes will have completed, or be registered in, a minimum of two full credits at the 2000-level.

Classes marked with an asterisk (*) are offered in alternate years. Consult timetable for current year.

3000-Level

3012A (Biochemistry 3200A). Introduction to Biological Chemistry:

lecture 3 hours, lab 3 hours; A.H. Blair, J.A. Verpoorte, C. Mezel, L.C. Stewart. Prerequisites: Biology 2015 (Biochemistry 2000), Biology 2012A/B (Biochemistry 2600A/B) and Chemistry 2400 or their equivalent(s). This class is described under Biochemistry 3200A. Major and honours biology students do not require this class as compulsory prerequisite to Biology 3013B or 3014B.

3013B (Biochemistry 3300B). Intermediary Metabolism: lecture 2 hours, tutorial 1 hour, W. Kimmins, F.B. Palmer; lab 3 hours, P. Dolphin. This class is described under Biochemistry 3300B.

3014B (Biochemistry 3400B). Nucleic Acid Biochemistry and Molecular Biology; lecture 2 hours, tutorial 1 hour, C.W. Helleiner and J. Wright; lab 3 hours, D. M.J. O'Halloran. This class is described under Biochemistry 3400B.

3020A Advanced Cell Biology I: lecture 3 hours, T.H. MacRae. Prerequisite: 2020A or 2015R or permission of the instructor. Molecular and organellar aspects of cytoplasmic organization in eukaryotic cells are examined. A number of interrelated topics are discussed providing an opportunity to study new concepts in cell biology and to evaluate established ideas in the context of recent findings. Students must supplement lectures with assigned readings and discuss selected subjects in essays.

3021B, Advanced Cell Biology II (Plant Cell Biology): 3 lecture 2 hours, lab 3 hours. Prerequisites: 2020A or 2015R. Biology 3020A is recommended. The class examines plant cell structure, relating structure to physiological function in diverse systems. Emphasis is placed upon structures visible in the electron microscope, and upon structural aspects of the integration of activities within plant cells, and between cells in tissues. Laboratory sessions will be held irregularly and are concerned with interpretation of microscopic images.

3031A Molecular Genetics of Eukaryotes: lecture 3 hours, R.W. Lee. Prerequisites: Biology 2030A/B or 2035R, 2110A/B or 2015R. One or more topics from the broad and rapidly expanding field of eukaryotic molecular genetics will be chosen for comprehensive review. The topic(s) may change from year to year. This year the class will focus on the genetics and molecular biology of chloroplasts and mitochondria. Emphasis will be placed on the application of modern molecular genetic approaches, especially those involving recombinant DNA technology. Grades will be based mainly on the critical evaluation (oral and written) of journal articles.

***3032B Cytogenetics:** lecture 2 hours, lab 3 hours, O.P. Kamra. Prerequisites: 2030 or 2035R. Detailed consideration of certain genetical and cytological mechanisms in relation to chromosomal modifications, gene mutations and evolution.

3033A Microbial Genetics, (Microbiology Dept.)

***3034B Biological Effects of Radiation:** lecture 2 hours, lab 3 hours, O.P. Kamra. A survey of current knowledge of the effects of ionizing radiation on biological material on three levels: physical, chemical and biological. In addition, methods of dosimetry, autoradiography, somatic and genetic effects, radionimetic chemicals and bioassays are discussed.

***3035B Population and Evolutionary Genetics:** lecture 2 hours, tutorial 1 hour, E. Zouros. Prerequisites: Biology 2030 or 2035R or Biology 2040 or Biology 2046. The following topics are covered: amounts and kinds of genetic variation in populations, genetic properties and differentiation of populations, causes of evolution with emphasis on natural selection, molecular and intragenomic evolution, applications of molecular techniques to population biology. Data from actual research provide material for exercises. Students doing research in genetics are encouraged to bring in the class the results of their own research.

3039A Human Genetics: lecture 3 hours, lab 3 hours, O.P. Kamra, P.J. Welch, L. Zouros and staff. Prerequisite: Biology 2030A/B or 2035R. For students of Biology and Medicine with special interest in human genetics. Topics include human cytogenetics and abnormalities, inborn errors, genetic risk induced by environmental factors; prediction and detection of

genetic risk, genetic counselling; genetic and non-genetic factors in behavioural characters and multifactorial diseases; genetic variability; selection and genetic load in human populations; ethical and social issues associated with manipulation of human genetic pools. A background in basic genetics is assumed.

3050B Advanced Animal Development: lecture 2 hours, lab/discussions 3 hours, B.K. Hall, P. Collins. Prerequisite: Biology 2050A/B (with a minimum grade of B), Biology 2020A or Biology 2015R (completed or concurrent registration). This class is the follow-up to Biology 2050A and deals with the mechanisms and controls which regulate the development of vertebrate and invertebrate embryos. Topics covered include cell determination and differentiation, morphogenesis, mechanisms of organ formation, inductive tissue interactions, growth, regeneration and wound healing. The laboratory project (60% of lab time) involves grafting tissues from one embryo to another in experiments designed to explore aspects of cell differentiation and morphogenesis; preparation of a lab report, and introduces the student to microdissection, sterile techniques, tissue recombinations and whole-embryo staining. Discussions and presentations (40% of lab time) will relate to the lecture and lab topics.

3060B Environmental Ecology: lecture 2 hours, lab/tutorial 3 hours, B. Freedman. Prerequisites: Biology 2046 or 2060. Various topics within the field of Environmental Ecology are discussed. Emphasis is on the organism/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 are considered.

3061A Communities and Ecosystems: lecture 2 hours, tutorial 1 hour, lab 3 hours, P.A. Lane. Prerequisite: Biology 2046, 2066 or 2060A. Major concepts and recent advances in community-ecosystem ecology are stressed; size-spectrum theory, evolutionary strategies of organisms and a delineation of contemporary ecosystem problems, especially those pertinent to the area of environmental impact assessment. The focus is on aquatic ecosystems — both freshwater and marine — and their major features are compared. The evolutionary strategies of plankton, fish predation models, and community descriptions are discussed in the first half of the term. Students also are given practical laboratory experience in associated methodologies. In the second part of the term, three major approaches to ecosystem analysis are compared. The laboratory parallels the lectures and gives experience in analyzing ecosystem data and applying theoretical techniques. In the tutorials, broader issues of environmental ecology will be presented by the students.

3062B Behavioural Ecology: lecture 2 hours, tutorial 1 hour, M.R. Rose. Prerequisites: Biology 2046 or 2060/2040 (Biology majors); Psychology 2000 (Psychology majors). The class is divided into three sections: (A) Background-selection and behaviour: natural selection, group selection, kin selection; (B) Methods-general methodological problems, ultimate, mediate, and proximate causation, the comparative method, optimality theory, strategy polymorphism; (C) Modes of behaviour — gathering food, living in groups, intraspecific conflict, sex, parental care and development, co-operation, communication, coevolution, sapience.

3066A Plant Ecology: lecture 2 hours, lab 3 hours, one/two field trips on weekends, B. Freedman. Prerequisite: Biology 2046 or 2060. Various topics within the field of Plant Ecology are discussed. At the ecosystem level, we deal in depth with the cycling of energy and significant nutrients, and with successional changes in these processes. At the autecological level we deal with plant population biology and demography, resource allocation, and physiological ecology. The plant environment is also described in terms of energy budgets, soils, and water availability.

3067B A Survey of Fish Biology: lecture 2 hours, seminar 1 hour, R.G. Boutiller, R.W. Doyle, R.K. O'Dor. Prerequisites: Biology 2046 or 2060, Biology 2015 or 2020. The topics covered include fish systematics, physiology, behaviour and ecology. The primary purpose is to prepare students for Honours research projects in fish biology and to provide the background necessary for entry to 4th-year courses such as Fisheries Population Biology, and Fisheries Oceanography. Although no laboratory is scheduled, practical and library research projects are required.

3089A Animal Population Ecology: lecture/tutorial 2 hours, lab 3 hours, H. Whitehead. Prerequisites: Biology 2046 or 2060, Math 1000, 1010, 1080. Population ecology of a representative species is used to exemplify various demographic tactics and situations: a marine copepod for links with physiological ecology; an "out-break" insect for density-independence and questions of control; a passerine bird for density-independence and the adaptedness of demographic parameters; lemmings for cycles and "self-regulation" hypotheses; eastern Canadian seals for problems of management and control of long-lived species; cranes and condors for the demography of threatened species. The demography of "model" species is explored in the (open) lab sessions.

3070R Principles of Animal Physiology: lecture 2 hours, discussion 1 hour, lab 3 hours, R.G. Boutiller, R.K. O'Dor; instructor M.J. O'Halloran. Prerequisites: Biology 2001 and 2020 or 2015 (in which a minimum C grade is required). A discussion of the mechanisms which coordinate the activities of cells within multi-cellular organisms and permit such organisms to maintain a stable internal environment in a changing external environment. The emphasis is on the mechanisms most widely distributed through the animal kingdom. The laboratories are designed to illustrate these "principles of physiology" in a variety of organisms and to demonstrate the experimental approaches used to study physiology.

3071R Physiology of Marine Animals: lecture 2 hours, discussion 1 hour, lab 3 hours, R.K. O'Dor, R.G. Boutiller, instructor, M.J. O'Halloran. Prerequisites: Biology 3321 and 2020 or 2015. Credit may not be given for both 3070 and 3071. The problems of animals in a marine environment are quite different from those found in air or fresh water, but the "physiological principles" are similar. This class deals with the same principles as 3070, but emphasizes the special characteristics of marine animals in the laboratory and the techniques necessary to study them.

***3073B Plant Physiology:** lecture 2 hours, lab 3 hours, D.G. Patriquin. Prerequisites: Biology 2002 and 2110 or 2015 or 2020 or permission of instructor. Topics include water relations, photosynthesis, respiration, nitrogen, metabolism, transport, translocation, and some aspects of plant development, crop physiology and productivity.

***3075B Plant-Soil Relationships:** lecture 2 hours, lab 3 hours, D.G. Patriquin. This class deals with processes that are involved in the exchange of materials between plants and soils, and that limit plant growth under field conditions. The emphasis is on cultivated plants, but the material is relevant to natural systems, and reference is made to aquatic angiosperms and sediments. Topics include soil formation, soil aeration and root metabolism, water relationships, mineralization and humification of organic matter, plant mineral nutrition and ion uptake, fertilizers, saline soils and halophytic angiosperms, and plant-microbe interactions. Laboratory sessions deal with the design of field and greenhouse experiments and with the methodology of measuring the various properties and processes discussed in class.

3100B Aquatic Microbiology: lecture 2 hours, lab 3 hours, R.G. Brown, J. Novitsky. Previous knowledge of microbiology is not necessary for this class; however, enrolment is limited to students in the Marine Biology Honours Program. The main emphasis of this class is on the interactions of microbes and aquatic plants and animals including nutrition, disease, and immunization. The latter part of the class considers the role of microorganisms in nutrient availability and productivity in aquatic environments.

***3111B Microbial Activities in Nature:** lecture 2 hours, lab 3 hours, R. Brown. Prerequisites: Biology 2100A/B and Chemistry 240 or Biology 2110 or 2015. The format is lectures and laboratory exercises. Microorganisms play a far more important role in nature than their small size would suggest. To illustrate this, the following topics are considered at the cellular and molecular levels: epiphytic microorganisms of plants and animals. Koch's postulates, protective mechanisms of plants and animals, the function of microbes in ruminants and the rhizosphere, nitrogen fixation and the mineralization of organic matter including petroleum.

3115A Introduction to Immunology: (Microbiology Dept.).

***3116 Mycology:** D. Brewer. Prerequisite: Biology 2100A or B. An introduction to the morphology and taxonomy of the fungi.

3117A Yeasts and Fungi: R. Brown. Prerequisite: Biology 2100A or B. An introduction to the biology of yeasts and fungi with emphasis on the structure and function of the cell wall and membrane, control of cell metabolism, and the cell cycle.

3118B Medical Bacteriology: (Microbiology Dept.).

3120A Advanced General Microbiology: lecture 2 hours, lab 4 hours, J. Novitsky. Prerequisite: Grade B or better in Biology 2100A/B. For students interested in increasing their knowledge and skills in microbiology beyond the introductory level. This class provides excellent background for students continuing in microbiology or entering employment where skills in handling microbes are required. Topics include microbial metabolism, growth, structure, genetics, taxonomy, symbiosis, pathogenesis, the environmental effects on microbial activity, and an introduction to soil, food, aquatic, applied, and industrial microbiology. The laboratory stresses basic techniques in microbiology with a strong emphasis on individual students' skills.

3150A Applied Microbiology: lecture 2 hours, lab/tutorial 3 hours, staff. Prerequisite: Biology (Microbiology) 2100A/B and 2110B. For students who wish to broaden their interests in microbiology as well as for those with a particular interest in the applications of microbiology as a career. It deals with the role of microorganisms in processes such as cheese making, brewing and the production of vitamins, food additives, antibiotics and other economically important substances. It also includes topics such as sewage and waste treatment, conversion of biomass to fuels and the applications of biotechnology. The laboratory component consists of student projects with tutorial, seminar and group discussion of ideas and results.

3211B Systematic Survey of the Algae: lecture 2 hours, lab 3 hours, A.R.O. Chapman. Prerequisite: Grade B or better in Biology 2001. An examination of the taxonomic and evolutionary relationships of the algae. Considerable emphasis is placed on practical work (field and laboratory) where students become familiar with the algal components of the local flora.

3212A Biology of the Algae: lecture 2 hours, lab 3 hours, A.R.O. Chapman. Prerequisite: Grade B or better in Biology 2001. A non-systematic examination of the cellular, organic, population and community organizations of benthic and planktonic algae.

3214A Plant Design: lecture 2 hours, lab or tutorials 1-3 hours, K.E. von Maltzahn. The structural design of plants in terms of the functional performance of their parts and their integration at different levels of organization. Types of design are established on the basis of comparative studies of life forms seeking to find homologues between the elements of design. Design in relation to climate and habitat is examined and integrated at the level of the landscape.

3215A Systematics of Higher Plants: lecture 2 hours, lab 3 hours, M.J. Harvey. Prerequisites: Biology 2002 or permission of instructor. This class has two main aims; first, to give consideration to current speculation on the evolution of the flowering plants, connecting this with the attempts over the years to produce a phylogenetic classification of the existing species; second, to go into some of the newer concepts of classification arising out of the 'computer revolution.' A plant collection is one requirement; consult the instructor as early as possible about this.

3216B Adaptation and Speciation in Higher Plants: lecture 2 hours, lab/seminar 2 hours, M.J. Harvey. Prerequisites: Biology 2002 or 2020 or 2030 or 2040. The discipline known as biosystematics or, alternatively, experimental taxonomy. The approach taken is analytic, considering particular examples and trying to deduce which peculiarities of their biology have contributed to their relative success. In this way the mechanisms which have caused particular species pairs to diverge are studied. Examples considered are many and range from evening primroses and

3114A Introduction to Virology: (Microbiology Dept.).

lises, through bananas and maize, down to the humble, but complex, dandelion.

3218B Plant Anatomy: lecture 2 hours, lab 3 hours, G.S. Hicks. Lectures will explore the internal organization of the leaves, stems, and roots of both the flowering plants and the cone bearing plants, emphasizing the common plan that is found at the tissue system level of organization. All major cell and tissue types will be reviewed in the light of modern evidence which correlates structure with function. These surveys will embrace both the primary and the secondary plant bodies. Laboratory exercises will illustrate these concepts, focussing on the study of a variety of economically important woody and herbaceous crop plants. Students will be introduced to techniques of free hand sectioning, the rotary microtome, staining protocols, and camera lucida recording.

3321R Invertebrates: lecture 3 hours, lab 3 hours, J. Farley. Prerequisites: Biology 1000. How different groups of invertebrate animals live — what modifications they have incorporated that allow them to survive in environments or to assume a manner of life unlike that of their evolutionary predecessors. Because there are so many kinds of invertebrate animals, certain morphological and functional changes are considered in those animals where they are most pronounced or where they first occur. The course progresses chronologically through the phylogenetic series; the characteristics of the animals in a group are considered and new physiological systems and morphological peculiarities are emphasized. A laboratory session each week gives students an opportunity to examine the morphology and life traits of live invertebrate animals.

***3322B Parasitology:** lecture 2 hours, lab 3 hours, E. Angelopoulos. Prerequisites: Biology 2001 and 2002, 3321 is desirable. The lectures emphasize the parasite-host relationships, evolution of the parasites and adaptations to the host, modifications of physiology, structure and life cycle for a parasitic existence. Examples are taken from all major animal groups where a parasitic mode of existence has developed beginning with the protozoa. Since the most extensive research pertains to parasites of man, the emphasis is on human parasites. Recommended for Ecologists and Pre-Meds. The laboratory stresses recognition and identification of parasites.

3323R Vertebrates: lecture 2 hours, tutorial 1 hour, lab 3 hours, E.T. Garalde. Prerequisites: Biology 2001, 2002. A survey of the current state of knowledge and speculation concerning the evolution of vertebrate animals. Those vertebrates which have survived form a series of stages or steps, each characterized by several pronounced alterations in various organ-systems and in the general form of the body. Approximately three-quarters of the program is given to an analysis, by procedures of comparison and contrast, of these changes and their relevance in the synthesis of the evolutionary pathway. An appreciation of the classification, structure and evolution of vertebrates is essential to considerations of their development and functional capacities and of their relations with their surroundings and with each other. The laboratory study of a broad array of vertebrates provides the core and familiarizes the student with the gross anatomic features of these animals while giving instruction in the traditional approach to comparison and contrast.

3324R Entomology: lecture 2 hours, lab 3 hours, E. Angelopoulos. Entomology is an important branch of academic biology and also one of the largest divisions of applied biology. The class is an introduction to the study of insects dealing with: (1) The classification and evolutionary diversity of insects. (2) The biology, ecology and behaviour of insects. (3) Applied aspects —medical, agricultural and forest entomology, harmful and beneficial insects; biological control of insects.

3402A The Rise of Modern Science (History 3072A, Physics 3402A, Comparative Religion 3502A): lecture 3 hours, J. Farley, R. Ravindra. This class, designed for students in the arts and the science, will deal with the origins of modern science. We shall stress the new physics, associated with the names of Copernicus, Kepler, Galileo and Newton, that arose during the Scientific Revolution of the 16th and 17th Centuries. In addition, we shall go beyond that period to examine the popularization of science in the 18th century, the appearance of the "scientist" in the 19th century and the rise of the scientific-industrial complex.

***3403B The History of Biology:** lecture 2 hours. Prerequisites: Biology 3402A. J. Farley. A class for biology and geology majors, dealing with the history of post-Newtonian biological sciences.

3410B Man in Nature: lecture 2 hours, tutorials 1 hour, K.E. von Maltzahn. An introduction to the science of nature which deals with structural order within organic nature, i.e. the relationships of different beings to each other including man within nature as a whole. The ideal of man's self-realization through his emancipation from nature is discussed. The class is concerned with man's biological and aesthetic and rational requirements and how these different needs affect one another. It inquires into the consequences which these needs may have upon man's judgements and actions and the well-being of nature as a whole. For students in the arts and sciences. There are no special prerequisites, but students must deal seriously with questions raised. The class is also useful for students in biology who wish to obtain a broader framework of knowledge. General degree students may not include this class in the 4 required for a Biology major. Honours students may count it towards their Biology requirements.

***3421B Comparative Vertebrate Histology:** I.G. Mobbs (Anatomy Dept.). Prerequisites: Biology 3430A. An advanced histology class surveying the whole range of vertebrate tissues and organs.

3430A Introduction to Human Histology: lecture 2 hours, lab 2 hours, D.H. Dickson (Anatomy Dept.). Prerequisites: Biol 2020A, or 2015 or permission of instructor. Histology is the study of the structure of cells, tissues and organ systems, and utilizes information derived from both light and electron microscopy. It complements studies in anatomy, cell biology, physiology and biochemistry, broadening the understanding of how organisms function.

3435R Anatomy: R.W. Currie (Anatomy Dept.). Prerequisites: Biology 2020A, or 2015R and permission of instructor. A comprehensive review of the gross anatomy of the human body with special emphasis on musculoskeletal, cardiovascular and respiratory systems.

3440B Neuroanatomy: lecture or lab 3 hours, D.A. Hopkins (Anatomy Dept.). Prerequisites: Biology 2020 or 2015 or permission of instructor. A survey of the histology, development and organization of the central nervous system, with emphasis on the developmental and structural relationships between spinal cord and brainstem. The organization of cranial nerves and microanatomy of the brain stem is discussed. The organization of sensory and motor systems is presented in detail. The cerebral cortex, cerebellum, basal ganglia, and limbic system are also covered.

3450A Comparative Vertebrate Neuroanatomy: Sensory Systems: J.A. Matsubara (Anatomy Dept.). Prerequisites: Biology 3440B, Psychology 2070R or consent of instructor. A survey of sensory modalities of vertebrates with emphasis on central brain structures associated with each sense.

***3614C Field Ecology:** 5 projects involving 7 days of field work in September, lab or lecture first term only. R. Schelbling. Prerequisites: Biology 2080 or 2048, Mathematics 1060, 1070 or equivalent. The course provides practical experience in techniques of quantitative field ecology, including design of field sampling programs and manipulative experiments. Students examine specific ecological questions and hypotheses by collecting, analyzing and interpreting field data and writing scientific reports. Projects focus on intertidal and subtidal systems but involve concepts and techniques that have broad application in ecology. Lectures provide the theoretical background to projects and the rationale for methodology and statistical analysis. Topics include: spatial pattern, zonation, animal movement, disturbance and succession, and herbivore-plant interaction.

4000-Level

The following classes are primarily for honours and graduate students. They are open to others with permission of the instructor.

4024A Microscopy: lecture 2 hours, lab 3 hours, J.H.M. Willison, D.B. Stoltz, K.B. Easterbrook, G. Faulkner. Prerequisite: A grade of B- or better in 3020A, or 3021B, or 3114A. The class deals with some of the principal methods involved in the study of cell structure. Both light and electron

microscopy, including ancillary techniques, are considered in depth. The importance of a proper understanding of the physical and/or chemical principles governing technical procedures is emphasized. During laboratory periods students practise, or watch demonstrations of, some of the techniques covered in the lectures.

4026A The Mammalian Cell (Microbiology Department).

4027B The Cancer Cell (Microbiology Department).

4030A Advanced Topics In Genetics: R.W. Lee and staff. Prerequisite: Permission of the instructor. A general topic from the current literature in genetics is examined in seminar format. The nature of the topic and the instructor in charge of the class vary from year to year. Students present at least one seminar during the term.

4033B Advanced Microbial Genetics (Microbiology Department).

4039B Topics in Human and Medical Genetics: lecture/seminar 2 hours, O.P. Kamra (Coordinator), R.S. Tonks, J.P. Welch, E. Windsor, E. Zouros and others. Prerequisites: Biology 3039A or 1st year Medicine. An advanced level seminar open to Biology and Medical students. Students present reports based on a research project (experimental or literature search) conducted under the supervision of faculty members in Biology or one of the medical departments. Lectures from the faculty supplement class work and emphasize integration of student seminars into a self-contained unit.

***4046B Quantitative and Ecological Genetics:** lecture 2 hours, tutorial 1 hour, R.W. Doyle and E. Zouros. Prerequisites: one full year of mathematics, a second-year genetics class or half class, a third-year ecology class (may be concurrent). Recent research in ecology has turned to quantitative genetics for experimental and theoretical tools to deal with population variables such as survival and fertility. Evolutionary biologists have been turning to ecology for a deeper understanding of the forces of natural selection that influence the evolutionary process. The course will include an introduction to the fundamentals of quantitative genetics and selection theory, and a review of recent research at the intersection of ecology, quantitative genetics and evolutionary biology.

4064C Pleistocene Biogeography: lab 3 hours, J.G. Ogden, III. Prerequisites: At least two credits in Biology or Geology. Permission of the instructors. May be counted as Biology or Geology half-credit. Lecture, discussion, and laboratory experience in the reconstruction of environmental change during the Pleistocene epoch. Laboratory and field experience pay particular attention to the environmental history of the Maritime region, including environmental changes caused by man. Techniques of pollen and diatom analysis, plant and animal microfossil study, dendrochronology, geochemical and isotopic dating methods are explored. Field and laboratory work include a class problem in an area in the Halifax region.

4067B Fisheries Population Biology: seminar 2 hours, R.W. Doyle. Prerequisites: Biology 2060 or 2046 (the course is intended for Honours and graduate students only). Familiarity with elementary calculus and statistics is required. Prior experience with computers is not required. Enrolment limited to 8. An introduction to fisheries stock assessment and the biological aspects of fisheries management. Emphasis on the relationships between management techniques and the general principles of population biology. The class includes several weeks of introductory lectures followed by exercise in applied population dynamics lasting the remainder of the term. The exercise consists of a computer simulation of the growth and relation of a fish population of the student's choosing coupled with computer-based investigations of the usefulness of various management models.

4068A Limnology: lecture 3 hours, lab/tutorial 3 hours, J.G. Ogden. Prerequisites: 2046, 2066 or 2060. The class is divided into four sections: (A) Physical Limnology—geology, morphometry, thermal properties, system hydrology & budgets, optical properties, vegetational interactions, history of limnology in N.S.; (B) Chemical limnology—oxygen, acidity/alkalinity, physical/chemical interactions, major/minor ions and heavy metals, organic molecules, atmospheric geochemistry, ionic budgets and mass balances;

(C) Biological limnology, palaeolimnology, microbiology/phytoplankton, quantitative geochemistry, zooplankton/invertebrates, vertebrates, sampling technology; (D) Cultural limnology—eutrophication, BOD/COD, phosphorus loading, environmental impact assessments, acid rain, future shock.

4070C Advanced Topics in Animal Physiology: lecture 2 hours, open lab, R.K. O'Dor, R.G. Boutiller. Instructor M.J. O'Halloran. Prerequisites: Biology 3070 or 3071. 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 a seminar reviewing the literature on the solution of a particular animal and applies advanced techniques in an experimental study of the animal. Students choose the animal and the technique.

***4072R Animal Nutrition:** J. Castell, lecture and seminar, 2 hours. Prerequisites: Biology 2110A/B or equivalent and permission of instructor. Biology 3013A and 3071 are recommended. General principles and techniques of animal nutrition are reviewed and used to examine current literature. Emphasis is on the assessment of nutrition requirements of aquatic and marine species.

4101B Industrial Microbiology and Biochemistry: lecture and seminar 2 hours, staff. Prerequisites: Third-year class in biochemistry or microbiology. A class in organic chemistry is recommended. For students who have taken classes at the third-year level in microbiology or biochemistry and are interested in the practical applications of this knowledge. It deals through lectures with basic aspects of industrial fermentation processes and, through student seminars, explores topics in genetic engineering, antibiotic production and other current and projected uses of microorganisms in the manufacturing sphere.

4113A Bacterial Physiology: lecture 2 hours, lab 3 hours, R. Brown. Prerequisites: Biology 2100A/B and Chemistry 240 or Biology 2110 or 2015. Although the class concentrates on the structure and function of the bacterial cell envelope, that is, the capsule, cell wall and cell membrane, other topics such as the physiology of obligate anaerobiosis, sporulation, motility etc. are also covered.

4114B Topics in Basic and Medical Virology: (Microbiology Dept.).

4115B Immunology: (Microbiology Dept.) Prerequisite: Biology 3115A.

***4214B Physiology of Marine Algae:** lecture 2 hours, J.S. Craigle. Prerequisites: Biology 2110 or 2015 and permission of instructor. A comparative study of the physiology and biochemistry of the various algae classes is conducted, including studies of carbohydrates, proteins, fats, pigments and nutrition.

4366A Fisheries Oceanography: lecture 3 hours, J.A. Koslow. Prerequisites: Biology 2060 or 2046. Familiarity with calculus and statistical concepts helpful but not required. Permission of instructor is required. The ecology of fisheries with emphasis on the factors affecting their production and recruitment variability. Topics covered include physiology of fish production; classic management models; larval fish ecology; the effects of fishing and changing stock size, of climate, and of community interactions upon year-class variability.

4379A Ichthyology: lecture 3 hours, E.T. Garaide. Prerequisites: Biology 3323. Evolution, systematics, structure, embryology, life history and distribution of fishes.

4401R Introduction to Pharmacology: lecture 2 hours, lab 2 ½ hours, M. Karnazyn (Co-ordinator for Dept. of Pharmacology.) Prerequisites: Permission of co-ordinator. This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions in mammals including man. Interactions of drugs with central and peripheral nervous systems and with the physiologically active chemicals (e.g. prostaglandins, peptides) are stressed. Factors affecting blood levels of drugs (absorption, distribution, metabolism and elimination) are considered, and potential uses. The laboratory consists of prescribed exercises followed

by a project of several weeks duration carried out in the research laboratories of the Dept.

4403R Human Physiology: lecture 3 hours, J. Dudar (Physiology/Biophysics Dept.). Prerequisites: Introductory classes in Biology, Chemistry and Physics. Permission of the instructor is required. A class dealing with the physio-chemical basis of the physiological processes in man.

***4610B Ecosystem Analysis:** lecture/discussion 3 hours, P.A. Lane. Prerequisites: Biology 2060, 2066 or 2046, 3061; Math 1000, 1010. 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: *quantitative techniques*: (1) general systems theory, (2) ecosystem description methodologies, (3) systems analysis-computer simulation; and *qualitative techniques*: (4) loop analysis and time averaging. Each student must lead at least one discussion and present a short position paper on the theory underlying some of the important problems in ecosystem analysis. In addition, a term paper is required demonstrating a creative application of these methodologies to an environmental problem at the ecosystem level. Students complete program sets and exercises in data analysis to gain experience using various techniques. Aquatic ecosystems are emphasized.

4617A Theoretical Population Dynamics: individual tutorial 3 hours, M.R. Rose. Prerequisites: Biology 2046 or 2060, Math 1000, 1010. The class is divided into six sections: (A) Single species population growth — including discrete and continuous time models, (B) Prey-predator interactions — including continuous and discrete time models, (C) Competition — including Lotka-Volterra models, higher-order competition models and symbiosis models, (D) Simple ecosystems — including food chains, one predator and several prey; (E) Complex ecosystems.

4650/5650A Resource Systems and Economic Development: lecture/seminar 3 hours, A.J. Hanson. Major theories of natural resource management, have evolved rather separately through economic, behavioural and ecological disciplines. The interphase of ecology with these other disciplines and the criteria which may be used to weigh ecological inputs in economic development planning processes are the major topics to be covered. Current approaches and analytical techniques are described. These illustrate adaptive strategies for long-term resource use, pest and disease control. The course may focus on specialized topics such as fisheries or tropical resource management, as announced in advance. The class includes an introduction to practical problems of project cycles, of defining objectives and of budget analysis. It is open to students from any faculty by permission of the instructor.

4652A Advanced Ecology Seminar, consult Department.

4653B Advanced Ecology Seminar, consult Department.

4660A Introduction to Biological Oceanography: lecture 2 hours, lab 1 plus hours, M.R. Lewis. Prerequisite: Biology 2060 or 2046 or equivalent Math 1000, 1010 and permission of the instructor. Quantitative descriptions of biological oceanographic processes are used to explore interactions with physical and chemical processes in various oceanic ecosystems. Topics discussed range from factors affecting rates of microalgal photosynthesis to expected response of the ocean ecosystem to global variation in carbon dioxide and climate. Laboratory emphasizes independent, original research.

4662B Biology of Phytoplankton: lecture 3 hours, some labs, M. Lewis. Prerequisite: Permission of instructor. The role of phytoplankton as primary producers of organic material in the sea, and as agents of biogeochemical transformations, is explored in the context of interactions with physical and chemical oceanographic processes. Emphasis is on the current literature.

***4664B History of Oceanography:** lecture and seminar, E.L. Mills (Oceanography Dept.) Permission of instructor required. This class describes the development of Oceanography from biological, chemical, physical and geological knowledge going back to the 18th century in scientific, political and social contexts. Includes: plankton dynamics, deep sea biology, ocean circulation and plate tectonics.

***4666B Benthic Ecology:** E.L. Mills. Permission of instructor required (Oceanography Dept). An advanced level undergraduate 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 processes in the sediments. Year-to-year the course content changes, keeping up with current problems of research workers in this discipline.

4800 Special Topics

4806A/4807B/4808C Special Projects, staff.

4800 Honours Research and Thesis.

Canadian Studies Programs

Who are eligible

Dalhousie students who are planning to do, or are at present doing, major programs in any of the following six departments, are eligible:

Economics,
English,
French,
History,
Political Science and
Sociology & Social Anthropology.

Aim

The purpose of the program is to allow such students to concentrate part of their work on Canadian studies both within their major field, and outside of it. For example, a student who is planning to major in Political Science would take at least 3 of his political science classes in classes designated as Canadian. He would in addition take four classes outside his major field in Canadian Economics, Canadian History, Canadian Literature (either English or French), or Canadian Sociology.

In other words, the Canadian Studies Program does not attempt to establish a new major field. It seeks to use any one of six present departments in the Faculty of Arts and Science as a base around which a student may effectively cluster a number of classes in Canadian subjects.

How to arrange it

Students wishing to discuss a Canadian Studies Program, or wishing to take it, should get in touch with any of the following:

Professor B. Lesser, Economics Department
Professor M.G. Parks, English Department
Professor Hans Runte, French Department
Professor P.G. Clark, Sociology & Social Anthropology Department
Professor D.S. Stairs, Political Science Department
Professor P.B. Waite, History Department

Chemistry

Chairperson of Department

J.C.T. Kwak, BSc, MSc, PhD (Amsterdam)

Emeritus Professors

W.J. Chute, BSc (Acad.), MA, PhD (Tor.)

D.E. Ryan, BSc (UNB), MA (Tor.), PhD, DSc (Lond.), DIC

Professors

D.R. Arnold, BS (Bethany College), PhD (Roch.)

W.A. Aue, PhD (Vienna)

R.J. Boyd, BSc (UBC), PhD (McG)

T.S. Cameron, BA, MA, DPhil (Oxon.), *Associate Dean of Faculty of Arts and Science*

A. Chatt, BSc (Calcutta), MSc (Roorkee), MSc (Wat.), PhD (Tor.)

H.C. Clark, BSc, MSc, PhD (Auckland), PhD, ScD (Cambridge), *President, Dalhousie University*

J.A. Coxon, MA (Cantab.), MSc, PhD (East Anglia)

T.P. Forrest, BSc (MtA), MSc (Dal), PhD (UNB)

K.E. Hayes, BSc (Lond.), PhD (Ore.)

W.E. Jones, BSc, MSc (MtA), PhD (McG), *Chairman of Senate*

O. Knop, DSc (Laval), *Harry Shirreff Professor of Chemical Research*

J.C.T. Kwak, BSc, MSc, PhD (Amsterdam)

K.T. Leffek, BSc, PhD (Lond.), *Dean of Faculty of Graduate Studies*

P.D. Pacey, BSc (McG), PhD (Toronto)

R. Stephens, MA (Cantab.), MSc (Bristol), PhD (London), DIC

R.E. Wasylshen, BSc (Wat.), MSc, PhD (Man.), *Senior Killiam Fellow*

Associate Professors

T.B. Grindley, BSc, MSc, PhD (Queen's)

J.S. Grossert, BSc, MSc, PhD (Natal)

K.R. Grundy, BSc, MSc, PhD (Auckland)

R.D. Guy, BSc (SFU), PhD (Carl.)

D.L. Hooper, BSc, MSc, PhD (UNB)

J.A. Pincock, BSc, MSc (Man.), PhD (Tor.)

L. Ramaley, BA (Col.), MA, PhD (Prin.)

C.H. Warren, BSc (UWO), PhD (McM)

M.A. White, BSc (UWO), PhD (McM)

Assistant Professor

N. Burford, BSc (Wales), PhD (Calgary)

Visiting Scientists (1987)

K.Sakai, Tokai University, Japan

Xi Feng, Chinese Academy of Sciences

T.Z. Guo, Qinghai Geology Bureau, China

Shi-Lian Jing, Inst. Environmental Chem., Beijing, China

Yong Chong Luo, Sichuan Teachers Coll., Sichuan, China

Jesus M. Ugalde, Basque Country University, Spain

Caiying Wu, Wuhan University, China

K. Hayakawa, Kagoshima University, Japan

Liang Chen Wang, E. China Univ. of Chem. Tech., Shanghai, China

Instructors

C.D. Burkholder, BSc (Wat.)

C.M. Byers, BSc Honors (Dal)

J. Gabor, MSc (Budapest)

S.A. Sawler, BSc, (MSU)

D.J. Silver, MSc (CWRU)

W.D. Tacreiter, MSc (Krakow)

K.E. Thompson, BSc (Acad.)

M.E. Warren, BSc (Western)

Postdoctoral Fellows and Research Associates (1987)

D. Adhikesavali, PhD (IISc, Bangalore)

V.M. Allen, BSc (Dal)

J.F. Britten, PhD (McMaster)

K.S. Chandrasekhar, PhD (Bhabha ARC, Univ. Bombay)

S.C. Chol, MSc (Dal)

R. Cordes, PhD (UBC)

H. Dang, PhD (IIT, Bombay)

K.V. Darvesh, PhD (UNB)

R. Dharmaratne, PhD (Peradeniya)

H. Furue, PhD (Queen's)

J. Kralovec, PhD (Inst. Chem. Tech., Prague)

S.W. Kim, PhD (Wayne State)

A. Linden, PhD (Melbourne)

B.J. MacDonald, MSc (Guelph)

M.S. MacKinnon, PhD (Guelph)

A.M. de P. Nicholas, PhD (Dal)

D.L. Pegg, PhD (UBC)

P. Pruzynski, PhD (A. Mickiewicz, Poznan)

Ravinutha R. Rao, PhD (IIT, Bombay)

K. Robertson, BSc (Dal)

U.K. Roychowdhury, PhD (IIT, Kanpur)

H. Tan, PhD (Queen's)

S. Vempati, PhD (IIT, Kanpur)

F. Yamashita, PhD (Hokkaido)

Chemistry is one of the fundamental sciences. It explores the interactions among different forms of matter and energy. Its main purpose is to gain a basic - but also a very useful - understanding of how compounds react and when and why they form particular products. Chemical knowledge helps us influence the world in which we live; chemical principles and procedures are found everywhere in the groundwork of the natural and medical sciences.

A student considering an honours program in chemistry should be competent in mathematics as well as chemistry. The honours BSc is the expected professional requirement for a chemist. Chemists with honours degrees are employed in widely differing areas in industry and government. A degree in chemistry will provide a background for further graduate work in chemistry or in such diverse areas as medicine, law, business administration, biochemistry, oceanography and geology. A postgraduate degree is essential for independent original research in an industrial career or in university teaching.

Chemistry 1100 (or 1110 or 1120 or 1200) is an introduction to the discipline. All students intending to take classes in chemistry beyond the first-year level should include classes in mathematics and physics in their first year. Final grades in these classes should not be less than C; if they are, the student is bound to find advanced classes in chemistry difficult and frustrating.

At the second-year level the student is exposed to the four traditional areas of specialization in chemistry. Inorganic chemistry deals with all the chemical elements except carbon, and the compounds which these elements form. Organic chemistry is devoted to the study of the almost limitless number of compounds containing carbon. Analytical chemistry is concerned with the determination of the composition of substances, and with the detection of elements in quantities however minute. Physical chemistry is concerned with both macroscopic phenomena, including why and at what rates chemical reactions occur, and with molecular phenomena through the application of spectroscopic techniques. Beyond the second-year level, a student's studies in chemistry become increasingly concentrated in one of these four areas. The student may also be introduced to biochemistry or the chemistry of living organisms, as well as such specialties as structural chemistry, radiochemistry, electrochemistry and theoretical chemistry.

Degree Programs

Major in Chemistry

In order to obtain as general a chemical background as possible, the student, after taking Chemistry 1100, or 1110, or 1120, or 1200, must include in his/her program the classes 2110A/B, 2200A/B, 2310A, 2320B and 2400, which give exposure to the four areas of specialization in chemistry. The remaining requirements in chemistry may be chosen from third and fourth-year classes depending on the student's major interests. Each student who plans to major in chemistry should consult with a Chemistry Counsellor each year regarding a program of study. The

student's program should also include Mathematics 1000 and 1010 and Physics 1100.

The Chemistry Counsellors this year are N. Burford, D. Burkholder, A. Chatt, P.D. Pacey, J.A. Pincock and L. Ramaley. All students are encouraged to meet with one of these faculty members to discuss any problems that may arise.

All chemistry classes to be counted towards the major in chemistry must be passed with a grade of C- or better.

Honours in Chemistry

This program is intended to provide a broad training in chemistry while at the same time making provision for the individual interests of students. All honours students must consult annually with an Honours Student Advisor (P.D. Pacey or J.A. Pincock), and obtain approval of their course selection.

All required chemistry classes must be passed with a grade of at least C.

Year I will normally consist of:

Chemistry 1100 or preferably Chemistry 1200; Mathematics 1000 and 1010; a foreign language at the 1000 level; one of Biology 1000, Geology 1000 or Physics 1100; plus an elective.

Years II, III and IV must include:

1. Chemistry 2110A/B, 2200A/B, 2310A, 2320B, and 2400
2. Six full classes from Chemistry 3000 and 4000 levels. Chemistry 3000A, 3110A, 3120B, 3210A, 3220B, 3350R, 3410A, and 3420B are required classes. In addition the non-credit classes 3880, 4880 and 8880 must be taken.
3. Mathematics 2000 or 2500; a prerequisite for Chemistry 3000A and 3350R.
4. Five other classes. These must be chosen as follows:
 - a) if Physics 1100 was not taken in Year I, it must be taken in Years II-IV.
 - b) Two classes beyond the 1000-level must be taken in a minor subject. Minor subjects allowed for this degree are biochemistry, biology, computing science, geology, mathematics or physics.

These five other classes should be chosen according to the future plans of the student.

Combined Honours Program

The department has designed a number of programs which allow a student to obtain a Combined Honours Degree in Chemistry with one of Biochemistry, Biology, Computing Science, Geology, Mathematics or Physics. To obtain an introduction into all the basic areas of chemistry, Chemistry 2110A/B, 2200A/B, 2310A, 2320B and 2400R must be part of all combined honours programs involving Chemistry, and must be passed with a grade of at least C.

In addition to the above second-year chemistry classes, the following programs are suggested for guidance to the student.

Combined with Biochemistry

Chemistry 3410A, 3420B, 3430A/B, 4330A/B, 4400A/B, 4410A/B, 4420A/B and 8880, together with Biochemistry 2000R, 2800A/B, 3200A, 3300B, 3400B and 1 ½ other full credits in Biochemistry and Chemistry of which one must be in Biochemistry.

Combined with Biology

Chemistry 2130A, 3410A, 3420B, 3430A/B, 4400A/B, 4410A/B, 4420A/B and 8880 with Biology 2000, 2010A/B, 2020A/B and 2-½ other full credits in Biology and Chemistry of which at least two must be in Biology.

Combined with Computing Science

Chemistry 3000A, 3380B, 4000A/B, 4300A/B, 4350A/B and 8880 with Computing Science 2270B, 2450A, 2810A/B, 3690A, 3700A/B and 3 other credits in Chemistry and Computing Science of which at least 1-½ must be in Computing Science. Students are reminded that Math 1000A/B, 1010A/B, 2030A, Computing Science 1400A/B and 1410A/B are prerequisites to the Computing Science classes.

Combined with Geology

Chemistry 3110A, 3120B, 3210A, 3220B, 4100A, 4120B and 8880 with Geology 2100, 2200 and three other full credits in Chemistry and Geology of which at least two must be in Geology.

Combined with Mathematics

Chemistry 3000A, 3350R, 3380B, 4000B, 4300A/B and 8880 with Mathematics 2130, 2500, 3030, 3500 and four more half-classes of 3000 and 4000 level Mathematics, of which at least two must be at the 4000 level.

Combined with Physics

Chemistry 3000A, 3350R, 3380B, 4000B and 8880 with Physics 2110, 2120, 2200A, 2210B, 3140A, 3150B, 3210A/B, 3200A/B and one other chemistry or physics credit.

The above are only guidelines and students must consult an Honours Student Advisor of the Department of Chemistry (P.D. Pacey or J.A. Pincock) and the Chairman of the other area of study before registering in the combined program. Interested students should also consult the Department's Handbook "Undergraduate Studies in Chemistry" for more information.

Classes Offered

A or B indicates that the class is a half credit and is offered in either the A or B term or in exceptional circumstances in both terms. Consult the timetable for up-to-date details.

Early registration for classes is strongly encouraged. In recent years certain classes, particularly Chemistry 1100, 1200, 2110, 2200, and 2400, have reached maximum possible enrollment long before completion of the final registration period in September.

Students who have passed a first-year Chemistry class with a grade of D should consider themselves inadequately prepared for advanced studies in this subject. Such students will not be allowed to register directly for second-year Chemistry classes but may request that their names be put on a waiting list. Consult the Department for details. Duty registered students, who do not show up during the first week of classes, may lose their place to students on the waiting list.

Students, who voluntarily withdraw from any Chemistry class, may be placed on a waiting list if they want to register again for this class within 12 months after their initial withdrawal. (Students who duty register with the Department for a particular course but do not show up for classes, are considered to have "withdrawn" for purpose of this rule).

Chemistry Resource Centres

First Year and Advanced Resource Centres are located in Rooms 167 and 168. The former is staffed with people who can help with Chemistry problems. Facilities include study areas, computer terminals with special programs designed for Chemistry students, molecular models, audio-visual aids and a small library.

The professor most likely to teach the classes are listed following the class titles in the next section.

1000R The Chemical World: lecture 2 hours, lab/tutorial 2 hours, T.S. Cameron. This class is intended for students who want to take only a first-year credit in science, and who wish to understand some of the chemical aspects of the world around us. The class does not use a mathematical approach to science, and can be taken by students with no or limited previous chemistry experience. The class will cover the development of chemical knowledge from early times to the present. By means of lectures, frequent (and sometimes spectacular!) demonstrations, and laboratory or reading projects, students will be introduced to the world of chemistry and to chemicals and chemical ideas in everyday use. Students contemplating careers, e.g., in law, business, or government could profit from the material studied in this class. Students will be required to do extensive written assignments, which will be marked both on content and writing style. Chemistry 1000R is an approved "writing class" in the Faculty of Arts and Science. Chemistry 1000R does not serve as a prerequisite for second-year chemistry classes. It cannot be taken concurrently with Chemistry 1100, 1110, 1120 or 1200 but for students with no previous chemistry

experience, it will be an excellent preparation for these classes. Enrollment is limited.

1100R General Chemistry: lecture 3 hours, lab/tutorial 3 hours, N. Burford, T.P. Forrest, K. Grundy, R.D. Guy, W.E. Jones, J.C.T. Kwak, P.D. Pacey, L. Ramaley, R. Stephens. A study of the fundamental principles of chemistry with particular reference to stoichiometry, atomic and molecular structure, gases, liquids and solids, solutions, thermochemistry, equilibria, chemical properties of common substances, acid-base and oxidation-reduction reactions and chemical kinetics. Students enrolling in this class should have a background in chemistry equivalent to the Nova Scotia XII level. Mature students should consult the Department. It is important that students be familiar with exponents and logarithms, proportionality and variation, and graphical methods, and be able to solve quadratic and simultaneous equations.

1110R General Chemistry for Engineering Students: lecture 3 hours, lab/tutorial 3 hours, K.E. Hayes. Similar to Chemistry 110, but with a greater emphasis on the mathematical approach to chemistry. Basic chemical thermodynamics is presented in an exact algebraic manner, and includes a study of isothermal and adiabatic transformations for ideal gas systems as well as isothermal equilibria between liquids and vapors. All of the other topics, such as gas phase equilibria, the Gibbs-Helmholtz equation, electrochemistry and reaction kinetics are treated mathematically. Wherever possible examples and problems are selected from the real world. This class is open only to students enrolled in the Engineering program.

1120R General Chemistry for Health Professions Students: lecture 3 hours, lab/tutorial 3 hours, W.A. Aue. This class is intended in particular for Pharmacy students and for other students in the Faculty of Health Professions. Its content is essentially the same as that of Chemistry 1100, and it does serve as prerequisite for all second-year Chemistry classes. Some emphasis is given to topics of importance to students in Pharmacy and other health sciences. Space for students other than Pharmacy students may be limited.

1200R Principles of Chemistry: lecture 3 hours, lab/tutorial 3 hours, M.A. White. Similar to Chemistry 1100 but with more emphasis on atomic and molecular structure, thermodynamics, equilibria and kinetics. This class is intended for prospective science students and for students wishing to gain a more thorough introduction to the principles of chemistry. Students enrolling in this class must have attained high standing in high school chemistry and are advised to contact the lecturer(s) prior to registering for this class. Concurrent enrollment in Mathematics 1000 and 1010, or in Mathematics 1500 is advised.

Any of Chemistry 1100, 1110, 1120 or 1200 may serve as a prerequisite for any 2000 level class in chemistry, and as a credit in the Faculty of Arts and Science. However, credit will only be given for one of 1100, 1110, 1120 or 1200.

1410A Introductory Chemistry: lecture 3 hours, tutorial 2 hours, J.S. Grossert. A descriptive introduction to chemistry with emphasis on materials related to the life and health sciences. This class will cover the properties of gases; acid/base equilibria; chemical bonding; Lewis structures; organic functional groups; chirality; carbohydrates, amino acids and other biologically important chemicals; as well as a brief discussion of NMR and other spectroscopic techniques of current interest.

This class is considered terminal; it does not count as a prerequisite for any other Chemistry class.

1430R Introductory Chemistry and Biochemistry:
This class combines Chemistry 1410A and Biochemistry 142B for use by Nursing students and cannot be used for credit in Arts and Science.

2110A/B Introductory Inorganic Chemistry: lecture 3 hours, lab 3 hours, N. Burford, K.R. Grundy. Prerequisite: Chemistry 1100 (1110, 1120, 1200). The fundamentals of inorganic chemistry are covered. Specific topics include: ionic bonding and the nature of solids, the structure of atoms and simple molecular orbital theory, coordination chemistry of the transition

metals and a certain amount of systematic chemistry of inorganic compounds. The preparation, analysis and observation of inorganic compounds are the laboratory assignments.

2130A (or B) Inorganic Chemistry of Life: lecture 2 hours, lab 3 hours, subject to availability of professor. Prerequisite: A good understanding of the principles studied in Chemistry 1100. This class may not be included in nine chemistry credits required for an honours chemistry degree, see Academic Programs, page 26; it may however be taken by honours chemistry students in addition to these nine. Inorganic elements and their compounds in living systems, their special properties, structures and reactivities are studied. The laboratory illustrates class work with experiments on compounds isolated from living systems and on inorganic compounds that are used as models for these systems.

2200A/B Introductory Analytical Chemistry: lecture 3 hours, lab 3 hours, L. Ramaley, R. Stephens. Prerequisite: Chemistry 1100 (1110, 1120, 1200). An introduction to modern analytical techniques most often encountered in the laboratory. Topics include: theory of acid-base and redox titrations; molecular and atomic spectrometry in the visible and ultraviolet regions; potentiometry and use of ion selective electrodes; and gas and liquid chromatography. Laboratory experiments will be based on topics selected from the lectures and will introduce the student to a variety of methods.

2310A Introduction to Physical Chemistry — Energetics: lecture 3 hours, lab 3 hours, R.E. Wasylshen. Prerequisites: Chemistry 1100 (1110, 1120, 1200), Mathematics 1000, 1010. This class together with 2320B introduces students to the fundamental principles of physical chemistry. The class stresses the energies of both molecular systems, where quantum mechanical results are introduced, and macroscopic systems, which are treated using the laws and basic concepts of classical thermodynamics. The molecular basis of the ideal gas laws is also discussed. The laboratory sessions illustrate many aspects of the material presented in lectures.

2320B Introduction to Physical Chemistry — Dynamics: lecture 3 hours, lab/tutorial 3 hours, J.A. Coxon. Prerequisites: Chemistry 2310A or equivalent. This class introduces the fundamentals of molecular spectroscopy, statistical thermodynamics and reaction kinetics. Initial topics include the nature of electromagnetic radiation and the experimental determination of molecular properties through microwave, infrared and optical spectroscopies. Statistical thermodynamics provides the student with an insight on the relationship between the thermodynamic properties of bulk matter and molecular energy. The class concludes with a treatment of the basic concepts of chemical kinetics - rate laws, elementary and composite reactions, the Arrhenius law, chain reactions, catalysis, photochemistry, collision theory and transition state theory.

2330B (or A) Physical Chemistry for the Life Sciences: lecture 3 hours, lab/tutorial 3 hours, R.J. Boyd. Prerequisite: Chemistry 1100 (1110, 1120, 1200). Chemistry majors may not apply credit for Chemistry 2330 towards the major requirements for a degree in Chemistry. Credit will not be given for both of Chemistry 2310 and Chemistry 2330 or for both of Chemistry 2320 and Chemistry 2330. Those who do not plan a career in chemistry, but who can use the principles and concepts of physical chemistry in related areas, are introduced to the basic ideas of physical chemistry with the necessary mathematical concepts in simple terms. Previous knowledge of calculus is not necessary. The principal topics, thermodynamics, rates of enzyme catalyzed reactions, chemical equilibrium and spectroscopy are treated by application to examples of biological and environmental interest.

2400R Introductory Organic Chemistry: lecture 3 hours, lab 3 hours, D.L. Hooper, T.B. Grindley, J.S. Grossert, J.A. Pincock. Prerequisite: A good comprehension of the principles studied in Chemistry 1100. A broad introduction to the chemistry of carbon compounds, including molecular shapes and bonding, characteristic reactions of functional groups and the way in which they take place, and the application of spectroscopy to organic chemistry. Laboratory work is designed to teach a broad range of fundamental operations and techniques used in modern organic chemistry laboratories.

3000A Introductory Theoretical Chemistry: lecture 3 hours, C.H. Warren.

Prerequisites: Mathematics 2000 or 2200 and Chemistry 2110A/B or 2310A or 2320B. An introduction to quantum mechanics and its application to spectroscopy and the electronic structure of atoms. The postulates of quantum mechanics are presented and applied to some simple physical systems, followed by a discussion of the rotations and vibrations of molecules, and the electronic structure of atoms, concluding with an introduction to the simple Hückel molecular orbital method.

3110A(orB) Chemistry of the Main Group Elements: lecture 2 hours, lab 3 hours, T.S. Cameron. **Prerequisite:** Chemistry 2110A/B. A systematic study of the chemistry of the main group elements, with particular emphasis on the nonmetals of the first and second row elements. Use is made of modern bonding concepts. The laboratory introduces synthetic procedures for the preparation of inorganic compounds including study of their reactions. Some of these experiments involve special handling techniques, such as controlled atmosphere, high temperature or vacuum line manipulation.

3120B(or A) Chemistry of the Transition Metals: lecture 2 hours, lab 3 hours, O. Knop. **Prerequisites:** Chemistry 2110A/B, Mathematics 1000 and 1010. Modern bonding theories are used to unify the discussion of the chemical and physical properties of compounds of the transition elements. The laboratory experiments introduce procedures for the preparation and characterization of compounds of the transition elements.

3210A Solution Equilibria and Analytical Spectroscopy: lecture 3 hours, lab 3 hours, A. Chett. **Prerequisite:** Chemistry 2200A/B. Chemistry 3210A is organized into three units. 1. Introduction to Statistics; 2. Chemical equilibria and their analytical applications; and 3. Spectrochemical methods of analysis. Laboratory experiments illustrate the above techniques with practical examples.

3220B Analytical Electrochemistry and Separations: lecture 3 hours, lab 3 hours, R.D. Guy. **Prerequisites:** Chemistry 2200A/B and 3210A or permission of the instructor. Chemistry 3220B deals with the application of electrochemical and separation techniques to chemical analysis. The basic chemical and physical principles are explained, applications to analytical problems are examined and instrumentation is described. The laboratory work is concerned with practical examples of the above techniques in both qualitative and quantitative analysis.

3300A Chemical Thermodynamics No longer offered.

3310B Chemical Kinetics No longer offered.

3350R Intermediate Physical Chemistry — Properties of Matter: lecture 3 hours, lab 3 hours, alternate weeks, J.A. Coxon, P.D. Pacey, R.E. Wasylshen, M.A. White. **Prerequisites:** Chemistry 2310A, 2320B and 3000A and Mathematics 2000 or 2200 or equivalents. Chemistry 3000A should normally be taken concurrently. Credit will not be given for both Chemistry 3350R and Chemistry 3370A/B, or for Chemistry 3350R and Chemistry 3300A, or for Chemistry 3350R and Chemistry 3310B. This class begins with a discussion of the thermodynamics of real systems, including activities, chemical potentials and phase diagrams for pure and mixed gases, liquids, and solids. Approaches to understanding the rates and mechanisms of chemical changes will be described. The course will conclude with a study of microwave, infrared, Raman, electronic, laser, photoelectron and magnetic resonance spectroscopy.

3360B Numerical Methods in Chemistry: lecture 3 hours, C.H. Warren. **Prerequisites:** Chemistry 2310A, 2320B and Mathematics 2000 or 2200 or permission from the instructor. This class provides an introduction to numerical methods that can be applied to various problems in chemistry. Students will utilize these techniques on microcomputers, and Dalhousie's mainframe computer. Topics to be covered include the treatment of experimental data by least squares methods; by curve fitting, smoothing, and interpolation techniques; and by numerical integration. Matrices, determinants, and eigenvalue equations will be studied and applied to problems in quantum chemistry and spectroscopy. Complex equilibria will be examined through the numerical solution of simultaneous equations. Computer graphics will be introduced and applied to topics such as

wavefunctions, gas laws, potential energy contours, coordinate transformations and molecular geometries. Computer simulation of experiments will also be examined.

3370B (or A) Applied Physical Chemistry: lecture 2 hours, tutorial 1 hour, lab 3 hours (alternate weeks), staff. **Prerequisites:** Chemistry 2310A and 2320B or 2330 with permission of the instructor. Credit will not be given for both Chemistry 3350R and Chemistry 3370, or for Chemistry 3370 and Chemistry 3300A, or for Chemistry 3370 and Chemistry 3310B. This is an intermediate level class in applications of physical chemistry concepts, intended for students other than honours chemistry students. Topics covered will include the theory and experimental methods of determining the following: the phases of matter, the non-ideality of matter, molecular weights, molecular structure, rates of chemical reactions. The class will give an introduction to and draw examples from solution chemistry, electrochemistry, colloid chemistry, metallurgy and polymer chemistry.

3410B (or A) Identification of Organic Compounds: lecture 3 hours, lab 3 hours, T.B. Grindley. **Prerequisites:** Chemistry 2400 (or equivalent). The techniques necessary for the identification of organic compounds are introduced. Some presentation of the classical analysis methods is given, but the main emphasis is on modern spectroscopic techniques. The class builds on the framework of the functional group classification developed in introductory organic chemistry classes. Students work independently in the laboratory to identify unknown substances and to separate and identify components of mixtures using a variety of techniques.

3420A (or B) Synthesis in Organic Chemistry: lecture 3 hours, lab 3 hours, J.A. Pincock. **Prerequisites:** Chemistry 2400 (or equivalent). The reactions of a variety of functional groups and their applications to multi-step organic syntheses are surveyed. Examples chosen include syntheses of compounds which are important to the chemical and pharmaceutical industries. Students work independently in the laboratory and carry out a variety of syntheses. Experiments are designed so that students learn to monitor the purity of their products by the use of spectroscopic and other techniques. Some library work is required.

3430A (or B) Bioorganic Chemistry: lecture 3 hours, T.P. Forrest. **Prerequisites:** Chemistry 2400 (or equivalent). This class may *not* be included in the nine chemistry credits required for an honours chemistry degree (Academic Programs Section 11). It may however be taken by honours chemistry students in addition to these nine. Since molecules in nature operate under the same rules as those in an organic laboratory, one can apply the principles elucidated in the organic laboratory to the study of the behavior of organic compounds in nature. To cause a reaction to occur in the laboratory it might be necessary to alter functional groups and provide other conditions necessary to induce a particular reactivity. An analysis of the requirements for reactivity, methods by which these can be achieved and the influence of various factors on the outcome of reactions serve as the basis for the consideration of selected naturally occurring reaction pathways.

3880 General Topics in Chemistry. A non-credit class to be given by invited speakers which must be taken by all 3rd year honours Chemistry students.

***4000B Theoretical Chemistry:** lecture 3 hours; R.J. Boyd. **Prerequisites:** Chemistry 3000A. A continuation of 3000A. Molecular orbital theory and its applications are examined in greater detail. Group theory is introduced and applied to spectroscopy and molecular orbital theory.

***4100A(or B) Inorganic and Organometallic Reaction Mechanisms in Synthesis:** lecture 2 hours, lab 3 hours, K.R. Grundy. **Prerequisites:** Chemistry 3110 and 3120 or permission of the instructor. This class examines the fundamental aspects of inorganic reaction mechanisms such as substitution, isomerisation, oxidative addition, insertion, etc., together with their applications to inorganic synthesis. The laboratory is project oriented with each project illustrating the various mechanistic paths discussed in class. The experiments incorporate modern inorganic synthetic techniques and characterization by instrumental methods where appropriate.

***4120B Solid State Chemistry:** lecture 2 hours, lab 3 hours, O. Knop. Prerequisites: Chemistry 2110A/B, 3350R, and 4350A (or equivalents) or consent of instructor. All chemical elements and compounds can exist as crystalline solids, and most of them normally do. The arrangements of atoms and molecules in such solids, known as crystal structures, closely reflect the bonding properties and constituent elements. They can be studied by methods that do not destroy or modify the crystal structure. The methods most frequently employed for this purpose are covered together with the principles of solid state chemistry in general.

4210A(or B) Instrumentation: lecture 2 hours, lab arranged, L. Ramaley. Prerequisites: Chemistry 3210A and 3220B or permission of instructor. This class presents a detailed discussion of one particular area of Analytical Chemistry. The areas covered include Radiochemistry, Electronics or Atomic Spectroscopy. This class may be given in conjunction with a graduate class.

4200B(or A) Topics in Instrumental Analysis: lecture 2 hours, lab 3 hours, R.D. Guy. Prerequisites: Chemistry 3210A and 3220B or permission of instructor. This is a survey class of instruments and methodologies found in modern analytical laboratories. It may include atomic spectroscopy, chromatography, nuclear methods, surface analysis, laboratory automation, electrochemistry and some instruments of interest to the life sciences. The laboratory will consist of demonstrations and experiments on instruments at Dalhousie or at cooperating institutions in the Metro area.

***4300B Introductory Statistical Thermodynamics:** lecture 3 hours, M.A. White. Prerequisites: Chemistry 3300A or Chemistry 3350R (concurrently) or permission of the instructor. An introduction to the principles of statistical thermodynamics and quantum statistical mechanics. Wherever possible the application of statistical thermodynamics to chemical systems as well as physical and biological processes is emphasized.

4330B (or A) Biophysical Chemistry: lecture 2 hours, lab 3 hours, alternate weeks, R.E. Wasyfishen. Prerequisites: Chemistry 2310A, 2320B and either Chemistry 3300A and 3310B, or 3350 or 3370, or permission of the instructor. A theoretical and practical introduction necessary for the application of physical chemistry in life sciences and medicine. Topics include the structure and conformation of biological macromolecules, techniques for the study of biological structure and function, transport processes and biochemical spectroscopy. The laboratory is on an open basis with at least four experiments completed during the term.

4350A Symmetry and Group Theory: lecture 2 hours, compulsory tutorial 3 hours, O. Knop. Prerequisites: Chemistry 2110A/B and Mathematics 2000 or 2200 or consent of instructor. The theory of abstract groups and their representations, crystallographic and non-crystallographic point groups, and an introduction to the theory of space groups are presented. Examples from stereochemistry, crystallography, and spectroscopy illustrate the theory.

4400C Organic Spectroscopy: lecture 1 hour, lab 3 hours (as required), for two terms, D.L. Hooper. Prerequisites: Chemistry 3410A or equivalent, or permission of instructor. Nuclear Magnetic Resonance experiments and their interpretation. Application of NMR and other spectroscopic methods to the structure determination of organic molecules.

4410B Stereochemistry and Synthesis in Organic Chemistry: No longer offered.

4420B(or A) Organic Reaction Mechanisms: lecture 2 hours, lab 3 hours, D.R. Arnold, K.T. Lefkø. Prerequisites: Chemistry 3410A, 3420B or equivalents, or permission of the instructor. Methods for determining the mechanisms of organic reactions are discussed from the viewpoint of the physical organic chemist. Topics considered include applications of kinetic data, linear free energy relationships and acid and base catalysis, concerted reactions, steric effects, solvent effects and isotope effects.

4880 Advanced Topics in Chemistry, a non-credit seminar to be given by invited speakers which must be taken by all 4th year Honours Chemistry students.

8880 Honours Examination. This is an additional class required of all Honours students in Chemistry in order to satisfy regulation 11. It should be taken in the final year of a concentrated chemistry honours program. All honours students, whether in a concentrated or unconcentrated program, must consult with the professor in charge of the honours Thesis Program (L. Ramaley).

Classics

Chairperson of Department
R. Friedrich

Emeritus Professors
A.H. Armstrong, MA (Cantab.), FBA
J.A. Doull, BA (Dal), MA (Tor.)

Adjunct Professor
T.E.W. Segelberg, DTh, FK (Uppsala)

Professors
J.P. Atherton, MA (Oxon.), PhD (Liverpool)
R.D. Crouse, BA (Vind.), STB (Harv.), MTh (Trin.), PhD (Harv.) DD (Trin.)
R. Friedrich, Dr.phil. (Goettingen)

Associate Professors
W.J. Hanky, BA (Vind.), MA (Tor.), DPhil (Oxon.), *Undergraduate Studies Advisor*
D.K. House, MA (Dal), PhD (Liverpool), *Graduate Studies Advisor*
P.F. Kuserna, Dr.phil (Basle), Dr.phil.habil. (Heidelberg)
C.J. Starnes, BA (Bishop's), STB (Harv.), MA (McG), PhD (Dal)

Assistant Professors
P.J. Calkin, BA (UBC), MA (Dal), PhD (Dal)
A.M. Johnston, BA (McG), MA, PhD (Dal)

Postdoctoral Fellow
G. Naddaf, Étève Diplômé (E.P.H.E.), Docteur de l'Université de Paris IV (Sorbonne)

Classics is the study of our origins — how the Christian-European tradition to which we belong arose out of the ancient civilizations of the Mediterranean area. The fundamental ideas and beliefs of Europeans and North Americans, by which we are distinguished from Chinese, Indians, and those of other traditions, were formed in the meeting of Greek and Oriental cultures in ancient times. To understand fully our own contemporary culture, we must study its historical origins.

Classics is more than the study of ancient languages. Languages are not learned for themselves, but because they are necessary for the scientific study of ancient history, literature, religion, mythology and philosophy. The Classics Department at Dalhousie provides instruction both in these subjects and in ancient languages. While previous preparation in one or more ancient languages is desirable, it is nevertheless quite feasible for a student who discovers an interest in classics to begin his language studies at university.

Students of classics usually learn Greek and Latin. Instruction is also offered in Hebrew, Coptic, Syriac and Arabic.

It is obvious that classics is worth studying for its own sake by students who wish to obtain a better understanding of the common assumptions and beliefs of our society. This knowledge has always been regarded as pertinent to a career in politics and the higher levels of the civil service. For those who are thinking of the clergy, classics is the most relevant preparation.

Classical studies also prepares students for a life of teaching and

scholarship in several directions. Canada is responsible for its own culture, and we have great need of scholars and teachers who know about our origins. Teachers of classics for schools and universities are hard to find in Canada. Classics is also the best preparation for the study of non-European cultures (Chinese, Indian, Islamic, etc.), and there is a growing need for specialists in these fields. For the older history of philosophy, and for the history of Christian belief until, and including, the Reformation, a knowledge of classics is indispensable. The same may be said for medieval studies. Classics leads also to ancient Near Eastern Studies (Jewish, Babylonian, Egyptian, etc.) and to archeology.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

BA and BSc

Of classes offered by the department, Classics 1000, 1010, 1020, 1030 and 1100 and those classes in Ancient History and Religions and Ancient and Medieval Philosophy not having a Language prerequisite should be especially useful to students taking a bachelor's degree. All classes beyond the 1000 level are available for major and minor programs in classics, and the Department is glad to assist students in working out programs according to their interests.

Note: The following classes satisfy the first-year writing requirements for a degree: Classics 1000; Classics 1010; Classics 1100.

Honours Programs

The candidate may choose between three programs: BA with Honours in Classics (Ancient Literature), BA with Honours in Classics (Ancient History), or BA with Honours in Classics (Ancient Philosophy). *In each case, it is highly desirable, but not essential, that the student begin the study of at least one of the classical languages during the first year of study.* For purposes of meeting grouping requirements, Ancient History and Ancient and Medieval Philosophy classes may be counted either as Classics credits, or as History and Philosophy credits, respectively.

To receive an Honours degree in Classics:

Students must complete nine to eleven classes in Classics beyond the 1000 level chosen in accord with the general Faculty regulations for Honours.

The program must include work in either Greek or Latin Language and Literature to the 3000 level and work in the other language to an appropriate level as determined by the Undergraduate Advisor.

The program must be approved by the Undergraduate Advisor.

Whether the Honours degree is awarded in Ancient Literature, History or Philosophy depends on the area of the Department's offerings in which a larger part of the work is done.

Combined Honours

Classics may be taken as part of a combined honours program with French and German. Students interested in either of these programs should consult with the chairmen of the respective departments.

Undergraduate Advisor

The programs of all students majoring or honouring in the Department must be approved by the Undergraduate Advisor. Currently, Professor Hankey holds the position.

Changes and Additions

As the Calendar goes to press before all plans for the next academic year are completed, there may be significant changes in the classes listed below. Students should consult the Department for names of instructors and revisions.

Classes Offered

Note: A number of classes listed here are not offered every year. It is advisable to inquire at the Classics Department (424-3488).

Literature, History and Philosophy, Art, Archaeology and Mythology

Note: The introductory classes, and the more elementary classes in Ancient History and Religions, and Classical Philosophy listed below do not require knowledge of the ancient languages. However, students who plan to do advanced work in any of these areas are advised to begin study of the appropriate languages as early as possible.

Introductory: Origins of the West

Classics 1000 Ancient Literature in Translation: This class is the same as Classics 2000 (see below) but meets the first-year writing requirement.

Classics 1010 Ancient History: An Introduction to the Cultural History of the Ancient World: lecture 2 hours, D.K. House. The first term is devoted to a study of the major pre-classical civilizations (Sumer, Egypt, etc.) with attention paid to the art, religion and social forms of these cultures as well as their political development. In the second term the civilizations of Greece, Rome, and Israel are studied, and their issue in the Early Christian world considered. As the class is intended as an introductory one, no special preparation is expected. There is no foreign language requirement. This class fulfills the first year writing requirement.

Classics 1100 Classical Mythology: This class is the same as Classics 2100 (see below) but meets the first-year writing requirement.

Classics 1020 Archeology and Art: lecture 2 hours, W.J. Hankey, J.P. Atherton, P.F. Kussmaul. A study of Greco-Roman civilization through its visual art. The class will cover the period from 800 BC to AD 800. This is an introductory class. No special preparation is expected and there is no foreign language requirement.

Classics 1030 Origins of Western Thought: Introduction to Ancient Philosophy: lecture 2 hours, J.P. Atherton, W.J. Hankey. An introduction to classical culture through a study of its philosophical ideas. The ideas are presented in the religious, literary, and social context of their historical development.

Classics 2000 Classical Literature: lecture 2 hours, R. Friedrich, R.D. Crouse, C.J. Starnes and others. An introduction to classical civilization by way of the literature, read in English translations. Authors studied are Homer, the Greek Dramatists, Plato, Vergil and St. Augustine. *This class is open to first year students.*

Classics 2100 Classical Mythology: lecture 2 hours, A.M. Johnston. This class is designed as an introduction to the mythology and religion of ancient Greece and Rome. First the major gods and goddesses their worship and their myths will be studied, then the major cycles of Greek and Roman heroic mythology (the Trojan War, the Argonaut expedition, the cycles centering on Hercules, Perseus, Theseus and Aeneas) as they were recounted in Vergil, Ovid and in the visual arts. All texts read in translation. *This class is open to first year students.*

Ancient History and Religions

Classics 2200 Ancient History: The Ancient City: lecture 2 hours, P.F. Kussmaul. An introduction to Ancient History through a study of the constitutions of the Greek city states (especially Athens) and of Rome. Basic texts, such as Aristotle's *Athenian Constitution*, are read in English translation. *This class is open to first-year students.* There is no foreign language requirement. This class is given alternately with 2210.

Classics 2210 Roman History: The Roman Empire and the Rise of Christianity: lecture 2 hours, P.F. Kussmaul. A continuation of the introduction to Ancient History through a study of the institutions and constitutional arrangements of the Roman Empire from the time of Augustus. The relation of the Empire to Christianity is a topic of primary interest. This class is given alternately with 2200.

Classics 2220 Greek History: lecture 2 hours, D.K. House. Given alternately with Classics 2230.

Classics 2230 Roman History: The Cultural History of the Roman World: lecture/seminar 2 hours, D.K. House. Given alternately with Classics 2220.

Classics 3280/5280 Christian Beginnings and the Early History of the Church: seminar 2 hours, W. Hankey. The study of the beginnings of the Christian Church against its Jewish background within the Hellenistic culture.

Classics 3290/5290 Greek Religion: seminar 2 hours. The history of Greek Religion, with particular attention to the interpretation of myth.

Classics 3260/5260 Roman Religion: seminar 2 hours.

Classics 3270/5270 Near Eastern Religion: seminar 2 hours.

Classics 3520/5520 Seminar on Problems of the Hellenistic period: seminar 2 hours; Religions in the Hellenistic Period.

Classics 4530/5530 Seminar on the Roman Empire and the Rise of Christianity: seminar 2 hours, P.F. Kussmaul. Selected topics from the transition from Classical to Christian culture are studied. Particular attention is paid to the connection between religious innovation and the effect of the new beliefs on literature, art and philosophy.

Classical Literature

Classics 2000 Classical Literature: See description for Classics 2000 listed above.

Classics 2012 Greek Tragedy: Sophocles, seminar 2 hours. P. Calkin, R. Friedrich, A. Johnston. This class introduces the student to Greek tragedy through an in-depth study of the seven extant plays of Sophocles. This will be accompanied by a study of Aristotle's *Poetics*. This class is open to first year students. All texts will be read in translation.

Classics 2014A/2015B Euripidean Tragedy: seminar 2 hours, A. Johnston. These classes introduce the student to Greek tragedy through an in-depth study of a number of plays by Euripides. This will be accompanied by a study of Aristotle's *Poetics*. All texts read in translation. These classes, which may be taken separately or consecutively, are open to first-year students.

Classics 3510 Ancient and Modern Drama I: seminar 2 hours. R. Friedrich. Ancient and Modern Drama I is a study of Western drama from its ritual beginnings in ancient Greece to its 20th century forms. It is presented in two parts, each forming a full credit course. However, both parts (Classics 3510 and 3511) are designed in such a way that they can be taken independently from one another. Ancient and Modern Drama I deals with ancient drama and theatre: their beginnings in the Dionysian ritual; the Dionysian festivals; production and stage conventions. The aim of this class is a study of Greek and Roman plays, both tragedies and comedies, by Aeschylus, Sophocles, Euripides, Aristophanes, Menander, Plautus, Terence and Seneca. This study will be accompanied by readings from Aristotle's *Poetics* and Horace's *Art of Poetry*. All texts will be studied in English translation. (Cross-listed as Comparative Literature 3510).

Classics 3511 Ancient and Modern Drama II: seminar 2 hours. R. Friedrich. This is Part II of a study of western drama from its ritual beginnings in ancient Greece to its 20th century forms. Although this class is a continuation of Ancient and Modern Drama I (Classics 3510), Part II can be taken independently of Part I. Thus Classics 3510 is not a prerequisite for Classics 3511. The class will open with a few lectures reviewing the results of Part I of Ancient and Modern Drama. A brief study of Aristotle's *Poetics* and Horace's *Art of Poetry*, will provide a guide to the study of the plays. The chief purpose of this class is to trace the formation of European drama and to study the influence of the ancients on this process. This will be done by studying a number of plays ranging from Medieval and Elizabethan Drama to 20th century drama, each representing

a type and/or period of European Drama. All texts will be studied in English. (Classics 3511 is cross-listed as Comparative Literature 3520.)

Classical Philosophy

Classics 3300/5300 History of Christian Doctrine to Augustine: lecture 2 hours, C.J. Starnes, W.J. Hankey. The meaning of Christian doctrines in relation to their Jewish and Greek origins and their development in the classical world.

Classics 3361A and 3362B Ancient Philosophy from its Beginning to the Sixth Century AD: (same as Philosophy 3360) lecture 2 hours, J.P. Atherton, W.J. Hankey. Proper attention is paid to the great classical philosophies of Plato and Aristotle studied in their historical context. Much emphasis is laid on the Greek philosophy of the first centuries AD and its influence on developing Christian thought. The first half considers the history from the Pre-Socratics to Plato. The second half moves from Aristotle to Plotinus.

Classics 3370/5370 History of Christian Doctrine II: From Augustine to Calvin: W.J. Hankey. The class considers the theological development of matters like the Trinity, Incarnation, predestination, the nature of man and the sacraments by medieval thinkers.

Classics 3380 Medieval Philosophy: (same as Philosophy 3380) lecture 2 hours, R.D. Crouse. A study of the development of philosophy in the formative age of European civilization related to political, institutional, literary and theological concerns. An attempt is made to show how the legacy of classical and Christian antiquity was appropriated and reformed to constitute the ideology of medieval Christendom. The lectures are devoted mainly to the study and discussion of a few fundamental texts, beginning with Boethius' *Consolation of Philosophy*. Special attention is given to Anselm's *Proslogion* and the first few questions of Thomas Aquinas' *Summa*. It is the object of lectures to present the continuity of the historical development and to emphasize broad implications of the philosophical doctrines presented in the texts. In the later part attention is given to late medieval Platonism and Mysticism, to show something of the Reformation and modern philosophical and religious thought.

Classics 3400 The Dialogues of Plato: seminar 2 hours, D.K. House. This class presupposes some knowledge of the history of Ancient Philosophy, and some of Greek. Given alternately with Classics 3500.

Classics 3410 St. Augustine's Confessions: seminar 2 hours, C.J. Starnes. A study of the three parts of Augustine's *Confessions* with a view to understanding his dissatisfaction with the various positions he adopted prior to his conversion to Christianity (Part I), the practical consequences of this conversion (Part II), and the new theoretical understanding of time, space and motion which come out of his Trinitarian exegesis of the first chapters of Genesis (Part III). This class presupposes some knowledge of the history of Ancient Philosophy, and some of Latin. This class is given alternately with Classics 3420.

Classics 3420 St. Augustine's City of God: seminar 2 hours, C.J. Starnes. A study of Augustine's account of the failure of the Roman Empire and of the new Christian 'city' that replaced it. The course sometimes concentrates on the entire twenty-two books of the *City of God* and sometimes begins with a study of earlier accounts of Rome (*Aeneid*), and of the relations of Rome and the church in, for example, the *Apostolic Fathers*, the *Acts of the Martyrs* and Tertullian, before turning to the first ten books of the *City of God*. This class is given alternatively with Classics 3410.

Classics 3450/German 345 Hegel's Philosophy of Nature

Classics 3470, Reading and Research: Ancient Literature

Classics 3480, Reading and Research: Ancient History

Classics 3490, Reading and Research: Ancient Philosophy

Classics 3500 Aristotle: seminar 2 hours, D.K. House. This class studies a treatise of Aristotle, usually the *De Anima* or the *Physics*. It presupposes some knowledge of Ancient Philosophy and some knowledge of Greek.

Classics 4200/5670 Ancient Practical Philosophy: seminar 2 hours, J.A. Doull, W.J. Hankey.

Classics 4300/5600 Seminar on the philosophy of Aristotle: seminar 2 hours, J.P. Atherton. Usually the *Metaphysics* and its relation to the other Aristotelian treatises will be studied.

Classics 4310/5610 Seminar on the Philosophy of Plato: seminar 2 hours, J.A. Doull.

Classics 4320/5620 Ancient and Modern Dialectic: seminar 2 hours, J.A. Doull. Dialectical method in Fichte, Schelling and Hegel in relation to Plato and Aristotle.

Classics 4400/5700 Seminar on the Philosophy of the Church Fathers: R.D. Crouse.

Classics 4450/5640 Medieval Interpreters of Aristotle: seminar 2 hours, J.P. Atherton, R.D. Crouse, W.J. Hankey.

Classics 4500/5800 Seminar on Neoplatonism: seminar 2 hours, J.P. Atherton. Topics from the history of Neoplatonism and its relation to the theology of the Greek Church are studied.

Classics 4580/5580 Reading and Research

Classics 4680A/4690B Reading and Research

Classics 4900/5900 Departmental Seminar: seminar 2 hours.

Classical Languages and Literature

Classics 1700 Introductory Greek: lecture 3 hours, P.J. Calkin. This is the beginner's class in the Greek language. No previous knowledge is required. The aim is to teach the student to read a Greek text. After becoming accustomed to the new alphabet — which does not take long — the study of grammar is introduced along with reading and translation of texts from original Greek literature.

Classics 2700 Intermediate Greek: lecture 3 hours, P.J. Calkin. *Classics 2700* is a continuation of *Classics 1700* or *2710*. The aim is to develop the student's ability and to read and translate prose as well as poetic Greek texts.

Classics 2710 Greek Prose: seminar 3 hours, P. Calkin. A study of Greek accidence and syntax through the reading of Greek prose authors (Xenophon, Lysias). Prerequisite: any 1000 level Classics class or equivalent.

Classics 3700 Advanced Greek: seminar 2 hours, J.A. Doull, D.K. House, R. Friedrich. Prerequisite: *Classics 2700*. This class which reads both a prose and a poetic work is the normal third class in Greek.

Classics 3710/5710 Greek Epic: seminar 2 hours, R. Friedrich. Prerequisite: *Classics 2700*.

Classics 3720/5720 Greek Lyric: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3730/5730 Greek Drama: Tragedy: seminar 2 hours, R. Friedrich. Prerequisite: *Classics 2700*.

Classics 3740/5740 Greek Drama: Comedy: seminar 2 hours, R. Friedrich. Prerequisite: *Classics 2700*.

Classics 3750/5750 Greek Philosophical Texts I: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3760/5760 Greek Philosophical Texts II: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3770/5770 Greek Philosophical Texts III: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3751 Ancient Comedy; Greek New Comedy and Roman Comedy: seminar 2 hours, R. Friedrich. A comparative study of Menander, Plautus and Terence. Prerequisite: *Classics 2700* and *2800*. This course is cross-listed as *Classics 3850* or as *Comparative Literature 3750*.

Classics 3780/5780 Greek Historians: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3790/5790 Greek Literary Criticism: seminar 2 hours, R. Friedrich. Prerequisite: *Classics 2700*.

Classics 3791A & B Reading and Research: seminar 2 hours, staff. Prerequisite: *Classics 2700*.

Classics 3725 Biblical Greek: This class enables the student who already knows the basics of Classical Greek to familiarize himself with *koine*-Greek as it is found in various *New Testament* authors. The Greek of the *Septuagint* will also be taken into account.

Classics 4700/5700A/B Reading and Research: staff. Prerequisite: any *Classics 3000*-level class.

Classics 1800 Introductory Latin: lecture 3 hours, C.J. Starnes. An introduction to Latin through the study of its basic grammar.

Classics 2800 A Study of Latin Prose and Poetry: lecture/discussion 2 hours, P.F. Kusmaul. A study of the poetry and prose literature of Rome through a selection of texts. Particular attention is paid to improving the students' command of the grammar and syntax of the Latin language.

Classics 2810 Latin Prose: seminar 3 hours, C. Starnes, P. Kusmaul. A study of Latin accidence and syntax through the reading of Roman prose authors (Caesar, Cicero). Prerequisite: any 1000 level Classics class or equivalent.

Classics 2860 Latin Historical Texts: lecture 2 hours, J.P. Atherton.

Classics 3800/5800 Roman Satire: seminar 2 hours, staff.

Classics 3810/5810 A Study of Vergil: seminar 2 hours, J.P. Atherton. Prerequisite: A class in Latin at the 2000 level. A study of the development and importance of Vergil's basic themes and ideas embodied in the *Aeneid*. In the first part of the class special attention is given to his early work the *Bucolics*, where his themes begin to appear, and their development is then followed through the relevant parts of the *Georgics*. The main part of the class is devoted to the reading and discussion of the chief themes of the *Aeneid*, especially as they illustrate Roman political, religious and social ideas which have greatly influenced our own beliefs and institutions.

Classics 3820/5820 Advanced Reading in Latin Literature: staff.

Classics 3830/5830 Latin Religious Poetry: seminar 2 hours, J.P. Atherton, P.F. Kusmaul. A study of religious poetry written in the Latin language from the *Carmen Saillare* (680 BC) to Calvin's *Épître* (1544 AD) and the poems of Leo XIII (1890 AD).

Classics 3840 Latin Philosophical Texts: lecture 2 hours, R.D. Crouse. Prerequisite: *Classics 1800*, *2810* or Senior Matriculation in Latin. The purpose is to give students experience in reading philosophical Latin. Various authors are read from Cicero to the late Middle Ages.

Classics 3850: A Latin (Le. 800) listing for *Classics 3751*.

Classics 4800 Reading and Research: staff.

Classics 4850/5850 Reading and Research: staff.

Near Eastern Languages

The classes in Hebrew, Coptic, Syriac and Arabic, are sometimes available as electives at the discretion of the Department, only in relation to the needs of the particular student.

Note: The classes in Hebrew and Arabic are taught by the Atlantic School of Theology.

Hebrew

1010 Elementary Hebrew and Introductory Readings

2020 Intermediate Hebrew

3030 Advanced Hebrew

Arabic

Students wishing to take a class in Arabic must consult with the Department before registering for the class.

1000 Introductory Grammar and Reading of Texts

2000 Intermediate Arabic

Special Topics

Classics 4910A/4920B Special Topics

Classics 4710A/4720B Special Topics

Classics 4810A/4820B Special Topics

Comparative Literature

A. Andrews (Theatre)
 J.A. Barnstead (Russian)
 S.A.M. Burns (Philosophy)
 R. Friedrich (Classics) (Chairman)
 F. Gaede (German)
 R.M. Huebert (English)
 S. Jones (Spanish)
 J.M. Kirk (Spanish)
 R.M. Martin (Philosophy)
 H.R. Runte (French)
 M.C. Sandhu (French)
 H.G. Schwarz (German)
 H.S. Whittier (English)

Comparative Literature, despite its name, is not so much defined by 'comparisons' as by studies involving literary works which belong to more than one literature and language. The idea of a national literature (English literature, French literature, Canadian literature, etc.) is of relatively recent date. It originated in the 18th century with the rise of national consciousness; yet at the same time the traditional broad unity of all literatures reasserted itself in Goethe's concept of 'world literature.' In Comparative Literature the literary work is treated in its double aspects of belonging to a national literature as well as forming part of world literature. Comparative Literature has various approaches. It implies the study of *themes and motifs* (e.g. Faust, myths, etc.) as they recur in literary works of different ages and literatures; of *literary genres* such as drama, epic or romance; of *periods* (e.g. Renaissance, 18th century, etc.); of authors writing in different languages but linked by influences; of the *reception* of the work of an author in another literature (e.g. Shakespeare in Germany). The relationships of literature to the other arts (e.g. film, the fine arts, music, etc.) may also be a subject of Comparative Literature; and last but not least, Comparative Literature forms a bridge between literature and other fields in the humanities such as philosophy, religion, and politics.

The Departments of Classics, English, French, German, Philosophy, Russian, Spanish and Theatre offer the following classes in Comparative Literature. Classes which are cross-listed may form part of an area of concentration. All lectures are given in English and works are read in English translation unless otherwise noted.

Classes Offered

Classes marked * are not offered every year. Please consult the current timetable on registration to determine if this class is offered.

Note: At present the Comparative Literature Program is being revised; the entries may therefore be outdated at the time when this Calendar will be published. Students interested in the Comparative Literature Program should contact R. Friedrich, Classics Department, 424-3468; or H.R. Runte, French Department, 424-2430.

*2000 Introduction to Comparative Literature: This is an introduction to the understanding of man's approach to the problems of life through the study of selected masterpieces of European literature which may include works by Dante, Chaucer, Cervantes, Shakespeare, Molière, Goethe, and others. Note: English 100 or Classics 2000 is acceptable as an equivalent to Comparative Literature 100.

2011A/B The History of the Theatre from Its Origins to the Renaissance: 3 hours, A. Andrews. This class is cross-listed as Theatre 2011A/B.

2012A/B The History of the Theatre from Renaissance to the Twentieth Century: 3 hours, A. Andrews. This class is cross-listed as Theatre 2012A/B.

2030 Masterpieces of Western Literature: H.S. Whittier. This class is cross-listed as English 203.

2040 The European Novel: Staff. This class is cross-listed as English 204.

2100 Classical Mythology: A. Johnston. This class is cross-listed as Classics 2100.

*2110 Theories and Manifestations of Love in Medieval Europe: H.R. Runte. A literary and anthropological study of major poetic, romanesque, and dramatic works by English courtly poets, French troubadours, and German Minnesänger, with special emphasis on their relation to our time.

*2120 Realism and the 18th Century English and French Novel: R. Runte. Novels by such authors as Marivaux, Richardson, Prévost, Fielding, Rousseau, Diderot, Smollett, and Laclos are studied. Aspects of realism in style and structure provide the basis for comparison/contrast of the works read.

*2140 Arthurian Romances: H.R. Runte. A historical, archaeological, cultural and literary investigation of French, English, and German Arthurian texts dealing with the medieval legend of King Arthur and the Knights of the Round Table. All readings in modern English translations.

*2180 Germanic and Greek Mythology: This class is cross-listed as German 235.

*2370 Restoration and 18th Century Comedy: R. Runte. A comparative study of English and French plays by such authors as Wycherley, Etherege, Congreve, Steele, Sheridan, Molière, Lesage, Marivaux, Voltaire, and Beaumarchais. Critical essays on comedy are studied with a view to defining the universal, national and temporal nature of comic elements in the works read.

2705B Philosophy in Literature: R.M. Martin. This class is cross-listed as Philosophy 2700B.

3500 The Modern Theatre: A. Andrews. This class is cross-listed as Theatre 3500.

3510 Ancient and Modern Drama I: R. Friedrich. This class is cross-listed as *Classics* 3510.

3511 Ancient and Modern Drama II: R. Friedrich. This class is cross-listed as *Classics* 3511.

4900 Dramatic Theory and Criticism, and the Aesthetics of the Theatre: A. Andrews. This class is cross-listed as *Theatre* 4900.

Comparative Religion

Professor (Chairperson)

R. Ravindra, BSc, MTech, (IIT), MA (Dal), MSc, PhD (Tor.), Adjunct Professor of Physics

Associate Professor

C.T. Sinclair-Faulkner, BA (Tor.), MTh, MA, PhD (Chic.)

The University study of religion aims at an intellectual understanding of this more than intellectual reality. Religion is a phenomenon virtually universal in human society and history; some have held that it is central to the human condition. Understanding involves grasping simultaneously both the meaning of faith in the lives of participants, and the critical analysis of outside observers. Both the student wishing enhanced understanding of religion as an historical and social and human fact, and the student who wishes to wrestle with problems arising in academic reflection concerning the relation between the personal and the objective, can find material to engage them in the courses described below.

BA

Students wishing to major in Comparative Religion must successfully complete Comparative Religion 1010 or 1301, and at least four to eight full-year classes or their equivalent in Comparative Religion beyond the 1000-level. These must include at least two from each of the groups (2001, 2002, 2003) and (2011, 2012, 2013).

After earning at least 10 credits of any kind students must successfully complete one class in Comparative Religion beyond the 3000-level (see "Topics in Comparative Religion").

This provides them with a broad introduction to both Eastern and Western religious life, and to the various ways in which religion may be studied. In light of their specific interests, Comparative Religion majors are encouraged to enrol in related classes offered by other Departments. Programs should be planned in consultation with the undergraduate advisor, Dr. C.T. Sinclair-Faulkner.

Please consult the current timetable on registration to determine which classes are being offered.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Classes Offered

1000/2000R Introduction to World Religion: lecture and tutorial 3 hours, R. Ravindra. No prerequisites. This class will focus on a comparative study of Christianity and other major world religions. The first half of the class will be an introduction to the basic ideas and concerns of the world religions with an emphasis on fundamental general questions in comparative studies: What materials in different traditions are comparable? What psychological and intellectual attitudes are required for such a study? The second half is

devoted to a comparative study of the Gospels and a scripture from another religion. Extra work will be required in 2000 which is not available to first-year students.

1301 Introduction to the Study of Religion: lecture 2 hours, section meeting 1 hour, C.T. Sinclair-Faulkner. (No prerequisites). Religion is: a way of life? an encounter with God? a neurosis? the essential human trait? an epiphenomenon? The possibilities are explored by using the insights of modern social scientists, humanists and theologians to study Canadian life. This class fulfills the first-year Writing Requirement. A detailed syllabus is available from the Department of Comparative Religion.

The following semester-long classes serve variously as prerequisites to 3000-level classes (q.v.). Each deals with one of the world's six major religious traditions by examining its founder(s), scriptures, history, communal forms, a key ritual, and the impact of the modern world. The common text for all six classes is Nielsen *et al.*, *Religions of the World*. There are no prerequisites for these classes but first-year students are not admitted without the consent of the instructor.

2001 A/B Judaism: lecture and seminar 3 hours, C.T. Sinclair-Faulkner.

2002 A/B Christianity: lecture and seminar 3 hours, C.T. Sinclair-Faulkner.

2003 A/B Islam: lecture and seminar, 3 hours, C.T. Sinclair-Faulkner.

2011 A/B Hinduism: lecture and seminar, 3 hours, R. Ravindra.

2012 A/B Chinese and Japanese Religions: lecture and seminar, 3 hours, R. Ravindra.

2013 A/B Buddhism: lecture and seminar, 3 hours, R. Ravindra.

3001 Western Spirituality: lecture and seminar 2 hours, C.T. Sinclair-Faulkner. Prerequisite: At least one of 2001, 2002, 2003 or permission of the instructor. The Western world has known many different ways to be religious: personal, mystical, political, rational, sensual. Original accounts of Jewish, Christian, Muslim and Amerindian spiritualities are studied in their historical context. Each student undertakes a guided study of some twentieth-century religious experience of his or her choice. A detailed syllabus is available from the Department of Comparative Religion.

3002 Religion in Story: lecture and seminar 3 hours, C.T. Sinclair-Faulkner. Prerequisite: At least one of 2001, 2002, 2003 or permission of the instructor. When religious people seek answers to ultimate questions or try to come to grips with the mystifying phenomenon of the Holy, they turn to stories. Modern novels and short stories, particularly Canadian works, are the primary reading assignments in this class. They are set in the context of related material from the broader western culture, including the Jewish scriptures. A detailed syllabus is available from the Department of Comparative Religion.

3003 Religion in Canada: lecture and seminar 3 hours, C.T. Sinclair-Faulkner. Prerequisite: 2001 or 2002 or permission of the instructor. When Canadians have built cities, gone to war, founded economic empires, fallen in love, designed school systems, and elected governments, religion has often been a decisive factor. Sometimes religion has been the decisive factor. What is "religion" in Canada? In the course of this extensive historical study of life in Canada from the sixteenth century to the present, a variety of answers will be explored. A detailed syllabus is available from the Department of Comparative Religion.

3014R Love and Death in World Religions: lecture and seminar 3 hours, R. Ravindra. Prerequisite: A class in Comparative Religion or the permission of the instructor. What are love and death? Is it possible to love in the midst of intense suffering and hatred, as in the Holocaust? How are sex and love related with each other? Why do mystics in many traditions speak of love and death together? What meaning can life have in the face of the inevitability of death? Does individual identity come to a complete end or does one continue existence in some form, as most religions assert? What is the nature of judgment after death? Is there reincarnation?

3015A/B Myths, Symbols and Rites: lecture and seminar 3 hours, R. Ravindra. Prerequisite: A class in Comparative Religion or permission of the instructor. Myths, symbols, and rites have been among the major vehicles of spiritual truths and psychological insights in all religions. After a general discussion of the nature of symbolic and mythic understanding, the focus is on some of the major myths and symbols associated with the lives and teachings of Krishna, Shiva, Gautama Buddha and Jesus Christ.

3531 Mystical Consciousness and Modern Science: seminar 2 hours, R. Ravindra. Prerequisite: A class in Comparative Religion or in Science (preferably both). Yoga, Zen, Prayer of the Heart, Sufism and other spiritual disciplines have gathered an enormous amount of experiential and theoretical material about human consciousness and its many levels, from the ordinary to the mystical and cosmic. The first term is devoted to understanding many levels of human consciousness based on these disciplines. The second term is devoted to a critical examination of mystical consciousness in the light of modern scientific discoveries, and of the fundamental presuppositions of modern science in the light of the universal experience and knowledge of the many levels of consciousness.

3502A/B The Rise of Modern Science: lecture/tutorials 3 hours, J. Farley (Biology) and R. Ravindra (Comparative Religion/Physics) The modern world has been fundamentally altered by science and technology. In what ways? How has this come to be? This class, designed for students in the arts as well as the sciences, examines these questions by looking at the origins of modern science in the 16th and 17th centuries, its growing popularity in the 18th century, and the rise of the scientific profession and science-based industry in the 19th and 20th centuries.

3503A/B Nuclear Bombs: Survival and Morality: seminar 3 hours, R. Ravindra. This class, designed for students in the arts and the sciences, will study the history of atomic bomb development, the moral issues involved in the destruction of Hiroshima and Nagasaki, and the concerns about human survival raised by the proliferation of these weapons. Prerequisites: Comparative Religion 3502A (or equivalent) or permission of the instructor.

Classes at the 4000-level will normally only be arranged at the request of a student who is majoring in Comparative Religion, though other students may then be admitted to the class upon application to the instructor. These classes permit the student to integrate the work of many previous classes and lines of study while examining some chosen topic in the academic study of religion.

4310A/5310A-4320B/5320B Topics in Comparative Religion: seminar 2 hours, staff. Structured as a seminar or for independent guided study depending on the interests and needs of the students and the faculty. The intention is to devote some concentrated time to a specific topic of interest, such as *Cults and New Religions*, *The Feminine in World Religions*, *Religious Aspects of Middle-East Politics, Tradition and Modernity*, etc. Please consult the Department for the topic which may be discussed in any given term.

Computing Science

Director of Computing Science Division
M.A. Shepherd

Professors
A.G. Buckley, MSc (Alta.), PhD (UBC)
P. Keast, PhD (St. Andrews)
K.J.M. Moriarty, MSc (Dal), PhD (London)

Associate Professors
B.W. Fawcett, MSc, PhD (McMaster)

C.S. Hartzman, MS (Purdue), PhD (Colorado)
M.A. Shepherd, MSc, PhD (Western)

Assistant Professors
A. Farrag, PhD (Alberta)
R.D. Holmes, MSc (Princeton), PhD (Dal)
J. Mulder, PhD (UBC)
A.E. Sedgwick, MS (Wisconsin), PhD (Tor)

Degree Programs

Students who plan to major in Computing Science should arrange a program in consultation with the Department of Mathematics, Statistics and Computing Science.

Major in Computing Science

Majors in Computing Science must obtain at least four (and no more than eight) credits beyond the 1000 level in Computing Science.

In addition to the necessary first-year prerequisites (i.e. Math 1000, 1010, Computing Science 1400, 1410) the following classes are required:

2nd year: CS2270, CS2350, CS2450, CS2810, Math 2030 or Math 2130

3rd year: CS3690, CS3040, CS3700, CS3250

Students wishing to major in Computing Science will normally take the pair CS1400/1410, but it will be possible to proceed from CS1200/1210 into a Computing Science program. The main purpose of CS1200/1210, however, is to provide an introductory computing course suitable for science majors. This pair of courses leads naturally into CS2270 (Numerical Linear Algebra), CS3210 (Numerical Analysis) and CS3350 (Introduction to Supercomputers). In addition, CS1200/1210 (as well as the pair CS1400/1410 satisfies the first year requirement for TUNS programs (see Other Information section)

Students who wish to arrange inter-disciplinary programs (with fields such as Mathematics, Physics, Psychology, and others) are invited to discuss their interests with the department.

Honours in Computing Science

The Honours program in Computing Science must include the following courses usually taken in the years shown:

1st year: Math 1000, Math 1010, CS1400, CS1410, CS1670*, CS2670*

2nd and 3rd year: CS2450, CS2350, CS2810, CS2270, CS2670, CS3690, Math 2070, Math 2080, Math 2130 or (Math 2030, Math 2040), CS3040, CS3700, CS3250

4th year CS8870, and four 4000 level CS courses.

*Typically taken within the first two years.

Combined Honours

Students interested in taking honours in Computing Science and another subject as a combined program should consult the honours advisor through whom a suitable course of study can be arranged.

A combined honours program may well be an appropriate choice for many students. If a student is contemplating graduate work, it should be borne in mind that the work in either subject of a combined honours program may be insufficient for entry to a regular graduate program, and that a qualifying year may be necessary.

Cooperative Education Programs

The department offers two Co-op education programs involving Computing Science, a concentrated honours program in Computing Science, a 20-credit major program and a combined program with Mathematics. Computing Science Co-op students are required to take all the courses that non-Co-op students take.

For further information regarding the 20-credit program refer to specific regulations on pages 33 to 41. Further information about the Co-op

programs is included under the Calendar entry for Mathematics. Interested students should note that some Departmental regulations for Co-op students differ from those regulations for students not in the Co-op program.

Any student who is interested in enrolling in a Co-op program is urged to contact the Director of Co-op Education as early as possible in their academic career for course advice and other information.

Prerequisites:

If a Computing Science course is listed as a prerequisite for a Computing Science course beyond the first year level, a grade of C or better is required in the listed course for it to count as a prerequisite.

Other Information

The Department operates a VAX-750 system, running Unix, for Computing Science students. The terminals are located in the Killam Library. The university also operates a VAX-8800 running VMS that is used for some Computing Science courses and has a PC lab and a Macintosh lab available for coursework and student use. In addition, a VAX-785 system, running Unix, is available for faculty and graduate students.

Students who complete the first two years of a Dalhousie program in Computing Science may complete their programs at Dalhousie or may be able to transfer to the Technical University of Nova Scotia (TUNS) to complete a Bachelor of Computing Science with Engineering options. Further information about the classes required for admission to a TUNS program may be obtained from TUNS or the Department of Mathematics, Statistics and Computing Science.

Note that credit may not be obtained for the same class twice even if the number has been changed (e.g. 2610 is the same as the former 360).

Classes Offered

Classes marked * are not necessarily offered every year. Please consult the current timetable on registration to determine if this class is offered.

1200A Introductory Computing Science: lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Math 441 or equivalent. Together with CS1210 this class provides an introduction to Computing Science. No previous knowledge of computing is assumed. The course will teach the elements of programming and algorithm development. The language which will be used is FORTRAN. Throughout the course the emphasis will be on numerical and scientific applications. Credit will be given for only one of CS1200 and CS1400.

1210B Scientific Applications and Algorithms: lecture 3 hours, tutorial 1 hour. Prerequisite: CS1200 (or CS1400 and the permission of the instructor), and Math 1000. This is a continuation of CS1200. The course will deal mainly with scientific applications of computers and with the development of algorithms for scientific problems. Elementary numerical techniques will be taught and deterministic and random simulation will be discussed. Credit will be given for only one of CS1210 and CS1410.

1400A Introduction to Computing Science: lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Math 441 or equivalent. This class together with CS1410 provides a general introduction to algorithmic concepts, structured programming, and Computing Science. Students develop programming skills in a higher-level language such as Pascal, with emphasis on structured programming. The exercises involve primarily non-numerical tasks including character manipulation and sequential file processing.

1410B Applications and Algorithms: lecture 3 hours, tutorial 1 hour. Prerequisite: CS1400 (or CS1200 and permission of the instructor) and Math 1000. This is a continuation of CS1400. The applications tend to be more mathematical and include numerical calculations with truncation and rounding errors, statistics, modeling and simulations, data processing, non-numerical applications involving networks and graphs, interpreters and translators. Students are introduced to elementary data structures and algorithm analysis.

1670A Discrete Structures I: lecture 3 hours (see Mathematics 1670A).

2270A Introduction to Numerical Linear Algebra: lecture 3 hours (same as Mathematics 2270B). Prerequisite: Math 1010, 2030 and CS1410. We begin by examining the floating point number system and its arithmetic. Next, we investigate the numerical solution of systems of linear equations, examining Gaussian Elimination and some iterative methods. The idea of condition numbers, both of a problem and an algorithm, is introduced, together with some techniques of estimating the condition number of a matrix. The Singular Value Decomposition of a matrix and generalized inverses are also examined. The Modified Gram Schmidt process, the solution of underdetermined linear systems, and overdetermined linear systems using a least squares approach, are discussed. Reference is also made to various software libraries available, including LINPACK. Time permitting, interpolation is also discussed.

2350B Introduction to File Processing: lecture 3 hours. Prerequisite: CS2610. This class begins with a review of sequential file algorithms. However, the primary subject is direct-access file systems and the various access methods. Some of the theoretical topics covered include hashing and tree data structures appropriate for file directories. Internal and external sorting methods are covered in considerable detail.

2450A Introduction to Computer Systems: lecture 3 hours. Prerequisite: CS1410. An introduction to machine architecture from the perspective of an assembly language programmer. Students gain familiarity with an assembly language and the translation process needed to produce machine code. Common addressing modes, macros and file I/O are discussed, together with the internal structure of memory, control units and processing units.

2610A Data Structures and Algorithmic Analysis: lecture 3 hours. Prerequisite: CS1410. Data types and the operations on them are covered in this class, including stacks, queues, trees and various linked structures. The efficient representation of graphs and the corresponding algorithms are discussed. Considerable emphasis is placed on the analysis of algorithms.

2670B Discrete Structures II: lecture 3 hours (see Mathematics 2670B).

3040A/B Introduction to Computer Organizations: lecture 3 hours. Prerequisite: CS2450. An introduction to logic design and detailed computer architecture. Basic logic elements such as gates and flip-flops are discussed and the design of combinational networks, registers and control mechanisms analyzed. Internal representation and arithmetic, communication between components, instruction fetch and sequencing, interrupts and I/O controllers are also discussed.

3090A/B Computers and Society: lecture 3 hours. Prerequisite: CS1410. The impact of computers on society is discussed in this class. Topics include the history of computing and technology, the place of the computer in modern society, legal issues such as the copywriting of software, the computer scientist as a professional, the impact of databanks on individual privacy and the public perception of computers and computer scientists.

3210B (formerly part of 320) Introduction to Numerical Analysis: lecture 3 hours (same as Mathematics 3210A). Prerequisite: Mathematics 2000 and CS2270. See class description for Mathematics 3210A.

***3220A or B Numerical Solutions of Ordinary Differential Equations:** lecture 3 hours (same as Mathematics 3220B). Prerequisite: CS3210 and Mathematics 3110, 3090. See class description for Mathematics 3220B.

3250A Data Base Management Systems Design: lecture 3 hours. Prerequisite: CS2610, CS2350. The concepts and structures necessary to design and implement a data base management system are stressed. Hierarchical, network and relational models are discussed with emphasis on the necessary logical and data structures. Various normal forms and canonical schema are discussed as well as the concepts of relational algebras and relational calculus.

3350A/B Introduction to Supercomputing: lecture 3 hours. Prerequisite: CS 2270 and CS2450. An introduction to the computer architecture of the supercomputers of today: CRAY X-MP, CRAY 2, CDC CYBER 205, ETA-10,

FIJITSU VP200 and NEX 2X-2. The software for the efficient implementation of vectorization and parallel processing will be discussed.

3690B (formerly 270) Programming Languages: lecture 3 hours. Prerequisite: CS2610. The emphasis is on fundamental concepts such as block structure and recursion and structured control flow. Exercises are given in several languages such as C, Lisp and Prolog. Recursion and functional programming are extensively discussed as well as an introduction to program correctness.

3700B Operating Systems I: lecture 3 hours. Prerequisite: CS2610, 3040. This class covers the principles of modern operating system design with examples from existing systems. Specific topics include: concurrent processes, interprocess communication, synchronization, scheduling policies, multi-level storage management, and associated algorithms.

3750A Artificial Intelligence: lecture 3 hours. Prerequisite: CS3690. An introduction to basic concepts and techniques of artificial intelligence or systems with insights given into active research areas and applications. Representational issues and notational structures are emphasized and existing systems are surveyed. Students work on a fairly large project using Lisp.

***3810B (formerly Physics 421) Microcomputers in the Real World:** lecture 3 hours (same as Physics 3810B). Prerequisites: CS2450, Physics 2200A/2210B or 2110/2120. See class description for Physics 3810B.

***4100A/B Operating Systems II:** lecture 3 hours. Prerequisites: CS3700B, Mathematics 2070-2080. A further development of the material of Operating Systems I. Topics include concurrent processes, address space management, resource allocation, multiprogramming systems, protecting access to objects, pipelining, user interfaces and networks.

***4130A/B Analysis of Algorithms:** lecture 3 hours, (same as Math 4130 A/B) Prerequisite: CS3690. This class covers algorithmic solutions to a wide variety of problems and a formal analysis of their complexity. It is a continuation of the 2610 class. Problems are taken from combinatorics and numerical computation including algorithms for unordered and ordered sets, graphs, fast multiplication, prime testing, factoring, polynomial arithmetic and metric operations. Other topics include the analysis of algorithms used in systems programming and artificial intelligence such as pattern matching for text processing and algorithms in natural language processing.

***4140A/B Software Design and Development:** lecture 3 hours. Prerequisite: CS3690. This class involves a formal approach to state-of-the-art techniques in software design and development. Students work in teams in the organization, development and management of a large software project. Formal models of structured programming, stepwise refinement and top-down design, strength and coupling measures, milestones and estimating, chief-programmer teams, program libraries and documentation are included.

***4150A/B Theory of Programming Languages:** lecture 3 hours. Prerequisite: CS3690. This is a class in the formal treatment of programming language translation and compiler design concepts. Topics include lexical analysis and parsing with emphasis on the theoretical aspects of parsing context-free languages, translation specification and machine-independent code optimization. Finite state grammars, lexical scanners, and context-free parsing techniques such as LL(k), precedence, LR(k), SLR(k) are included.

***4200A/B Selected Topics in Artificial Intelligence:** lecture 3 hours. Prerequisite: CS3750

4250A Information Retrieval: lecture 3 hours. Prerequisite: CS2350. An introduction to online information retrieval systems for textual databases. The major models of information retrieval will be covered as well as such basic tools as automated indexing and performance measures.

***4270A/B Numerical Software:** lecture 3 hours. Prerequisite: CS3210. The design and implementation of reliable programs and libraries for numerical computation are the foci of this class. Program libraries such as EISPACK, LINPAC and IMSL are reviewed. Particular attention is paid to the choice of

subroutine parameters and the tradeoffs between convenience, simplicity and generality.

***4350A/B Topics In Computer Science:** lecture 3 hours. Prerequisites: Three 3000 level CS courses. See the Department for the current topic.

4380A/B Statistical Computing: (see Statistics 4380) lecture 3 hours. Prerequisites: Statistics 2080, Mathematics 2040, CS1210 (or 1410).

***4400A/B Programming Methodology:** lecture 3 hours. Prerequisite: B average in 3000-level Computing Science courses. Techniques for verification of computer programs. Formal specification of software.

***4450A/B Introduction to Data Communications:** lecture 3 hours. Prerequisite: CS3700. The elements of data communications and the structure of computer networks will be discussed. The course uses the ISO model as a reference and includes an introduction to basic data transmission techniques, computer network topologies and architectures, and a look at some specific implementations and applications.

***4500A/B Computational Linguistics:** lecture 3 hours. Prerequisite: CS3750. An introduction to the computer modelling of natural language understanding. Recent developments in Artificial Intelligence will be reviewed.

4550A or B Microcomputers: lecture 3 hours. Prerequisites: CS2450 and CS3700. This course provides an overview of microcomputer systems both at the general concept level and by examining specific systems. General architecture topics include instruction sets, memory I/O, bus systems and interrupt structures. Specific systems by several different manufacturers are examined on the basis of both hardware and software.

4650A or B Selected Topics in Information Retrieval: lecture 3 hours. Prerequisite: CS4250A. Assuming that the student has a broad understanding of the field of information retrieval, this course takes an in-depth look at selected topics at the forefront of the field. The topics will vary slightly from year to year, but may include: clustering and nearest neighbour matching, information theory, bibliometrics, and new models of information retrieval.

***4680A/B Automata and Computability:** lecture 3 hours (same as Mathematics 4680A/B). Prerequisite: CS2670. This class deals with finite state, pushdown and linear bounded automata; their correspondents in the Chomsky hierarchy for formal grammars and Turing machines. Appropriate closure properties and non-determinism are discussed as well as computable and noncomputable functions and the Halting problem.

***4700A/B Advanced Topics in Data Base Design:** lecture 3 hours. Prerequisite: CS3250.

4800A/B Computer Systems Modelling: lecture 3 hours. Prerequisites: CS3700 and Stats 2070/2080. This course develops queueing network models suitable for modelling computer systems. Approximate and exact solutions to these models are developed and single and multiple classes of users are considered. Modelling multiprocessors, I/O, shared memory, swapping, paging, etc. are also considered. Finally, some of the modelling techniques are applied to other situations such as database performance. The models are developed intuitively and justified rigorously using queueing network theory.

8700 (non credit) Co-op Seminar

8701 (non-credit) Co-op Seminar II

8870C Honours Seminar

8881 Co-op Work Term I

8892 Co-op Work Term II

8893 Co-op Work Term III

8894 Co-op Work Term IV

Economics

Chairperson of Department
E. Klein

Emeritus Professor
Z.A. Konczacki, BSc (Lond.), B.Econ.Hons. (Natal), PhD (Lond.)

Professors
R.L. Comeau, BA, MA (St FX), PhD (Brown), *Coordinator of Graduate Studies*
J.L. Cornwall, BA (Iowa), MSc (Lond.), PhD (Harv.)
R.E. George, BSc (Lond.), MA (Brist.), PhD (Lond.) William A. Black
Professor of Commerce
J.F. Graham, BA (UBC), MA, PhD (Col.), FRSC, Fred C. Manning Professor
of Economics
E. Klein, LL.M. (Buenos Aires), MSc (Dal.), Dr.Rer.Pol. (Hamburg)
C.T. Marfels, Dr.Rer.Pol. (Berlin)
R.I. McAllister, MA (Oxon.), MA (Cantab.)
L. Osberg, BA Hons (Queen's), MPhil, PhD (Yale)
U.L.G. Rao, MA, MSc (Andhra), PhD (W.Ont.)
A.M. Sinclair, BA (Dal.), MA, B.Phil. (Oxon.), PhD (Harv.)

Associate Professors
F.M. Bradfield, BComm (McM), PhD (Brown)
M.G. Brown, BA (W.Ont.), MA (Queen's), AM, PhD (Chi.)
M.L. Cross, AA (Dawson College), BA (Montana), MA (SFU), PhD (Texas
A&M.)
S. DesGupta, BA (Calcutta), MA (Delhi), MA, PhD (Rochester)
P.B. Huber, BA, MA, PhD (Yale)
G. Kartsakle, CE (Athens), Dr.Rer.Pol. (Bonn)
B. Lesser, BComm (Dal.), MA, PhD (Corn.)

Assistant Professors
D. Gordon, BA Hons (Lethbridge), MA (Saskatchewan), PhD (UBC)
B.M. Jamieson, BA (UBC), MA, PhD (Tor.)
R.L. Mazany, BSFS (Georgetown), PhD (UBC)
S.A. Phipps, BA Hons (Victoria), MA (UBC)

Special Lecturer
T.A. Plinford, BA, MA (W.Ont.), PhD (Minn.)

Economics is a social science — a science because it involves a rigorous intellectual effort to derive logical conclusions from basic facts and propositions; a social science because it has human beings and their welfare as its ultimate concern. The basic facts of Economics cannot be knowable and measurable with the same precision as those of the physical sciences — human society and its motivations are far too complex to permit this — but none of the sciences surpasses economics in its relevance to our needs, problems and goals: Economic man is rational man consuming, organizing and producing within a framework of laws and customs in an effort to use the limited resources of our world efficiently for the greatest satisfaction. It is not an easy science; indeed it is one of the most complex, difficult (and fascinating) areas of study you could choose in the university when you pursue it beyond its elementary levels, but some basic knowledge of economics is essential for any educated person. A more extensive knowledge of the subject is an invaluable complement to other fields of specialization such as law, commerce, politics and other studies. In social sciences or humanities, and a specialization in the field can lead to a variety of interesting career opportunities.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

BA Degree Program (Three Years)

Students choosing to major in economics at the undergraduate level may do so in the three-year BA Program, or they may seek a higher level of specialization in the four-year Honours Program. Several combined programs may also be arranged with economics as the major or minor subject in association with such other fields as political science, sociology, history, geology, biology, mathematics — and possibly others.

Final program approval for all majors' students must be obtained from the appropriate coordinator.

General Principles: The following program arrangements are provided to the students as guidelines to facilitate the selection of classes appropriate to particular areas of interest. They should not, however, be construed as straitjackets nor as a reason for not seeking individual guidance from faculty members. In suggesting such program frameworks, two principles have particular weight: (a) students taking economics as a major, or in an honours program, should strike a balance between breadth of coverage among disciplines and depth of specialization in economics; (b) students taking economics as a minor or as a component of another specialization, such as commerce, should be allowed a reasonable degree of flexibility in their choice of economics classes.

General Format: Requirements for a major in economics can be satisfied by taking Economics 1100 or equivalent and any four other full-year classes, or equivalent, in economics. However, a student who desires to take a major in economics with more than the minimal requirements should undertake a program of study along the following lines:

Year 1: Principles of Economics; Mathematics 1000/1010, or equivalent (usually Mathematics 1100); and three classes in fields other than Economics.

Year 2 and 3: A minimum of 5 and a maximum of 8 classes in Economics; Classes in Political Science, History, Mathematics and other related subjects are to be taken to bring the total of classes over the three-year period to 15.

No more than one credit will be given for Economics 1100, 1105B, and 1120. For persons considering an honours degree, or any advanced work in economics, intermediate micro and macroeconomic theory classes and intermediate statistics (Economics 2228 or equivalent) are mandatory. No more than one-half credit will be given for Economics 2200A/B and 2220A/B, or for Economics 2201A/B and 2221A/B.

Specific Programs

Students wishing to take a set of classes which provide both depth and coherence in a particular area of economics should examine the following program suggestions:

Canadian Development Studies, Economic Analysis and Policy, Economics and the Citizen, Economics and Government, Economic Development in Historical Perspective, International Development Studies, Labour and Society, Mathematical Economics and Econometric Methods, Regional and Urban Economics, or Resources and Environment.

The details of these programs are in a brochure obtainable from the Department of Economics.

Students with interests not covered in the above-listed programs are encouraged to set up their own programs with the advice and approval of the Department. The Department is prepared to assist students who wish to devise their own programs under the present curriculum regulations. Interested students should consult the Undergraduate Coordinator.

BA Honours Degree Program (Four Years)

The necessary core classes for an Honours Degree in Economics are: Economics 1100; 2220 (A or B); 2221 (A or B); 4420A; 4421B; 2228; Mathematics 1000A/B and 2030A/B or equivalent; a class in Economic History; a class in the History of Economic Thought. A minimum of nine classes in Economics beyond the elementary level is required.

The student's program is chosen in consultation with the Department and must have the approval of the Department. The 21st mark required for the honours program is based on an honours essay, graded on a pass/fail basis. Of the classes selected outside of economics in the third and fourth

year, students must include at least two classes above the elementary level.

Since mathematics is required for graduate work in most good graduate schools, the value of econometrics and of additional mathematics is stressed. In some instances, the Department may permit students to take classes in other subjects in lieu of classes in economics and may permit minor variations in the required classes. Students must arrange their courses to ensure that they satisfy the overall requirements for the General BA degree.

Combined Honours

Combined honours programs may be arranged with other departments. Combined programs with Biology, Geology, History, Mathematics, Political Science or Sociology are available; others can be arranged by consultation. For combined honours programs with economics where the major concentration is in the other discipline, students should consult the other departments concerned.

Classes Offered

Classes marked * are not offered every year. Please consult the current timetable on registration to determine if any such class is being offered.

1100 Principles of Economics: lecture 3 hours, tutorial 1 hour (optional), various members of staff. For those lacking a background in economics, taken as the first in a series of classes in economics or as a background elective. Emphasis is on developing the basic analytical tools and applying them in the context of contemporary, and generally Canadian, economics problems. Section 5 of Economics 1100 offers a problem-oriented framework in which the analytical tools are developed by examination in each term of a specific question. No more than one credit will be given for 1100, 1105B, and 1120.

1101A/B* Principles of Microeconomics: lecture 3 hours, tutorial 1 hour (optional), various members of staff. Available only to students who have one half credit of introductory macroeconomics which is being transferred from another university, this class completes the principles of economics complement. Consult Department.

1102A/B* Principles of Macroeconomics: lecture 3 hours, tutorial 1 hour (optional), various members of staff. Available only to students who have one half credit of introductory microeconomics which is being transferred from another university, this class completes the principles of economics complement. Consult Department.

1105B* Principles of Economics: lecture 6 hours, tutorial 2 hours (optional), various members of staff. Available only to students who are enrolling for the first time in January or who are declared economics majors, in that order of priority. For description see Economics 1100. Consult Department. No more than one credit will be given for 1100, 1105B, and 1120.

1106A/B Introductory Statistics for Non-Mathematicians: (cross-listed with Mathematics 1060A/B), lecture 3 hours. Prerequisite: Nova Scotia Mathematics or equivalent. For description see Mathematics 1060A/B.

1107A/B Statistical Techniques of Scientific Experimentation: (cross-listed with Mathematics 1070A/B), lecture 3 hours. Prerequisite: Mathematics 1060. For description see Mathematics 1070A/B.

1120* Principles of Economics, A Historical Approach: lecture 2 hours, tutorial 1 hour, B. Lesser. Note: Economics 1120 is not open to Commerce students needing to satisfy their Economics 1100 requirements. Episodes from Canada's past, such as the economic factors leading to Confederation, the development of the Prairie wheat economy, the building of the CPR, the beginnings of U.S. investment in Canada, and the Great Depression, are examined as a means of developing the basic analytical principles of economics. No more than one credit will be given for 1100, 1105B, and 1120.

2200A/B Intermediate Microeconomics: lecture 3 hours, various members of staff. Prerequisite: Economics 1100 or equivalent. An introduction to microeconomic theory and its applications which satisfies the

minimum microeconomic theory requirements for majors and honours in economics. Of particular interest to Commerce students or others not majoring in economics, it pays particular attention to applications of theory in a practical context. Serves as the microeconomic prerequisite for higher-level classes in economics. Note: Students may not receive credit for both 2200A/B and 2220A/B.

2201A/B Intermediate Macroeconomics: lecture 3 hours, various members of staff. Prerequisite: Economics 1100 or equivalent. Inflation, unemployment, exchange rate and related macro problems, with emphasis on Canadian policy experience in these areas. An introduction to macroeconomic theory and its applications which satisfies the minimum macroeconomic theory requirements for majors and honours in economics. Of particular interest to commerce students or others not majoring in economics, it serves as the macroeconomic prerequisite for higher-level classes in economics. Note: Students may not receive credit for both 2201A/B and 2221A/B.

2220A/B Microeconomic Theory: lecture 3 hours, (offered both terms). Prerequisite: Principles of Economics. Microeconomics deals with the economic behaviour of households as purchasers of output and suppliers of input services, and of firms as producers of outputs and purchasers of inputs, as well as with the behaviour of groups of households and firms. In addition to standard topics, an introductory treatment of general equilibrium, external economies, and welfare economics is included. Emphasis is on theoretical ideas, while applications of these ideas are also considered. Of particular interest to those planning to major or to do honours in economics. Note: Students may not receive credit for both 2200A/B and 2220A/B.

2221A/B Macroeconomic Theory: lecture 3 hours, (offered in both terms). Prerequisite: Principles of Economics. The various models that economists use to analyze an economy at the macroeconomic level are developed, showing how they relate to the formulation of macroeconomic policy. Of particular interest to those planning to major or to do honours in economics. Note: Students may not receive credit for both 2201A/B and 2221A/B.

2222A Economic Statistics I (cross-listed with Commerce 2501A/B): lecture 3 hours, workshop 2 hours, various members of staff. For description see Commerce 2501A/B.

2223B Economic Statistics II (cross-listed with Commerce 2502A/B): lecture 3 hours, workshop 2 hours, various members of staff. For description see Commerce 2502A/B.

2226 Intermediate Statistics: lecture 3 hours, U.L.G. Rao. The student is expected to have at least a one-year course in calculus (Mathematics 1100 or 1000) and preferably linear algebra too. Including the basic theory of mathematical statistics and an introduction to econometrics, this class concentrates on the theory of probability, discrete and continuous probability models, mathematical expectation, moment generating functions, and statistical inference. The general linear model is also discussed. A critique of various problems that arise consequent to violations of the assumptions of the general linear model is presented as a preparation for applied econometric work and advanced work in econometrics.

2231A Health Economics: lecture and seminar 3 hours, M.G. Brown. Prerequisites: Principles of Economics; Economics 2200A/B or 2220A/B is desirable. An examination of the allocation of resources to and within the health care sector of an economy. Characteristics claimed to be unique to the health care sector are analysed within an economic framework. Determinants of demand, supply and use of health services are examined with particular reference to the organization and evolution of Canada's health care system. This one-term survey class consists of a literature review, lectures, and student seminar presentations on selected topics. To accommodate part-time students the class meets during late afternoon or evening, one day per week.

2232 Canadian Economic History: lecture 3 hours, B. Lesser. As prerequisite, a class in economics principles and some knowledge of history would be beneficial. The development of Canada from the age of discovery to now, presented in relation to the larger system of the relationships

between the Old World and the New. As the class proceeds, the focus shifts more and more towards Canada and more formal theory is introduced in discussing Canadian problems and policies, especially in the twentieth century.

2238A* The Industrial Revolution in Europe: lecture 2 hours, Z.A. Konczacki and P.B. Huber. Prerequisite: Introductory Economics or permission of instructor. Transitions from preindustrial to industrial economies in England, France, Germany and Russia form a broad background for understanding the roots of contemporary society; of particular relevance for those interested in the economic history of Canada, the United States and other countries formerly part of a colonial system. Emphasis is on the economic, social, and technical changes of these industrial "revolutions" to disclose common elements in the experience of industrialization.

2239B* The European Economy in Historical Perspective: After the Industrial Revolution: lecture 2 hours, P.B. Huber and Z.A. Konczacki. Prerequisite: Introductory Economics or permission of the instructor. A self-contained class (may be taken separately from Economics 2238A) examining the contrasting development patterns of various industrialized European countries after their respective industrial revolutions and up to about 1960. Focus is on the development of hypotheses regarding the causes and effects of differences in the experience of growth of mature economies.

2241A* Comparative Economic Systems: National Economies: seminar 2 hours, P.B. Huber. Prerequisite: Introductory Economics. A detailed background of institutional material on the structure and performance of several economies is featured. Reading on specific countries provides the basis for several short papers. There is no written examination. A student taking this class must understand the interrelated character of economic activity and grasp the nature of the price system.

2242B* Comparative Economic Systems: Economic Organization and Planning: seminar 2 hours, P.B. Huber. Prerequisite: Introductory Economics, plus an additional half-class in Economics. The economic behaviour of organizations and the ways in which this can be controlled provide the basis for consideration of the theory and practice of economic planning at micro-economic and macro-economic levels in various institutional contexts.

2250 Applied Development Economics: seminar 2 hours and tutorials, R.I. McAllister. Prerequisite: Introductory Economics. Analysis of economic development theory and practice, with particular emphasis on developing countries and regions. There are three main elements: (1) policy and theory for economic development, focussing on foreign aid and regional aid; (2) development plans, budgets, and programs — lessons from experiences of agencies such as CIDA, CUSO, and the World Bank; (3) projects for development — drawing on case studies and first-hand field work. Experienced advisors from government and the private sector join the instructor during project visits.

3315A Labour Economics: lecture 3 hours, L. Osberg or S.A. Phipps. Prerequisites: Economics 1100; Economics 2200 and 2201 (or equivalent) are recommended. The theory of labour markets is emphasized, in particular the aftermath of alternative viewpoints which seek to explain relative wages, unemployment and the allocation of labour.

3316B* Collective Bargaining and Labour Market Policy: lecture and seminar 3 hours, L. Osberg. Prerequisite: Economics 3315A. Topics covered are the theory and institutions of collective bargaining and current issues in labour market policy, e.g. discrimination, manpower planning, wage/price controls, impact of unemployment insurance or the negative income tax.

3317B* Poverty and Inequality: lecture and seminar 3 hours, L. Osberg. Prerequisites: Economics 1100; Economics 3315A is highly recommended. The extent of poverty and the distribution of income and wealth in contemporary societies are discussed. Most data are drawn from Canada but international evidence is introduced for comparative purposes. The

theories underlying alternative measures and explanations of economic inequality are emphasized.

3324 Public Finance: lectures and seminar 3 hours, J.F. Graham. Prerequisites: Introductory Economics, Economics 2200A/B or 2220A/B and 2201A/B or 2221A/B are desirable. The principles of public finance and public policy, i.e. the economics of the public sector. The two major sections are (1) the theory of public goods and public expenditures and (2) the theory of public revenue, principally taxation. Other important areas are public borrowing, fiscal (stabilization) policy, and intergovernmental fiscal relations. Both normative and positive theory are considered. Particular attention is paid to the Canadian federal system, with its three levels of government: federal, provincial and municipal.

3326A Money and Banking: lecture 3 hours, R.L. Comeau. Prerequisites: Introductory Economics; Economics 2201A/B or 2221A/B is desirable (complemented by Economics 4426B.) Deals with the nature and operation of the financial system, with particular reference to Canadian experience. It is concerned with financial instruments and institutions and the process of the social control of the supply of money and credit.

3327* History of Economic Thought: lecture 3 hours, M.L. Cross. Prerequisite: Economics 1100. Classes in micro- and macroeconomics are advised. The approach taken is to study 'the intellectual efforts that men have made in order to understand economic phenomena.' The presentation is largely non-mathematical; the main requirement is an ability to read and assimilate a certain body of literature rather quickly.

3328 Industrial Organization: lecture 2 hours, C. Marfels. Prerequisite: Economics 2200A/B or 2220A/B which may be taken concurrently. Students may also be admitted by permission of the instructor. The application of the models of price theory to economic reality. In any industry, the problems of a firm competing with its rivals in order to survive and acquire a higher market share are far more complex than those in price theory where we have to deal with more or less simplified assumptions. The three main parts are: market structure, market conduct and market performance.

3330A/B* International Trade: lecture 3 hours, R.L. Mazany or A.M. Sinclair. Prerequisites: Introductory Economics and 2200A/B or 2220A/B. The causes of international exchange of goods and services are considered and the effects of international integration on the incomes and growth rates of national economies are analyzed. The theory and practice of commercial policy and other restrictions on trade are considered after the pure theory of international trade and its implications have been explored. Depending upon class interest and availability of time, the subjects of economic integration and of Canadian commercial policy may be discussed in some detail.

3332B* Resource Economics: lecture 3 hours, M. Cross. Prerequisite: Introductory Economics. Economics 2200A/B or 2220A/B is also desirable. This class focusses on economic theory pertaining to fisheries and the economic history of the Canadian Atlantic and Newfoundland fisheries since 1870. Reference is made to other resource sectors—agriculture, forestry, mining and energy—and students may undertake study of them.

3333A/B* Theories of Economic Development: lecture 2 hours, Z.A. Konczacki. Prerequisite: Introductory Economics. A class in macroeconomics equivalent to Economics 2201A/B or 2221A/B and Economics 3327 are desirable. A theoretical framework for the understanding of the process of economic development in the more and the less developed countries is provided with a view to its eventual application to the solution of practical problems. The concluding seminars are devoted to the problem of the foundations of the theory of economic development, and the distinction between the concepts of unilinear and multilinear evolution is discussed.

3334A/B* Economic Development: Recent Debates, Controversies and Conflicts: lecture 2 hours, Z.A. Konczacki. Prerequisite: Economics 1100. Economics 2201 or 2221 and Economics 3333A/B are desirable. Whereas Economics 3333A deals with the more rigorously defined theories and models and their appraisal, this class focusses on the development policies and related controversies. Important examples of such controversies and

conflicts, with far reaching developmental consequences, are provided. Attention is paid to the much debated environmental aspects of growth and development.

3336B Regional Development: seminar 2 hours and tutorials, R.I. McAllister. Prerequisite: Introductory Economics. At least one class in both Political Science and Canadian History are desirable. Most countries have richer and poorer regions. The energy crisis has raised additional complications. Economic development issues, policies, and theories facing more industrialized nations are analyzed with particular focus on Canada (especially the Atlantic region), the European Economic Community, U.S.A., Japan, and Australia.

3338A Introductory Econometrics I: lecture 3 hours, R.L. Mazany or L. Osberg. Prerequisites: Mathematics 1000 (or equivalent) and one of Economics 2228, Economics 2222A and 2223B or Mathematics 1060A. The theory of some quantitative methods commonly used by economists is introduced in the context of the classical linear model. Estimation problems caused by violations of the assumptions of the classical model are discussed including heteroskedasticity, autocorrelation and simultaneous equations bias.

3339B* Introductory Econometrics II: lecture 3 hours, R.L. Mazany or L. Osberg. Prerequisite: Economics 3338A. Practical problems associated with economic data and with model specification and estimation are discussed. The techniques introduced in Introductory Econometrics I are used to estimate simple economic models. Some additional methods of estimation and forecasting are introduced.

3350A/B* Social Cost Benefit Analysis: seminar 3 hours, T.A. Pirford. Prerequisite: Introductory Economics. Intermediate Microeconomics and Introductory Statistics are desirable. 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.

3356A Marxian Economics I: lecture 3 hours, G.A.B. Kartsaklis. Prerequisites: Economics 2200A/B and 2201A/B; Economics 3327R is recommended, or permission of the instructor. Historically, the economics of Karl Marx defined a very important period in the development of economic theory. Recently, several attempts have been made to integrate Marxian economics into the mainstream of modern economic analysis. This class and Economics 3357B constitute an introduction to the economics of Karl Marx. In 3356A, special attention will be paid to: the labour theory of value; the theory of exploitation and Marx's fundamental theorem on industrial capitalism; and the theory of simple reproduction.

3357B Marxian Economics II: lecture 3 hours, G.A.B. Kartsaklis. Prerequisites: Economics 3356A or permission of the instructor. This class is a continuation of Economics 3356A. Special attention will be paid to the theory of extended reproduction and accumulation of capital; the so-called transformation problem; and the issue of class struggle in a growing economy.

3432* Regional Economics: lecture and seminar 3 hours, F.M. Bradfield. Prerequisites: Economics 2200A/B or 2220A/B. A variety of growth theories are examined, followed by a discussion of empirical studies and their assessment from the various theoretical points of view. Policy discussion and the presentation of a seminar paper are involved. A framework for understanding the reasons for regional disparities is provided. Focus is on the underdeveloped regions of developed nations.

4000* Seminar on Economic Policy: Public Policy in the 80's: 2 hours. The discussion centres on the problems of formulating and carrying out economic policy in Canada. Recent budget addresses; industrial policy and tax and expenditure policies are reviewed. Other topics include Canada's reliance on resource exports and capital imports; issues raised by multinational corporations and their consequences for political sovereignty.

The choice of a balanced economy or export specialization is examined. The approach is interdisciplinary.

Economics 4000C Honours Seminar: seminar 2 hours, various staff members. Prerequisites: Economics 2220 and 2221 (or equivalent) and Economics 2228. The seminar is designed to provide fourth-year honours students with an exposure to research being conducted in various fields of economics. The students are expected to work on their own research leading up to the completion of the honours essay.

4400A Linear Models I: lecture 3 hours, S. Dasgupta. Prerequisites: Intermediate Micro and/or Macroeconomics and a class in linear algebra are desirable. Admission by permission of instructor possible. Exposition of aspects of economic theory from the standpoint of linear economic models. A brief systematic exposition of linear programming, followed by applications such as In: Theory of the Firm, Leontief Inter Industry Model, Transportation problems, International Trade, General Equilibrium Theory, Game Theory.

4408R Competition Policy/Antitrust Economics: lecture 2 hours, G. Marfels. Prerequisite: A course in Industrial Organization (Ec. 3328R) is desirable, but students may also be admitted by permission of the instructor. In this course the various ways of public policy towards business are discussed. Basically, there are three approaches to public policy towards business — the competitive approach, the regulatory approach, and the ownership approach. Under the first, the ownership of the means of production is in private hands, and the public interest is assumed to be protected by the free play of competitive forces. Under the second, ownership remains in private hands but in one way or another the state restrains the exercise of private economic power. And under the third, the state not only owns but manages and operates the productive facilities. Specific attention will be paid to the means of implementing the competitive approach the antitrust laws.

4409B* Linear Models II: lecture 3 hours, S. Dasgupta. Prerequisites: Economics 4400A and a class in calculus are desirable. Admission by permission of instructor possible. Introduction to dynamic models of economic growth and planning over time. Efficient programs of capital accumulation, growth with terminal objectives and balanced growth, optimal savings over time, theories of interest and capital, money, exhaustible resources and population are discussed.

4420A Microeconomic Theory: lecture 3 hours, E. Klein. Prerequisite: Economics 2220 or 2200. Mathematics 1000 and 1010 are desirable. A basic but rigorous introduction to modern microeconomic theory. Deals in detail with the theory of choice as applied to consumers and firms, and discusses the working of an economy as a system of interdependent decision-makers. Emphasis is on the comparison of alternative solution concepts for competitive economies ending with an introduction to stability theory.

4421A Macroeconomic Theory: lecture 3 hours, J. Cornwall. Prerequisite: Economics 2201A/B or 2221A/B and Mathematics 1100 (or equivalent). For those who wish to do relatively advanced work in economic theory, possibly with the thought of going on to do graduate work in economics. The class assumes some knowledge of calculus. Topics covered include: classical models of income and employment; Keynesian models of income and employment; the theory of economic growth (including two-sector models); and trade cycle models.

4422B* Inflation, Stagflation and Macroeconomic Policy: lecture 3 hours, J. Cornwall. Prerequisite: Economics 2201 or 2221. A consideration of different theories of inflation that have been developed to explain the acceleration of inflation in the past decade. Alternative policy solutions are appraised. Forms of incomes policy are taken up in some detail.

4428B* Monetary Policy: lecture 3 hours, R.L. Comeau. Prerequisite: Economics 2201A/B or 2221A/B. It is advantageous for students to have completed Economics 3328A as well. Assuming a basic knowledge of monetary institutions and macro-economics, a critical analysis of the objectives and effectiveness of monetary policy is developed. Particular attention is given to the Canadian experience and the effectiveness of Canadian policy.

4431A/B* International Payments: lecture 3 hours, R.L. Mazany or A.M. Sinclair. Prerequisite: Economics 2201A/B or 2221A/B. Selected topics in recent international monetary history are examined, the causes of and remedies for external imbalance in national economies are considered, and the reorganization of the international monetary system is discussed. Depending upon class interest, certain issues of international development finance and problems of instability and growth in the international economy may be discussed in detail.

4433B* Intergovernmental Fiscal Relations: seminar 2 hours, J.F. Graham. Prerequisite: Principles of Economics. Economics 2200A/B or 2220A/B, and 3324 are recommended. The principles of intergovernmental fiscal adjustment and their application in a federal political system, particularly Canada, at both federal-provincial and provincial-municipal levels are developed.

4448B Classical Liberalism, and Democracy: (seminar in Philosophy, Politics, and Economics) 2 hours, D. Braybrooke. For description see Philosophy 4470.

4447B The Theory of Games as an Approach to the Foundations of Ethics and Politics: (seminar in Philosophy, Politics and Economics) 2 hours, spring term, D. Braybrooke. For description see Political Science 4485B.

4448A Social Choice Theory: (seminar in Philosophy, Politics, and Economics) 2 hours, D. Braybrooke. For description see Political Science 4480A.

4449B The Logic of Questions, Policy Analysis, and Issue Processing: (seminar in Philosophy, Politics, and Economics) 2 hours, D. Braybrooke. For description see Philosophy 4490.

Graduate Studies

The Department offers a graduate program leading to the MA and PhD degrees. Details of these programs, including a list of graduate courses, are given in the calendar of the Faculty of Graduate Studies. Senior undergraduates may be admitted to some graduate classes at the discretion of the instructors concerned.

Education

Chairperson of Department
L.E. Haley

Emeritus Professor
E.Z. Friedenberg, BA (Centenary), MA (Stanford), PhD (Chic.)

Professors
L.E. Haley, BSA, MSA (Tor.), PhD (California)
W.F. Hare, BA (London), MA (Leeds), PhD (Tor.)
J.D. Myers, BA, MA (Tor.), PhD (Edinburgh) — Dean, Henson College

Associate Professors
A. Barton, BA, MA (Trinity)
R.N. Berard, BA (Antioch), MA (McM), BEd (Dal), PhD (McM)
R. Gamberg, BA (Brandeis), MA (Illinois)
P. Keane, BA (Manch.), MEd (Bristol), PhD (Bath)
T. Laidlaw, BA, MEd (Calgary), PhD (Alta.)
J. Manos, BA, BEd (StFX), MEd (Calgary), PhD (Alta.)
E.T. Marriott, BA (MtA), MEd (Tor.) — Dean, Student Services
H.J. Murphy, BSc (St. Dunstan's), BEd (P.E.I.), MEd (Virginia), EdD (Virginia)

H.E. Poole, BA, MA PGCE (Birm.), PhD (Tor.)
E. Ricker, BA, MEd (UBC), PhD (Tor.)
J.B. Roald, BEd (UBC), MEd (Wash.), EdD (UBC)
S.W. Semple, BA, Dip.Ed. (Syd.), MEd, EdD (Tor.)
S.S. Sodhi, BA, BT, MA (Punjab), Dip. Guid. (Delhi), BEd, PhD (Alta.)
K. Sullivan BSc, BEd (Dal), MEd, PhD (Alta.), *Coordinator, MA DA/PhD Programs*
B.A. Wood, BA (Tor.), MEd (Ottawa), PhD (Ottawa)

Assistant Professor
M.R. Walton, BA, MA, PhD (UBC)

Lecturers
M. Crowley, BA (Miami), MAT (Johns Hopkins) *Coordinator, BEd Program*
A. Manicom, BEd (McGill), MEd (Alt. Inst. Educ.), *Coordinator, MEd Program*
M. St.J. Macdonald, BSc (McGill), MA (StFX), EdD (Tor.)

Instructors
J. Althelm
W. Kwak
M. Swall

The problems of education have been the subject of serious study since at least the time of Plato and Aristotle. Education is an important and interesting field of study in which historical, psychological, philosophical and sociological inquiries, among others, can be pursued. Many elect to take classes in Education because they are interested in the questions raised for their own sake. Others are interested in education as a program of professional preparation. Such students include in the programs classes in methodology and field experience. The study of education should alert the student teacher to the assumptions which lie behind the methods of teaching being considered, and should ensure that these assumptions do not go unexamined.

Programs:

1. A sequential secondary BEd course of one year which may be taken by students who have already completed a BA or BSc degree course or otherwise fulfill the requirements for admission to the BEd program.
2. Part-time study toward a BEd at the secondary level.
3. Classes which may be used for credit toward a BA or BSc. These classes may be chosen from the following areas: Sociology of Education, History of Education, Philosophy of Education, and Educational Psychology. Students intending to take education classes for credit toward a BA or BSc degree should consult Arts and Science regulation 11.2. Some classes are cross-listed with other departments, e.g. French, Theatre, Philosophy, so that a student who is not enrolled in a BEd program may register for such a class either through Education or the cognate department.
4. A four-year integrated course at the elementary or secondary level at the end of which students are awarded simultaneously the degrees of BA or BSc and BEd.
5. A five-year integrated course at the elementary or secondary level at the end of which students are awarded simultaneously the degrees of BPE, or BSc (HealthEd), or B.Mus.Ed. and BEd.
6. Dalhousie — Nova Scotia Teachers' College Associateship BEd.
7. Dalhousie BA/BSc — Nova Scotia Teachers' College Associateship BEd.

BEd Secondary Programs

Entry Requirements

1. BA or BSc by September in the year of application. Candidates with other bachelor degrees should enquire from the Secretary, BEd Program.
2. Applications from all students are welcomed. Opportunity to draw attention to strengths is provided by the letter of application.

Application

Upon request, a student receives a Dalhousie University Application form, a Department of Education Application form, two reference forms, and further details from the Admissions Office, Dalhousie University, Halifax, Nova

Scotia. The first selection round will be completed by May 30. Applications will be considered after that date but as enrolment is limited, there is no guarantee space will be available.

Frequently, an interview is arranged with the Department of Education after initial application has been made.

Selection is based on:

1. Academic record. All applicants, including Dalhousie graduates, must ensure that their transcripts are forwarded to the Admissions Office. (a) Candidates for the BEd secondary program normally should have a "B" average in their major subject, comprising at least five full credit classes (four beyond the introductory or 100 level). This major should be in a teachable subject: English, mathematics, geography, science, foreign languages (either in French or German), or social studies (history, economics or political science). (b) Individual methods/field experience professors may have more specific requirements for entry into their respective areas. Candidates should consult the Calendar (under Field Experience), the Departmental Program Planning Guide or the professor. The program must be planned and approved in consultation with the faculty advisor.

2. References; and

3. Responses on application form.

Classes in the BEd program are grouped into three general categories:

Educational Foundations: Classes to develop theoretical perspective as a basis for professional performance. There are four main subdivisions in this category — sociology of education, history of education, philosophy of education, and educational psychology. These classes are found in the calendar under course numbers 4000 to 4399.

Methods and Field Experience: Classes which deal essentially in an applied manner with teaching and learning and the evaluation of learning. These classes are found in the calendar under course numbers 4500 to 4999.

Electives: These classes provide supporting experience for other classes in Education, additional academic preparation, or an introduction to areas of potential student interest. Electives may be chosen from any course offered in the BEd program or classes in other departments of the Faculty of Arts and Science.

Secondary Program Requirements

Candidates for the degree of BEd (Secondary) must complete successfully the following: a minimum of 4 half-credit courses covering all four Education Foundation areas — sociology, history, philosophy and educational psychology; 1 full credit in a methods course in their major subject area; 1 full credit in Education 4900 (Field Experience); 1 credit in Special Education, as required by the Provincial Department of Education; and 2 further credits approved by the faculty advisor.

Students planning a BEd following a BA or BSc should be aware that at present certain areas of concentration in the first degree might not easily lead to teacher certification. They are advised to consult with the Coordinator of the BEd Program when drawing up their programs for the first degree.

Part-time study toward a BEd

Students registered part-time at Dalhousie University are permitted to take classes in Education leading to a BEd degree, secondary. Individual timetables may be planned in consultation with the Department of Education, Dalhousie.

Education Foundation Classes

Acceptable for credit towards a BA or BSc degree. Classes are numbered from 4000 to 4399. See Arts and Science regulation 11.2.(b).

BA or BSc/BEd Elementary and Secondary Integrated (Four-year) Course

In the integrated course, the classes in education are integrated with academic classes in the second, third, and fourth years, the first year being

confined to the regular classes required for the BA or BSc degree. While students normally enter this program in their second year, students may also enter the integrated program after their second year.

The ten classes in Arts and Science taken in the second and subsequent years must meet the requirements set forth in Degree Programs, section 11.1(b).

Education course requirements for elementary and secondary integrated students are the same as those required by sequential students. The year of study in which the various education classes are to be taken is up to the individual. An exception to this is the methods and field experience. The integrated student, both elementary and secondary, should plan second, third, and fourth year classes in consultation with the Department of Education so that methods classes and field experience may be accommodated. It is required that all integrated students meet with their Faculty Advisor upon admission to plan a suitable program.

Students admitted into the integrated program must maintain a minimum of a B average in work completed for both degrees.

Enquiries should be made to the Secretary, BEd Program, Dalhousie University before May 30 of the student's first or second year at Dalhousie University.

Students wishing to obtain a BEd and a BA or BSc with honours should consult the Department of Education and the department or departments in which they wish to do their honours work not later than the beginning of their second year in order that a proper sequence of classes may be arranged. Five years from senior matriculation are normally sufficient to complete this course of study.

BPE or BSc (Health Ed) or BMusEd/BEd Integrated (Five-year) Course

The BEd part of the program consists of a minimum of five full classes for secondary students and six full classes for elementary students:

- 2 full classes in foundations including a half class in each of Sociology, Philosophy, History, Psychology of Education.
- 1 full class in Special Education.
- Secondary: 1 full class in Teachable subject* methods.
Elementary: 1 full class in language Arts/Reading methods, ½ class Math methods, ½ class methods elective.
- 1 full class in field experience in the Teachable subject* area.

Co-requirements

Elementary: A student must complete a minimum of 3 full classes from English, History, Math and Science. It is recommended that courses be selected from each area.

Secondary: A student must complete a minimum of 3 full classes above the 100 level in a teachable subject*.

*Teachable subjects — English, French, History, Math, Biology, Chemistry, Physics, Economics, Geography.

Application, Entry and Continuation in the BEd

- Complete a Department of Education Application and University Application form at the end of the 1st year of University.
- The application must be supported by the Director or Chairperson of the other degree (BPE, BMusEd, BSc, HE) program (in lieu of academic references).
- To continue in the integrated program, students must maintain a minimum of a B average in the Education and a B average in the Teachable subject* Arts and Science classes.
Enquiries should be made to the Secretary, BEd Program, Dalhousie University before May 30 of the student's first year at Dalhousie University.

BEd Degree in Association with Nova Scotia Teachers College

General Description: The program is available at Dalhousie University to graduates of the Nova Scotia Teachers College who have completed the three-year Associateship at NSTC. Suitably qualified students may graduate after taking five further classes at Dalhousie. The program is a fifteen-credit course, comprising six credits in education and nine credits in Arts and Science. A maximum of ten credits may be transferred from NSTC to the joint Dalhousie/NSTC BEd degree, but they must meet Dalhousie's transfer

credit regulations. It is available for full-time and part-time students.

Prerequisites: The applicant must have graduated from the three-year Associateship program at the Nova Scotia Teachers College.

Program: 15 required credits — 6 in Education: (a) 5 maximum may be taken at NSTC and must meet Dalhousie transfer credit regulations; (b) 1 education class must be taken at Dalhousie; plus 9 in Arts and Science: (a) 5 maximum may be taken at NSTC and must meet Dalhousie transfer regulations and *not* be in education; (b) 3 must be taken at Dalhousie in Arts and Science subjects other than education and at least 2 must be above the first year level; (c) 1 class, taken at Dalhousie, must be in consultation with the student's advisor (in the Department of Education).

Dalhousie BA/BSc and BEd Degrees for Associates of Nova Scotia Teachers College

General Description: The program is available at Dalhousie University to graduates of the Nova Scotia Teachers College who have completed the three-year Associateship at NSTC. Suitably qualified candidates may transfer up to eleven credits from NSTC to Dalhousie. The program is a twenty-two credit course, comprising seven credits in education and fifteen credits in Arts and Science. All credits transferred from NSTC must meet Dalhousie's transfer credit regulations. Students may complete the program on a part-time or full-time basis thereafter.

Prerequisites: The applicant must have graduated from the three-year Associateship program at the Nova Scotia Teachers College.

Program: 1. Twenty-two credits are required, seven in education and fifteen in Arts and Science. 2. 7 in education: (a) 5 maximum from NSTC; (b) 2 further from Dalhousie; plus 15 in Arts and Science: (a) 6 maximum from NSTC; (b) 9 further from Dalhousie. 3. A subject major must be chosen at registration and must be approved by the Department concerned. 4. Students must maintain a minimum of a B average in work completed for both degrees.

Transfer of Credit

Decisions concerning transfer of credit will be made following consideration of transcripts and students' interested areas of study. Normally, the maximum number of transferable credits from another university or non-degree status is three and one-half. Enquiries should be directed to the Secretary, BEd Program. Students *must* request that transfer credits be considered *before* fall registration begins.

Students who wish to obtain the degree of BEd with transfer of previous credit must obtain the degree of BA or BSc and apply for admission to the BEd program. Graduates of non-degree granting Teachers' Colleges who have a BA or BSc should note that the following guidelines are used in transfer of Education credits: Graduates of an acceptable three-year program take an additional two and one-half classes. Graduates of an acceptable two-year program must take an additional three and one-half classes. Graduates of an acceptable one-year program are required to take an additional five classes. The actual selection of classes is made to suit the needs of each student and you are advised accordingly when your file is examined.

Certification of Teachers

Licenses to teach are issued by the Department of Education, Province of Nova Scotia. According to the regulations of the Province of Nova Scotia, every applicant for a Teacher's license or Professional Certificate must submit with his application documentary evidence (in a form prescribed by the Minister of Education) respecting the applicant's moral character, age, health, training and qualifications. Further information may be obtained from the Registrar, Nova Scotia Department of Education. Graduates with senior matriculation are entitled to a Teacher's Certificate, Class 5 in Nova Scotia. All other BEd Graduates should consult the Registrar, Nova Scotia Department of Education, concerning class of Teacher's Certificate. Students from other provinces should consult the appropriate provincial department of education for certification and licensing information.

Certificate Program in Educational Administration

This non-degree program may be completed through part-time or full-time study. It is intended for those persons interested in studying in the field of educational administration at an introductory level.

Admission requirement is graduation from a teacher's college/normal school or an acceptable undergraduate degree plus a BEd (or its equivalent). Advanced standing for classes completed in the former Nova Scotia Block Program will be considered upon application to the program. The deadline for applying is August 15th for the academic year.

Program Length is 5-8 credits depending upon qualifications. The minimum program will usually be prescribed for those holding an undergraduate degree and a BEd (or its equivalent); others may be required to take additional credits depending upon an assessment of qualifications. Full-time students may take a maximum of 6 credits and part-time students a maximum of 2 ½ credits during a regular session. A maximum of 1 credit may be taken during a summer session (½ credit in each half of the summer session).

Program Requirements are as the following core and elective classes

Core Classes (compulsory for all students):

- All of the following classes:
 - School-Community Relations (Ed. 8432), ½ credit
 - Supervision of Personnel and Programs (Ed. 8411 and Ed. 8412), one-half credit
 - Budget and Finance (Ed. 8471), one-half credit
 - Field Study of Administration (Ed. 8490), Ed. Admin. one credit
 - Implementation and Administration of Curriculum (Ed. 8520), one credit
- One of the following ½ credit classes:
 - Administrative Roles and Structures (Ed. 8401)
 - Concepts in Educational Administration (Ed. 8402)
 - Philosophy of Educational Administration (Ed. 8451)
 - Educational Ideas and Issues and the Administrator (Ed. 8440)
 - Education and Public Policy (Ed. 8431)
- One additional credit chosen in consultation with the faculty advisor.
Minimum 5 credits.

Elective Classes

Students who are required to do more than the basic 5 credit program or students who wish to take more than the minimally prescribed program may select up to 3 credits in additional classes in consultation with the faculty advisor.

Total: 3 credits.

Classes Offered

The following list represents this year's classes. Minor changes will be noted in the preregistration material sent to the students who are accepted into the program.

Certain Education classes are offered in Summer School. Details may be obtained from the Director of Summer School and Extension.

4012 A/B Sociology of Education: two lecture hours per week. Mainly theoretical, the accent is on the rationale and assumptions of educational systems, socialization in Canadian Society, and the posing of alternatives to traditional educational practices.

***4011A/B Family, State and Schooling:** This class begins with questioning the nature of our knowledge about schools to develop a way of thinking analytically about schools and schooling. Through readings and discussion, an attempt made to display sets of relations (both current and historical) that exist among the school, the family, the labour force and various state institutions, particularly as these relations produce and maintain inequalities of class, race, and gender.

4021A Gender Roles: Identification and analysis of problems deriving from sex roles form the core of this class. Emphasis is on female roles in contemporary Canadian society. The significance of factors which relate to an understanding of the subject is also considered. Attention is given to possible approaches to solutions of the problems already identified and analysed.

4022B Gender Roles: This course is a continuation of Education 4021A and is open only to those students who have completed that course.

***4090 The Relationship Between Theory and Practice in Education**

***4101A/B The History of Western Educational Thought:** The history of educational ideas in the West. Through lectures and discussions of readings, the place of education in the ancient, mediaeval, early-modern, and modern worlds is examined. The development of our own educational ideas can then be subject to more sophisticated criticism.

4121A New Education In a Canadian Context: The New Education curricular changes, institutional, experiments and philosophical goals that affected Canadian education at the turn of the century are explored. Foreign influences and forces in Canadian society that affected public schooling are examined. Students investigate primary source material at the Provincial Archives of Nova Scotia to determine the extent to which Nova Scotian curricular changes during this period (1890-1911) were affected by these trends. Arranged in a seminar-lecture form so that students' research can be guided each week, culminating with each student submitting a research paper.

4132B Progressive Education In a Canadian Context: Continuing many of the themes explored in the previous term (Education 4121A), significant institutional shifts of emphasis which occurred in Canadian public schooling after World War I are explored. American and British influences on the curriculum, as well as on the stated intentions of educators, are examined. Primary source material applying to Nova Scotia is investigated to determine if the Progressive Education movement had an effect on the schooling of children between 1911 and 1940. A seminar-lecture form is followed and a term paper is required.

4141A Educational Issues In Canadian History: An overview of major social and political issues in Canadian education. Selected case studies introduce the method of identifying and asking appropriate questions about the nature of issues and conflict. The historical antecedents of a number of major contemporary issues in education are explored in depth. A consideration of the "issue approach" to history in relation to various schools of historical thought about education is provided.

4142B Educational Issues In Canadian History: A continuation of 4141A but with a different selection of topics. A student is free to take the first half, second half, or both.

***4171A/B The Teacher In History:** Emphasis is on the connections between the historical experience of teachers and the contemporary situation in which teachers find themselves. The political characteristics of the education system are critically analysed and the development of the occupation of teaching, in comparison with other occupational groups, is examined. Particular topics related to the changing roles, attitudes and influences of teachers in terms of educational and social policy are discussed. A number of reading and writing assignments must be completed.

4201A/B Analytical Philosophy of Education: An introduction to the analysis of the central concepts in educational theory with particular attention to certain attitudinal concepts which have been neglected in contemporary philosophy of education.

***4221A Introduction to the Philosophy of Education:** a lecture/discussion class dealing with a broad range of philosophical questions about education including the use of slogans, multiculturalism, teacher education, and the role of the teacher. No prerequisites. Cross-listed with Philosophy 2175.

4222B Issues in Philosophy of Education: an introductory level, lecture/discussion class dealing with some fundamental issues in philosophy of education, including indoctrination, open-mindedness and bias-free teaching. No pre-requisites. Open to students who have taken Education 4221A. Cross-listed with Philosophy 2180.

4251B Philosophical Issues In Sex Education: A number of philosophical problems which arise in connection with sex education are considered. Both sex education and socialization are discussed and an attempt made to clarify central concepts.

***4290 The Adolescent**

4311A Psychology and Education of the "Exceptional" Child: A broader understanding of the term "exceptional child" and the causes for such behaviour is provided. Psychodiagnostic and remedial processes to help children with communication behaviour problems are considered. Administrative use of standardized tests is discussed. Myths in Special Education are considered using Psycho-social Model of "exceptional behaviour."

4312B Myths In Special Education: Special education practices which attempt to help the "special child" "adjust" to the school as it presently exists are examined. Diagnostic approaches which lead to "suspicion confirming" and "pigeonholing" of the child are considered along with alternatives to special and remedial education.

4322A Learning In the Classroom: The psychology of learning, involving an examination of certain internal and external conditions which influence the direction and efficiency of the learning process. There is an orientation throughout to classroom learning; the focus of enquiry is fundamental psychological processes.

4335A/B Childhood into Adulthood: Psychological development from early childhood onwards from a cognitive perspective shows how adult identities are constructed by the individual by continual assessment and periodic revision of objectives.

4340 Developmental Psychology: An examination of the areas of human development with particular emphasis on cognition; personality, social, and moral development. Theory and relevant experimental data to cultural contexts are related. This course satisfies the educational psychology requirement and one half of the special education requirement for students in BEd programs.

4351A/B Psychology for Sex Education: This class traces the psychological development of sexual interest and love. Special attention is paid to psychological factors in sex education.

4361A Understanding Reading: Psychological and linguistic factors relevant to the skills of fluent readers and to the process of learning to read are examined. An analysis of the reading process provides an understanding of what the skilled reader can do and how the beginning reader develops the skill. Reading instruction is discussed with the emphasis on "how a child learns."

4371A/B Social Psychology of Education: The psychological climate of the classroom is examined from a traditional, behavioural, and humanistic viewpoint. Emphasis is on the teacher-student relationship found in these three approaches to education and the resultant psychological effects on both the teachers and students.

***4381A/B Introduction to Counselling:** This course is designed to introduce students to the major theoretical perspectives underlying current psychotherapeutic practices. More specifically the course will examine traditional and contemporary approaches to counselling in order to determine: (a) the assumptions underlying each approach; and, (b) the implications of each approach for the client. The goals of the courses are: (a) to develop an information base with respect to counselling theory; (b) to increase an understanding of one's attitudes, values and behavior as they relate to counselling; and, (c) to provide exposure to and practice in some counselling methods.

4660 Geography in Education: While of direct value to teachers of social studies the course is open to all students and without prerequisites. It explores questions of space and environment for increased understanding of our world, using techniques helpful to prospective or practicing teachers. Local field trips are conducted from the campus at various times during the academic year.

4620 Theatre 4220 Developmental Drama: For class description see entry in the Theatre section of this calendar.

4634A/B Computers and the Classroom: This class concentrates on the role of microcomputers in the school. Emphasis is on curricular implications arising from the presence of computers in the classroom and on gaining familiarity with existing computer courseware.

4637C Computers and Writing: Methods are described by which people may be taught to use computers to write interactive fiction and poetry, and to publish their work. No previous knowledge of computers is required. Participants are provided with hands-on experience.

4642B Principles of Outdoor Education: For class description see entry in the Recreation, Physical and Health Education section of this calendar.

4684B Physical Activity for Special Populations: For class description see entry for 2384, the Bachelor of Physical Education section of this calendar.

4700A Introduction to the Theory and Practice of Teaching: (required for students in a three-year Integrated Elementary BEd Program). The major theory/practice issues and concerns in elementary education are introduced through films, readings, and observations in school. The school observations are done as a group, include discussions with teachers about their work, and serve to introduce a variety of classroom settings and ways of thinking about differences in classrooms, teachers, and schools.

***4701A Psycho-Educational and Policy Decisions in "Special Education."**

4743A/B Reading Across the Curriculum: This class clarifies the kinds of questions which serve as a basis for instructional decisions. Students investigate various applications of psycholinguistic theory. Examining instructional techniques that can be used in the classroom for developing students' fluency as readers and writers.

4750 Teaching English in Secondary Schools: Personal approaches to the teaching of English at the secondary school level are developed. Weekly classes involve those activities teachers probably encourage. A range of classroom procedures and teaching methods fosters an imaginative and critical approach to the demands of teaching English.

4760 Teaching Social Studies in Secondary Schools: Skills in curriculum planning and course organization are developed and a variety of teaching strategies are introduced. Reflection on the nature and purpose of each discipline in the social studies allows one to develop appropriate lessons. Evaluation is based on weekly papers and a mid-term exercise in the first term and a major curriculum planning project and a mid-term exercise in the second term.

4770 Teaching Geography in Secondary Schools: The course presents a variety of models for teaching geography, as part of junior high social studies or senior geography courses, and treats the acquisition of skills, concepts, and values. Attention is given early to lesson and course planning and later to aspects of curriculum development. Course evaluation is based on weekly assignments, and on essays, projects, and reports, all of which have direct relevance for intending teachers.

4780 Teaching Mathematics in Secondary Schools: The study of a variety of methods relating to the teaching of mathematics at the secondary level forms the framework for this class. Students must read about each technique, participate in discussions about these techniques, and in many cases observe classroom situations where each method is used. A strong

emphasis is placed on exploring the curriculum changes occurring in Education. This includes the place of statistics, the computer, the calculator, problem solving, and geometry in a school curriculum. Evaluation is based on one major project, assignments done individually and in groups, class participation, and a final examination.

4841A/4842B Teaching French in Secondary Schools: Open only to students who have demonstrated adequate competence in French language and culture (passing a French language proficiency exam is required). Students taking this class must consult the instructor. A consideration of foundations of second language teaching which moves to a discussion of methodology, techniques, materials (including visual aids), and testing. Emphasis is on developing teaching strategies which enable students to use French as a tool for authentic self-expression, orally and in writing. Directed observation of experienced teachers and practice in the development of teaching skills are integral parts of the class. Evaluation is based upon class participation (micro-teaching, oral reports, contributions to discussions), written projects, lesson plans, and examinations.

4871A Further Educational Studies

4872B Further Educational Studies

4873C Further Educational Studies: Students may apply to instructors for permission to undertake either a specially designed readings course in a given area, or to undertake additional work in their first teaching method, for credit. *This may also be done with prior consent in writing from the instructor to the Coordinator, BEd program. The instructor thus assumes personal responsibility for supervising the work of a student enrolled in this half credit elective course.*

4881C Teaching Science in Secondary Schools

4882C Teaching Science in Junior High Schools: (4881C and 4882C are required of BEd candidates in Science). Science is more than a collection of facts. It is a way in which human beings seek to understand, predict, and control the world around them. This class inquires into the nature of science — the different meanings that attach to the word "science" for different people, the significance of the terms (*like fact, hypothesis, theory, explanation, law*) which people use in connection with science, and the ways of reasoning about the world that scientists use. But science is more, too, than "natural philosophy." It is an institutionalized activity, a profession into which people enter only after a long period of initiation. It is a source of employment, a requisite for technological innovation, and a receptacle into which public and private money may pour or trickle. These aspects, too, will be examined.

4891A Additional Curriculum Projects

4892B Additional Curriculum Projects

4893C Additional Curriculum Projects: Students may apply to instructors for permission to undertake additional project work in the area of curriculum design, implementation, and evaluation, for credit. *This may be done with prior consent in writing from the instructor(s) to the Coordinator, BEd Program. The instructor(s) thus assumes personal responsibility for supervising the work of a student enrolled in this half credit elective course.*

4902A, 4903B, 4900R Field Experience: It is the primary objective of the field experiences to provide students with opportunities to analyze, compare, and participate in a variety of teacher-learning situations. Students who intend to apply for a Provincial Teachers' Certificate should plan to log the equivalent of 200 hours field experience. All arrangements for field experiences are made through the Office and Methods Class instructor.

4901 Elementary Curriculum Study and Field Experience: (This class is restricted to Integrated Elementary BEd students.) Conducted partially in the Dalhousie Elementary School, and partially in monthly tutorial sessions. The skills of planning integrated curriculum units, linking provincial guidelines to teacher-planned curriculum and the teaching skills involved with small group work, types of questioning, and the evaluation of children from a developmental perspective, are topics covered.

4910S Additional Field Experience: (Available only during the first Summer Session.) Permission of dept. required. This one-half credit class is made available to the BEd students as an elective which they may choose to supplement the basic requirement for field experience. These additional field experiences are acquired through a block of three weeks spent in the schools at the end of the academic year. This class can only be taken with the permission of your major methods instructor and the BEd committee.

4912B Theme Study: Additional Field Experience in Dalhousie Elementary School: Prerequisites: 4900R & elementary reading methods class. This half-credit class offers two opportunities to the student: 1) six weeks of increased field experience, bringing the total logged teaching time to eleven weeks which is closer to the twelve weeks required in many provinces in Canada; 2) guided supervision in the implementation of a theme developed with the faculty supervisor in advance and designed for the spring theme study at the Dalhousie Elementary School. The student also gains experience in team teaching as the theme may be team-taught by two students to one of the three groups in the School. Because this class overlaps with graduation in May, a letter from the BEd Coordinator is written at the conclusion of the class in May indicating that all classes have been completed to fulfill the requirements for the BEd elementary program and that licensing forms have been sent to the Department of Education so that the student's application for teaching positions will not be jeopardized. A teaching license would be issued by the Department of Education at the end of June. The student would graduate in October. The class mark is arrived at by the supervising professor in consultation with the cooperating teachers and after consideration of the student's teaching performance and written conclusions regarding the theme's implementation.

4932A/B Measurement and Evaluation: A study of the writing objectives, teacher-made tests, standardized tests, random variation, and basic statistical ideas.

***4961A Canadian Studies: Methods of Teaching:** This course examines the particular problems and possibilities in teaching any type of integrated studies course or program, but its focus will be on integrating disciplines in teaching about Canadian society and culture.

4982B Canadian Studies in the Curriculum: This course analyses the place in school curricular of the study of Canadian society and culture through traditional academic disciplines and through specially designed courses and programs in Canadian Studies.

Note: 8000-level classes are open *only* to students registered in the Certificate of Educational Administration Program. Please consult the Department for detailed course descriptions and program requirements.

8030 Teachers, Their Organizations, and Decision Making in Education

- 8080 The History of Curricular Thinking
- 8151A/B Ethics and Education
- 8182A/B Open-Mindedness and Education
- 8202B The School as a Communications System
- 8221B Schools and Social Identity
- 8290 Multiculturalism and Education
- 8341 Special Education Policy Decisions
- 8370 Developmental Psychology

Educational Administration Classes

- 8401A Administration of Public Education in Canada
- 8402B Concepts in Educational Administration
- 8411A Administration of Educational Personnel
- 8412B Administration of Educational Programs
- 8431B Education and Public Policy
- 8432B The Local Government and Administration of Education
- 8440A Contemporary Issues in Educational Administration
- 8451A Philosophy and Educational Administration
- 8460R Law and the Schools
- 8462B Interest Groups in Education
- 8471A Educational Finance
- 8490 Field Study of Administration
- 8520R Implementation of Curriculum

Engineering

Chairperson of Department
J.C. MacKinnon

Professor
J.C. MacKinnon, BEng (TUNS), MScEng (Lond.), PhD (Dal), PEng

Associate Professors
D.M. Lewis, BEng, MEng (NSTC), PEng
S.T. Nugent, BSc (Mem.), BEng (NSTC), MAsc (Tor.), PhD (UNB), PEng
E.N. Patterson, BSc (MTA), BEng (NSTC), MSc (Queen's), PEng
D.G. Retallack, BSc (Dal), BEng (NSTC), MSc, PhD (Manchester), PEng

Assistant Professors
C.K.K. Lun, BEng, (McGill), MEng (McGill), PhD (McGill)
M.H. Mansour, BEng (Cairo), BSc (AIN Shams) MEng (McM), PhD (TUNS), PEng

Visiting Lecturer (Previous Year)
R.C. Gilkie

Professional engineers are concerned with making the properties of matter and the sources of energy in nature beneficial to mankind. The curriculum develops "an individual's ability to use the basic sciences, mathematics, engineering sciences, economics and social sciences to convert, use and/or manage resources optimally through effective analysis, interpretation, and decision making to meet objectives." University studies in engineering are concerned with the design of engineering systems, but the skills learned are widely applicable. Many engineers combine their profession with other activities, most notably management.

The professional degree in Engineering is the Bachelor of Engineering Degree which is conferred by the Technical University of Nova Scotia in association with Dalhousie University. The first two years of study are taken at Dalhousie and comprise a program of 11 credits which lead to the Diploma in Engineering. Upon successful completion of this program, students will be admitted to the Technical University of Nova Scotia for a further three years of study leading to the degree of Bachelor of Engineering in Civil, Electrical, Mechanical, Mining, Chemical, Industrial, or Agricultural Engineering or Engineering Physics. These programs have been accredited by the Canadian Accreditation Board of the Canadian Council of Professional Engineers.

TUNS offers a combined BEng/MEng program in Metallurgical program is accredited by the Canadian Accreditation Board of the Canadian Council of Professional Engineers.

Dalhousie offers various programs for students wishing to pursue studies jointly in Engineering and in Science. Students may arrange programs leading to a Bachelor of Science Degree, with a major in Biology, Chemistry, Computing Science, Geology, Mathematics or Physics in addition to the Diploma in Engineering. These combined programs require three years of study at Dalhousie. Three years are still required at TUNS in order to receive the Bachelor of Engineering degree.

Students wishing to enroll jointly in the Diploma in Engineering and a Bachelor of Science must consult the Department of Engineering prior to registration in the first year.

Students who graduate from TUNS fulfill the academic requirements for registration as a Professional Engineer in all provinces in Canada. In addition to the academic requirements, the Profession requires that applicants for registration have practical experience relevant to the discipline of engineering. The minimum requirement is two years of experience subsequent to completion of the BEng. It is recommended that, in addition to this, students obtain engineering experience in the summer periods prior to graduation.

Diploma in Engineering

Admission Requirements

Students wishing to enroll in the Diploma in Engineering Program in the

Department of Engineering must satisfy the requirements for admission to the Faculty of Arts and Science at Dalhousie and must also satisfy the additional requirements of the Department of Engineering. Students are normally expected to have completed Nova Scotia Grade XII senior matriculation classes, or equivalent, in Mathematics, Physics and Chemistry and should rank well in their class. Students may be admitted with advanced standing.

Admission with Advanced Standing

Students wishing admission with advanced standing in the Diploma in Engineering Program are advised that normally a minimum of seven full credit classes of those described for the program must be taken at Dalhousie. Transfer credit will not be granted for any class in which the final grade was less than C, or equivalent, or for any class in which a final grade was granted conditionally. Moreover, summer school classes are normally required as part of any Engineering program incorporating advanced standing. Students must obtain agreement for such programs, prior to the start of the Summer School session which precedes the next regular session, from the Department of Engineering.

Diploma in Engineering Program

The program is organized on a term basis although some classes are of two terms duration. Terms I and II are Year I; Terms III and IV are Year II.

Term I: Engineering 1100A, Mathematics 1280A, Chemistry 1110R, Physics 1100R, and one elective*

Term II: Engineering 1120B, Mathematics 1290B, Chemistry 1110R, Physics 1100R, and one elective*

Term III: Engineering 2121A, Engineering 2331A, Engineering 2240A, Engineering 2340A, Mathematics 2480A, and one elective*

Term IV: Engineering 2222B, Engineering 2101B, Engineering 2341B, Engineering 2230B, Mathematics 2490B, and one elective*

The electives shown with an asterisk are to be selected from the humanities and social sciences. In the first year the elective must be selected from an approved list of classes in which written work is considered frequently and in detail. Students should seek the advice, and they must obtain the approval, of the Department of Engineering for these electives.

BSc/Diploma in Engineering

Students may arrange programs leading to a BSc with a major in one of the physical sciences in combination with the Diploma in Engineering. Upon completion of the joint program, graduates receive both the Diploma in Engineering and a BSc degree.

The program for the BSc plus Diploma in Engineering consists of fifteen classes. Eleven of the classes are the classes for the Diploma in Engineering. The remaining classes must be chosen to meet the requirements for the BSc. One of these requirements is that there must be four classes beyond the first year in the science major. If the science major is mathematics, physics, or chemistry, then the recommended first year program is the first year of the Diploma in Engineering. The second and third years each consist of approximately half of the remaining requirements for the Diploma and half of the requirements for the BSc. If the science major is computing science, biology, or geology, then students should seek the advice of the Department of Engineering, prior to registration in first year.

Classes Offered

Texts shown are for the previous year.

1100A Graphics: lecture 2 hours, lab 3 hours, R.C. Gilke, D.G. Retallack, E.N. Patterson. In this class the basic problem of representing three-dimensional solid objects on a two-dimensional sheet of paper is solved by a variety of methods. Problems of the type involving points, lines, planes, solid objects, projections, pictorial views, intersections and developments, and freehand sketching are assigned on a weekly basis. Text: Engineering Design Graphics, Earle.

1120B Statics: lecture 4 hours, lab 2 hours, E.N. Patterson, R.C. Gilke. Prerequisite: Mathematics 1280. Statics is the first in a sequence of three classes in Engineering Mechanics. The others are Engineering 2121 and Engineering 2222. The work in Statics is designed to instruct the students in concepts of force and equilibrium. Topics include a review of the laws of motion, elements of vector algebra, such quantities as position and force vectors, moments of a force about an axis, couple moments, equivalent force systems, equilibrium of two and three-dimensional structures, two-dimensional frames and simple machines, shear forces and bending moments in beams, laws of Coulomb friction, centroids, area moments, and moments and products of inertia. Text: Engineering Mechanics, Vol. 1 Statics, 4th Edition, Hibbeler.

2101B Engineering Design: lecture 3 hours, lab 3 hours, D.M. Lewis, E.N. Patterson. Prerequisites: Engineering 1100, 1120, 2240; Math 1280, 1290, 2480. The work of 1100A Graphics is extended to include technical drawings and computer graphics, a design project with working drawings and a technical report, as well as the construction and testing of physical models.

2121A Dynamics of Particles: lecture 3 hours, lab 3 hours, E.N. Patterson, M.H. Mansour, C.K.K. Lun. Prerequisites: Engineering 1100, 1120; Mathematics 1280/1290. This second class in Engineering Mechanics considers the kinematics and kinetics of a single particle and of systems of particles. The class builds on the concepts introduced in Engineering 1120, Statics; a vector approach is used. Topics include kinematics of a particle, Newton's laws, work, energy, power, conservative force fields, linear impulse and momentum, impulsive forces, impact, collisions, and angular momentum. All topics are treated using rectangular, path, and cylindrical coordinates. Text: Engineering Mechanics, Vol. 2 Dynamics, 4th Edition, Hibbeler.

2222B Dynamics of Rigid Bodies: lecture 3 hours, lab 3 hours, D.G. Retallack, D.M. Lewis. Prerequisites: Engineering 1120, 2121, 2240; Math 1280, 1290, 2480. This class completes the study of Engineering Mechanics. The concepts introduced in Engineering 2121, Dynamics of Particles, are extended to rigid bodies. Topics include kinematics of a rigid body using both the translating reference frame theory and the general rotating reference frame theory, kinetics of plane motion of rigid bodies including general plane motion, energy methods, impulse and momentum methods and vibrations of single degree of freedom systems. Text: Engineering Mechanics, Vol. 2 Dynamics, 4th Edition, Hibbeler.

2230B Electric Circuits: lecture 3 hours, lab 3 hours, S.T. Nugent. Prerequisites: Physics 1100, Mathematics 1280, 1290. An introduction to the fundamental laws of electric circuits and circuit parameters, the concept of time-constants, impedances, admittances, general network theorems, three phase circuits and transformers. The laboratory periods illustrate the use of electrical measuring devices. Text: Circuits, Devices and Systems, R.J. Smith.

2240A Computer Methods in Engineering: lecture 3 hours, tutorial/lab 3 hours, D.M. Lewis, D.G. Retallack. Prerequisites: Engineering 1120; Math 1280, 1290. This class first introduces the student to computers in general and to our machines in particular, to the use of an editor for creating computer programs, and to the design and running of simple programs. The class then focuses on an algorithm-design process which uses structured programming techniques and is independent of the language chosen for coding. PASCAL is used as the implementation language, and is taught to an intermediate level. Typical assignments involve computer solutions of engineering and mathematical problems. Text: Introduction to Computer Science, Third Edition, N. Graham.

2331A Strength of Materials: lecture 3 hours, lab 3 hours, M.H. Mansour. Prerequisites: Engineering 1100, 1120; Mathematics 1280, 1290. This class is an introduction to the study of the stresses, strains, and deformation of a solid body which result when static forces are applied to the body. Topics discussed include: the definition and transformation relation of stress and Mechanics of Engineering Materials, Bowes, Russell, Suter.

2340A Classical Thermodynamics: lecture 3 hours, tutorial/lab 3 hours, C.K.K. Lun, J.C. MacKinnon. Prerequisites: Mathematics 1280, 1290;

Chemistry 1110. This class delivers a general, but rigorous, presentation of the fundamentals of classical thermodynamics which is comprehensive enough to provide the basis for further study. The mathematical presentation requires an understanding of the concept of a partial differential equation but the content stops short of mathematical manipulation of the Fundamental thermodynamic relationships. The rudiments of engineering design are emphasized throughout the presentation of the First and Second laws, with the attendant concepts of energy, enthalpy, entropy, reversibility, availability and efficiency. The content includes analysis of some real power and refrigeration cycles and presents entropy in terms of the concept of unavailable energy of a system. Some problems are solved by computer methods. Text: *Engineering Thermodynamics*, Howell and Buckius.

2341B *An Introduction to Fluid Mechanics*: lecture 3 hours, lab/tutorial 3 hours, C.K.K. Lun, J.C. MacKinnon. Prerequisites: Engineering 1120, 2121, 2340; Mathematics 1260, 1290, 2480. This class completes the study of mechanics by extending the basic concepts from solids to fluids. It comprises the study of fluids in motion and at rest, their properties and impacts on their boundaries. The class content is, basically, the application of energy, momentum and mass conservation statements to fluid systems. Dimensional analysis is introduced. Laboratory experiments supplement tutorial sessions and some problems and projects involve the use of computer methods. Text: To be announced.

English

Chairperson of Department
Alan Kennedy

Emeritus Professors

M.M. Ross, OC, BA (UNB), MA (Tor.), PhD (Corn.), D Litt (UNB), LLD (St. Thom.), LLD (Dal.), D Litt (Trent), (Edinburgh), FRSC
S.E. Sprott, MA, BD (Melb.), PhD (Col.)

Professors

J. Fraser, MA (Oxon.), PhD (Minn.) *George Munro Professor of English Literature*
J. Gray, MA (Aberd.), MA (Oxon.), PhD (Montreal), FRSC, FRSA, *McCulloch Professor*
R.M. Huebert, BA (Sask.), MA, PhD (Pitt.)
A.E. Kennedy, BA, MA (UBC), PhD (Edinburgh)
M.G. Parks, MA (Dal.), PhD (Tor.)
R.J. Smith, BA (Natal), MA (Oxon.), PhD (Natal)
D.P. Varma, MA (Patna), PhD (Leeds)

Associate Professors

J.R. Baxter, BA, BEd, MA, PhD (Alta.)
S.A. Cowan, BA (Montana), MA (Yale)
R. MacG. Dawson, MA (Tor.), M Litt (Oxon.)
M.M. Farrow, BA (Dal.), MA, MPhil, PhD (Yale)
M.A. Klug, BA (Minn.), MA (Kan. State), PhD (Ill.)
P. Monk, BA (Reading), MA (Carleton), PhD (Queen's)
C.J. Myers, BA (Sask.), MA, PhD (Tor.)
R.R. Tetreault, BA (UBC), MA, PhD (Corn.)
J.A. Walwright, BA (Tor.), MA, PhD (Dal.)
H.S. Whittier, BA (U.S. Naval Acad.), MA (New Hamp.), PhD (Yale)

Assistant Professors

L.P. Diepeveen, BA (Calvin Coll.), MA, PhD (Ill.)
B. Greenfield, BA (York), MA (McGill), PhD (Columbia)
A. Higgins, BA (Conn.), MA (McGill), MA (Mass.), MA, PhD (Yale)
V. Li, BA, MA (UBC), PhD (Cantab.)
H.E. Morgan, BA (UBC), MA (Wash.), B Litt (Oxon.), PhD (Wash.)

D. McNeil, BA (Concordia), MA (UNB), PhD (McMaster)
M.I. Stone, BA (Guelph), MA, MPhil (Wat.), PhD (Tor.)

Adjunct Professor

R.L. Raymond, BS (Yale), MA (Tor.)

Senior Instructor

L. Choyce, BA (Rutgers), MA (Montclair), MA (CUNY)

The study of English literature at Dalhousie is not just the study of the literature of England. Although largely concerned with the rich written heritage of the British Isles, it also includes the study of writing in Canada, the United States, parts of the English-speaking Commonwealth and, indeed, some European countries, in translation.

It ranges widely in time from early Anglo-Saxon works of the eighth century through thirteen centuries of changing ideas and language to the still-changing thoughts, feelings and expressions of our own time. The many forms that the written word may take — poetry, fiction, drama, essay, history — are read, not only for an understanding of the literary evolution that brings them to be what they are, but also for an understanding of that which is temporary and that which is more enduring.

The purpose of English studies at Dalhousie, briefly stated, is the enjoyment and understanding of the written word. Since the word is the principal link between the individual heart and mind and the rest of the world, such studies naturally touch upon philosophy, politics, religion, and the fine arts as well. At the same time, the student is required to think, and to use language with clarity, judgement and imagination.

In more detail, the goals of English studies are to perceive that reading is a source of pleasure, knowledge and wisdom, to sharpen the powers of discrimination between what is good and bad in literature and ideas, to gain some understanding of the process by which great writing is achieved and indeed to inspire students to their own best expression.

In the first year, English 1000 is required of all students who wish to take further English classes. There are some thirty different sections ranging from historical surveys to more eclectic studies. To enable students to choose the one most suited to their inclinations and needs the English Department and the Registrar's Office have an English 1000 supplement which includes the aims and reading lists of each section.

Classes numbered from 2000 to 4099 are especially suited for those concentrating in English, studying is as a complement to their main area, or taking an elective, and classes beyond 4250 are designed as studies of specialized areas for Honours students. Honours classes are open to General students with permission of the Chairperson and the professor concerned. A supplement describing Upper-year General and Honours classes in detail is available from the English Department.

Degree Program

BA Program

Students in the BA program must take from four to eight classes in English beyond 1000. The Department expects of all of its students to consult with faculty advisors and to form coherent programs of study; it strongly recommends that these programs contain at least six classes in English beyond 1000.

English majors must take at least one class from each of the following groups, unless they have departmental permission to use an honours class to meet a group requirement.

GROUP I: English 2207, 3209, 3210, 2211, 3212, 3213, 2221, 2231, 3232, 2233, 2234.

GROUP II: English 2205, 3206, 2208, 3215, 3218, 3219, 3224, 3229.

GROUP III: English 2200, 3201, 3202, 2203, 2204, 3214, 3216, 2220, 2225, 2226, 2227, 2228, 3244.

The purpose of the requirements stated above is to ensure some variety in each student's program. The Department recommends that the student take at least one class that concentrates on poetry and one that concentrates on fiction, and at least one class from each of two different historical periods. There is, of course, more to a sound program than variety. From the Department's offerings, students may approach the study of English literature in a number of different ways. They may choose programs which offer a broad historical background, which focus on specific genres or

which concentrate on specific historical periods such as the 19th or 20th century. There are numerous other possible combinations. In any case, students should give careful consideration to planning their programs to meet their individual needs and interests, and should consult with their departmental advisor if they need help in doing so.

The following program of study is recommended for English majors intending to become teachers of English at the high-school level:

2200 Advanced Composition, or 3201 The English Language, or 3202 History of the English Language

2207 Canadian Literature

3214 Shakespeare

2228 The Short Poem in English, or 3215 Romantic Poetry, or 3210 Modern Poetry in English, or 3224 Renaissance Poetry, or 3229 Victorian Poetry.

3220 English Drama, or 2226 Tragedy, or 2227 Comedy and Satire, or 3232 Modern Drama.

2208 English Novel to 1900, or 3209 Modern Fiction, or 3212 British Literature of the 20th Century, or 3213 American Literature of the 20th Century

At least one class chosen from the last three groups should involve a substantial amount of literature written prior to the 20th Century.

The student may also choose a maximum of two more classes in English.

Classes numbered from 2000 to 4099 (excepting 3201, 3202, 3218, 3244) are not accepted as preparation for Graduate Studies in English. Students who may desire to change to an Honours Program or continue in Graduate Studies should arrange with their advisor and with the Chairman of the Department to complete several Honours classes before graduating with a General BA. It is possible to enter a two-year MA course on completion of a General BA degree, but only if the student has completed four or five Honours rather than General classes for the concentration and has attained at least a second-division average in them.

The BA with Honours in English (Major Program)

The Honours course in English offers a systematic study of the major writers and trends from medieval times to our century. It is therefore of particular relevance to the student who is interested in detailed study of English as a basis of a liberal education, to the prospective high-school teacher of English who needs a comprehensive understanding of the subject, and to the student intending to proceed to the graduate study of English and to complete in one year the requirements for the MA degree.

Students intending to enter the Honours course in Year II must consult the Department in advance to plan their course and be formally enrolled. In the subsequent years, Honours students are encouraged to seek advice of the Department in choice of classes.

The Honours course consists of nine classes (in addition to English 0451A) beyond English 1000. At least one class must be taken from each of the following six sections:

Section A: English 4252 (recommended for third year)

Section B: English 4253, English 4351

Section C: English 4251, English 4352

Section D: English 4254, English 4356

Section E: English 4354, English 4355, English 4452, English 4457

Section F: English 4357, English 4453, English 4455

The student may choose the three remaining classes from those not already chosen in Sections B to F, or from Section G: English 3201, 3202, 3244.

Introduction to Literary Research

English 0451A, a non-credit class which meets one hour per week in the first term is required of all Honours students and is to be taken in the first year of the Honours course.

Honours students must meet the requirements for the General BA degree. They are advised to select a minor from one of the subjects listed under either Group A or Group B in the "Academic Programs" section of the Calendar.

BA with Combined Honours

There are several Combined Honours programs: English and French, English and German, English and History, English and Philosophy, English and Spanish, English and Theatre. Students interested in any of these combinations or any other that involves English and another subject should consult with the Departments concerned.

Classes Offered

1000 Introduction to Literature: lecture 3 hours, members of the Department. Since English 1000 consists of sections taught by many different instructors, statements about its objectives and approach must be confined to generalizations. All instructors of English 1000 have these two broad objectives in common: (a) to involve students in the serious study of literature; (b) to involve them in the discipline of words so that they will be more critical and responsive readers and more exact and imaginative writers. The subject matter varies from section to section. Detailed syllabi of all sections are available. Practice in writing is carried on throughout the year in fortnightly essays. Each section attends three lectures per week. In addition, the tutors attached to each session conduct small discussion groups and personal interviews with students.

Classes for General Degree

Successful completion of English 1000 is the prerequisite for entry into Upper-Year classes.

For a more complete description of classes and of texts, students should consult the Departmental Supplement for Upper-Year classes. Not all classes shown are taught every year.

(Tentative List)

Classes in the 2000 Series

The 2000 series includes classes that emphasize genre or literary form, and those that offer broad surveys of literature. Classes in the 2000 series are open to students in their second or third year of studies who have completed English 1000.

2200 Advanced Composition: lecture 3 hours, P. Monk. Prerequisite: English 1000. An advanced class in the theory and practice of writing English prose, designed for people who already have some competence and interest in writing. The class is *not* a "remedial" class and *not* a "creative writing" class.

2203 Masterpieces of Western Literature: lecture 3 hours, H. Whittier. Intensive reading of selected major works from Western literature, is designed to broaden the student's outlook on literature and also to increase his familiarity with works that are not only stimulating in themselves but also comprise the basis for the development of English and other literatures.

2204 The European Novel: lecture 2 hours. An intensive study of about ten representative European novels of the last two hundred years. A considerable amount of attention is paid to the philosophical ideas which are an important feature in many of the novels studied.

2205 Landmarks of English Literature: lecture 3 hours, A. Kennedy, R.F. Tetreault. This class studies works by many of the most influential British authors from Chaucer to the present century. These landmarks provide some orientation in the literary landscape, and help to make students aware of the diversity available in literary studies. The class is aimed at, but not limited to, English majors.

2207 Canadian Literature: lecture 2 hours, R.J. Smith, M.G. Parks, P. Monk, J.A. Walwright. This class offers an introduction to Canadian poetry and prose written in English. The aim will be to trace the development of Canadian fiction and poetry from the nineteenth century to the present through discussion of selected texts.

2208 The English Novel to 1900: lecture 2 hours, H.E. Morgan, M. I. Stone,

D. McNeil. Based on a selection of titles by representative authors, this class is a survey of the early English novel. Attention is given to the rise of the genre as well as to the variety of forms and functions which the novel assumed or served.

2211 Commonwealth Literature: lecture 2 hours, R.J. Smith, A. Kennedy. An introduction to the literature of the British Commonwealth, excluding that of Canada and the British Isles. Writing from Africa, Australia, the Caribbean and India will be discussed and common problems or themes examined. The bulk of the literature studied will be modern.

2220 English Drama: lecture 2 hours, R.M. Huebert. An introduction to some of the major plays and playwrights in the history of English drama. Special emphasis is given to plays by such leading dramatists as Marlowe, Webster, Wycherley, Shaw, Pinter, and Stoppard. Some attention is paid to the principal changes in staging practices from the medieval beginnings of English drama to the recent experimental theatre. The objective of the class as a whole is to sample the richness and diversity of the English dramatic tradition.

2221 Fictions of Development: lecture 2 hours, M. Stone. A study of a variety of literary works (chiefly novels) which portray the crises and conflicts involved in growing up, finding a vocation, and finding oneself. Works from the nineteenth century to the present by Canadian, English and American authors are included, and special attention is given to the connections between art and autobiography, and between literature and psychology, as well as to the influence of gender differences in patterns of human development, and ways of writing about them.

2225 Epic, Romance, and Fantasy: lecture 2 hours, P. Monk. This class offers a consideration of epic, romance, and fantasy. Starting with a consideration of primary epics, it will then go on to take a look at manifestations of the epic spirit in modern works.

2226 Tragedy: lecture 2 hours, R.R. Tetreault. A study of the nature and method of tragedy in literature. Examples are taken from Greek, Shakespearean, and modern drama, as well as from poetry, and from novels.

2227 Comedy and Satire: lecture 2 hours, J. Gray, D. McNeil. The comedian and the satirist are interested in both the laughable and the deplorable antics and eccentricities of human nature. This class concerns itself with their points of view, as expressed in such varied forms as stage comedy, graphic satire, the comic novel, and the humorous essay. It also considers theories of comedy and laughter in their application to a wide variety of literary types. Lectures and class discussions are augmented with play readings, films and other illustrative materials.

2228 Short Poems in English: lecture 2 hours, A. Kennedy, J.A. Walwright. Forms and themes in the short poem are studied by means of critical reading of poems written in English. Topics may include the self in the short poem, other persons, public events, love, nature, the city, the machine, wit, myth, traditional forms, free verse, the haiku, lyric as song, spoken poetry, poetry in print, concrete poetry, and possibly other topics to suit the class.

2231 Modern American and Canadian Novels: lecture 2 hours, M.A. Klug, members of the Department. Six Canadian and six American novels are treated as related "pairs," with the instructors dividing their time equally between the two sections. Both sections and both instructors meet together to discuss each pair of novels, after the novels have been dealt with individually.

2233 Science Fiction and Fantasy: lecture 2 hours, S.A. Cowan, P. Monk. Selected works of speculative fiction are read for pleasure and studied for understanding. The study emphasizes analysis and evaluation of the works as literature. Each student is responsible for self-disciplined study of the history of science fiction and may expect to be examined in detail on his knowledge. Non-majors are welcome.

2234 The Short Story: lecture 2 hours, A. Kennedy, J.A. Walwright. This class attempts to combine detailed consideration of a wide range of the

best short stories of the last 150 years with discussion of general questions about the nature of the genre itself. As much as anything else it is a class in 'reading and writing' intended to improve reading ability and to develop the capacity to understand and interpret literature.

Classes in the 3000 Series

The 3000 series includes classes that focus on periods in national literatures, that take up the descriptive and historical study of the English language itself, and that deal with the theory and history of literary study. Classes in the 3000 series are open to any student who has completed English 1000.

3201 The English Language: lecture 2 hours, M.M. Furrow. This class, concerning the English language of today, begins with some general questions about the nature of language, and goes on to investigate the syntax, semantics, phonology, and dialects of modern English, with an ultimate interest in the stylistic analysis and comparison of short literary texts.

3202 History of the English Language: lecture 2 hours, R. MacG. Dawson, M.M. Furrow. An introduction to the historical development of the English language. The growth of our "word-hoard," the evolution of word meanings, the changing patterns of speech sounds, of word forms and of syntactic structures, the distinction of dialects and literary styles are studied through analysis of selected literary texts. English 3201 and 3202 are complementary classes.

3206 American Literature of the Nineteenth Century: lecture 2 hours, S.A. Cowan, H.S. Whittier. An introduction to American literature through representative works by major writers from 1800 to 1900. Among those studied are Cooper, Hawthorne, Poe, Emerson, Melville, Whitman, Dickinson, and Twain. Both fiction and poetry are studied. Students are encouraged to discuss the works, and classes usually proceed by a combination of discussion and lecture.

3209 Twentieth-Century Fiction: lecture 2 hours, R.J. Smith, J.A. Walwright, H.S. Whittier. An introduction to the main thematic and technical trends in the modern novel. Each section has its own emphasis and choice of texts.

3210 Modern Poetry in English: lecture 2 hours. A study of modern poetry in English focusing on the seminal poets Yeats, Stevens, Pound, Eliot, and Williams. Developments and trends in poetry from the 1930's to the present are also considered. For readers, beginning and more experienced, who wish to get their bearings in modern poetry.

3212 British Literature of the Twentieth Century: lecture 2 hours. A survey introduction to the past seventy-five years of British fiction, drama, and poetry.

3213 American Literature of the Twentieth Century: lecture 2 hours, B. Greenfield, V. Li, M.A. Klug. An introduction to poetry, fiction and drama by American poets and novelists of the twentieth century.

3214 Shakespeare: lecture 2 hours, M.M. Furrow, R.M. Huebert, C.J. Myers, A. Higgins. An introduction to Shakespeare's career as a playwright, through discussion and interpretation of a dozen or more of his plays.

3215 Poetry of the Romantic Period: lecture 2 hours, D.P. Varma, R.R. Tetreault. An introduction to the spirit of an age and its manifestations in literary art. Examples of shorter and longer lyrics and excerpts from longer narrative and dramatic poems are drawn from the works of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Although devoted to the study of a period, the class begins with a general introduction to the reading of poetry.

3216 The Gothic Novel: lecture 2 hours, D.P. Varma. A survey of the origins and development of *The Tale of Terror and the Supernatural* during the latter half of the eighteenth century and its various manifestations and influences in succeeding fiction. Students will not only chart the chief landmarks of gothic fiction but also explore the various chambers of horror-literature.

3218 Medieval Literature: lecture 2 hours, H.E. Morgan, A. Higgins. A study of selected medieval works of Northern Europe, with major emphasis upon the Arthurian legend as found in Malory. Beginning with a look at Nordic, Celtic and Frankish background materials (in translation), one goes on to focus upon late-medieval developments in saga and romance, concluding with a look at some post-medieval uses of the inherited matter in Tennyson, Morris, Lewis and Tolkien. An enriched English 3218 is available for Honours credit students who have previously taken English 4351.

3219 Chaucer and his Contemporaries: lecture 2 hours, M.M. Furrow, A. Higgins, H. Morgan. A selection from the genres of late medieval literature in English: romances, fabliaux, plays, lyrics, and legends. Some works are studied in translation; others (including Chaucer's) are read in the original Middle English.

3224 Renaissance Poetry: lecture 2 hours, J.R. Baxter. An Introduction to English poetry from the early sixteenth to the mid-seventeenth century, concentrating on authors whose works have exercised a continuing influence: Sidney, Shakespeare, Donne, Jonson, and Milton.

3229 The Victorian Age: lecture 2 hours, M.I. Stone. A survey of selected Victorian texts designed to deconstruct modern myths about the Victorians and to introduce students to the diversity of the Victorian Age. Works by Mill, Tennyson, Arnold, the Brownings, the Pre-Raphaelites, and Wilde demonstrate that Victorian Literature is animated by a spirit of rebellion and a zest for controversy, marked by innovation and experimentation in literary forms and subjects, and notable for both its passionate defences of individual liberty and its surprisingly modern affirmations of women's rights.

3232 Modern Drama: lecture 2 hours, R.M. Huebert. An introduction to the major developments in drama from Ibsen to the present. Special attention is given to changes in dramatic style and to the growth of modern theatrical movements. The playwrights represented include Strindberg, Shaw, Pirandello, Brecht, Genet, Ionesco, Pinter, Albee, and Stoppard. A few recent Canadian plays provide a focus for discussion of contemporary trends.

3244 Literary Criticism: lecture 2 hours, A. Kennedy. A survey of Classical Greek and Latin theory, English critics and some pertinent European writers and trends.

Classes in the 4000 Series

Classes in the 4000 series focus on more specialized topics than other courses in the major program. They are designed for the more experienced student of literature and are open to English majors in their third or fourth years. Other majors must have completed two English classes after English 1000 (or have obtained the permission of the instructor) to be eligible. These classes will be organized as seminars and will have a lower enrolment than other major program classes. Their specific subject matter will vary year-to-year.

- 4001A/B Studies in an Individual Author I (half class)
- 4002A/B Studies in an Individual Author II (half class)
- 4003A/B Studies in Genres I (half class)
- 4004A/B Studies in Genres II (half class)
- 4005A/B Studies in National Literatures in English I (half class)
- 4006A/B Studies in National Literatures in English II (half class)
- 4007A/B Studies in Literary History I (half class)
- 4008A/B Studies in Literary History II (half class)
- 4009A/B Studies in Literary Theory I (half class)
- 40010A/B Studies in Literary Theory II (half class)

Classes for the Honours Degree

(Tentative List)

0451A Introduction to Literary Research: lecture 1 hour (first term only). C.J. Myers, H. Melanson, Ian Colford. A departmental (i.e., non-university and non-credit) technical class for honours and graduate students. It is planned to acquaint the student with certain research tools in the library that are most frequently used by students of English (bibliographies, catalogues, indices, digests, journals, dictionaries, microfilms), many of which the student is unlikely to stumble upon himself/herself in his/her own research.

There will be a brief introduction to the history of printing and papermaking. Students will be taken on a tour of the printing shop (Dawson Room) and occasionally guest speakers will lecture on relevant topics. Successful completion of exercises and attendance at lectures one hour a week for the first term will constitute fulfillment of requirements for the course.

4251 Sixteenth-Century Prose and Poetry: lecture 2 hours, M.G. Parks, A. Higgins. This is a class in the prose and poetry of the English Renaissance from its beginnings to the 1590s. The major writers to be studied are More, Sidney, Spenser, and Shakespeare; brief selections from Wyatt, Surrey, Elyot, Ascham, Hooker, Marlowe and a few others will also be read.

4252 Shakespeare and the Drama of His Time: lecture 2 hours, J.R. Baxter, R.M. Huebert. About fifteen plays by Shakespeare, some by choice of the class, are read in the context of representative plays by his earlier and later contemporaries, especially Marlowe and Jonson. Students may consult the professor for a list of plays and suggested preliminary reading.

4253 Old English: lecture 3 hours, R. MacG. Dawson. An introduction to the Old English language (700-1100 AD), followed by a study of some of the prose and minor poems, and, in the second term, of *Beowulf*. Students are also introduced to some aspects of Old English art and archaeology. Some knowledge of a classical or modern European language (preferably German) is desirable, though not essential, and an understanding of traditional grammatical terminology will be helpful. This class is not recommended, except in unusual circumstances, to those who are not thoroughly fluent in modern English.

4254 Restoration and Eighteenth-Century Literature: lecture 2 hours, J. Gray, D. McNeil. The emphasis is on three great satirical authors (Dryden, Pope, and Swift), on a study of Restoration drama and on major works of Samuel Johnson. Since the literature of the period is related closely to the men and manners of the age, some time is spent on the contemporary climate of opinion revealed in the works of a number of writers representative of literary, political, social, and philosophical points of view: Hobbes, Halifax, Pepys, Rochester, Butler, Addison and Steele, Mandeville and Shaftesbury.

4351 Middle English: lecture 2 hours, H.E. Morgan, M.M. Furrow, A. Higgins. An introduction to the language and literature of feudal and chivalric England, with the principal emphases being upon Chaucer's poetry and upon the Arthurian story. Through readings and study, the student should gain some historical sense of the language, of the late-medieval social milieu and of the especial flourishing of literature in the late-fourteenth century.

4352 Seventeenth-Century Poetry and Prose: lecture 2 hours, M.G. Parks, R.M. Huebert. A study of selected poetry and prose of the later Renaissance from the turn of the century to the Restoration. Of the poets, Donne and Milton are given special emphasis; poems by Jonson, Herbert, Vaughan, and Marvell are also studied. Prose works are by Bacon, Donne, Browne, and Milton. The study of Milton's poetry, especially *Paradise Lost*, occupies a major part of the second term.

4354 Victorian Novel: lecture 2 hours. The novels of the period from Scott and Austen to Hardy are studied.

4355 American Literature to 1900: lecture 2 hours, B. Greenfield. This class deals with major writers of the 19th century, as well as works from the colonial period which raise important cultural questions.

4356 The Romantic Period: lecture 2 hours, R. Tetreault, V. Li. A close reading of the major poetry of Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats. Attention is also given to their critical writings in prose, and to the intellectual, cultural, and historical milieu in which they worked.

4357 Modern Canadian Literature: lecture 2 hours, A. Wainwright, P. Monk. A study of Canadian fiction and poetry since the 1920's with emphasis on the changing form and content of Canadian writing. Classes consist of lectures and discussion.

4360C Old Norse: lecture 1 hour, H.E. Morgan. Prerequisite: One of English

3218, 4253, 4351 or instructor's permission. A broad survey of major Old Norse prose and poetic works in translation and an introduction to the comparative study of the very close relation of the early Norse and English languages and literature.

4452 Nineteenth-Century Prose and Thought: lecture 2 hours, C.J. Myers. The study of representative non-fictional prose works of the nineteenth century, for their intrinsic merits, with the object of exploring the ideas of the period about politics, religion, education, art and society. Instruction is chiefly by means of lectures, but there are ample opportunities for class discussion, and each student presents one seminar paper per term.

4453 Twentieth-Century English Literature: lecture 2 hours, J. Fraser. Primarily for honours students and for MA students in their make-up year. Each member of the seminar writes two papers to serve as starting-points for the class discussions. There are no examinations, but regular attendance is expected in the interests of effective debate.

4455 Modern American Literature: lecture 2 hours, M.A. Klug, V. Li. In the first term, this class studies 20th-century American fiction. In the second term, modern American poetry is assessed. Classes are a combination of lectures and discussion.

4457 Victorian Poetry: lecture and discussion 2 hours, C.J. Myers, M.I. Stone. Poems by Tennyson, Robert Browning, Elizabeth Barrett Browning, Arnold and selected Pre-Raphaelites are studied in the context of the social and political, the religious and scientific ideas current in Victorian England.

Graduate Studies

The Department offers graduate classes leading to the degrees of MA and PhD. Details relating to admission, scholarships and fellowships, requirements for the degree, classes of instruction, etc., can be found in the Calendar of the Faculty of Graduate Studies.

French

Chairperson of Department
M. Bishop

Emeritus Professor
P. Chavy, Agrégé des Lettres (Paris), Chevalier de la Légion d'Honneur

Professors
M. Bishop, BA, BEd (Manchester) MA (Manitoba), PhD (Kent, Canterbury)
J.W. Brown, AB (Miami), MA (Middlebury), PhD (Penn.)
B.E. Geener, BA (Kings), BEd, MA (Dal), Dr. de 3e cycle (Toulouse, II)
W.T. Gordon, BA, MA, PhD (Tor.)
R. Kocourek, State Examination, PhD, CSc (Charles U., Prague), *McCulloch Professor, (Graduate Coordinator)*
D.W. Lawrence, BA, MA, PhD (London)
H.R. Runte, MA, MPh, PhD (Kansas)
M. Sandhu, Licence ès Lettres (Montpellier), PhD (Yale)

Associate Professors
P. De Méo, BA, MA, PhD (UCLA)
N. Trèves, BSc (American U., Cairo), PhD (Rice)
K. Waterson, BA (Long Island), MA (NYU), PhD (CUNY)

Assistant Professors
B. Bednarski, BA (London), MA (Dal), PhD (Laval)
I.Z. Coore, BA (Tel-Aviv), MA (Waterloo), PhD (Western Ontario)

E. Boyd, BA (SMU), BEd (St FX), MA (Middlebury)
M. Myers, DUEL, Licence ès Lettres, MA, Dr. de 3e cycle (Strasbourg)

Adjunct Professor
R. Runte, BA (SUNY), MA, MPh, PhD (Kansas)

The Department of French offers students not only the opportunity to develop fluency in classes backed up by excellent laboratory and ancillary facilities, but also the possibility of studying the literature and culture of France, French Canada and the other nations of the French-speaking world, and the linguistic structure and development of French.

Classes are available for beginners and for those with a background in the language who wish to improve and maintain any or all of the following skills: speaking, listening, reading, and writing. Other classes are specially designed for students who are interested in teaching, translation, or other areas of language study. The role of French in Canada and in the Maritimes is stressed in classes in Acadian and Québécois literature and civilization. The literature of France and French-speaking nations is brought to life in classes organized around a theme, a genre, or a historical period.

The Department of French urges students to practise the language as much as possible. The *Maisons Françaises* are two houses on campus in which students may live with native speakers in a francophone environment. The French Club organizes activities including films, French meals, parties and plays in which all students may participate. Exchanges with Québec and individual student travel and study are encouraged. Normally the Department offers at least one course off campus in a francophone environment. In the past we have offered an intensified version of French 3000B in Mayenne, France and in Saint-Pierre and Miquelon. Please consult the Department for information concerning schedule.

A BA degree in French with Honours or with Honours in French and another subject combined may lead the student to a career in education, written or oral translation, or may provide the background for careers in many fields, including radio, television, law, social work, public relations, business, diplomacy, journalism and library science. Students considering French as an area of concentration in a BA degree course are invited to discuss the matter at any time (the earlier the better) with a member of the Department. The accent is on the particular needs and aspirations of the individual. An Honours degree is normally required for access to graduate studies. MA, MAT and PhD degrees may be pursued in the Department (see the Calendar for Faculty of Graduate Studies).

Major or honours students may, with the approval of the Department of French, take up to one year (5 full credits) of work at a University in a francophone environment and receive credit at Dalhousie. Scholarships are available for students selected to participate in the Dalhousie/Aix-en-Provence Year-Abroad Program, for Honours students.

Students considering a career in teaching French are encouraged to discuss their goals and program as early as possible with Professors DeMéo or Myers.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

BA Program

Students should consult the Chairperson or a Department Advisor about their choice of classes. The Department expects students majoring in French to form coherent programs of four to eight full classes or equivalents beyond 1020R or 1000R/2000R. The following classes are required: 2040R, 2201A, 2202B, 3040R and one other full credit at the 3000-level. Normally, three full credits are taken in the second year (and a minimum of two). Courses other than those required may be chosen freely in consultation with the Major Advisor, according to the students' desire to obtain a general knowledge of the field, or a greater concentration in specific areas such as Literature, Linguistics, French-Canadian Studies, etc.

Students wishing to change to an Honours Program may do so during the second or third year of studies, given sufficient standing. Those wishing to do so, or to continue in Graduate Studies after obtaining a BA Major in French, should consult the Chairperson or the Honours Advisor.

BA with Honours in French

This program offers systematic, comprehensive and individualized study of French language and/or literature both within and without the classroom. It is, therefore, an option which should be considered seriously by any student who, with career or personal objectives in mind, wishes to obtain a strong background in French and by those who plan to teach or earn a graduate degree in French.

Honours students are strongly encouraged to enrich their more traditional learning experience by living in one of the *Maisons Françaises* and by spending at least one summer in a French-speaking area. Majors or honours students may, with the approval of the Department, take up to one year (five full credits) of work at a university in a francophone environment and receive credit at Dalhousie. Please consult department for information on programs available.

Financial support may be available. Please consult the Chairperson of the Department.

Combined-Honours students should consult the Chairperson before proceeding to see the Honours Advisor. Following is a description of the three different kinds of honours programs in French and the requirement for each*:

I. **Concentrated Honours** (from 9-11 credits in French beyond the first year. First year does not necessarily mean 1000-level courses; it refers to any course taken in the first year of study). The following courses are required: 2040, 2201A/2202B, 3020, 3040, one full-credit to be chosen in French literature and/or culture, one full-credit to be chosen at the 4000-level.

II. **Combined Honours** (from 11-13 credits in French and another subject. Not fewer than 4 nor more than 9 may be chosen in either subject.) Minimum requirements for the combined honours program are as follows: 2040, 2201A/2202B, plus a minimum of two credits in language, literature and/or culture.

III. **Honours Certificate** The honours certificate is an option for continued study open to anyone who has previously completed a BA major program in French. Normally, it consists of five full credits of course work plus one additional credit: either an honours essay or an oral interview based on course work and/or a specific topic. Requirements for the honours certificate are similar to those for the concentrated honours program, but will vary according to individual circumstances.

*A requirement may only be waived in exceptional circumstances with Departmental approval.

Classes Offered

1000R Français pour débutants/Beginners French: lecture 3 hours, language lab 3-6 hours, according to individual need, members of the department. This class, intended for students with little or no previous instruction in French, covers a sufficient range of basic linguistic structures and high-frequency vocabulary to enable students to engage in simple, everyday communication on a variety of subjects. Classes are conducted in French as much as possible with a view to developing competence in "real-life" communication, both oral and written. Work done in the three class meetings per week is supplemented with both oral and written exercises in the Dalhousie Learning Laboratory and with reading assignments, compositions, and written exercises to be completed outside of class. Students are also introduced to significant aspects of French, French-Canadian, and other francophone cultures. Upon completion of French 1000, students wishing to complete the study of basic French language structures and to increase their written and spoken fluency should enroll in French 2000. Anyone wishing to register in 1000 must provide the grade 12 transcript at the time of registration.

1001A/2001B Français pour débutants: Niveaux I & II/Beginners French: Levels I & II: lecture 6 hours, language lab 6-12 hours, according to individual need, E. Geener. This course offers motivated students the opportunity to do the work of French 1000R and 2000R, normally a two-year program, in one academic year. 1001A and 2001B each give one full credit.

Neither is counted towards a Major in French, but completion of this work permits entry into the Major or Honours programs.

1020R Révision de français oral et écrit/Spoken and Written French in Review: lecture 3 hours, language lab 1-2 hours, according to need, members of the department. This is the usual first-year class for those students who have studied French throughout high school. Designed to develop proficiency in speaking and listening skills, as well as in reading and writing. Classes are taught in French and involve much oral practice: discussions, exercises, etc. are based on a wide variety of reading and listening materials. Short written exercises and regular compositions reinforce this work. The basic structures of French are reviewed through independent study and classroom practice. Listening comprehension assignments are done in the Learning Laboratory in the Killam Library. It is assumed that students are familiar with the basic structures of French, although it is expected that students have not full control of them.

1060R Pratique de la lecture/French for reading: lecture 3 hours, members of the department. Development of the ability to read contemporary French prose with ease and accuracy. Emphasis is on the acquisition of skills that facilitate reading. Students are encouraged to become familiar with the best French-English dictionaries and to use them judiciously, to learn large blocks of vocabulary by recognizing word families, and to grasp the meaning of unknown words from context wherever possible. Classroom work involves a grammar review, study and discussion of a wide variety of readings as well as correction of prepared translations and sight translations (from French to English only). French 1060 is given in English and is not, by itself, suitable for students who plan to major in French. It may, however, be taken by those with no prior training in French and as an additional first-year option for those taking French 1020.

Note: All classes above this level are normally given in French.

2000R Français pour débutants: Niveau II/Beginners French: Level II: lecture 3 hours, language lab 3-6 hours, according to individual need, members of the department. No student may enrol in French 2000 without having first completed French 1000 or without the chairperson's permission. This class continues the work begun in French 1000, focusing on more advanced forms of expression including the vocabulary, verb forms, and syntactic structures necessary for communication at a relatively high level of abstraction and complexity. As in French 1000, all classes are conducted as much as possible in French, with additional practice provided through the Dalhousie Learning Laboratory and through regular reading and writing assignments. Reading selections drawn from the press and the literature of French-speaking cultures continue to be a regular part of the work, in the interest of deepening and enriching the students' understanding of the people whose language they are studying. (Credit awarded for French 2000 may not be counted towards a major in French but the completion of this work permits entry into the Major or Honours programs.)

2001B: See 1001A above.

2021A/2022B Etudes pratiques/Practice in Language Skills: lecture 3 hours. Follows 1020 or 1000/2000, members of the department. It is normally taken in the second year of study and provides the opportunity to practice and improve language skills already acquired. Sections approach language learning through different subjects (such as Acadian studies, African and Caribbean civilization, cinema, journalism, the occult, or the detective novel). All classes and assignments are entirely in French. Students must choose sections with different topics to earn credit for both A and B. However, it is not necessary to take both A and B and students may elect to study one semester only. Students should consult the current timetable, as the topics offered change each year.

2023A/2024B Etudes pratiques II/Practice in Language Skills II: lecture 3 hours, members of the department. For non-majors only. Permission of coordinator of French 2021 required. Open only to students having completed French 2021A/2022B. These classes provide the opportunity for further practice and improvement of language skills already acquired. As in 2021A/2022B, sections approach language learning through subject areas such as French Art, Technical and Commercial Vocabulary, Women in

France and French Canada, etc. All classes and assignments are entirely in French. Students must choose sections with different topics to earn credit for A and B. The topics chosen for 2023A/2024B must also be different from those taken in 2021A/2022B. It is not necessary to take both A and B and students may elect to study one semester only. Students should consult the current timetable, as the topics offered change each year.

2025A/2026B Etudes pratiques III/Practice In Language Skills III: lecture 3 hours, members of the department. For non-majors only. Permission of coordinator of French 2021 required. Open only to students having completed 2023A/2024B. Topics chosen must differ from those of all previous classes.

2030A/2030B De l'orthophonie à l'intonation expressive/From Corrective Phonetics to Expressive Intonation: lecture 3 hours, language lab, according to need, K. Waterson. Prerequisite: French 1020 or equivalent. Using widely varied texts and recordings, this class studies the basic sounds (phonemes) of French and the essential non-phonemic features of the language (rhythm, stress, intonation, etc.). It helps students master French phonemes, understand the role of non-phonemic features in oral communication and develop self-expression and audio-comprehension.

2031A/2031B Interprétation/Simultaneous Translation: lecture 3 hours in language laboratory, supplementary lab hours, as necessary for individuals, H. Runts. Practical introduction; given in the language lab, to oral English-French and French-English translating (interpreting) with emphasis on fluency, vocabulary building and comparative syntactico-stylistic analysis.

2040R Etudes pratiques de stylistique/Intermediate Composition: lecture 3 hours, R. Kocourek, D. Lawrence, I. Oore, M. Sandhu. These classes constitute a detailed and comprehensive review of grammar by means of various exercises including dictations, translations, compositions and summaries. They involve a study of written style and manner of expression.

2201A/2202B Introduction à la littérature/Introduction to French Literature: lecture 3 hours, M. Bishop, D. Lawrence, H. Runts, N. Trèves. A survey of literature in French from the Middle Ages to the 20th century, presenting selected works of prose, poetry and theatre from France, Québec, Acadia and other francophone areas. Introduction to general notions of literary history and to the basic concepts involved in reading literary texts. Attention is paid to the development of both oral and written expression of ideas. French 2201A and 2202B may be taken consecutively. Classes involve, principally, group discussion, often based upon short individual presentations.

3000B Cours supérieur de français oral/Advanced Oral French Workshop: lecture 3 hours, members of the department. Class discussions and oral presentations based on themes of contemporary concern. This class may be offered off campus in France in the summer in an intensive fashion. This class is intended to build vocabulary, perfect facility of expression (fluency) and style. Reading and research are necessary for the oral presentations.

3020R Linguistique/Linguistics: lecture 3 hours, R. Kocourek. This class will interest future linguists, literary specialists and language teachers, as well as translators and public servants concerned with bilingualism. Its main objective is to improve and refine the students' understanding of the French language and to explain the major areas of its study. Culturally interesting literary excerpts will be used to observe and analyse linguistic problems in texts. Each student will prepare two reports on linguistic topics. Assignments based on practical problems of pronunciation, spelling grammar, vocabulary and meaning will complement the syllabus.

3025A/3025B Les Parlers acadiens: Introduction linguistique/Linguistic Introduction to Acadian Dialectology: Students wishing to take the course must have taken, be concurrently enrolled in French 3020R, or must seek the permission of the instructor, E. Geaner. An examination of the phonetic, morphosyntactic and lexical systems of various Acadian speech communities, with emphasis on the Acadian dialects of Nova Scotia.

Frequent comparisons will be made between these dialects and both standard French and Québécois. Recorded and written materials are used.

3040R Stylistique/Advanced Composition: lecture 3 hours, M. Sandhu, D. Lawrence. This class develops further the skills acquired in 2040R. Through a variety of exercises, students are taught to express themselves in clear, accurate, idiomatic French, and to perform a number of tasks of a practical nature: writing reports, summaries, letters, etc. A good knowledge of grammar is essential.

3081A/3082B Didactique du français langue seconde à l'école secondaire/Methods of Teaching French at the Secondary Level: lecture 3 hours, P. De Méo, M. Myers. Open only to students who have demonstrated adequate competence in French language and culture (passing a French language proficiency exam is required). Students taking this class are normally completing a BEd. Other students interested must consult the instructor. A consideration of foundations of second language teaching which moves to a discussion of methodology, techniques, materials (including visual aids), and testing. Emphasis is on developing teaching strategies which enable students to use French as a tool for authentic self-expression, orally and in writing. Directed observation of experienced teachers and practice in the development of teaching skills are integral parts of the class. Evaluation is based upon class participation (microteaching, oral reports, contributions to discussions), written projects, lesson plans, and examinations.

3085B Didactique du français langue seconde à l'école élémentaire et en immersion/ Methods of Teaching French in the Elementary School and Immersion: Prerequisite: Students must have enrolled in or actively audited French 3081A, P. De Méo, M. Myers. This class focuses on specific methods and materials appropriate for the elementary-age child in the French core program and/or immersion.

3100R Civilisation de la France/Civilization of France: lecture 3 hours, M. Sandhu, J. Brown. An attempt, through talks, reading, discussion and slide presentations, to understand and to suggest fruitful ways of studying, from an English-speaking Canadian point of view, what is essential in French culture and outlook.

3200A/3200B Appréciation de la littérature/Literary Appreciation: lecture 3 hours, M. Bishop et al. An approach to the critical reading of various periods of French literature. The class offers discussion of representative works of major writers, centering either on genre, theme, or period and involving close textual analysis. It also includes some discussion of past and current theories of literature. See department for specific details in any given year.

3300A/3300B La littérature médiévale/Medieval French Literature: lecture 3 hours, H. Runts. Textual analyses of selected works representing the major literary genres (epic, romance, theatre, poetry) from the *chansons de geste* to François Villon (most texts in modern French translations). The discussion of the origins and the development of a national French literature provide a convenient introduction to critical approaches to literary texts.

3400A La littérature du seizième siècle/16th-Century French Literature: lecture 3 hours, N. Trèves. Reliving the awakening, bloom and decline of the Renaissance period in literature and language through the works of Marot, Rabelais, Du Bellay, Ronsard, Montaigne and the poets of the *baroque*. The century's concern with the French language provides a convenient introduction to the study of the development of modern French.

3500A/3500B La littérature du dix-septième siècle/17th-Century French Literature: lecture 3 hours, K. Waterson. The theatre in 17th century France: an examination of representative works by Corneille, Racine and Molière; an attempt to define these dramatists' vision of man and the world and to assess their contribution to the history of ideas and the development of French theatre.

3600A La littérature du dix-huitième siècle/18th Century French Literature: lecture 3 hours, members of the department. An introduction to the literature of the 18th century which includes works by such authors as

Voltaire, Rousseau, Diderot and Marivaux. Each year the readings and class discussions will be centered on a different theme (for example: the hero, women, love, wealth and power).

3700A/3700B La littérature du dix-neuvième siècle/19th Century French Literature: lecture 3 hours, J. Brown. An introduction to the main literary movements of the 19th century: Romanticism, Realism, Symbolism. Focus is on representative authors and/or texts belonging to one or more of these trends.

3800A/3801B La littérature du vingtième siècle/20th Century French Literature: lecture 3 hours, M. Bishop. Poetry and Theatre, 1900-1988. Study of modern poetry from Dada and Surrealism to the work of contemporary poets such as Yves Bonnefoy, Jacques Dupin and Michel Deguy, and of modern theatre from Jarry to Beckett, Ionesco and beyond.

3900A/3901B La littérature canadienne française/French-Canadian Literature: lecture 3 hours, B. Bednarski, I. Oora. In-depth study of a few major works of French-Canadian literature with emphasis on the period from 1945 to the present day. Each class deals with a specific genre (e.g. 3900A Poetry, 3901B Novel) and choice of genre may differ from year to year.

3910A/3910B Etudes acadiennes/Acadian Studies: lecture 3 hours, H. Runte. Critical investigation into the historical, socio-cultural, linguistic and literary significance of past and present Acadian writing. May follow Acadian Studies (2021A/2022B).

4001A/4002B Histoire de la langue française/History of the French Language: lecture 3 hours, H. Runte. 4001A *Histoire du français — Moyen Age/History of French — The Middle Ages:* Advanced research into selected topics in Old and Middle French — manuscript studies; paligraphy; historical phonetics, morphology and syntax; the cultural-literary context of linguistic development; etc. 4002B *Histoire du français — Époque moderne/History of the French — The Modern Period:* Advanced research into selected topics — the emergence of a national language, the problem of orthography, usage and the development of normative grammars, the evolution of vocabulary, epochal phenomena (Rhetoriciens, the Baroque, Préciosité, the Revolution, scientific French, argot), etc.

4010A/4010B Grands Linguistes du vingtième siècle/Great Linguists of the 20th Century: lecture 3 hours, R. Kocourek. How did French-speaking linguists of the 20th century contribute to the understanding of the language? Interpretation of passages by six linguists (such as Saussure, Bally, Tesnière, Guillaume, Gougenheim, Martinet) will show how interesting questions were asked, and how new answers and methods enriched the field of language study. Class reports, discussions, assignments.

4011A/4011B Lexicologie/Lexicology: lecture 3 hours, R. Kocourek. How can French vocabulary be studied and structured? What is its formation (derivation, composition, metaphor, borrowing, abbreviation, etc.), its meaning, its development? Class reports, discussions and lexical assignments are important components of this class.

4012A/4012B The Structure of French: lecture 3 hours, R. Kocourek. Students will help select, from the many problems of French phonology, graphonomy, grammar, lexical formation and semantics, the ten subjects to be examined in detail. Lectures and readings will be complemented by students' reports. Culturally relevant excerpts from literary masterpieces will be used for discussion and assignments.

4015R Cours supérieur de version/Advanced Translation into English: lecture 3 hours, W.T. Gordon. Development of awareness of the expressive resources of French by dealing with problems and techniques of translation into English. The texts of weekly translation assignments, which account for 50% of the final grade, progress from expository and descriptive prose to poetry. Topics introduced through lectures and oral class reports include categories of translation, style, context and choice, context and meaning, ambiguity, verb systems of French and English, textual redundancy, simultaneous interpretation, and translation of metaphors. Occasionally, alternate English translations of a French text are studied for revealing contrasts.

4041A/4042B Cours avancé de stylistique littéraire/Advanced Composition: lecture 3 hours, members of the department. These classes present an in-depth study of style. The class has as a goal to teach students to express themselves with elegance and refinement.

4300A/4301B Le roman et la poésie courtois/Courtly Novels and Poetry: lecture 3 hours, H. Runte. *Le Roman courtois/The Courtly Novel:* A close literary analysis of mediaeval French Arthurian romances. Texts in bilingual (Old French/French) editions. *La Poésie courtoise/Courtly Poetry:* A stylistic and socio-cultural study of French courtly love poetry from the 9th to the 15th centuries. Early texts in modern French translations.

4400A/4400B Poésie de la renaissance: Théorie et pratique/Renaissance Poetry: Theory and Practice: lecture 3 hours, N. Trèves. A seminar-style study of poetic theories and practices from the *Rhetoriciens* to the *Pléiade* and to Malherbe. French 3400 recommended.

4401A/4401B La pensée philosophique, politique et morale de la renaissance/Philosophical, Political and Moral Thought of the Renaissance: lecture 3 hours, N. Trèves. An in-depth study of major currents of Renaissance thought: humanism, scientific awakening, the beginning of *littérature engagée*, and the emergence of the *moralistes* and *philosophes*.

4500A/4501B L'aventure intellectuelle du grand siècle/The Intellectual Adventure of French Classicism: lecture 3 hours, K. Waterson. The focus of these classes, which examine, at an advanced level, a major figure, movement, genre or theme in 17th-century French literature, will vary frequently. Please consult the professor for detailed information on the topic to be treated in any given semester.

4600A/4601B Le siècle des lumières: forme et philosophie/The Enlightenment: Form and Philosophy: lecture 3 hours, members of the department. An in-depth study of the French Enlightenment which treats some of the longer works by major authors and introduces the student to secondary authors whose works are also of significant literary, philosophical or historical value. The study is unified by an examination of recurring philosophical ideas and literary themes important to understanding the development of new genres and styles. Please consult the professor for information on the theme treated and the works to be studied in any given semester.

4700A/4701B Du romantisme au réalisme/From Romanticism to Realism: lecture 3 hours, J. Brown. 4700A *La révolution romantique/The Romantic Revolution:* Romanticism is viewed primarily as a rebellious and creative force which greatly contributed to reshape traditional society. The origins, main themes and trends of the movement are studied with an attempt to show Romanticism as a European movement, the impact of which was felt in fields beyond the boundaries of literature. Classes are conducted as seminars; students are required to do a great deal of personal research, to prepare *exposés* and to participate in class discussions. The choice of texts depends largely on the students' previous experience: they include works by Mme de Staël, Chateaubriand, Lamartine, Hugo, Vigny, G. Sand and others. 4701B *Le roman/The Novel:* Intensive study of the work of a major novelist of the 19th century: e.g., Stendhal, Flaubert, Balzac, Zola; a study of his place in the development of the novel and of his contribution to the genre. The class involves a considerable amount of reading and regular reports and *exposés*.

4710A/4710B Du symbolisme au surréalisme/From Symbolism to Surrealism: lecture 3 hours, M. Bishop. Analysis of the evolution of French literature from the various symbolist manners of Verlaine, Rimbaud, Mallarmé, Lautréamont and Laforgue, through the period of Jarry and Dada, to the aspirations and paradoxes of Surrealism viewed, principally, through the work of Breton, Eluard, Aragon and Desnos.

4800A/4801B Le théâtre et le roman modernes/Modern Theatre and Novel: lecture 3 hours, D. Lawrence. 4800A *Le théâtre de Camus et de Claudel/The Theatre of Camus and Claudel:* In all, eight plays are studied, four from each author. The works offer a contrast in philosophical content and reveal technical problems involved in their stage presentation. 4801B

Le nouveau Roman/Anti-novels of the 20th Century: In this class we are mainly interested in fictional techniques: how the author creates his illusion. Each of the works selected for detailed study is important due to the author's rejection of conventional ideas regarding the form of the novel.

4811A/4811B *La poésie francophone de Perse et Char à Senghor et Césaire/Francophone Poetry from Perse and Char to Senghor and Césaire:* lecture 3 hours, M. Bishop. Discussion of the works of five or six major francophone poets of the modern period, chosen from: Perse, Reverdy, Claudel, Char, Frénaud, Senghor, Tchicaya, Césaire, Glessant, Miron and others.

4902A/4903B *Ecrivains Québécois Contemporains/ Contemporary Québec Writers:* lecture 3 hours, B. Bednarski, I. Oore.

4994A/4995B, 4996A/4997B, 4998A/4999B *Recherches Indépendantes/Independent Research:* May only be taken with the approval of the Chairperson as well as that of the faculty member concerned.

Graduate Level Courses

Classes in the 5000 series are for graduate students who, for more detailed information, should consult the Graduate Calendar and arrange to meet the Graduate Coordinator. Special seminars and graduate colloquia are arranged each semester. Students may obtain current information as to topics, dates, and places, in the Departmental office.

Geology

Chairperson of Department
P. Ryall

Undergraduate Advisor
M.R. Gibling

Graduate Advisor
R.A. Jamieson

Emeritus Professors
H.B.S. Cooke, MSc, DSc (Witwatersrand)
C.G.I. Friedlaender, PhD (Zurich)

Professors
D.B. Clarke, BSc, MA (Tor.), PhD (Edin.)
J.M. Hall, BSc (Wales), PhD, DIC (Lond.)
F. Medloll, PhD (Parma)
P.T. Robinson, BSc (Mich.), PhD (Calif.), Mobil Professor of Geology
M. Sallisbury, BSc (MIT), PhD (Washington), NSERC/Petro Canada Professor
P.E. Schenk, BSc (W.Ont.), MSc, PhD (Wisc.)
M. Zentilli, BSc (Chile), PhD (Queen's)

Associate Professors
R. Boyd, BSc, PhD (Sydney)
M.R. Gibling, BA (Oxon.), PhD (Ottawa)
R.A. Jamieson, BSc (Dal), PhD, (MUN)
G.K. Muecke, BSc, MSc (Alta.), DPhil (Oxon.)
P.H. Reynolds, BSc (Tor.), PhD (UBC), (jointly with Physics)
P.J.C. Ryall, BSc (Dal), MSc (Alta.), PhD (Dal)

Assistant Professors
N. Culshaw, BA (Keele), PhD (Ottawa)
D.B. Scott, BSc (Wash.), PhD (Dal)

Instructor
P. Wallace, BSc, MSc (McM)

CIDA/NSERC Research Fellow
S.O. Akande, BSc (Ibadan), MSc (Western), PhD (Dal)

Research Associate
C. Beaumont (Major appointment in Oceanography Department)

Adjunct Professors
F. Gradstein, BA, MSc, PhD (Utrecht)
P. Hacquebard, PhD (Groningen)
L. Jansa, BSc, MSc (Masaryk), PhD (Charles)
P.J. Mudle, BSc (Leicester), PhD (Dal)
D.J.W. Piper, BSc, PhD (Cambridge)

Honorary Research Associates
P.S. Giles, BSc, MSc (Acadia), PhD (W. Ont.)
F.J. Hein, BSc (Ill.), MSc, PhD (McMaster)
P.R. Hill, BA (Oxon), PhD (Dal)
C.E. Keen, BSc, MSc (Dal), PhD (Cambridge)
C.T. Schafer, BSc, MSc, PhD (New York)

Geology is for those who wonder about the earth. How was it made? What changes it now? Where do we seek oil? Or nickel? What moves continents? Its study is of enormous economic importance to Canada — and of course to the world as a whole — and is intellectually exciting.

The Halifax-Dartmouth region is one of the best places in Canada in which to study the earth. The departments of geology, oceanography, and physics at Dalhousie are all involved, as are several government agencies in the region.

Classes in geology are offered for different types of students. Some will want to make a career in some aspect of the study of the earth — as geologists, geochemists, geophysicists, oceanographers or teachers. Some may need instruction in geology as an aid to other disciplines: for example, a mining engineer, or a physicist interested in X-ray diffraction spectrometry, or a chemist interested in crystallography, or a biologist interested in protozoa. Students may be interested in a geology degree before they take a professional qualification such as law or business administration. Those whose prime interest is the humanities or social sciences will find that the introductory class in geology stimulates their awareness of their surroundings, and their appreciation of the many facets of science.

Careers open to geologists are many and varied. The largest number of job opportunities is provided by industry, primarily in the search for the production of raw materials. Geologists competent in mathematics might be involved in processing and analyzing data using digital computers; those interested in going to sea might work with marine institutions. The federal and provincial governments also employ geologists.

High School Preparation

Students in high schools who plan a career in sciences involving the earth, such as geology or geophysics, should note that it is sensible to try to have the following subjects in Grades XI and XII: Grade XII mathematics, plus two of Chemistry, Physics and Biology. (The third should have been taken in Grade XI if possible). Note that these are *not* prerequisites, but are strongly advised. The student should aim to make up deficiencies in high school preparation in the first year at Dalhousie. Note too that, at present, Grade XII Geology is *not* counted as equivalent to a 1000-level class in Geology at Dalhousie.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Undergraduate Programs

Programs and classes for those whose major is not geology

These classes are specially designed for those who want to know something about the earth, but whose major field of study at Dalhousie will

be elsewhere; an economics student, concerned with resources; a history student, interested in the role played by Canada's geological frame in the development of transportation; a biology student whose fauna and flora inhabit the mud of the sea floor. These classes are:

Geology 1040A/1050B, an evening class especially designed for students in the humanities and social sciences.

There is one evening class, 2410B, open to all with 1000, or good grades in 1040A. This particular class is not normally suitable for students whose major is geology.

For engineering students and science students in other disciplines: Biologists: 1000, 2410B, 2200R; Chemists: 1000, 2100, 3010A, 3020B, 4380A; Physicists and mathematicians: 1000, 2050B, 3130B, 4270A, 4280B, and 4290B.

General Degree Program

Three-year programs with a major in Geology are suitable for students who intend to take further professional training or to enter fields where they are likely to need their geological training as background, but are of little value as a qualification for a professional career in the earth sciences.

One program recommended for students undertaking a general BSc with a major in Geology is the first three years of the concentrated honours program (see the table below). This program may not be suitable for all students, and others can be arranged. All students intending to major in geology are required to take Geology 1000. Geology 1000 is offered during summer school in alternate years (offered in 1988). The core program for a major in geology must include Geology 2100, 2110A, 2200, 2050B 3010A and 3020B. Faculty regulations permit a student graduating with a general degree with a major in Geology to convert it to an honours degree by certificate. Note that Geology 2410B does not form a part of the core program for concentrated honours in Geology and cannot count as a credit towards an honours degree although it can form part of the General Degree Program.

Students undertaking a general degree with a major in Geology must attend an approved field school, normally the first of the two field schools offered by the department. It should normally be taken at the end of second year.

Twenty Credit Major A 20-Credit Advanced Major degree is offered in Geology. This is, in essence, an "enriched" General Degree requiring the student to take twelve of twenty credits beyond the 1000 level. Six to nine of the classes beyond the 1000 level must be in the major and three at the 3000 level or above. Students are required to earn a minimum of sixteen merit points for this degree. Students should also note that a grade of C- or better in a third year prerequisite class is required for registration in a fourth year class. Where several classes are listed as prerequisites and a grade of C- was not obtained in all, the instructors consent may be the basis for admission.

Students undertaking this Twenty Credit Major degree with a geology major must attend an approved field school.

Honours degree programs

An honours degree is almost essential for any professional work in earth sciences, and for graduate study. Students must take the second and third year classes of the Geology core program listed below. The recommended program is:

Year 1: Geology 1000; Mathematics 1000A/1010B/1500R; *one class in two of Physics, Chemistry, Biology;* an elective (normally selected to meet the faculty requirement for a class in which writing ability is emphasized). Note that Geology 2050B fits best in Year 2 of the program and that it has Physics 1100 and Mathematics as prerequisites. Physics and Mathematics should therefore be included in Year 1 if possible.

Year 2: Core program: Geology 2100, 2200, 2110A; *one class in two of Physics, Chemistry, Biology, Mathematics;* and an elective. Geology 2050B is required but students not in the geophysics stream may elect to take this class in the 3rd year.

Year 3: Core program: Geology 3010A, 3020B, 3140A, 3300R; *plus one*

class in Physics, Chemistry, Biology, Mathematics; and an elective. Students in the geophysics stream will take 2050B in year 2 and 3130B in year 3.

Year 4: Geology 4200; 4350B, other 4000 level classes in Geology; and an elective.

A student who decides at the end of first year to take honours in Geology but has not taken Geology 1000 in that year may take Geology 1000 if available, in the summer session or may take 1000 and 2100 in Year 2 if he has obtained a B+ standing in Year 1. A student who has taken Geology 1000, but whose program does not meet the other requirements, should consult the department.

A student must normally complete one class in each of Biology, Chemistry, Physics, and Mathematics by the end of his second year, and a second class in one of these subjects. The recommended first classes are Physics 1100, Chemistry 1100, Mathematics 1000/1010, 1500R, Biology 1000 or 2000. Recommended second classes are: Biology 2000 or 3321; Chemistry 2110B, 2200A, 2300A, 2340B; Physics 2200A/2210B or 2300A/2330B; Mathematics 2000, 2200, 1060/1070, 1300R, 2270B.

Students wishing to take combined honours in geology and another subject should discuss their program in detail with the undergraduate advisor.

Suggestions for the first three years of study are given below:

Combined honours with Biology: Students should follow the Geology honours program in Years 1-3, including Geology 2200 and 2110A; but should take either a Biology class, or Geology 4500R in place of Geology 3010A/3020B. Suggested Biology classes are 1000 or 2000 in Year 1, 2040A/B, and 2080A/B in Year 2, and 2000 or 3321 or 3323 in Year 3.

Combined honours with Physics (a possible geophysics program): Students should follow the Geology honours program in Years 1-3, including Geology 2050B and 3130B, but should take a Physics class in place of Geology 3010A/3020B. Suggested Physics classes are 1100 in Year 1, 2300A/2330B in Year 2, and two of 2200A/2210B or 3000A/3010B or 3200A/3210B and 3160A/3170B in Year 3. Math 2000 should also be taken in either Year 2 or 3.

Combined honours with Chemistry: Students should follow the Geology honours programs in Years 1-3, but should take 3000 level Chemistry classes in place of Geology 3300R and 2110A/3130B. Suggested Chemistry classes are 1100 in Year 1; 2200A/2110B and 2300A/2340B or 2400 in Year 2; any 3000 level Chemistry in Year 3.

Students in combined honours and unconcentrated honours programs should attend the field camp, normally taken at the end of the second year.

Field Work

Students in a concentrated honours program must complete one field camp at the end of second year and one at the beginning of fourth year. The camp at the end of the second year runs for ten days early in May or September. It is designed to introduce the simpler techniques used in geological mapping. The field trip at the beginning of fourth year is of seven to fourteen days duration. It is designed to give the student an introduction to regional geology and serves as a practical synthesis of specific course material. Normally the trip will take place within Atlantic Canada, but if additional funds are available a more remote location could be selected. A geophysics field school is held in early May and is an integral part of Geology 3130B. Field excursions are a part of several classes and are conducted at appropriate times during the session. In addition, some optional field excursions may be held each year.

Students are charged a contribution towards the cost of all field excursions. Charges for those trips that are held, during the session, as part of a class are payable at registration. Due to increased costs and uncertainty of external funding, fees for individual field excursions are fixed yearly. (Please consult department.) The charges for optional field trips are notified, and payable, several months in advance. Overpayments, in excess of \$5.00, are reimbursed to the student.

Thesis and Honours Qualifying Examination

A student in an honours degree program may choose one of three options:

A thesis as Geology 4200, followed by an oral examination, based on the general subject area of the thesis. This oral examination then counts as the honours comprehensive examination.

A thesis as Geology 4200, and a written comprehensive examination, reflecting the content of the 3000 and 4000 level classes which the student has taken.

An honours thesis in addition to five regular classes in the fourth year, in which case the thesis will count as the honours comprehensive examination.

Theses must be completed by the second Monday in March of the fourth year. Students who complete them after this date must re-register for Geology 4200 for the following academic year, pay the fees for that class, and graduate at the spring convocation of that academic year.

Minimum Grades

Admission into the second year of the Geology program is conditional upon a minimum grade of B- in Geology 1000.

A grade of D in a later Geology class precludes admission to classes for which that one is a prerequisite.

Classes Offered

1000 Introduction to Geology: lecture 3 hours, lab 3 hours, M. Salisbury, R. Boyd, M.R. Gibling and staff. An introductory class for students who plan to take a degree in geology, or in another science, or in engineering. The lecture material covers the whole field of geology including the origin of the solar system, earth history, mountain formation, volcanoes, continental drift, natural resources such as metals and petroleum, and environmental pollution. The laboratory component involves work with minerals, rocks, fossils, and geological maps as well as a number of field excursions to observe local geological features. Students who wish to major in Geology but have unresolvable scheduling conflicts with Geology 1000 should consult the undergraduate advisor.

1040A/1050B The Earth and Society: lecture 3 hours, lab 1 hour per week, D.B. Scott. These classes are two parts of a single unit designed for students in the social sciences and humanities. Geology 1040A deals with the nature and structure of the earth and with processes acting thereon, but only in sufficient depth to provide background for understanding of the matters discussed in Geology 1050B, without detailed study of rocks and minerals. Previous mathematics, physics, or chemistry is not required. Students with good grades in this class may enter Geology 2410B. Geology 1050B applies to geological concepts learned in 1040A to consider the influence of geological factors upon economic, social, and political decisions of the past and future. Geology 1040A is a prerequisite.

2050B Principles of Geophysics: lecture 3 hours, lab 1 hour, P.J.C. Ryall. Prerequisites: Physics 1100 and a first year class in mathematics. Geophysical methods are increasingly important in geological studies. Understanding the principles of the various techniques (seismics, gravity, magnetics, electromagnetics), their powers, and limitations, provides a foundation for later more practical classes.

2100 Introduction to Mineralogy and Geochemistry: lecture 3 hours, lab 3 hours, D.B. Clarke. Prerequisite: Geology 1000. This class deals with the ways in which the chemical components of rocks are organized into crystalline compounds (mineralogy) and the ways in which chemical changes affect rocks (geochemistry). The lectures cover the crystallographic principles which determine the regular internal and external structure of minerals, the chemistry and structure of the major groups of rock-forming minerals, the ways in which minerals interact with melts, with other minerals and with solutions in geological environments, and practical applications of these principles to mineral exploration. The labs cover the identification and description of minerals both in hand specimen and with the use of the petrographic microscope.

2110A Field Methods: lecture 3 hours, lab 3 hours, N. Culshaw. Prerequisite: Geology 1000. This is intended as an introduction to field techniques useful to the practising geologist, particularly those concepts essential for the accurate field description and identification of rocks and the use and construction of geological maps. Geophysical field techniques and elementary structural geology are also considered.

2200 Sedimentology and Biostratigraphy I: lecture 3 hours, lab 3 hours, M. R. Gibling, R. Boyd, F. Medioli, P.E. Schenk. Prerequisite: Geology 1000 or equivalent. This class studies the basic materials of sedimentary geology: modern sediments and processes of deposition, ancient siliciclastic and carbonate rocks, and macrofossil morphology and taxonomy. The principles of stratigraphy are studied in order to subdivide the strata into mappable units and understand the evolution of sediments and fossils through geological time.

2410B Environmental and Resource Geology: lecture, lab 3 hours, one evening per week, P. Robinson, M. Salisbury. Prerequisite: any first level class in geology. Geology lies behind many of the environmental problems facing man today. In this class we consider topics such as energy and mineral resources, geological hazards such as earthquakes, landslides, and volcanic eruptions, the relevance of geology in the fields of foundation engineering, pollution and waste disposal, and the role that geology has to play in planning urban areas, especially in Nova Scotia.

0001 Field School. The course provides ten days of training in geological field methods. A wide range of rock types are examined in the field, and are described using traverses, measured sections, and outcrop and structural maps. An individual field mapping project forms part of the course. For students taking combined honours with Physics, participation in the geophysics field school (part of Geology 3130B) is considered equivalent. Although the field school is a non-credit course, it appears on transcripts and is a compulsory part of the geology program.

3010A Igneous Petrology: lecture 3 hours, lab 3 hours, P.T. Robinson. Prerequisite: Geology 2100. The study of the field relations, mineralogy, texture, and geochemistry of volcanic and plutonic rocks. Lectures discuss the classification, graphical representation, means of production, differentiation, and emplacement of igneous rocks, and their grouping into co-magmatic provinces. Labs involve using the petrographic microscope to determine the crystallization history of igneous rocks through their mineralogy and texture.

3020B Metamorphic Petrology: lecture 3 hours, lab 3 hours, R. Jamieson. Prerequisites: Geology 2100R, 3010A. Metamorphic petrology is the study of the way in which pre-existing igneous, sedimentary, and metamorphic rocks respond to changes in pressure, temperature, and geochemical environment. The mechanisms of metamorphic reactions and recrystallizations, the stability relations of minerals and mineral assemblages under various physical and chemical conditions, and the concept of metamorphic facies series are discussed. In the labs, microscopic mineralogy and texture are used to decipher the metamorphic history of rocks.

3130B Exploration Geophysics: lecture 3 hours, tutorial 3 hours (every second week), P.H. Reynolds. Prerequisite: Geology 2050B. This is a class in exploration geophysics relating largely to the mining industry and designed to follow Geology 2050B. It is a normal prerequisite for the several 4000 level geophysics classes. Topics include: electrical properties of rocks; resistivity, self-potential and induced polarization exploration methods; electromagnetic exploration; radioactivity as an exploration tool; geophysical well logging; integrated geophysical problems. The geophysics field school normally conducted during the last week of April is an integral part of this class.

3140A Structural Geology: lecture 3 hours, lab 3 hours, N. Culshaw. Prerequisites: Geology 2100R, 2110A, 2200R. An introduction to the behaviour of rocks during deformation, stressing the geometrical aspects of rock structures on the scale normally encountered by the exploration geologist, and their interpretation. The laboratory exercises in the construction and interpretation of geological maps develop skill in the interpretation and graphical representation of structures in three dimensions.

3300 Sedimentology and Biostratigraphy II: lecture 3 hours, lab 3 hours, P.E. Schenk, R. Boyd, M.R. Gibling, F. Medioli, D.B. Scott. Prerequisite: Geology 2200R. This course is concerned with the generation of siliciclastic, glacial, carbonate and evaporite sediments in their environments of deposition. Weekend field trips to selected environments occupy the first

month of class laboratory sessions. A second component of the course involves micropaleontology and includes a general, systematic study of major groups of microfossils (mainly foraminifera, ostracoda and calcareous nanoplankton). Particular emphasis is placed on recent microfauna and laboratory techniques for sampling and studying them.

0002 Advanced Field School: The course is a field excursion of 7 to 14 days duration which is designed to give the student a regional perspective of Appalachian geology, including the metamorphic terranes, igneous intrusions and sedimentary basins of Precambrian to Mesozoic age. Classic field localities in eastern North America will be discussed. Exceptionally, a more distant location may be selected. Although the field school is a non-credit course, it appears on transcripts and is compulsory for all Honours students.

4084C Pleistocene Biogeography: lab 3 hours, J.G. Ogden III. Prerequisite: at least two credits in Biology or Geology. Cross-listed with Biology 4084C.

4150 Economic Geology: lecture 3 hours, lab 3 hours, M. Zentilli. Prerequisites: 3010A, 3020B, 3140A. For those interested in mineral exploration. The class starts with a brief introduction to principles of exploration and mining geology, followed by a review of the processes leading to the formation of metallic mineral deposits. Later, and developed mainly as seminars, important examples of ore deposits are discussed with emphasis on their total geological environment and the development of conceptual models for their genesis.

4155B Fossil Fuel Geology: lecture 3 hours, lab 3 hours, P. Hacquebard and staff. Prerequisites: Completion of 3rd year core courses. This course will consider the geology of hydrocarbons. One third of the term will consist of a self-contained course on the geology and petrology of coal (Hacquebard). Consideration of the geology of petroleum will make up the bulk of the course. Topics covered will include source rocks, maturation, migration, reservoirs, entrapment, and preservation of hydrocarbons. An introduction to the geophysical and geochemical characteristics of petroleum reservoirs will be offered as well as an overview of the geology of oil shale and tar sands. Students cannot receive credit for both 4150R and 4155B.

4200 Honours Thesis: A research project and thesis are a normal part of the Honours BSc program and may be counted as a class under certain conditions. Special regulations govern this, and the student should consult the undergraduate advisor.

4270A Applied Geophysics: lecture 3 hours, P.J.C. Ryall. Prerequisites: Geology 2050B, 3130B, or instructor's consent. The application of geophysical methods to petroleum and mineral exploration as introduced in 2050B and 3130B is here treated at a more advanced level. Assignments attempt to involve the student in interpretation of realistic geophysical data.

4280B Marine Geophysics: lecture 3 hours, lab and occasional sea trip to be arranged, P.J.C. Ryall, K. Loudon (Oceanography). Prerequisites: Geology 2050B, 3130B, 4270A or instructor's consent. 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.

4290A Geodynamics: lecture 3 hours, C. Beaumont (Oceanography). Prerequisites: Geology 2050B, 3130B and 4270A, or instructor's consent. Essential for geology or physics students who intend to be geophysicists, the class covers the physical state and behaviour of the Earth as a whole. It shows how studies of geomagnetism, the Earth's electrical conductivity, earthquake seismology, the Earth's gravity field and the loss of heat from the Earth contribute to our present detailed picture of the Earth's interior. Methods of absolute age determination and other isotopic studies together with paleomagnetism allow us to follow aspects of the Earth's evolution to its present state.

4350B Tectonics: lecture 3 hours, J.M. Hall, and staff. Prerequisites:

Completion of third year core courses. This is a required class for Geology Honours students. It is intended to synthesize the various aspects of geology treated in more specialized courses through an analysis of those processes which have shaped the earth's crust in the past and continue to do so today. Part of the course deals with modern plate tectonic processes as observed at active spreading centres, subduction zones, and transform faults. The rest of the course examines the structure, stratigraphy, and petrology of mountain belts like the Cordillera and the Appalachians in order to determine what processes, including plate tectonic processes, created them.

4380A Advanced Geochemistry: lecture 3 hours, lab 3 hours, G.K. Muecke. Prerequisites: Geology 3010A, 3020B. Geochemical aspects of ore formation and the exploration for economic mineral deposits are covered. How principles of crystal chemistry, isotope fractionation, thermodynamics, solution chemistry, etc., apply to the investigation of hydrothermal solutions, models of ore deposition and redistribution, and geochemical cycles is demonstrated. Geochemical surveys, exogenic element dispersion and the origin and evaluation of geochemical anomalies are also discussed. In the laboratory the most common methods of rock and mineral analysis and the processing of geochemical data are introduced.

4390B Advanced Igneous Petrology: lecture 3 hours, R.A. Jamieson. Prerequisites: Geology 3010A, 3020B, (not offered in 1987-88). This class deals with advanced topics in igneous and metamorphic petrology. The exact content of the class varies from year to year depending on the instructor. A project involving lab work outside the scheduled lecture time is normally part of the course.

4400B Advanced Metamorphic Petrology: lecture 3 hours, R.A. Jamieson. Prerequisites: Geology 3010A, 3020B. Metamorphic rocks are considered as equilibrium systems. The role of fluids in metamorphism, metasomatism and mass transport, and kinetics of metamorphic process are discussed. Laboratory projects and special topics are chosen to suit the student's interests.

4500 Sedimentology and Biostratigraphy III: lecture 3 hours, F.S. Medico, R. Boyd, M.R. Gibling, P.E. Schenk, D.B. Scott. Prerequisite: Geology 3300. This course is designed to present advanced topics of current interest in sedimentology and biostratigraphy. It builds on the basic elements presented in years II and III and provides a broad synthesis approach to topics such as: sedimentary tectonics and basin analysis in the context of plate-tectonic theory; the diagenesis of sediments during basin filling; seismic stratigraphy and sedimentation in the world's oceans; Quaternary paleo-oceanography and faunal distribution; and the evolution of North American fossils and sediments through time.

4510A/4511B Directed Reading: Permission of the department required. This class is intended to permit further study of a specific topic of interest, or to correct a deficiency in a student's program.

Seminars

Department seminars are arranged during the term. Other specialized seminars are arranged on an ad hoc basis.

Graduate Classes

Some graduate classes may be suitable. Please consult the Graduate Calendar and seek advice from the Department.

German

Chairperson of Department
H.G. Schwarz

Professors
F.W. Gaede, PhD (Freib.)
P. Michelsen, PhD (Gott.)
H.G. Schwarz, MA (Munich), PhD (McG)

Associate Professor
D. Steffen, PhD (Gott.)

Assistant Professor
E.A. Spence, BA (Hons), MA, PhD (UBC) *Undergraduate Advisor*

Lecturer
G. Josenhans

German, the most widely used language in Central Europe, is spoken by approximately 100 million people as their native tongue in Austria, the two Germanies, Switzerland and some parts of Eastern Europe. The cultural, economic, and scientific role of the German-speaking countries makes the knowledge of German indispensable to the study of most academic disciplines.

The departmental program "German Studies" is the investigation of German culture and its place in the formation of the modern world. The program concentrates on significant aspects of the cultural tradition of the German-speaking countries. From Luther to Nietzsche, Freud, and Marx, German writers have moved men and nations to change the course of the world. The literary and intellectual development of Germany culminated around 1800 in the epoch of Classicism. The authors of this epoch (Lessing, Herder, Hegel, Goethe, Schiller) founded their writings on a thorough knowledge of the cultural tradition of Europe, especially Greek culture. As scientists, historians, and politicians they described in their literary works, problems and questions of a universal nature. They became the first historians of literature and created the discipline of aesthetics. The universality of the authors of German classicism explains their present actuality and makes the study of German important and attractive.

Major or honours students may, with the approval of the Department of German, take up to one year (5 full credits) of work at a University in a German-speaking country and receive credit at Dalhousie.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

BA
Students concentrating on German should take a minimum of four German classes beyond the 1000 level.

BA with Honours in German
Students considering an honours course are advised to consult the Department of German.

Combined Honours
It is possible for a student to take an honours degree combining German with another subject. Any student intending to take such a combined honours degree should consult with the two respective departments to arrange the details of such a program.

Program for Future Teachers of German
The Department also offers a special one-year program in conjunction with

the Department of Education for third-year students of German. All courses under this program must be taken as a unit. Any student desiring to pursue this program should consult with the Department.

Prerequisite: Successful completion of an intermediate German Class (such as German 2000) or equivalent.

Structure of Program: (a) intensive language training, (b) philology and linguistics, (c) teaching methods, and (d) work in German civilization.

Classes marked * are not offered every year. Please consult the timetable on registration to determine if this class is offered.

German Language Studies

Introductory Classes Offered

1000 German for Beginners: lecture 3 hours, members of the Department. German 1000 is a seminar class for beginners only, and no previous knowledge is required. Its equivalent is two years of German in high school with a final mark of 75% or better. The class emphasizes the spoken language, and provides the student with a thorough knowledge of basic grammar. Language laboratory work and attendance of small conversation groups are required. The class fulfills the writing requirement for first-year students. German 1000 or its equivalent is a prerequisite for all classes on the 2000 level.

1010 German for Beginners: lecture 3 hours, members of the Department. An introductory language class, using the same methods and goals as German 1000. This class does not fulfill the writing requirement for beginning students.

1050 German Reading Course for Beginners: lecture 3 hours, H.G. Schwarz. Students acquire a knowledge of basic vocabulary and grammatical structures sufficient to understand newspapers and texts in the humanities and sciences. No previous knowledge of German is required. The class is taught in English. For purposes of admission to advanced classes in German it is equivalent to German 1000. This class fulfills the writing requirement for first-year students.

1060 German Reading Course for Beginners: lecture 3 hours, H.G. Schwarz. An introductory reading class using the same methods and goals as German 1050. This class does not fulfill the writing requirement for beginning students.

1000/1050 Intensified German: lecture 6 hours, lab 2 hours. The combination of German 1000 and 1050 is recommended for students who desire rapid progress in the German language.

Intermediate Classes

Intermediate classes are based on German 1000, high school German Grade 10, 11, 12 or an equivalent basic knowledge.

A combination of German 2000 and German 2020 serves as an accelerated intermediate German course and is designed for students who want to make rapid progress in the language.

2000 Intermediate German: lecture 3 hours, G. Josenhans, H.G. Schwarz, E. Spence. The main aim is to develop a certain degree of speaking fluency as well as reading and writing skills. Language Laboratory work is required. Small conversation classes once a week as an aid to speaking fluency are compulsory.

***2010 Scientific German:** lecture 3 hours, E. Spence. Prerequisite: German 1000 or equivalent. Primarily a reading and translation class designed to enable science students to read scientific papers, reports, and articles in scientific journals in the original language. A reading knowledge of German is a prerequisite for many PhD degrees.

***2020 Exercises in Translation and Composition:** lecture 2 hours, G. Josenhans. Prerequisite: German 1000 or equivalent. English and German texts from various periods of different types will be translated. These translations lead to the discussion of specific difficulties of grammar and

construction. Students must prepare translations or compositions for each class. Dictations are given once a week. The class is conducted mainly in German.

2030 Advanced German: lecture 3 hours, G. Joenhans. Prerequisite: German 2000 or equivalent. Readings, essays and discussions will promote fluency in the language on the advanced level.

Study of German Literature and Culture

***2160 Goethe's Faust:** lecture 2 hours.

2200 Introduction to German Literature: lecture 2 hours, E.A. Spence. A study of texts representing major periods of German Literature. Special emphasis is on the interaction between literature, society and other forms of art. The class also serves as an introduction to literary criticism.

***2300 In Pursuit of Freedom from Luther to Nietzsche:** lecture 2 hours, D. Steffen. A study of major modern writers with special emphasis on Hegel's "Philosophy of Right."

***2350 Germanic and Greek Mythology:** lecture 2 hours.

2400 German Art and Literature: lecture 3 hours, H.G. Schwarz. This class gives an introduction to modern German Art and Literature. Special emphasis is on the interaction between art and literature, particularly the themes and styles shared by visual and literary expression during the various epochs of modernity.

***2450 Kant and the History of German Idealism:** seminar 2 hours, D. Steffen. A study of Kant's relation to modern Rationalism and Empiricism, and an inquiry into the principles of Idealism.

***3050 History and Theory of the German Novel:** seminar 2 hours, F. Gaede. Representative works from the Baroque Age to the 20th Century are studied and the principles of the genre discussed.

***3100 German Literature and Thought from Reformation to Enlightenment:** lecture 2 hours, F. Gaede. A study of German literature between the 16th and 18th centuries as a direct reflection of the important religious, social and philosophical developments after the Reformation and during Absolutism.

***3150 Goethe and the Enlightenment:** lecture 2 hours, D. Steffen. A study of German literature and thought of the time which preceded and witnessed the great revolutions of the 18th century.

***3200 Goethe and Romanticism:** lecture 2 hours, D. Steffen. A study of Goethe, Hölderlin, Kleist, and Novalis.

***3240 Literature of the 19th Century:** lecture 2 hours, H.G. Schwarz. A discussion of essential literary texts which throw a critical light on the growing forces of materialism and positivism.

***3250 Modern German Literature:** lecture 2 hours, H.G. Schwarz. 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.

***3350 Hegel's Aesthetics and the Ancient:** seminar 2 hours, F. Gaede.

***3400 Heidegger and German Idealism:** seminar 2 hours.

***3450 Hegel's Philosophy of Nature:** seminar 2 hours.

***4100 Aesthetic Theory:** seminar 2 hours, F. Gaede. An historical study of the development of literary theory.

***4200 Seminar on Hegel's Phenomenology of Spirit:** 2 hours, D. Steffen. *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.

***4250 Studies in German Idealism**

Graduate Studies

The Department offers a graduate program leading to the MA degree. Details of the MA program are given in the Calendar of the Faculty of Graduate Studies.

Health Education

The course of study for the Bachelor of Science (Health Education) degree is described in the calendar entry for the School of Recreation, Physical and Health Education. The following health education course is approved as an elective for students in Arts and Science.

HE4412A/B Human Sexuality: lecture and discussion 3 credit hours, E. Belzer. Prerequisite: Completion of at least one year of university studies. This class is concerned with basic knowledge and understandings regarding biomedical, psychological, historical, legal, religious, semantic and comparative cultural aspects of human sexuality from conception to senility.

History

Chairperson of Department

G.D. Taylor

Professors

P. Burroughs, BA, PhD (Lond.), FR HistS
M.S. Cross, BA, MA, PhD (Tor.)
J. Farley, MSc (UWD), PhD (Man.), *Biology* (Adjunct)
J. Fingard, BA (Dal), MPhil, PhD (Lond.)
J.E. Flint, MA (Cantab.), PhD (Lond.), FR HistS, FRSC
R.M. Haines, MA, M Litt (Durh.), DPhil (Oxon.), FR HistS, FSA
N.G.O. Pereira, BA (Williams), MA, PhD (UC Berkeley)
G.D. Taylor, BA, PhD (Penn.)
M. Turner, BA, MA (Manc.), PhD (London)
P.B. Waite, MA (UBC), PhD (Tor.), FRSC
J.B. Webster, MA (UBC), PhD (Lond.)

Associate Professors

J.E. Crowley, AB (Princ.), MA (Mich.), PhD (Johns Hopkins)
J.F. Godfrey, BA (Tor.), B Phil, DPhil (Oxon.)
J.T. O'Brien, BA (Wisconsin), MA, PhD (Rochester)
J.L. Parpart, BA (Brown), MA, PhD (Boston)
L.D. Stokes, BA (Tor.), MA, PhD (Johns Hopkins)
D.A. Sutherland, BA (MtA), MA (Dal), PhD (Tor.)

Assistant Professors

R. Bleasdale, BA, MA, PhD (UWO)
D.R. Woolf, BA (Queen's), DPhil (Oxford)

Research Scholars

I. McKay, BA (Dal), MA (Warwick), PhD (Dal)
 C. Neville, BA (Hons), MA (Carleton), PhD (Aberdeen)
 L. White, BA (Calif.), PhD (Cambridge)

Honorary Special Lecturers

D.B. Flemming
 N. Jannasch
 M.E. Moore

History as a Subject for Study at University

A sense of history is a primitive need felt by individuals and by groups. Just as people need to know who they are and how they arrived where they are, groups, races, classes, states and nations need a sense of their own past as part of their culture.

The academic study of history, therefore, is concerned to discover as much as possible of the reality of the past and to interpret human behaviour in its changes through time. It is a unique subject, scientific in the way it uses evidence, but still an art because the reconstruction of the past requires a disciplined imagination and an effective rhetoric for the communication of meaning.

The contemporary world is one of intensive specialization, in which the varieties of human knowledge have increased well beyond the capacity of any individual to command them all. These developments have reinforced the role of history as the foundation of a person's education, because history can never draw frontiers around itself to exclude any branch of human knowledge, although individual historians will want to select that portion of it especially relevant for them. History's field of study will always be the whole of human experience.

Aims of Teaching and Study

The subject of history does not have a monolithic body of knowledge. Historical understanding is a matter of interpretation, of offering explanations for events and movements which are subject to constant revision by scholars. Arguments, scepticism and controversy are thus the very stuff of history. The history student does not merely acquire a particular mass of information, but learns to think independently.

Degree Programs

Classes in history are set out below. There are several levels of study. 1000-level classes are primarily for first-year students; most 2000-level classes treat broad geographical areas over specified periods; and 3000/4000 level classes provide opportunity for specialized study and advanced work for the undergraduate.

Bachelor's Degree Programs

Students who wish to major in history are urged to choose a 1000-level class and must take at least four and no more than eight upper-level classes, of which two should be at the 3000-level. First-year students may take two 1000-level classes in history.

Students who wish to build up a greater specialization in history than the minimum requirements may do so by taking classes of an historical nature given by the Departments of Classics, Economics, Music, Philosophy, Political Science, Theatre, etc.

Interdisciplinary Programs

Medieval Studies Program
 African Studies Program
 Canadian Studies Program

Honours Degree Programs

Students may choose from several honours programs: European, Canadian, North American, British Imperial/African/Caribbean or General. For details consult the History Honours Coordinator.

Note: Some former full-year classes are offered as two half classes or in a half-year version. Students cannot normally take more than one version of such a class. Please consult the timetable and History Calendar Supplement for current offerings and the timing of A/B classes.

Classes Offered at the 1000 Level

1000 The Making of Modern Europe: lecture/tutorial 3 hours, staff. An introduction to the history of Europe from the beginning of the Middle Ages to the period since the end of World War II, divided into four periods of differing chronological length: medieval times; the Renaissance, Reformation and early modern era; the 18th century (from the French Revolution to the outbreak of World War I); and the 20th century. The lectures, supplemented by tutorials, highlight a select number of themes and problems with which Europe has been confronted and which particularly characterized its development.

1010 Preindustrial Europe, 1450-1800: lecture/tutorial 3 hours, J. Crowley, D.R. Woolf. The fall term of the class will concentrate on topics in social and economic history such as demography, agriculture, transport, commercial towns, military, technology, scientific measurement, printing and literacy and metropolises. The spring term will be devoted to scenes of political and ideological conflict: Renaissance Florence, Reformation Germany, Cromwellian England, Enlightenment France and Scotland and the French Revolution. The first term will emphasise monographic literature and the second, primary sources.

1050 The Modern World: lecture 3 hours, G.D. Taylor. History cannot foretell the future, but historians seek to determine the origins of the problems that confront us today, and provide a perspective for people to consider how their ancestors coped with their world. This class relates current events to broader trends of political, economic and social developments in the modern industrial world.

1200 History of Canada: lecture 3 hours, staff. The development of Canada from Indian cultures to Pierre Trudeau. It has a central core of social and political history, but ranges across economic history as well as Canadian literature.

1300 United States History: 3 hours, staff. This class investigates the political, social and cultural development of the American colonies and the United States by addressing such fundamental matters as the coexistence of slavery with egalitarian principles, the conflict of sections over territorial expansion, the interplay of immigration with industrialization and urbanization, and the growth of the federal government's involvement in domestic and foreign affairs.

1400 Europe and the Third World: lecture/tutorial 3 hours, M. Turner, J.B. Webster. An introduction to university level work in history. This class also provides training in study habits, analysis of problems, and essay writing by examining six "units of study" in turn. The themes are announced in the Departmental Calendar Supplement. For each unit there are lectures and tutorials, and students write an essay each month in class time on each unit.

1600 Making the 20th Century World: First World, Third World: lecture/tutorial 3 hours, M. Turner. Concentrating on the period 1750 to the present this course investigates the origins of the present divisions between the industrialized and non-industrialized, capitalist and socialist countries. The course introduces a variety of source materials and is structured as a writing course.

1990 Problems of Historical Study and Writing: seminar 2 hours, staff. An introduction to the problems of historical study, including the nature of historical evidence, analysis and causation. No lectures take place; instead, each student registers for a section dealing with a type of history of interest. The sections are limited to fifteen students and meet once a week. Each student must write an essay per month. The general techniques of study and writing are thus acquired by consideration of particular problems in a field of special interest to the student. Some of the sections that may be offered: (1) The Atlantic World and the Colonization of the Americas (Crowley); (5) Medieval Life and Thought (Haines), 2 hours informal lecture/discussion, cross listed with Medieval Studies 301R; (7) The Holocaust (Stokes); (9) Canada: Politics and Protest (Sutherland); (10) Slavery in the United States (O'Brien); and (19) The Canadian Rebellions (Bourroughs)

Classes offered at the 2000 level

European History

2001A/2002B Medieval Europe: (formerly 2000) lecture/discussion 2 hours, R.M. Haines. Cross listed with Medieval Studies 3020A/3030B. An Introduction to the thousand years between the end of the classical world and the beginnings of "modern" Europe. Where possible original sources in translation will be used to illustrate the medieval world-view. Students are introduced to a wide range of topics, political, intellectual, artistic and social particular attention being paid to developing an appreciation of the richness of an age often characterized as dark and unknowable.

2010A Early Modern Europe's Expansion Overseas, 1450-1650: lecture/tutorial 2 hours, J.E. Crowley. The commercial and colonial expansion of Europe to the Americas. Topics of particular interest are the role of technology, the establishment of settler colonies, the use of unfree and indigenous labor, the effect of overseas communication on European culture, and the role of colonial expansion in the development of the world economy.

2011A Renaissance and Reformation Europe, 1650-1800: lecture/tutorial 2 hours, D. Woolf. An investigation of major changes in Western Europe from the late medieval depression to the crisis of centralized rule and economic growth in the seventeenth century. Among the topics are the development of humanism in fifteenth-century Italy and religious reform movements in transalpine Europe, the loss of Mediterranean predominance in European commerce, the centralization of authority by national monarchies and the rebellions lodged against them, and the subjection of urban culture and commerce to court dominance.

2012B Absolutist, Enlightenment and Revolutionary Europe, 1650-1800: lecture/tutorial 2 hours, J.E. Crowley. A study of Western Europe during the rise of absolutist states as agencies shaping economic and social structures. The class gauges the state's effectiveness in this role against Enlightenment writings on social and economic reform. We focus on the characteristic sources of social conflict in France's Old Regime and their relation to the course of the Revolution.

2013B Early Modern Europe's Expansion Overseas, 1650-1800: lecture/discussion 2 hours, J. Crowley. The development of the European colonial societies after their initial settlement and the establishment of their staples economies in the 16th and 17th centuries. The topics of chief interest are the predominance of colonial trade in Europe's large-scale commerce, the role of the colonies in European conflicts, the renewal of exploration, the development of the colonies' internal economies and politics, and their revolts against European rule.

2025R Russia, 9th-20th Centuries: lecture/tutorial 2 ½ hours, N.G.O. Pereira, E. Haigh. A survey of Russian history from the formation of the state at the end of the 9th century, through Kievan, Appanage, Muscovite, Petrine, and into modern times, ending with the Brezhnev era. Readings include translated primary source materials as well as recent Western and Soviet scholarship. No prior knowledge of Russian history is required or assumed.

2030 Germany in the 19th and 20th Centuries: lecture/tutorial 2 hours, L. Stokes. Selected topics in the history of Germany during the past two centuries, including the growth of nationalism and liberalism, the role of Prussia, industrialization, Bismarck and the political parties, civil-military relations and the rise, rule and destruction of Nazism. Open to all except first-year students.

2040 Modern France: From the Fall of the Bastille to the Rise of De Gaulle: lecture 3 hours, staff. Selected topics in French political, military, economic and cultural history from the Revolution of 1789 to the end of the Second World War.

2052B Europe and World War II: lecture/tutorial 2 hours, L.D. Stokes. Selected topics on the origins, course and aftermath of the Second World War as this involved Europe, including Nazi foreign and occupation policies, national resistance movements, the Holocaust and the wartime origins of the Cold War. Open to all except first-year students.

2062A Italy from the Risorgimento to Fascism, 1830-1945: lecture/tutorial 2 hours, L.D. Stokes. Selected topics in the history of 19th and 20th century Italy, including the role of Piedmont in the creation of the national state, regionalism and modernization, the political weaknesses of liberal Italy, and the origins and rule of Fascism. Open to all except first-year students.

British and British Imperial History

2101A Medieval England: lecture/tutorial 2 hours, R.M. Haines. Cross-listed with Medieval Studies 3090A. This introductory class examines some of the major political, social, and cultural themes in English history from the departure of the Roman legions to the Wars of the Roses. These may vary from year to year. At least one original source will be given detailed consideration.

2102B Early Modern England: lecture/tutorial 3 hours, D. Woolf. This class surveys the history of England from 1450 to 1750. Among the topics dealt with are the Reformation, the Government of Elizabeth I, Parliament in the early 17th century, the Civil War, the commercial revolution, and the establishment of political stability under Walpole. Note: 2101A/2102B supersedes 2100.

2111A Modern Britain to 1867: lecture/tutorial 2 hours, staff. Three themes of particular importance to the modern world: the emergence of parliamentary government, the industrial revolution, and the nature of social classes and politics from 1780 to 1867, including the press and public opinion.

2112B Modern Britain since 1867: lecture/tutorial 2 hours, P. Burroughs. The main themes are: the development of the popular press and modern modes of publicity and agitation, questions of imperial policy (including Ireland) as they reacted on governments and parties, and the experience of Britain in two world wars.

2131A/2132B The Rise and Fall of the British Empire: lecture/tutorial 2 hours, staff. A survey of British expansion overseas from Tudor times to the mid-Victorian heyday and the subsequent decline and fall of Britain as a great power. Among the themes considered are the motives and character of British imperialism, changing British attitudes and policies towards the empire, colonisation and conquests, contact with non-European peoples, the transformation of empire into commonwealth, colonial revolts and independence movements, decolonisation and the legacy at home and abroad.

2151B Scottish History to 1820: lecture/tutorial 3 hours, D. Sutherland. The making of modern Scotland. A survey of major themes in Scottish history from the Jacobean era to the end of the Napoleonic Wars. After a general introduction to Scotland, geographic and cultural inheritance, students will proceed to a review of such topics as: Anglophiles and Anglophobes; the Jacobite rebellions; commercial development and overseas expansion; Highlanders vs. Lowlanders, the Scottish Enlightenment, radicalism and repression; entrepreneurial innovation and the pursuit of progress, the Clearances and emigration to America.

2152B Scotland since 1820: lecture/tutorial 3 hours, D. Sutherland. A survey of major themes in the history of "North Britain" from the end of the Napoleonic Wars to the present. Topics to be dealt with in lectures or in tutorial discussion include: the transition from war to peace; crisis of the craftsman; agitation for Parliamentary reform; Scottish Chartism; Walter Scott and Scottish Romanticism; Scottish cities in the Victorian era; Evangelical ferment and Disruption of 1843; agrarian protest; Gladstone's Scotland; the second Scottish Industrial Revolution; shipbuilding; Scottish socialism; Clydeide and "Red Friday"; Scotland in the Depression; the war; the ascendancy of Labour; Roy Thomson's Scotland; Scottish Nationalism; North Sea Oil; the legacy of underdevelopment. No prerequisites required.

North American History

2202B Canada's Industrial Revolutions, 1850-1950: lecture/tutorial 2 hours, R. Bleasdale. A study of Canada's transition from a pre-industrial society to a leading industrial nation. Principle themes for discussion include urbanization, the rise of the factory and mass production, the impact on

home and family, the revolution in transportation and communications, weapons development, and patterns of consumption. Special attention is given to the role of technology.

2211A The Social History of Canada before 1870: lecture/tutorial 2 hours, M.S. Cross. This evening class examines the social history of pre-Confederation Canada through such topics as social control, violence and protest, women and domestic life, regionalism and marginal peoples, and the transformation of the economy.

2212B The Social History of Canada since 1870: lecture/tutorial 2 hours, M.S. Cross. This evening session surveys the development of Canadian society from Confederation to the present. Among the themes considered are social classes, the role of women, how people worked and how they lived, conflicts such as rioting and rebellions, and specific case studies such as Indian-white relations, the Winnipeg general strike and the troubles of Industrial Cape Breton. Note: 2211A/2212B supersedes 2210.

2230 Canada in the Twentieth Century: lecture/tutorial 3 hours, R. Bleasdale, P.B. Waite. A survey of the roots of contemporary Canada, studying the origins of our current issues and problems focussing on Canadian political developments, as well as on economic and social structures, French-English relations and provincial and regional disparities.

2240 French Canada, 1837 to 1967: lecture/tutorial 3 hours, staff. Prerequisite: It is helpful to have had a general course in Canadian History. Given in English, for English-speaking students, although French-speaking students are welcome, this class begins with the formation of French-Canadian society from 1760 to 1837. In the main deals with the development of French-Canadian political and social life from 1837 to the "Quiet Revolution" of the 1960's, including both federal and provincial aspects as well as French-Canadian developments in the West, Ontario and the Maritimes. Note: also offered as 2241A/B.

2250A/B West by North: History of the Canadian West and North: lecture 2 hours, staff. This course will cover the geography and history of the Canadian prairies, British Columbia, and Yukon and the Northwest Territories, from the first white contacts to the 1980s. Some emphasis will be given to the late 19th and 20th centuries.

2270 The Atlantic Provinces: lecture/tutorial 3 hours, D.A. Sutherland, J. Fingard. A survey of Maritime and Newfoundland history from the beginnings of European penetration to the "triumph of Canadianization." Attention is given to the interaction of environment and culture which has given rise to a durable but nevertheless vulnerable regional character. The class seeks to define internal patterns of social change and social conflict while simultaneously placing regional development within a broader national and international context.

2285B History of Modern Medicine, 1800-1950: lecture 2 hours, J. Farley. Examines the state of medicine in 1800, 1850, 1900 and 1950, and the transition of American and Canadian medicine from a low status, ineffective, poorly trained group of competing sects to what it is today. For each of these four periods the emphasis is on medical training, the diagnostic and therapeutic capabilities of physicians, their views on disease etiology, their attempts to control the size and quality of the profession and to prohibit the entry of women, and the scientific background to their views culminating in the growth of scientific medicine in the early 20th century.

2330 The United States: A Political and Economic History: seminar 2 hours, G.D. Taylor. American history features many colourful personalities and episodes from the Boston Tea Party to "Irangate." Underlying these events are broad patterns of change: population movements, religious and ethnic conflict, economic development, the organization of political parties and interest groups, and unheralded but enduring shifts in the law and public opinion. This class examines public life in America from the time of Benjamin Franklin to Ronald Reagan in the context of these general processes of social, economic, and cultural development.

2340 Social History of the United States: seminar 2 hours, J.T. O'Brien. A survey of the major social and economic forces which transformed the

United States from an agrarian republic to an industrial nation. Attention is drawn to the process of industrialization and such allied topics as urban growth, immigration, the rise of the corporation, the changing nature of work, and the role of government in fostering economic growth. We also look at the history of labour organizations, protest movements, and business groups that sponsored new forms of economic activity in the period from the founding of the Republic to the Great Depression.

Third World History

2370 Age of Imperialism 1870-1970: seminar 2 hours, M. Turner. Deals with the last hundred years of the activities of the imperial powers, their impact on the world, their rivalries among themselves and the resistance they provoked on every continent. Different forms of conquest are discussed and illustrated: the shifting power balance among the imperial powers is traced and the growth of national resistance movements and their ideologies investigated. The class gives particular emphasis to the United States as the most important imperial power of the period, to its role in Latin America and to the ideologies which inform resistance movements.

2380 Latin America: Underdevelopment and Revolution: lecture/discussion 2 hours, M. Turner. Outlines key developments in Latin America from the independence wars to the present: the growth of nationalism, the impact of British and American capital and the development of the anti-imperialist struggle, (a) in relation to Argentina, Brazil and Chile, and (b) in relation to Mexico, Central America and Cuba. Note: also offered as 2381A/2382B.

2400R Tropical Africa: lecture/tutorial 2 hours, staff. A survey of Africa from early times to the present.

2410R Tropical Africa Before 1800: lecture/tutorial 2 hours, J.B. Webster. A study of some of the major themes of African pre-colonial history through an examination of the internal politics and development of African states and societies in tropical Africa. It will focus on the impact of immigration, slavery, and Islamic penetration on African societies.

2421A Colonial Africa: lecture/tutorial 2 hours, J.L. Parpart. Examines European colonial rule from the partition in 1885 to the emergence of independent African states in the 1960s. The course will analyze the material basis of colonial society, culture, class and social change in colonial society, the nationalist struggle and decolonization.

2422B Independent Africa: lecture/tutorial 2 hours, J.L. Parpart. A study of Africa from the early 1960s to the present. The course will examine neo-colonial myths and realities, class, party and state in Africa, economic development and underdevelopment, and the quest for national stability during the current crisis.

2501A The Middle East to the First World War: J. Flint. This class begins with an examination of the historical geography, linguistic divisions, and cultures of the peoples of the Middle East. It examines the emergence of Islam, the basic doctrines of the religion, and its political implications, with emphasis on the Islamic view of history and its significance. With this background the class then concentrates on the 19th century, looking at the impact of European influences, the problem of "reform" in the Turkish empire and in Iran, the British occupation of Egypt, revolutions of the early twentieth century, the origins of Zionism, and the impact of the First World War. The class is a prerequisite to History 2502B.

2502B The Middle East Since the First World War: J. Flint. Prerequisite: History 2501A. The class begins by examining the impact of British and French imperial designs on the Middle East after 1918, the Balfour Declaration on Palestine, and the creation of new Arab states and the Republic of Turkey. These developments then lead to examination of the development of the oil industry, secular reformism versus Islamic traditionalism, Arab nationalism, the impact of the second world war, the emergence of the State of Israel, the revolutions in Egypt and Iraq, the rise of OPEC, the fall of the monarchy in Iran and the nature of Khomeini's Islamic Revolution.

2700R History of Political Thought: lecture/tutorial 3 hours, staff. This

course will study the History of Political Thought from the ancient Greeks to the mid-twentieth century. Students will read works by a number of key political philosophers, including Plato, Aristotle, Aquinas, Machiavelli, Hobbes, Locke, Rousseau, Mill, Marx. Lectures and supplementary reading will relate the arguments of these authors to political and philosophical developments of their day. The approach adopted will be historical, but students will be encouraged to ask themselves how and why our current assumptions about political rights and duties developed. There will be two lectures and a tutorial a week. Assessment will be by a number of short essays and in-class tests.

2800R History of Modern India: seminar 2 hours, staff. This course will examine the period from the late eighteenth century and the beginnings of British rule to the present day. Although most of the period therefore involves an India ruled by Britain, the focus will be less on imperial history and policy and more on change within Indian society. The principal themes will include: religion and social structure over two centuries of profound political and economic change; the modernization of the Indian economy; the rise of nationalism and national political organizations; and India's place in world affairs, before and after independence.

Classes offered at the 3000 level

European and British History

3001A/3002B Medieval Civilization: Sources and Literature: (formerly 3000) seminar 2 hours. Cross-listed with Medieval Studies 3150A/3160B. R.M. Haines. History 2001A/2002B provides the appropriate background for this class. Each year a selection of topics is made, wide enough to be used as central themes in the context of which medieval civilization can be studied; for instance monasticism, universities, papal government, or architectural theory. Such topics are studied in depth, where possible with the help of original documents (in translation), and using periodical literature. Students master the basic work in certain areas, and are also encouraged to develop special interests of their own. Class discussions are used to unravel more difficult aspects and all students contribute in this way and in the writing of a small number of well argued and documented papers. Some general books should be read before starting the class.

3009A/3007B England in the Later Middle Ages: (formerly 3010) seminar 2 hours, R.M. Haines. Beginning with the reign of Edward II, attention is given to political, institutional, religious and social aspects of English history prior to the Tudors. This period includes the deposition of two reigning monarchs (three if Edward V is counted), the Hundred Years' War, the Black Death, Wycliffite heresy and the Lollards, the so-called "Wars of the Roses" and the most widespread building activity in the country since the Normans — despite an economic "depression." It is therefore one of exceptional interest and variety. Some previous experience of medieval history is desirable but not essential.

3011A/B Renaissance to Enlightenment: seminar 2 hours, J. Crowley. Prerequisites: History 2100, 2102, 2011 or 2012, or a reading ability in a Western European language other than English. This class examines selected aspects of the intellectual history of early modern Europe including history of science, historiography, political and moral philosophy and economic theory. Alongside general discussions of Renaissance, Reformation and Enlightenment, a number of authors are studied in detail, amongst them Machiavelli, Montaigne and Locke.

3012A/B The Emergence of Modern European Society, 1450-1800: seminar 2 hours, J.E. Crowley. As the first civilization to industrialize, Europe also had the most protracted transition from traditional to modern society. To study this centuries-long transition, this class examines such topics as the confrontation of peasant society with the commercialization of agriculture, the decline of magic in the face of increased literacy, the growth of specialized institutions to redress crime and insanity.

3021A/3022B The Medieval Church: seminar 2 hours, R.M. Haines. Cross-listed with Medieval Studies 31303A/3140B. This course is offered from time to time in response to demand. It is not intended to provide a chronological survey of the development of the Western Church, but is an advanced seminar dealing with selected topics without strict chronological

limits, such as monasticism, heresy, education, administration, lay-clerical conflict, church life at parish level, the work of the episcopate, ecclesiastical architecture, etc.

3030B Russian Intellectual History: seminar 2 hours, N.G.O. Pereira. A changing selection and examination of some leading examples of Russian social and political thought, including that of Belinsky, Herzen, Chernyshevsky, Tkachev, Pobedonostsev, Soloviev, Gershenzon, Trotak, Lenin, and others.

3040 French Intellectuals in the 20th Century: seminar 2 hours, staff. In France, political life and intellectual life are inseparable. This class examines the intellectual careers of Bloch, Maritain, Bermane, Saint-Exupéry, Malraux, DeGaulle, Sartre, Camus, Teilhard de Chardin and Lévi-Strauss in the context of the political history of France in the twentieth century. Note: also offered as 3041/3042.

3051A/B Fascist and National Socialist Movements in Europe, 1900-1945: seminar 2 hours, L.D. Stokes. This class studies the origins, ideologies, social composition, leadership, rise to power and rule of the two principal European fascist and national socialist movements of the 20th century, those of Mussolini's Italy and Hitler's Germany, as well as similar phenomena which appeared in various countries of eastern and western Europe between the world wars. Through a comparative examination of these and other topics, the class attempts to define the nature of fascism and national socialism and to distinguish these from other contemporary European movements — in particular Soviet communism — with which they have often been associated as varieties of "totalitarianism."

3072A Rise of Modern Science: lecture/tutorial 3 hours, J. Farley (Biology), R. Ravindra (Physics). The modern world has been fundamentally altered by science and technology. In what ways? How has this come to be? This class, designed for students in the arts as well as the sciences, examines these questions by looking at the origins of modern science in the 16th and 17th centuries, its growing popularity in the 18th century, and the rise of the scientific profession and science-based industry in the 19th and 20th centuries.

3075B History of Tropical Medicine: lecture/tutorial 2 hours, J. Farley. With the acceptance of the modern germ theory of disease, and following the expansion of European powers into Africa, and the Spanish-American war of 1898, a full scale war was declared against such tropical diseases as yellow fever, malaria, sleeping sickness, hookworm and bilharzia. This class will examine this war as conducted by the British Imperial and colonial governments, the U.S. Army, business firms, the Rockefeller Foundation and finally the W.H.O. Some background in either 20th Century British Imperial, or African, or American history desirable. No medical or biological knowledge will be assumed.

3090A Soviet Society: seminar 2 hours, N.G.O. Pereira. The basic institutions of contemporary Soviet society are considered both in terms of their own historical antecedents and useful comparisons with European counterparts. Topics may include the role of official culture, party machinery, the individual in society, relations with the West, science and technology, and the economy. Cross-listed with Russian 309A. Reading knowledge of Russian is required.

3092R Soviet Topics: seminar 2 hours, N.G.O. Pereira. Similar in format to 3090A, but often with different themes reflecting the availability of English language materials. No reading knowledge of Russian is required. Also offered as 3092A/B.

3104 Tudor and Stuart Britain: seminar 2 hours, D. Woolf. Prerequisites: History 2100 or 2102, or instructor's permission. This class concentrates on the period 1558 to 1715. Within this period the central problem tackled is that of the causes, character and consequences of the English Revolution. This involves a study of social and economic change, cultural values and intellectual assumptions, and political conciliation and conflict.

3106 The Victorian Age, England 1815 to 1870: seminar with occasional lectures, 2 hours, staff. An examination of English society in the age of

English dominance after Waterloo, before the advent of rampant imperialism in the 1870's. The seminars are planned to portray the characteristic features of the Early and mid-Victorian period. Each seminar discusses a major theme illustrating the unique character of this period in English and world history. Contemporary papers, pamphlets and other writing, including fiction, and, where possible, recent films, are used.

3111A Victorian England: seminar 2 hours, staff. An examination of aspects of political, social and intellectual history, such as the transformation of parties under Gladstone, Disraeli, Joseph Chamberlain or the varied Labour leaders. The rival creeds of imperialism and socialism will be considered in the context of Victorian personalities.

3112B Edwardian England: seminar 2 hours, P. Burroughs. In this crowded period, which for convenience is taken to include the years 1900-1914, there is much action in the fields of naval, military and defence reorganisation, constitutional change, the Labour movement, women's political and social emancipation, and in the controversy over censorship and morality. Topics in political, social and intellectual history include tariff reform, the committee of Imperial defence, the monarchy, Ireland, the welfare state and social reform.

3113A Britain in the First World War: seminar 2 hours, staff. Questions of military command, strategy, civilian control, and the overall direction of the war are considered; also matters of civilian morale, war aims, intelligence and propaganda. The great personalities are Asquith, Kitchener, Lloyd George, Balfour, Bonar Law and Henderson. The secret cabinet papers are now accessible and will be given full value.

3114B Britain in the Second World War: seminar 2 hours, P. Burroughs. Centres on the official histories, including air power, the naval war, strategic factors, intelligence and cryptography, and on Anglo-US relations, lend lease, the scientific war, morale and war aims. The dominating personality is Winston Churchill.

North American History

3230 Canadian Working Class History I, 1830-1914: seminar 2 hours, R. Bleasdale. The transition to industrial capitalist society in Canada and the creation of a working class are the general themes of this course. Topics include pre-industrial work, the development of trade unions, strikes, immigration, poverty, violence, women at work, working class culture, labour in politics, and the emergence of socialism. Students write research papers based on primary and/or secondary sources. There are no formal prerequisites but History 2230 or 2270 would be helpful.

3231 Canadian Working Class History II, The Twentieth Century Experience: seminar 2 hours, R. Bleasdale. The development of the Canadian working class movement from 1896 to the present. Topics include the degradation of work, the question of international unions, labour in politics, women and trade unions, the role of the state in industrial relations, and working class culture in mass society. Students write research papers based on primary and/or secondary sources. There are no formal prerequisites but History 2230 or 2270 would be helpful.

3240 Violence and Order in Canada: seminar 2 hours, R. Bleasdale. This class attempts to uncover the causes of violence, to analyze its types and forms, and to assess the responses of authority to different kinds of disorder. Original documents are employed as well as more conventional sources. Useful preparatory reading is Hugh Davis Graham and Ted Robert Gurr, ed., *Violence in America: Historical and Comparative Perspectives* (New York, 1969). Note: also offered as 3241A/3242B.

3250 Canada within the Empire, 1780-1914: seminar 2 hours, P. Burroughs. An examination of the political, commercial and cultural relations of Canada with Britain from conquest to nationhood, the changing attitudes of Canadians and Englishmen to the developing empire, and the interplay of imperial policies and colonial conditions.

3255B The Age of MacDonald and Laurier: seminar 2 hours, P.B. Waite. A seminar course comprehending the society and politics of Canada from Confederation to the First World War. Students will be expected to be able to

participate in discussions of men, politics, and have at least begun reading in some Canadian literature. Background texts will be assigned, but it is essential to have had at least one survey course in Canadian history.

3270 Nova Scotian Society, 1750-1945: seminar 2 hours, J. Fingard, D.A. Sutherland. Major themes in the social, economic and political evolution of provincial society are explored in an effort to identify the major forces which, since the mid 18th century, have worked to shape the Nova Scotian identity. Discussion involves both existing historical literature and original student research. No prerequisites exist but participants should have some familiarity with Canadian history.

3272 The Mysterious East: Themes in Regional History: seminar 2 hours, J. Fingard, D.A. Sutherland. This class provides senior students with a chance to broaden their knowledge of historical trends in the region through archival research based on a specific theme. The theme for each session is announced in the Departmental Calendar Supplement.

3281B Disreputable Pleasures: Popular Diversions and Common Vices in Canada: seminar 2 hours, M.S. Cross. Popular diversions tell much about the character and values of society. This class explores the significance of sports, popular music, rioting, prostitution, drinking and other pleasures. As well, it considers the response of the respectable to these activities. Topics considered include: the temperance movement and industrial discipline; religious revivals; the invention of sport; changing attitudes to prostitution; and contemporary technological diversions.

3286A/B The Urban Experience in Canada: seminar 2 hours, D.A. Sutherland. The rise of the city stands as one of the most crucial changes to have taken place in our collective past. This class explores the reasons for and the impact of urbanization within Canada. Emphasis is on developments from the mid 19th century to the present.

3291A/B Wealth and Power in Canada: lecture/seminar 2 hours, G.D. Taylor. The role of business in the development and underdevelopment of Canada, and particularly the Atlantic region, is the focus of this class. Among the subjects covered are the significance of entrepreneurship in regional and national economic growth, the impact of government on business, the rise of big business and managerial organization, and the role of foreign investment in Canada.

3302A/B History of Technology: seminar 2 hours, G.D. Taylor. The effects of technology on our lives are ever-present, from debates over acid rain and nuclear reactors to promises of a glowing future for Cape Breton through high-tech enterprise and supercomputers. The continuing impact of technical innovation has been a central feature of the history of Canada and the U.S. going back even to the period before the Industrial Revolution of the 19th century. The harnessing of science and technology for industrial and military uses in our own era has fuelled both rapid economic growth and controversy over the benefits and costs of technological changes on the household, the workplace, the environment, politics and society in North America.

3330 The United States, Canada and the World: seminar 2 hours, G.D. Taylor. During the past century both nations of North America evolved from sparsely settled agricultural societies to complex industrial nations with increasing influence on, and dependence upon, developments throughout the rest of the world. This class traces the rise of the United States in global political and economic affairs, and reviews the role of the United States in the transformation of Canada since the early 19th century. The class focuses on diplomatic affairs, military conflict and cooperation, the rise of multinational enterprise, and the impact of technology in shaping America's relations with Canada and the world.

3333A/B Regionalism in North America: G.D. Taylor.

3341A/B Revolutionary America, 1780-1815: seminar 2 hours, J.E. Crowley. The origins of the American revolution in colonial society and politics and the alterations of social, economic and political life resulting from the crises. Themes of particular interest are the popularization of politics, the social conflicts resulting in Loyalism, the development of a

national political economy and constitutional tradition, and the cultural changes associated with republican government and egalitarian ideology.

3350A/B Family and Community in North America, 1800-1900: seminar 2 hours, J.E. Crowley. The family in North American history from the period when the family was a model for social relations to the time when it was seen as a private refuge from society at large. Among the topics considered are the role of the family in rural and urban communities; the demographic transition from high fertility and mortality; the constriction of the family's responsibilities in economic life and education; the role of ideology in shaping sex roles and childrearing; and the relations of family and community according to ethnic group, class and economic setting.

3360 Enslavement and Emancipation: Afro-Americans in the U.S. South to 1900: seminar 2 hours, J.T. O'Brien. This class examines slavery as a system of racial subordination and economic exploitation. Attention is given to the social, familial, and cultural life of the slaves, the role of slavery in shaping southern nationalism and national racial beliefs, and to reconstruction after the Civil War.

3361A/B The American Civil War and Reconstruction: seminar 2 hours, J.T. O'Brien. The Civil War, occasioned by formation of the Southern Confederacy and the Union government's refusal to recognize the existence of a separate southern nation, was a pivotal moment in the history of the United States. This course will examine the causes of the war, the forces behind slave emancipation, the military fortunes of the two combatants, and the efforts undertaken by the victorious society, and polity of the defeated South.

3366A/B Industry, Unionism, and Workingmen in the United States, 1873-1940: seminar 2 hours, J.T. O'Brien. America's rise to industrial pre-eminence shot forward after the Civil War. By 1900 she had the most productive industrial economy in the world, as well as one of the world's bloodiest labor histories. The growth of unions, however, proceeded much more slowly. Indeed, unionization of mass production industries was not achieved until late in the 1930s with the spread of the CIO and the revitalization of the AFL. This course examines the fitful history of American unions from the beginning of the depression of the 1870s to the end of the Great Depression of the 1930s.

3370 Marxism in the Third World: seminar 2 hours, M. Turner. Revolutionary movements in the twentieth century characteristically use Marxist ideology. This course outlines the fundamentals of Marxist thought and investigates uses by revolutionary movements and societies outside Europe. Case studies will be drawn from Latin America, Asia and Africa.

3380 Chattel Slaves and Wage Slaves: seminar 2 hours, M. Turner. Plantation production in the last 300 years has depended on various forms of labour, slave, contract and wage, sometimes working in conjunction. This course will investigate the interaction of economic and technological change on the workers' legal status and on the forms of labour, protest and the methods of control used throughout the history of the plantations. Studies will focus on the Caribbean and comparisons will be made with adjacent areas of the Americas.

3390 The Caribbean: Underdevelopment and Revolution: seminar 2 hours, M. Turner. Caribbean wealth and Caribbean revolutions have made the islands a focus of imperial rivalries for more than three centuries. This class deals with (a) 1750-1880: the chattel slave societies created by mercantile capital and their destruction by the forces of economic and political revolution and (b) 1895 to the present: the impact of 20th century imperialism and the emergence of nationalism and socialism. Particular attention is paid to Cuba and Grenada. Note: also offered as 3391A/3392B.

African History

3440 African History from Oral Tradition: seminar 2 hours, J.B. Webster. For those students who have a keen interest in African history, the class concentrates upon a restricted geographic area and considers myths of origin, allegory and symbolism in oral traditions, how political leaders become national deities through ancestor worship and how feminist movements of the past have been handled by male chroniclers. In addition

the class concentrates upon dating oral traditions through genealogies, eclipse-references, famines and cross-referencing.

3450 Southern Africa since 1808: seminar 2 hours, staff. The class examines not only political changes and race relations in Southern Africa but also the effects of mining capital on rural and urban societies. The main themes considered are: the Mfecane and its effects on Southern Africa, the economic transformation of Southern Africa and its impact on political and social developments in the region, the imperial factor, the growth of African and Afrikaaner nationalisms and the development of apartheid, Southern Africa and the wider world.

3461A/B Women and Development in Africa: seminar, J. L. Parpart. This course examines the economic, political and social roles of African women from precolonial to modern times. It analyzes women not as objects, but as actors who participate in the political and economic processes affecting their lives.

3462A/B Distortion or Development: African Economic History: seminar, J.L. Parpart. 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 crisis.

Other classes

3610A/B Women in Capitalist Society: the North American Experience: seminar 2 hours, J. Fingard. An examination of the impact of industrialization and urbanization on "woman's sphere" in society and of the emergence of various strains of feminism in the 19th and 20th centuries. Note: also offered as 3611R.

3612 Women in Socialist Societies: seminar 2 hours, M. Turner. Investigates the progress made towards the achievement of equal status for women in societies dedicated in principle to equality for all. Case studies will range from Cuba to China.

3750A/B History of Seafaring: lecture/discussion 2 hours, J. Fingard. An examination of our maritime heritage, with the cooperation of the staff of the Maritime Museum of the Atlantic. Within the context of these overlapping periods — the age of discovery, the age of sail, and the age of steam — the focus is on the development of merchant and naval fleets; the roles of the state, capital, and labour, and the features of seafaring culture. Special emphasis is given to the shipping industries and maritime traditions of this region.

3801A/3802B Independent Topic: staff. For students in the qualifying year of an MA program or who have specialized interests not met by the usual classes. Qualifying year students register with the permission of the Graduate Committee; undergraduates register with the permission of the Undergraduate Committee.

3890A/3890A Canadian Historiography: seminar 2 hours, M.S. Cross. The history of English-Canadian historical writing. Historians under consideration include Frank Underhill, Harold Innis, Donald Creighton, Arthur Lower, and W.L. Morton. Other topics include Canadian regional traditions and the development of new historical approaches. This course is primarily for MA students in Canadian history and for honours students in North American history. Others interested should see the instructor.

3990B Great Historians: staff. This is a course in historiography (the history of the writing of history). It will begin an outline of the nature and limits of ancient and medieval historical writing. It will then consider more closely the "modern" tradition of historical writing, beginning with the Renaissance, looking at the impact of the Reformation, and giving attention to Enlightenment historians such as Gibbon, Hume, Voltaire and Turgot. The course will then turn to the revolution in historical thinking carried out by Marx, and may end with an introduction to modern schools of historical writing, such as the Annales school.

4000A/B/C Directed Readings: staff. This class is open to 4th year honours students and honours certificate students only.

4010 Palaeography: seminar 2 hours, R.M. Haines. Prerequisite: Permission of the instructor. Cross-listed with Medieval Studies 3100R. This course is offered from time to time in response to demand. It provides an introduction to Latin palaeography with instruction and practice in the reading of selected manuscripts. An elementary knowledge of Latin is essential.

4990 Honours Essay: staff. All history honours students and those in combined honours courses in which history is their principal subject must write a substantial essay on a topic to be chosen in consultation with the Undergraduate Committee. The essay is related to one of their 3000 or 4000 level classes and is supervised by the appropriate staff member.

Graduate Studies

MA and PhD programs in history are offered. For details of these programs, see the Calendar of the Faculty of Graduate Studies.

Humanistic Studies in Science

Attention is drawn to the following classes, offered in several departments. All of these classes are concerned with the humanistic aspects of scientific thought and its development.

Classes marked * are not offered every year. Please consult the timetable on registration to determine if these classes are offered.

History of the Sciences

*Biology 3402A/Physics 3402A/History 3072A, Religion 3502A, *The Rise of Modern Science:* J. Farley (Biology and History), R. Ravindra (Physics, Comparative Religion).

*Biology 3403A/B, *A History of Biology:* J. Farley.

*History 2295A/B, *The History of Modern Medicine:* J. Farley.

*History 3075A/B, *History of Tropical Medicine:* J. Farley.

Biology 4664B, *Oceanography 5331B, History of Oceanography:* E.L. Mills

Psychology 4590, *History of Psychology:* J.W. Clark.

Philosophy of the Sciences

*Philosophy 2410A, *Philosophy of Psychology:* T. Tomkow.

*Philosophy 2420B, *Philosophy of Biology:* R. Campbell.

Biology 3410B, *Man in Nature:* K.E. von Maltzahn.

*Comparative Religion 3531, *Mystical Consciousness and Modern Science:* R. Ravindra.

*Comparative Religion 3503A/B, *Nuclear Bombs: Survival and Morality:* R. Ravindra

International Development Studies

Emeritus Professors

K.A. Heard, PhD (Political Science)

P. Ruderman, MBA (Health Administration)

Professors

J.H. Barkow, PhD (Sociology and Social Anthropology)

J. Flint, PhD (History)

E. Gold, PhD (Ocean Studies)

A. Hansen, PhD (Resource and Environmental Studies)

P.B. Huber, PhD (Economics)

L. Kasdan, PhD (Sociology and Social Anthropology)

J.J. Mangalam, PhD (Sociology and Social Anthropology)

E. Mann Borgese, (International Ocean Affairs)

I.R. McAllister, MA (Economics)

L. Osberg, PhD (Economics)

T.M. Shaw, PhD (Political Science) (IDS Coordinator)

M. Turner, PhD (History).

Associate Professors

R. Gamberg, MA (Education)

N.W. Jabbara, PhD (Sociology and Social Anthropology) (IDS Coordinator)

J.M. Kirk, PhD (Spanish)

B. Lesser, PhD (Economics)

J.L. Parpart, PhD (History)

K. Sullivan, PhD (Education)

Assistant Professors

M.E. Binkley, PhD (Sociology and Social Anthropology)

B.M. Jamieson, PhD (Economics and Public Administration)

D.F. Luke, PhD (Political Science)

L. McIntyre, MD (Community Health and Epidemiology)

M. Welton, PhD (Education)

"The interest in preserving peace and abolishing hunger needs no further reasoning. But the interest in mutual survival *must* also be linked to the overriding issues of energy and the environment and the risk of self-destruction.

... there are growing mutual interests . . . development in the South also serves people in the North."

— Brandt Commission *North-South: a program for survival* page 20

Changes in the international system including those in the Third World increasingly affect us all. So in association with faculty at Saint Mary's University, Dalhousie offers an interdisciplinary program in International Development Studies. This intercampus, interdisciplinary, international degree program focuses on comparative examples of and explanations for change — economic, environmental, strategic, social and political — in the Third World. In its major and honours degree programs it brings together a set of established Dalhousie disciplinary offerings in this growing field and combines them with three new intercampus courses — one for each year of study — in International Development Studies. These are designed to juxtapose and integrate empirical and conceptual materials drawn from several disciplinary and theoretical traditions represented in the field to provide a coherent yet diverse introduction to the contemporary world of development.

For a listing of Saint Mary's University faculty and classes in IDS, please consult the current Saint Mary's University academic calendar or the IDS brochure and timetable, available from the program coordinators. IDS core and other classes are usually available each summer through the "Halifax Summer School in International Development."

Degree Programs

The Regulations for the major or honours BA degree in International Development Studies require:

- (1) Completion of appropriate first-year classes (one of which must be a writing class as per regulation 11.1 (c)) in at least two of the major participating social science or humanities disciplines (i.e. Economics 1100/1120, History 1050/1400, Political Science 1100/1101, Sociology and Social Anthropology 1000 or 1100, or Spanish 1110A/B and 1100A/B).
- (2) For the major, at least four and no more than eight Development Studies classes from the following approved list, (see regulation 11.1), of which:

two must be DS2000A/2001B and DS3010A/3011B,

students must take a minimum of one class in at least two established disciplines within International Development Studies,

at least two must be at the 3000 level or above,

- (3) For the honours degree, at least nine and no more than eleven International Development Studies classes from the following approved list, (see regulation 11.4), of which:

three must be DS2000A/2001B, 3010A/3011B and 4010,

students must take a minimum of two classes in at least two established disciplines within International Development Studies,

at least five must be at the 3000 level or above,

class selection must be approved by one of the program coordinators.

The International Development Studies degree at Dalhousie is administered by a program committee consisting of one faculty member from each major department with a substantial teaching or research interest in the field chaired by two coordinators drawn from the humanities and the social sciences, Dr. Timothy M. Shaw (Political Science), and Dr. Nancy Jabbra (Sociology and Social Anthropology). All students' programs will have to be approved by one of the Dalhousie coordinators. A joint Dalhousie-Saint Mary's University International Development Studies Committee organizes the joint IDS offerings.

Classes Offered

Descriptions of International Development Studies Core Courses

DS 2000A/2001B Introduction to Development Studies: lecture and seminar 2 hours, J. Mugenyi and H. Veltmeyer. This class will introduce students to the scope and nature of development studies. Its main emphasis will be on various theories of social change in the Third World and on the lines of research associated with these theories. Students will review the contributions that various disciplines have made to development studies and examine ways in which these complement and compete with each other in the explanation of changing conditions and societies in less developed countries.

DS 2100A/2101B Special Topics in Development Studies: staff. A half-year reading course on a particular aspect of international development taught only by special arrangement between individual IDS major or honours students and individual instructors associated with the program. Available in summers as well as regular sessions.

DS 3010A/3011B Seminar in Development Studies: seminar 2 hours, T.M. Shaw and G. Schuyler. In this course students will begin to apply some of the theoretical perspectives and analytical tools of development studies to a selected problem of development in one particular region of the world: selected regions include Southern Africa, Tropical Africa, North Africa and the Middle East, South-East Asia, South Asia, the Caribbean and Latin America. Political and policy implications of case studies will be discussed. Presentations of student work will be preceded by presentations by faculty associated with the development studies program.

DS 3100A/3101B Special Topics in Development Studies: staff. A half-year reading course on a particular aspect of international development taught only by special arrangement between individual IDS major or honours students and individual instructors associated with the program. Available in summers as well as regular sessions.

DS 4010 Honours Essay Practicum in Development Studies: seminar 2 hours, staff.

DS 4001A/4002B and DS 4100R Special Topics in Development Studies: staff.

Listing of International Development Studies Approved Disciplinary Courses

(See respective disciplinary sections of the calendar for class descriptions. Note that not every class is offered each year and some may require permission of the instructor.)

African Studies

- 2000A Pre-Independence Inheritances
- 2001B Post-Independence Issues

Biology

- 4650 Resource Ecology and Economic Development

Comparative Religion

- 2001A/B Judaism
- 2002A/B Christianity
- 2003A/B Islam
- 2011A/B Hinduism
- 2012A/B Chinese Religions
- 2013A/B Buddhism
- 3010 Death and Afterlife in World Religions
- 3011 Religion and Culture in India
- 3012 Comparative Study of Christianity and Other Religions
- 3013 Religious Myths, Symbols, and Rites
- 3531 Mystical Consciousness and Modern Science
- 3500A/3501B Rise of Science and the Modern World

Economics

- 2238A Industrial Revolution in Europe
- 2239B European Economy in Historical Perspective
- 2241A/B Comparative Economic Systems
- 2250 Applied Development Economics
- 3317B Poverty and Inequality
- 3300A/B International Trade
- 3333A/B Theories of Economic Development
- 3334A/B Economic Development: theories and debates
- 3355R Marxist Economics
- 3336B Regional Development
- 3432 Regional Economics
- 4431A/B International Payments
- 4440 Applied Development Economics

English

- 2211 Commonwealth Literature

Geology

- 2410B Environmental and Resource Geology

Health Services Administration

- 5200B Principles of International Health

History

- 2130 British Empire and Commonwealth
- 2370 Age of Imperialism
- 2380A/B Latin America: Independence and after
- 2421A Colonial Africa
- 2422B Independent Africa
- 2501A/B Middle East before/after WWI
- 2800 Modern East Asia

- 3075A/B History of Tropical Medicine
 3330 The United States, Canada and the World
 3390A/B Empire and Revolution in the Caribbean
 3450 South Africa since 1806
 3461A/B Women and Development in Africa
 3462A/B African Economic History
 3612A/B Women in Socialist Countries

Political Science

- 3303B Comparative Development Administration
 3303B Human Rights and Politics
 3315B African Politics
 3340A Problems of Development
 3345A South Africa
 2500 World Politics
 2505 International Politics in the Post-War World
 3360B Politics of Latin America
 3531A UN in World Politics
 3535A Towards a New World Order
 3537R Management and Conservation of Marine Resources
 3540A Foreign Policies of African States
 3544A/B Southern Africa
 3585B Politics of the Environment
 3590 The Politics of the Sea

Sociology and Social Anthropology

- 2100 Ecology and Culture
 2190 Sex Roles in Cross-Cultural Perspective
 2230 Psychological Anthropology
 2260 Culture and Political Behaviour
 2370 Peoples and Cultures of the World I
 2380 Peoples and Cultures of the World II
 2390 Social Anthropology of the Middle East
 2400 Medicine and Health Across Cultures
 2600 Food and Nutrition Across Cultures
 3080 Modernization and Development
 3090A/B Population and Society
 3095A/B Demographic Techniques
 3210 Continuity and Change in Rural Societies
 3205 Ethnicity, Nationalism, and Race

Spanish

- 2070A/B Area Studies on Mexico and Central America
 2090A/B Women in Latin America
 2110A/B Cuban Cultural Revolution
 2130A/B Latin American Dictators
 2210A/B The Novel of the Mexican Revolution
 2230A/B Contemporary Latin American Prose
 3070A/B Contemporary Latin American History

Linguistics

Various departments offer classes in linguistics or in some aspect of linguistic study in the broad sense: *French* (3020 Linguistics, 3026 Linguistic Introduction to Acadian Dialectology, 4010 Great Linguists of the 20th Century, 4001 & 4002 History of the French Language, 4015 Advanced Translation into English, 4011 Lexicology, 4012 The Structure of French: Comparisons with English), *English* (2201 The English Language, 2202 History of the English Language, 4263 Old English, 4351 Middle English), *Philosophy* (3300 Philosophy of Language, 4510 Topics in the Philosophy of Language), *Sociology and Social Anthropology* (3080 Linguistics and Anthropology), *Psychology* (2190 Language and the Brain, 3150 Introduction to Hearing and Speech Mechanisms, 3190 Psychology of

Language), *German* (various classes), *Russian* (400 The Structure of Contemporary Standard Russian), *Classics* (several classes in Greek, Latin, Coptic, Syriac), *Spanish* (4040 Advanced Style and Syntax). Further information about these classes will be found under the departmental listing. It should be noted that some of the classes listed may not be offered in the current year.

Marine Biology

Program coordinator
 A.R.O. Chapman

The Biology Department offers an Honours Degree in Marine Biology. The program is designed to provide a fundamental background in Biological Science while permitting concentration in marine biology. It prepares students for technical positions in marine biology and fisheries and for advanced research training in graduate school. It combines the resources of the Departments of Biology and Oceanography and other various marine-related sciences (mostly located in the Life Sciences Building which is equipped with a sophisticated flow-through sea water system). Dalhousie is located very close to the sea coast and this enables many classes to offer extensive field work. The following is a suggested selection of classes:

Note: All students must complete Biology 2046, 2001A, 2020A and 2030A/B (or acceptable substitutions) by the end of Year III. A 'B' average is required in these classes with no mark less than 'B'.

Year I: Principles of General Biology (Biology 1000R), General Chemistry (Chemistry 110R), Differential and Integral Calculus (Mathematics 1000A/1010B), A "writing" class (several are acceptable), Introduction to Physics (Physics 1100R).

Year II: General Ecology¹ (Biology 2046R), Marine Diversity² (Biology 2001A), Survey of Fish Biology (Biology 3067B), Cell Biology³ (Biology 2020A), [Laboratory techniques for cell and molecular biology (Biology 2012A/B)/ Genetics (2030A/B) OR Organic Chemistry (Chemistry 2400)], Introduction to Probability and Statistics I (Mathematics 2070A/B), Introduction to Probability and Statistics II (Mathematics 2080B), Elective

Year III: Invertebrates (Biology 3321R), Physiology of Marine Animals (Biology 3071R), [Systematic survey of Algae (Biology 3211B) OR Biology of the Algae (Biology 3212A)], Communities and Ecosystems (Biology 3081B), Aquatic Microbiology (Biology 3100B), [Field Ecology (Biology 3614C) or Genetics (Biology 2030A/B) if not taken in second year], Electives.

Year IV: Honours Research and Thesis (Biology 4900R), Introduction to Biological Oceanography (Biology 4660B), Limnology (Biology 4068A), Fisheries Oceanography (Biology 4369A), Introductory Physical and Chemical Oceanography (Oceanography 4170B), Electives.

Acceptable Substitutions: ¹Biology 2080A, ²Biology 2602S (summer), ³Biology 2015R, or ⁴Biology 2110B.

Suggested Electives: Resource Ecology and Economic Development (Biology 4650A), Marine Microbiology, (Biology 4100A), Ichthyology (Biology 4379A), The Politics of the Sea (Political Science 3590R), Marine Geophysics (Geology 4280B), Animal Population Ecology (Biology 3069A), Plant Physiology (Biology 3073B), Physiology of Marine Algae (Biology 4214B), Advanced Topics in Animal Physiology (Biology 4070C), Animal Nutrition (Biology 4072C), Fisheries Population Biology (Biology 4067B), Biology of Phytoplankton (Biology 4662B), Ecosystem Analysis (Biology 4616B), Theoretical Population Dynamics (Biology 4617A).

Mathematics, Statistics and Computing Science

Chairperson of Department
P.A. Fillmore

Emeritus Professor
M. Edelstein, MSc (Jerusalem), DSc (Technion-Haifa)

Professors
J. Borwein, MSc, DPhil (Oxford)
A.G. Buckley, MSc (Alta.), PhD (UBC)
M.A.H. Dempster, MS, PhD (Carnegie-Mellon) (jointly with Business Administration)
C.A. Field, MSc, PhD (Northwestern) (Director of Statistics)
P.A. Fillmore, MSc, PhD (Minnesota), FRSC
L.A. Grünfelder, PhD (ETH Zurich)
R.P. Gupta, MSc (Agra), PhD (Delhi)
P. Keast, PhD (St. Andrews)
K.J.M. Moriarty, MSc (Dal), PhD (Lond.)
R. Paré, MSc, PhD (McGill)
J. Phillips, MA, PhD (Oregon)
H. Radjavi, MA, PhD (Minnesota)
P.N. Stewart, MA (Berkeley), PhD (UBC)
W.R.S. Sutherland, MSc, PhD (Brown)
S. Swaminathan, MA, MSc, PhD (Madras)
K.K. Tan, PhD (UBC)
A.C. Thompson, PhD (Newcastle upon Tyne)

Associate Professors
P. Borwein, MSc, PhD (UBC)
J.C. Clements, MA (UBC), PhD (Tor)
K.A. Dunn, MSc, PhD (Tor.)
B.W. Fawcett, MSc, PhD (McMaster)
G. Gabor, MSc, PhD (Eotvos)
J.B. Garner, MSc, PhD (Nottingham) (jointly with Community Health and Epidemiology)
D. Hamilton, MA, PhD (Queen's)
C.S. Hartzman, MS (Purdue), PhD (Colorado)
R.J. Nowakowski, MSc, PhD (Calg.)
C.C.A. Sastri, MSc (Andhra), PhD (New York)
M.A. Shepherd, MSc, PhD (Western) (Director of Computing Science)
R.J. Wood, MSc (McM), PhD (Dal) (Director of Mathematics)

Assistant Professors
A.A. Coley, PhD (Lond.)
J. Currie, PhD (Calg.)
K. Dlicher, MSc, PhD (Queen's)
A. Farrag, PhD (Alberta)
R.D. Holmes, MSc (Princeton), PhD (Dal)
K.P. Johnson, MSc (Tor.), PhD (Brandeis)
K.E. Manchester, MSc, PhD (Toronto)
J. Mulder, PhD (UBC)
I.F. Putnam, PhD (Berkeley) (University Research Fellow)
A. Sedgwick, PhD (Tor.)

Computing Lab Director
D. Trueman, MSc (Toronto)

Learning Centre Director
P. Stevens, MSc (Delft)

Statistical Consultant
J.D. Smith, MSc (Guelph)

Research Associate
J. Spielberg

Postdoctoral Fellows
R. Dawson
B. Jay
A. Lewis
E. Myers
T. Zannias

Adjunct Professor
H.J. Thiebaut

Instructors
K. Bowen
E. Cameron

Visiting Professors (1987/88)
A. Katavolos, Athens
M. Ornljad, Ljubljana
P. Scobey, St. Mary's

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

One full credit in mathematics other than Mathematics 1020 and 1110/1120 is required for a BSc degree.

Mathematics as an area of concentration

Students who plan to major in Mathematics should arrange a program in consultation with the department.

Majors in Mathematics must obtain at least four Mathematics credits beyond the 1000 level. Amongst these, the following are required: Mathematics 2000 (or 2500), 2030-2040 (or 2130), and at least one credit beyond the 2000 level.

Majors in Mathematics are strongly urged to include Computing Science 1400, 1410 as part of their program.

Students wishing to concentrate in Applied Mathematics, Pure Mathematics or Statistics are advised to consider modelling their programs on the first three years of the Mathematics or Statistics Honours programs, after possibly replacing 2130R with 2030A and 2040B, 2500R with 2000R, and 3500R with 3090A and 3100B.

Those students who wish to arrange inter-disciplinary programs (with such fields as Physics, Chemistry, Biology, Engineering, Psychology and Economics) are invited to discuss their interests with the department.

Honours in Mathematics

The following program is normally followed by students who plan to take honours in mathematics.

Entering students who have a strong interest or background in mathematics, or who contemplate taking honours, should enroll in Math 1500 and Math 1670/2670.

Year 2: Mathematics 2130 and 2500. Mathematics 2130 may be taken in Year I by well-qualified students with the consent of the instructor, in which case another class may be selected in Year II.

Year 3 and Year 4: Mathematics 3030, Mathematics 3500 and five additional classes at least two of which are numbered 4000 or above.

Students may choose programs with a concentration in Applied Mathematics, Computing Science, Pure Mathematics or Statistics. Students wishing to concentrate in Computing Science should consider Combined Honours in Mathematics and Computing Science, and examine the

separate Calendar entry for Computing Science.

Students wishing to concentrate in Statistics should consider Honours in Statistics or Combined Honours in Mathematics and Statistics, and examine the separate Calendar entry for Statistics.

All honours programs must be approved by the Chairman.

Those students wishing to take an Honours degree concentrating in Applied Mathematics are advised to consider a program similar to the following:

Year 1: 1500R; 1670A/2670B; CS1400A; CS1410B; 2 elective classes.

Year 2: 2500R; 2130R; 2070A; 2080B; 2270B; (Co-op Seminar) and 1-½ elective classes.

Year 3: 3500R; 3030R; 3110A; two of 3210A, 3300A, 3260B, an appropriate statistics class; 1 ½ elective classes.

Year 4: 4400; the remaining two of 3210A, 3300A, 3260B, an appropriate statistics class; one and a half other classes at 4000 level; 2 elective classes.

Those students wishing to take an Honours degree concentrating in Pure Mathematics are advised to consider a program similar to the following:

Year 1: 1500R; 1670A/2670B; CS1400A; CS1410B; 2 elective classes.

Year 2: 2500R; 2130R; another full mathematics class; 2 elective classes.

Year 3: 3500R; 3030R; another full mathematics class; 2 elective classes.

Year 4: 4010A; 4140A; three other full mathematics classes, at least one of which is at the 4000 level; 1 elective class.

It is recommended that the additional mathematics classes include a statistics class, an applied class and a class in algebra, topology or complex variables.

Honours Comprehensive Examination

The Honours Comprehensive Examination in mathematics consists of a written paper of about 20-30 pages researched and prepared by the student during the spring term. The topic is decided on in conjunction with the supervisor of the Honours seminar. The paper is also presented to the seminar. The Honours Comprehensive Examination in statistics requires successful completion of Statistics 8880.

Combined Honours

Students interested in taking honours in mathematics or statistics and another subject as a combined program should consult the chairman of the department through whom a suitable course of study can be arranged.

A combined honours program may be appropriate for many. Students contemplating a combined honours course in mathematics or statistics and another subject should, however, bear in mind that the work in either subject would probably be insufficient for admission to a regular graduate program. A qualifying year would usually be necessary.

Co-operative Education Programs

The Co-operative education program is an integrated program of 8 academic terms and 4 work terms of relevant industrial/ laboratory employment. The work terms, each of 4 months duration, are spent in industrial and laboratory positions primarily in the Maritime region. The work experience helps students see the applicability of their training in mathematics, statistics and computing science and helps them make intelligent career choices. Upon successful completion of the program the student's transcript indicates that the program was a cooperative one.

It is possible to complete a Co-op degree in 4 1/3 years, although students should expect to take 5 years. The Co-op programs are available either as an Advanced Major (20 credit) degree program or as an Honours degree program.

There are three Advanced Major Co-op programs; one in each division of the Department.

There are four Honours Co-op programs available within this Department;

In the areas of:

Mathematics,
Mathematics and Computing Science combined,
Computing Science
Statistics

A Combined Honours Co-op degree, combining Mathematics or Computing Science or Statistics and another appropriate subject, is possible. Students interested in such a program should consult the Director of Co-op Education.

Eligibility

Students are required to demonstrate

sufficient academic potential;

a suitability for and interest in Co-op education;

successful completion of an appropriate combination of the classes M1000/1010 and CS1400/1410. Normally all four of the half-classes would have been completed.

Normally, students entering their second year of study may apply for admission to one of the Co-op programs. However, interested first-year students are strongly urged to contact the Director of Co-op Education as early as possible for advice on course selection.

Work Terms

It is ultimately the responsibility of the student to arrange the work term. The Program Director serves to co-ordinate the contacts between student and employer. Students are remunerated according to the employer's policies regarding permanent employees of similar training and education. At the end of each work term, each student must submit an acceptable work report.

It is important that students realize that successful completion of the work terms are an integral part of the course of study. Indeed, the advantages of Co-op Education derive directly from the successful interplay of academic knowledge and practical implementation. Consequently the work terms are central to Co-op Education.

Work terms are each of four months duration. Two consecutive work terms may be taken. Work terms are arranged subject to the student's academic preparation and the availability of suitable placements. Various combinations of work term/academic term sequences are permissible, subject to the approval of the Director of Co-op Education.

Under normal circumstances, the following criteria apply

At least 4 academic terms must be completed before the first work term is begun.

In any twelve-month period (of full-time study) at least one academic term must be completed.

The last semester in the program must be an academic term.

Co-op Seminar

This is a special seminar arranged for the benefit of Co-op students. Various topics of relevance to the work terms are discussed. The purpose of the seminar is to better prepare students for their work terms so that everyone involved in the work term — the student, the employer and the University — may benefit as much as possible.

Co-op students enrolled in their second year at Dalhousie must attend this non-credit seminar.

Additional Information

For additional information, course selection advice, and entry into one of the Co-op programs, contact the Director, Co-operative Education, Department of Mathematics, Statistics and Computing Science, Dalhousie University, Halifax, Nova Scotia, B3H 4H8.

First-year students who are interested in a Co-op program are urged to contact the Director before or during their first year for advice on course selection.

Mathematics Classes Offered

The listed prerequisites indicate the mathematical background expected of students entering any class but may be waived with the consent of the instructor.

Class descriptions for Computing Science can be found in the calendar under Computing Science.

Class descriptions for Statistics can be found in the calendar under Statistics.

Credit may not be obtained twice for the same class even if the numbers have been changed.

0010R Pre-University Mathematics, "Classroom Version": lecture 3 hours (non-credit class). This course does not count as part of the regular student course load. This course is designed for students who do not have the usual prerequisite for first-year math classes (i.e. N.S. Math 441), or for others who wish to strengthen their background in mathematics. The class begins with a review of algebra, use of variables, exponents, absolute value, factoring methods and solution of equations and inequations. This leads to graphing and the functional approach which is the focus of the course. Functions studied include linear, quadratic, inverse, exponential, logarithmic and trigonometric. Throughout the year, there is strong emphasis on the use of mathematical models to solve application problems. Students completing this course should not only be adept at the mechanics of mathematics, but also have an understanding of the uses of these skills. After successful completion of this course, the student will have the necessary prerequisite for any first-year university mathematics, statistics or computing science class. Students register and pay for this class at Henson College, Centre for Continuing Studies, 6100 University Avenue.

0010R Pre-University Mathematics, "Self-Paced Version" (non-credit class). This course does not count as part of the regular student course load. This, as the name suggests, is a self-paced program. There are no classes, but assistance is available during the day and evenings through the Mathematics Learning Centre. The material covered is the same as that of the "classroom version" of the course. Students sign up for a six month period and work at their own pace. After successful completion of this course the student will have the necessary prerequisite for any first-year university mathematics, statistics or computing science class. Students register and pay for this class at Henson College, Centre for Continuing Studies, 6100 University Avenue.

Note: The following two classes, Mathematics 1000 and Mathematics 1010, introduce the basic ideas of the calculus and together constitute a solid foundation for study in the Sciences (Physics, Chemistry, Biology, etc.), as well as for further study in Mathematics. The class Mathematics 1000 is offered in both terms.

1000A/B Differential and Integral Calculus: lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Mathematics 441 or equivalent. Credit will be given for only one of Mathematics 1000, 1120, and 1280. A self-contained introduction to differential and integral calculus. The topics include: functions, limits, differentiation of polynomial, trigonometric, exponential and logarithmic functions, product, quotient and chain rules, applications of differentiation, antiderivatives and definite integrals, integration by substitution. A sequel to this class is Mathematics 1010.

1010B Differential and Integral Calculus: lecture 3 hours, tutorial 1 hour. Prerequisite: Mathematics 1000. A continuation of the study of calculus with topics including: techniques of integration, elementary differential equations and applications, Riemann sums, parametric equations and polar coordinates, sequences and series, Taylor series.

Note: Credit can be given for only one of Mathematics 1010 and 1290.

***1020R Mathematics for Liberal Arts Students:** lecture 3 hours. Prerequisite: Nova Scotia Mathematics 442 or equivalent. For students who wish to become acquainted with mathematics as an art rather than as a tool for the sciences. It discusses some of the more elementary yet interesting aspects of the subject with an emphasis on the historical origins of the various topics. Topics include elementary number theory, finite and infinite sets, graph theory, colouring problems, elementary topology, and topics from

geometry. This class may not be used to satisfy the requirement that BSc students must have at least one full university class in mathematics.

1060A/B Introductory Statistics for Science and Health Sciences: (same as Statistics 1060A/B) lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Mathematics 442 or equivalent. For description see Statistics 1060.

1070B Statistical Techniques of Scientific Experimentation: (same as Statistics 1070A/B) lecture 3 hours, tutorial 1 hour. Prerequisite: Mathematics 1060. For description see Statistics 1070.

1110A/B Finite Mathematics for Commerce: lecture 3 hours. Prerequisite: Nova Scotia Mathematics 442 or equivalent. This class provides an introduction to methods of finite mathematics with special emphasis on applications to business. Topics include linear equations, systems of linear equations, matrices, determinants, matrix inverses, linear programming including the simplex method, an introduction to nonlinear functions and the elements of the mathematics of finance. This class replaces half of the previous class Math 1100R. This class may not be used to partially satisfy the requirement that BSc students must have at least one full university class in mathematics. Credit can be given for only one of Math 1110, Math 1100, and Math 2030.

1120A/B Calculus for Commerce: lecture 3 hours. Prerequisite: Nova Scotia Mathematics 442 or equivalent. This is an elementary calculus class with special emphasis on applications to business. Topics include functions, limits, rate of change, derivatives, one variable optimization and curve sketching, exponential functions, logarithmic functions, functions of several variables, Lagrange multipliers, elementary integration. This class replaces half of the previous class Math 1100R. This class may not be used to partially satisfy the requirement that BSc students must have at least one full university class in mathematics. Credit can be given for only one of Math 1120, Math 1100, and Math 1000.

1280A/1290B Differential and Integral Calculus for the Engineering Program: lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Mathematics 441 or equivalent. Mathematics 1280A includes a review of precalculus mathematics, functions, limits, continuity, differentiation and integration of polynomials, exponential, logarithmic and trigonometric functions. Applications to finding areas, graphing, maximum-minimum problems and related rate problems. Mathematics 1290B includes vector algebra, techniques of integration, numerical integration, lengths of curves, vectors, lines and planes in three dimensions, surfaces of revolution, parametric equations and polar coordinates. 1280A is a prerequisite for 1290B.

1500R Calculus: lecture 3 hours, tutorial 1 hour. Prerequisite: high standing in Nova Scotia Mathematics 441 or equivalent. This course is intended primarily for students who anticipate taking an honours program in the physical or mathematical sciences. The topics of Mathematics 1000/1010 are covered, but in greater depth. Mathematics 1500 is equivalent as a credit to Mathematics 1000/1010. Note: Credit can be given for only one of Mathematics 1000/1010, 1280/1290 and 1500.

1670A Discrete Structures I: (same as Computing Science 1670), lecture 3 hours. Prerequisite: Nova Scotia Mathematics 441 or equivalent. This course together with Math 2670 offers a survey of those areas in Mathematics that may be classified as dealing with discrete structures. Areas covered include set theory, mathematical induction, number theory, relations, functions, algebraic structures and introductory graph theory. The topics to be discussed are fundamental to most areas of Mathematics and have wide applicability to Computing Science. Credit can be given for only one of Math 1670, Math 1300, and CS 2660.

2000R Intermediate Calculus: lecture 3 hours. Prerequisite: Mathematics 1010. Topics include: continuous functions and their fundamental properties, partial derivatives and applications, multiple integrals, geometry of Euclidean vector spaces with emphasis on three dimensions, elementary differential equations. Credit can not be given for more than one of Mathematics 2000, 2200, 2480-2490 and 2500.

2030A Matrix Theory and Linear Algebra I: lecture 3 hours. Prerequisite: Nova Scotia Mathematics 441 or equivalent. This class, together with Mathematics 2040, is a self-contained introduction to Matrix Theory and Linear Algebra. Topics include: vector spaces, linear transformations, determinants, systems of linear equations. Students should note that this is a second-year class and, although it has no formal first-year prerequisites, mathematical maturity and ability to handle formal proofs at the level of a student who has completed Mathematics 1000 is expected.

2040B Matrix Theory and Linear Algebra II: lecture 3 hours. Prerequisites: Mathematics 2030 and 1000. This class is a continuation of Mathematics 2030. Topics include: similarity, diagonalization, inner product spaces. No more than one credit can be given for Mathematics 2030/2040 and 2130.

***2050R Problems in Geometry:** lecture 3 hours. Prerequisite: Mathematics 1010. This class is organized around a sequence of stimulating geometrical problems. A set of approximately 20 challenging problems is given to the students at the beginning of the year. The students are expected to attempt these problems throughout the year. Good students should be able to do some of these problems and are encouraged to present their solutions to the class for extra credit on the final grade. These problems are chosen so that their solutions use a wide variety of geometrical ideas (from Combinatorial, Projective, Inverse, Transformational, Topological, Differential and Non-Euclidean Geometry).

2070A Introduction to Probability and Statistics I: (same as Statistics 2070A) lecture 3 hours. Prerequisite: Mathematics 1000. For description see Statistics 2070.

2080B Introduction to Probability and Statistics II: lecture 3 hours. (Same as Statistics 2080B). Prerequisite: Statistics 2070 and Mathematics 1010 or Mathematics 2030. Some knowledge of matrices is assumed. For description see Statistics 2080.

2130R Linear Algebra: lecture 3 hours. Prerequisite: Mathematics 1010. For students who are interested in a broader and more basic understanding of the theory and techniques of linear algebra than is provided by 2030 and 2040. Topics include: the material of 2030 and 2040, canonical forms including the Rational Form and Jordan Form, inner product spaces including the Spectral Theorem for normal operators on finite dimensional vector spaces, linear programming and further topics in pure and applied linear algebra. This class provides an excellent background for further study in Mathematics. Not more than one credit can be given for Mathematics 2030-2040 and 2130.

2270A/B Introduction to Numerical Linear Algebra: (same as Computing Science 2270B) lecture 3 hours. Prerequisites: Mathematics 1010, 2030 and Computing Science 1410. For description see Computing Sciences 2270B.

2300A/B Introduction to Models of Applied Mathematics: lecture 3 hours. Prerequisite: Mathematics 1010 and Computing Science 1400. An introduction to the application of mathematics in the social and life sciences. About six problems are analyzed by developing and solving mathematical models. Deterministic, axiomatic, probabilistic, and simulation models are covered. Areas from which the problems are drawn include assignment and transportation problems, measurement theory, social choice, conflict resolution, inventory management, queuing, epidemiology, and resource management.

2480A/2480B Intermediate Calculus for the Engineering Program: lecture 3 hours. Prerequisite: Mathematics 1290 or 1010. The topics for these two half classes include functions of several variables, partial derivatives, multiple integrals, indeterminate forms, improper integrals, infinite series, power series, Taylor and MacLaurin series, matrices, determinants, systems of linear equations, complex numbers, elementary ordinary differential equations. Students who take Math 2480/2490 may not also receive credit for 2000 or 2200.

2500R Introductory Analysis: lecture 3 hours, tutorial 1 hour. Prerequisites: Good standing in Mathematics 1010 and concurrent registration in

Mathematics 2130. For honours students and other serious students of mathematics. This class forms the first half of a 2-year sequence in analysis and advanced calculus; Mathematics 3500 completes the sequence. Topics include: real and complex numbers, set theory, elementary topology of Euclidean space, limits and continuity, differentiation of functions of several variables, the Riemann Integral, line and surface integrals, Green's, Gauss' and Stokes' theorems, power series. Credit can not be given for more than one of Mathematics 2000, 2200, 2480-2490 and 2500.

***2540A/B Basic Set Theory:** lecture 3 hours. Prerequisite: Mathematics 1000. A simplified introduction into basic topics of set theory. Matters discussed include: sets and relations, countable and uncountable sets, cardinality in general; partial order, maximal and minimal elements, functions and operations on them; elementary topology of the real line, continuity and related topics.

***2600B Theory of Interest:** lecture 3 hours. Prerequisite: Mathematics 1010 or 1100. A detailed examination of the theory of simple and compound interest. The syllabus includes the material on which the theory of interest portion of Examination 4 in the Society of Actuaries examination series is based. Some of the topics are: nominal and effective rates of interest and discount, force of interest, annuities, perpetuities, price of bonds, callable bonds, special topics. This class should appeal to students in mathematics, economics and commerce. Students interested in an actuarial career should take this class and are urged to consult the department for guidance in class selection and additional information.

2670B Discrete Structures II: (same as Computing Science 2670B), lecture 3 hours. Prerequisite: Math 1670. This course continues Math 1670. Topics discussed are from logic, graph theory including directed graphs, coloring, shortest paths, minimum spanning trees and matching formal languages including finite state machines, pushdown automata and linear bounded automata, Turing machines and computability. These topics form the theoretical basis for much of Computing Science and are of interest to mathematicians working in many areas. Credit can be given for only one of Math 2670, Math 1300 and CS2660.

2800A/B Applied Mathematics for the Life Sciences: lecture 3 hours. Prerequisites: Mathematics 1000, Biology 1000. A preparation for the mathematical aspects of advanced courses in ecology, genetics and physiology. Topics include: complex numbers, vector spaces, discrete mathematics and linear algebra, and differential equations. Students are introduced to each area through examples drawn from various areas of biology. Mathematics majors may not apply credit for Mathematics 2800 towards the major requirements, although they may take Mathematics 2800 as an elective.

***3010A/B Mathematical Logic:** lecture 3 hours. Prerequisites: Mathematics 2000 and 2040. Symbolic logic is introduced first so that students who have not had any previous experience handling connectives, quantifiers and tautologies have an opportunity to practice using them. Next propositional logic is studied. This system of mathematical logic affords the opportunity of studying a formal language which is quantifier-free and so introduces, in a relatively uncomplicated setting, the background for predicate logic. The work is carried as far as Henkin's Extended Completeness Theorem.

***3020A/B Set Theory and Foundations of Analysis:** lecture 3 hours. Prerequisites: Mathematics 2000 and 2130 (or 2040). This class concerns the basic objects of mathematics and the proper way of dealing with "infinity." It is essential for a clear understanding of most modern aspects of mathematics. The topics include: operations with sets, countable and uncountable sets, cardinal numbers, ordered sets, well-ordering, ordinal numbers, the axiom of choice and its equivalents, and axiomatic set theory.

3030R Abstract Algebra, lecture 3 hours. Prerequisite: Mathematics 2040 or 2130. In this first class in abstract algebra the following topics are treated: groups, sub-groups, factor groups, homomorphisms, rings, ideals, Euclidean domains, polynomial rings, fields, unique factorization, irreducible polynomials, Sylow theorems, solvability of polynomial equations, Galois theory, and the Jordan canonical form.

***3040A/B Metric Spaces and Elementary Topology:** lecture 3 hours.

Prerequisites: Mathematics 2000 and 2130 (or 2040). Topics include: metric spaces; bounded-, totally bounded-, compact- and complete sets in metric spaces; Lipschitz and contraction mappings; topological spaces; open and closed sets, bases; continuity, compactness, connectedness.

***3050R Differential Geometry and Tensor Analysis:** lecture 3 hours.

Prerequisites: Mathematics 2000 and 2130 (or 2040). The material consists of two parts. The first part discusses the theory of curves and surfaces in three-dimensional Euclidean space. Topics include: theory of curves, surfaces, first and second fundamental forms, Gaussian and mean curvature, formulas of Weingarten and Gauss, geodesic curvature and geodesics. The second part consists of an introduction to Riemannian geometry, and, if time permits, an introduction to general relativity as an application of Riemannian geometry. Topics include: foundations of tensor calculus, differentiable manifolds, foundations of Riemannian geometry, absolute differentiation and connections.

***3070A/B Theory of Numbers:** lecture 3 hours. **Prerequisites:** Mathematics

2040. The following topics are discussed: congruences and residues; elementary properties of congruences; linear congruences; theorems of Fermat, Euler and Wilson; Chinese remainder theorem; quadratic residues; law of quadratic reciprocity; Legendre, Jacobi and Kronecker symbols, arithmetic functions; algebraic fields; algebraic numbers and integers; uniqueness of factorization, definition and elementary properties of ideals; ideal classes and class number.

3080A/B Introduction to Complex Variables: lecture 3 hours.

Prerequisite: Mathematics 2000. An introduction to the basic elements of complex analysis. Topics include: complex numbers, functions, differentiation and integration in the complex plane, some special mappings, series in general, Taylor and Laurent Series, residues, some principles of conformal mapping theory.

3090A Advanced Calculus I: lecture 3 hours. **Prerequisites:** Mathematics 2000 (or 2200) and 2030. An introduction to Fourier Series. Topics covered include half range expansions, expansions on other intervals, convergence theorems, differentiation and integration of Fourier Series and the Complex form of Fourier Series. Also an introduction to special functions, including Gamma and Beta functions and orthogonal polynomials and some of their properties is given. Additional topics covered include some implicit function theorems and an introduction to transformations.

3100B Advanced Calculus II: lecture 3 hours. **Prerequisite:** Mathematics 3090. Topics covered include some properties of functions defined by integrals: differentiation under the integral sign, tests for convergence of improper integrals, improper multiple integrals and functions defined by improper integrals. Also considered is the Fourier integral and various other integral transforms, a review of multiple integrals and vector field theory. Green's Stokes' and the divergence theorems and related matters are also considered. **Note:** Not more than one credit can be given for Mathematics 3500, and 3090A, 3100B.

3110A Differential Equations: lecture 3 hours. **Prerequisite:** Mathematics 2000. One of the aims is to give students the ability to analyze and solve a number of different types of differential equations. Wherever possible, applications are drawn from the fields of physics, chemistry, biology, and other areas. The class is intended mainly for mathematics students interested in applications and for science students who wish to be able to solve problems arising in their major areas of interest.

3120B Differential Equations: lecture 3 hours. **Prerequisite:** Mathematics 3110. The topics discussed are of great importance to any student interested in applied mathematics. Areas include Euclidean spaces, Fourier series, orthogonal polynomials, Sturm-Liouville problems, the classical partial differential equations, and some applications to physics, chemistry and engineering.

3210A Introduction to Numerical Analysis: (same as Computing Science 3210A, and previously part of 3200R) lecture 3 hours. **Prerequisites:** Mathematics 2270, 2000 (or 2200, 2500). Some more advanced aspects of numerical linear algebra, including the Power Method and the QR Algorithm

are examined. Various acceleration procedures for iterative processes are examined. Several forms of interpolating polynomials, Newton, Lagrange and Hermite are considered. Finite differences are also introduced. Numerical differentiation and integration is examined. In particular, interpolatory, Gaussian, Romberg and adaptive quadrature are discussed, and error estimates considered. Polynomial splines and some of their properties are introduced. Methods for solving nonlinear equations including the Newton-Raphson method are considered. Special attention is paid to finding the roots of a polynomial. Throughout, the difficulties of implementing the various methods are discussed, and illustrated via assignments. Finally, some indication of the difficulties involved in multidimensional numerical analysis is given.

***3220B Numerical Solutions of Ordinary Differential Equations:** (Same as Computing Science 3220B), lecture 3 hours. **Prerequisites:** Mathematics 3110, 3210, 3090 (or concurrent registration in 3500.) Initial Value Problems are considered. Various methods, including Runge-Kutta and Predictor-Corrector are examined. The convergence and stability of the numerical methods is investigated and propagated error bounds and estimates sought. Also considered are starting techniques, variable order and/or variable step length strategies and automatic error control. Systems of equations and Stiff equations are discussed. Various methods for solving Boundary Value Problems (e.g. shooting methods and collocation are also discussed). Throughout, the difficulties of implementing various methods are discussed and illustrated via assignments and the use of various computer packages. A brief introduction to the numerical solution of Partial Differential Equations may also be included.

***3230B Applied Approximation Theory:** lecture 3 hours. **Prerequisites:** Mathematics 3210, 3090 (or concurrent registration in 3500). A review of orthogonal polynomials and their properties is given, and basic concepts, function norms, and orthogonal systems introduced. The best approximation to a function in the Euclidean norm is obtained. The Weierstrass Approximation Theorem is given and Runge's phenomenon discussed. We also consider characterizing the best approximation in the uniform norm and methods for obtaining this best approximation. Economization of power series is also discussed. Fourier approximation is discussed, and the Fast Fourier Transform is examined. An introduction to Rational and Padé approximation is given and these techniques are compared with polynomial approximation techniques. Throughout, the difficulties of implementing the various methods is discussed and illustrated via assignments.

***3260B Foundations of Applied Mathematics:** lecture 3 hours.

Prerequisite: Mathematics 3110. This one-term class surveys some of the powerful techniques employed by the applied mathematician to handle realistic problems in an analytical fashion. Asymptotic and perturbation methods form the central theme for the class, but some time is spent on differential equation theory and also on the study of a number of successful mathematical models that illustrate the various techniques. Topics include: superposition, heatflow, Fourier analysis, Sturm-Liouville Systems, generalized harmonic analysis, dimensional analysis and scaling, regular and singular perturbation theory, asymptotic expansions.

3300A Optimization I: lecture 3 hours. **Prerequisites:** Mathematics 2000, 2040. This class is an introduction to the concepts and applications of linear and nonlinear programming. Topics include the Simplex method for linear programming, duality and sensitivity analysis, convex programming, Kuhn-Tucker and Lagrange multiplier conditions, numerical algorithms for unconstrained and constrained problems. Some of these topics are illustrated by means of interactive computer packages.

3310B Optimization II: lecture 3 hours. **Prerequisite:** Mathematics 3300. This class continues on from the topics in 3300. Additional topics to be covered include network flow theory, graph theoretic matching problems, shortest route problems, discrete dynamic programming models, and combinatorial optimization with emphasis on integer programming problems.

***3320A/B Applied Group Theory:** lecture 3 hours. **Prerequisites:** Mathematics 2000, 2030. This interdisciplinary half-class is intended for third and fourth-year undergraduate and first-year graduate students in Chemistry, Mathematics and Physics. With some additional reading in

Physics, It is equivalent to Physics 4480A. Topics include: review of matrices, fundamentals of groups, normal subgroups, homomorphisms, representations, character, orthogonality, symmetry groups in crystallography, role of symmetry groups in quantum physics and chemistry, normal modes and molecular vibrations.

***3330A/B Graph Theory and Combinatorics:** lecture 3 hours. Prerequisites: Mathematics 2000, 2040. The following topics are discussed: elements of graph theory, paths and cycles, Eulerian graphs, trees, planar graphs and the Euler polyhedral formula, Hamiltonian graphs, chromatic numbers, the five-colour theorem; items to be selected from the following topics to suit class: graphs and matrices, graphs and groups, extremal problems, and enumeration problems.

3340A/B Regression and Analysis of Variance: (same as Statistics 3340) lecture 3 hours. Prerequisites: Statistics 2070/2080 and Mathematics 2030, or an equivalent knowledge of matrices. For description see Statistics 3340.

3380A/B Probability: (same as Statistics 3380) lecture 3 hours. Prerequisites: Statistics 2070/2080 and Mathematics 2000. For description see Statistics 3380.

3380A/B Sample Survey Methods: (same as Statistics 3380) lecture 3 hours. Prerequisites: Statistics 2070/2080. For description see Statistics 3380.

3460A/B Intermediate Statistical Theory: (same as Statistics 3460) lecture 3 hours. Prerequisites: Statistics 2070/2080 and 3380. For description see Statistics 3460.

3500R Intermediate Analysis: lecture 3 hours. Prerequisites: Mathematics 2130, 2500. Mathematics 3500 continues the analysis sequence begun in Mathematics 2500. Topics include: number systems, metric spaces, compactness, continuous functions on metric spaces, Stone-Weierstrass theorem, Arzela-Ascoli theorem, sequences and series of functions and their properties, inverse and implicit function theorems, extrema, co-ordinate transformations. Credit can be given for only one of Mathematics 3090A, 3100B and 3500.

4010/5011A/B Introduction to Measure Theory and Integration: lecture 3 hours. Prerequisite: Mathematics 3500. 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.

***4020/5021A/B Analytic Function Theory:** lecture 3 hours. Prerequisites: Mathematics 3080 and either 3100 B or 3500. A second half-class in complex function theory. Topics include: review of analytic complex functions including topological properties of the plane, Mobius mappings, exponential, logarithmic, trigonometric and related functions, integration and the Cauchy theorem. Cauchy's integral formula, residues, harmonic functions, analytic continuation, entire and meromorphic functions, some results of conformal mapping; including the Riemann mapping theorem.

4030/5031R Advanced Abstract Algebra: lecture 3 hours. Prerequisite: Mathematics 3030. This second class in abstract algebra deals with the structure of groups, rings, fields and modules. Topics which may be discussed include the Sylow theorems, tensor products, Ext and Tor, modules over a principal ideal domain and Galois Theory.

***4050/5051R Introduction to Algebraic Geometry:** lecture 3 hours. Prerequisite: Mathematics 3030. An introduction to the basic concepts of algebraic geometry.

***4080/5081A/B Statistical Analysis of Spatially Coherent Systems:** lecture 3 hours. For Math majors the recommended prerequisite is Statistics 3370. For students in physical science, the natural prerequisite is Physics 4540A. (Same as Statistics 4080A/B). For description see Statistics 4080.

4090/5090A/B Probability: (same as Statistics 4090) lecture 3 hours.

Prerequisite: Mathematics 3380 and a third year analysis course. 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 course is an asset.

***4130/5131A/B Analysis of Algorithms:** lecture 3 hours, (same as Computing Science 4130). Prerequisites: CS 3690 (with a grade of C- or better). See class description for CS 4130A/B.

***4140/5141A/B Introduction to Functional Analysis:** lecture 3 hours. Prerequisites: Mathematics 2130 and 3040. 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.

***4150/5151A/B Functional Analysis:** lecture 3 hours. Prerequisite: Mathematics 4140. Topics include: topological vector spaces, locally convex spaces, normability, function spaces, strict convexity, uniform convexity, reflexive spaces, support functionals, geometry of convex sets and other topics.

***4160/5161A/B Operator Theory:** lecture 3 hours. Prerequisites: Mathematics 4010 and 4140. 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 Theorem; and the spectral theorem.

***4170/5171A/B Introduction to General Topology:** lecture 3 hours. Prerequisite: Mathematics 3040. 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.

***4180/5181A/B Introduction to Algebraic Topology:** lecture 3 hours. Prerequisite: Mathematics 4170. 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.

***4190/5191A/B Differential Equations:** lecture 3 hours. Prerequisites: Mathematics 3500 (3090 and 3100) and 2030/2040 or 2130. Mathematics 3120 is recommended. Topics covered 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.

***4200/5201A/B Differential Equations - Qualitative Theory:** lecture 3 hours. Prerequisite: Mathematics 4190. Qualitative theory is concerned with what can be determined about the phase-portrait and the general behaviour of solutions of differential equations even though those solutions are not explicitly exhibited. Topics are selected from Liapunov stability theory, stable and unstable manifolds of singular points and periodic solutions, classification of plane singular points, structural stability, differential equations on manifolds and Hamiltonian systems. Various equations occurring in applications are qualitatively analysed. The precise topics and equations covered depend on the specific interests of the instructor and the students.

***4220/5221A/B Introduction to Partial Differential Equations:** lecture 3 hours. Prerequisite: Mathematics 3110. This class is the first half of a two term sequence designed to introduce the student to the theoretical and numerical aspects of partial differential equations. Topics to be covered

Include: review of the theory of ordinary differential equations, classification of partial differential equations, solution of first order equations, the diffusion equation and random walk, Fourier Series and transforms, generalized functions, eigenfunction expansions.

*4230/5231A/B Partial Differential Equations: lecture 3 hours. Prerequisite: Mathematics 4220. This class continues the study of partial differential equations begun in 4220A. Topics to be covered include: The Rayleigh-Ritz method, Green's Functions, finite difference methods of solution, an introduction to the finite element method.

*4270/5271A/B Numerical Software: (same as CS 4270) lecture 3 hours. Prerequisite: CS 3210 (with a grade of C- or better). See class description for CS 4270 A/B.

*4300/5301A/B Optimal Control Theory and Applications: lecture 3 hours. Prerequisite: Consent of instructor. Initially the classical calculus of variations is studied and the sufficiency conditions emphasized. A constructive solution of the Euler equations is presented. Then the modern theory of optimal control is developed using techniques of mathematical programming. This approach is applied to a variety of problems such as economic growth theory, inventory control and regulator problems. Numerical methods are also presented.

*4310/5310A/B Nonlinear Programming: lecture 3 hours. Prerequisite: Consent of instructor. A complete treatment of the mathematical theory which underlies the general problem of optimization of a real-valued function subject to a system of constraints. Examples and exercises of an Operations Research nature are used to illustrate the theory. The material studied in this class is a basic prerequisite for understanding and contributing to recent developments in mathematical programming.

4400/5401 A/B Modelling in Applied Mathematics: lecture 3 hours. Prerequisites: required Mathematics 3110, 3120; recommended Mathematics 3100, 3210, 3300. This course is concerned with the construction, analysis and interpretation of mathematical models in the natural sciences with an emphasis on industrial applications. It is intended that the course will draw from and expand upon the theory developed in the prerequisites listed above. Some of the problem areas which will be explored are: discrete and continuous biological models, hydrodynamic models, wave propagation models and shocks as well as models required for the optimal control of dynamical systems.

*4660/5660A/B Automata and Computability: (Same as Computing Science 4660) lecture 3 hours. Prerequisites: Computer Science 1410; a 3000 level Mathematics class such as 3030. For description see Computing Science 4660.

8700 (non-credit) Co-op Seminar I

8701 (non-credit) Co-op Seminar II

8891 Co-op Work Term I

8892 Co-op Work Term II

8893 Co-op Work Term III

8894 Co-op Work Term IV

8895 Co-op Work Term V

Medieval Studies

The period commonly called the Middle Ages (approximately AD 400-1500) offers a unique opportunity to study Western culture as a whole. Indeed, any attempt to study a part of this period in isolation leads to a conviction that such an investigation can never be satisfying and that the walls between disciplines must be broken down and the literature seen in relation to the philosophy, the philosophy in relation to the history, and the history in relation to the languages. No matter what the vernacular tongue of any geographical area, there was one common language throughout Europe and one church, and the study of these leads inevitably to a consideration of palaeography, art, architecture and music.

The field is a very large one and could become a fascinating and rewarding area for a certain type of students — those who like to immerse themselves in their work and who feel that university studies need not involve storing knowledge in separate pigeon holes because their language courses have nothing in common with the social sciences they are required to take.

The regulations for the Honours degree permit a structured program to be set up in Medieval Studies which cuts across traditional departmental lines while allowing considerable freedom in choice of classes.

Students who are interested in entering the program in Medieval Studies should speak to the Director, H. Morgan (English), the planning of their courses.

4050 Religious Myths, Symbols and Rites: (Religion 2030)

Meteorology

A one-year diploma program in meteorology is available to qualified students with a general BSc degree in Physics or related subjects. For details, see under "Physics."

Microbiology

Head of Department
K.B. Easterbrook

Emeritus Professor
C.E. van Rooyen, DSc (Edin.), MD, ChB, FRCP, FRCP(C), FRC Path (Lond.), (Virology)

Professors
R.G. Brown, PhD (Rutgers), (Major Appointment in Biology)
K.B. Easterbrook, PhD (ANU), (Structure and Function in Microorganisms, Bacterial Spines)
J.A. Embil, MD (Havana), PhD (Dal), FRCP(C), FACTM, Pediatrics, Community Health and Epidemiology, (Clinical Virology; Herpes, Cytomegalovirus)
G.C. Johnston, PhD (York), Graduate Studies Coordinator (Genetic Control of Cell Division)

L.S. Kind, PhD (Yale), (Immunology, Regulation of IgE)
 S.H.S. Lee, PhD (Dal), (Virology; Interferon)
 D.E. Mahony, PhD (McG), (Bacteriology, Bacteriocins and L-Forms of Clostridia)
 E.S. McFarlane, PhD (Dal), (Molecular Virology)
 K.R. Rozee, PhD (Dal), Dip.Bact. (Tor.), (Viral Pathogenesis; Epidemiology)
 D.B. Stoltz, PhD (McM), Undergraduate Studies Coordinator, (Biology of Parasitic Insects; Insect Virology)
 C. Stutard, PhD (Dublin), (Microbial Genetics)
 L.C. Vining, PhD (Cantab), (Major Appointment in Biology)

Associate Professors

R.I. Carr, MD (Tor.), PhD (Rockefeller), Assoc. Prof., Medicine (Rheumatology).
 R. Rajaraman, PhD (Dal), Asst. Prof., Medicine, (Cancer Cell Biology, Fibronectin)

Assistant Professor

M.T. Dalton, MBChB (Ireland), (Clinical Bacteriology)

Lecturers

G. Faulkner, PhD (Dal), (Ultrastructure)
 D.J.M. Haldane, MBChB (Dundee), FRCP(C), (Mycology)

The field of Microbiology includes the activities of viruses and cellular organisms such as bacteria, fungi, protozoa and algae. The Microbiology program is designed to provide the student with an understanding of microorganisms - their structure, function, diversity, and contribution to the biosphere - and attempts to provide a basic training which may serve as preparation for graduate or professional work in all fields of microbiology. The Department of Microbiology, located in the Sir Charles Tupper Medical Building and in the D.J. Mackenzie Laboratories, offers microbiology programs in the Faculties of Medicine, Health Professions, Dentistry, Arts and Science and Graduate Studies.

Degree Programs

There are no 3 or 4 year programs leading to a Microbiology major. Students wishing to include Microbiology in other 3-year programs should take Microbiology/Biology 2100, which is a prerequisite for most courses offered at Dalhousie in the discipline of microbiology. Students interested in an honours program (see below) should consult the departmental advisor, D.B. Stoltz, preferably prior to registration for 2nd-year classes.

BSc with Honours in Microbiology

This program is recommended for students wishing to acquire the strongest possible background in the discipline of microbiology. It is particularly suited to individuals who may be interested in pursuing an academic or professional career in microbiology. Students applying for admission to this program must have obtained a grade of B- or better in Biology 1000. Interested students are asked to seek advice from the undergraduate advisor.

Year 1: Biology 1000, Chem 1100, "Writing class," Math 1060A/1070B or 1000A/1010B, and one elective.

Year 2: Microbiology 2100A/B and if possible an additional ½ class in microbiology*, Biology 2020A and 2030A/B, Biology 2110B and an additional ½ class (any subject), Chemistry 2400, and one elective. See Note 2.

Year 3: Microbiology, two classes*; Biochem 3400B and one of Biochem 3200A or 3300B or 4403A; Microbiology, one half-class*, and an additional ½ class (any subject); and one elective. See Note 4.

Year 4: Microbiology 4900 (Honours research and thesis); Microbiology, two classes*; and two electives.

*To be chosen from any of the courses listed below (see note 3).

Microbiology

3033A Microbial Genetics

3114A Virology
 3115A/4115B Immunology
 3118B Medical Bacteriology
 4022A/B Microbial Ultrastructure Project
 4024A Microscopy
 4026A The Mammalian Cell
 4027B The Cancer Cell
 4033B Advanced Microbial Genetics
 4114B Topics in Basic and Medical Virology
 4301A/B Advanced Immunology I
 4302A/B Advanced Immunology II

Biochemistry

4403A Structural Organization and Replication of Genes
 4404B Gene Expression
 4802R Principles of Instrumentation

Biology

3111B Microbial Activities in Nature
 3117A Yeasts and Fungi
 3120B Advanced General Microbiology
 3150B Applied Microbiology
 3322B Parasitology
 4100A Marine Microbiology
 4101A Industrial Microbiology and Biochemistry
 4113A Bacterial Physiology
 5100A Marine Microbiology

Notes:

1. Except where a course number has been specified, "microbiology" has been used here in the sense of referring to the discipline, rather than the department; see Note 9.
2. In year 2, Biology 2015 and Biology 2012A/B can be substituted for Biology 2020A, 2030A and 2110B; students may take 2035R in lieu of 2030. The math requirement need not be satisfied in year 1. Students are advised to take 2100A and a 3000-level B course in year 2 (2100 is the prerequisite for most 3000-level courses).
3. Note that the 9 classes required beyond the 1000-level consist of Microbiology 2100A/B, Biology 2020A, 2030A/B, and 2110B, two half-classes in Biochemistry (3400B and one of 3200A or 3300B or 4403A), and 6 additional classes in the discipline of microbiology. Chemistry 2400 is also required because it is a prerequisite for Biochemistry; see Note 5.
4. All students are required to take at least one half-class at the 3-4000 level in each of the following subjects: bacteriology, virology, immunology, microbial genetics, applied or industrial microbiology, and mycology (if available). Note that 2 half-classes equal one class. In these "core" classes, students must normally maintain a B average, with no grade less than B-.
5. The minor can be taken in any subject (except Microbiology). Specifically, minors in either Biology or Chemistry are possible. While none of the Biology courses listed above can be used in a minor, Chemistry 240 can be.
6. In year 4, the honours research thesis can be done in either the Microbiology or Biology Department, but the work must be of microbiological content.
7. Students should be aware of Calendar regulation 22.3, and note further that certain advanced courses (eg 4114B) require that a particular grade be achieved in the prerequisite course.
8. Note that Calendar regulation 11.4 requires that of the 15 classes taken in years 2 to 4, 2-4 must not be in the major field.
9. This program is jointly administered by a committee composed of members from both the Microbiology (Stoltz; 424-2590) and Biology (J. Novitsky; 424-3665) Departments.

BSc with Combined Honours in Microbiology and Biochemistry

Students in this program complete core classes offered by both Departments (Biochemistry 2000R, 2600A/B, 3200A, 3300B, and 3400B; Microbiology 2100A/B, 3033A and 4033B, 3114A, 3115A, and 3118B), together with Chemistry 240 (minimal grade: C). In lieu of Biochemistry 2000R and 2600A/B, students may take Biology 2110B, 2030A/B and 2020A; this would not, however, change the minimum requirement of 4

Biochemistry classes in this program. The remaining 5 credits in Biochemistry and Microbiology must include at least one full credit in each subject (dept.) at the 4000 level exclusive of Biochemistry 4602 or Microbiology 4900. Thesis research may be done in either department. Advisors: D.B. Stoltz (Microbiology); D.W. Russell (Biochemistry).

BSc with Combined Honours in Microbiology and Biology

Students in this program must complete a number of core courses offered by the Microbiology Department (2100A/B, 3033A, 3114A, 3115A and 3118B; any course in bacteriology offered in the Biology Department may be substituted for Microbiology 3118B). Students are required to maintain an average grade of B in core classes, with no grade lower than B-. Biology 1000 should be taken in year 1, and Microbiology 2100 in year 2. Research thesis work can be carried out in either Department. The majority of classes required in this program must appear as Microbiology entries on the transcript. Advisors: D.B. Stoltz (Microbiology); G.S. Hicks (Biology).

BSc with Combined Honours in Biology and Microbiology

This program is designed for students who desire a broader exposure to biology in general, with less specialization in the area of microbiology. Students in this program fulfill normal Biology Department core course requirements, but can do thesis research in either department. The majority of classes required in this program must appear as Biology entries on the transcript. Students should consult departmental advisors (G.S. Hicks, Biology; D.B. Stoltz, Microbiology) for further details.

Classes Offered

NOTE: Due to the combined pressures of student numbers and a dearth of available space, the names of students not appearing on the first day of class may be deleted from class lists; students are advised that being signed into the course is no guarantee of late admission.

2100A/B Introductory Microbiology: lecture 2 hours, lab 3 hours, D.B. Stoltz (course coordinator), R.G. Brown, G.C. Johnston, J.A. Novitsky, C. Stuttard. Prerequisite: a grade of B or better in Biology 1000. An introduction to the basic concepts of microbiology through lectures, laboratory sessions, and demonstrations. Topics include the structure, ecology, growth, genetics and physiology of microorganisms, as well as basic immunology. This course is a prerequisite for all the other microbiology classes listed below, with the exception of 3020. For the convenience of all concerned, no student will be registered into 2100 after the first laboratory session. It should be noted that students wishing to acquire extra experience in microbiology could take 2100A followed by Biology 2110B, Biology 3111B, Biology 3120B, and/or Microbiology 3118B in the same academic year. Lab section assignments are made during the first lecture period. Consequently, due to limits in lab space, students not attending that lecture may be denied admission to the course EVEN IF THEY ARE ALREADY REGISTERED.

2110B Biochemistry and Physiology of Microorganisms: (see Biology Dept.).

3020R General Microbiology: lecture 2 hours, lab 3 hours, S.H.S. Lee. Prerequisite: Biology 1000 or permission of the instructor. Intended to provide a general knowledge of microbiology at an introductory level for students in the Health Sciences, this class is not considered to represent an alternative to 2100 in Arts and Science programs; students who have taken 2100 do not register for this class. The lecture topics are divided into three sections. The first introduces the microbial world, the basic concepts and facts of structure and function, growth, genetics, and immunology. The second comprises a systematic survey of the medically important groups of microorganisms, with special emphasis on host-parasite relationships. The third section is concerned with the application of microbiology in health sciences, industry and ecology. Laboratory work is designed to complement the lecture materials and to provide experience in the isolation, identification, cultivation and control of microorganisms.

3033A Microbial Genetics: lecture 2 hours, lab/tutorial 3 hours, C. Stuttard and G.C. Johnston. Prerequisites: Microbiology 2100, Biology 2012 or 2110, and Biology 2015 or 2030 or 2035. The study of heredity in microorganisms—especially bacteria and their viruses. Although there is some discussion of the chemical basis of mutation, DNA replication, recombination and repair,

the main emphasis is on mechanisms of gene transfer in microbes, gene mapping and manipulation, and the use of prokaryotic and eukaryotic microbes as model systems for the study of general genetic phenomena including plasmids and transposable DNA.

3114A Virology: lecture 2 hours, lab/tutorial 3 hours, E.S. McFarlane (course coordinator), K.B. Easterbrook, D.B. Stoltz. Prerequisite: 2100. Provides an introduction to Virology, and to some extent discusses all kinds of viruses—animal, bacterial, insect and plant. Important concepts relating to the isolation, biophysical characterization, classification and replication of viruses are considered.

3115A Immunology: lecture 2 hours, L.S. Kind. Prerequisite: Microbiology 2100 or permission of the instructor. The structure, synthesis, regulation of production, detection and measurement of antibodies. Also to be discussed are topics in the fields of transplantation, tolerance, hypersensitivity, tumour immunology, complement and the genetics of the immune response.

3118B Medical Bacteriology: lecture 2 hours, lab 3 hours, D.E. Mahony. Prerequisite: Grade of B- or better in 2100. A survey of several bacterial groups with particular attention devoted to bacteria of medical interest. Attention is given to those criteria which are regarded as important in the classification of bacteria, and to the techniques used to identify particular species.

4022A/B Microbial Ultrastructure Project: K.B. Easterbrook, D.B. Stoltz, G.T. Faulkner. Prerequisites: 4024A or permission of an instructor. A research project using one or more of the skills acquired in Biology/Microbiology 4024A, selected by the student in consultation with the instructor.

4024A Microscopy: lecture 2 hours, lab 3 hours, K.B. Easterbrook, D.B. Stoltz, G.T. Faulkner and M. Willson (course coordinator). Prerequisite: A grade of B- or better in either 3114A, or one of Biology 3020A or 3021B. The class deals with some of the principal methods involved in the study of cell structure. Both light and electron microscopy, including ancillary techniques, are considered in depth. The importance of a proper understanding of the physical and chemical principles governing technical procedures is emphasized. During laboratory periods students have the opportunity to practice, or to watch demonstrations of, some of the techniques covered in the lectures.

4033B Advanced Microbial Genetics: lecture 2 hours; lab/tutorial 3 hours. C. Stuttard, G.C. Johnston. Prerequisite: Microbiology/Biology 3033A. Selected topics in microbial and molecular genetics including plasmids, gene cloning, eukaryotic gene organization, specialized gene mapping techniques, genetics of industrial microorganisms.

4026A The Mammalian Cell: lecture 2 hours, lab 3 hours, R. Rajaraman (Course Coordinator). Prerequisite: Biology 2015 or 2020A and 2030A/B or permission from the instructor. The class considers recent advances and current concepts in cellular and molecular biology with reference to the mammalian cell cultured *in vitro*. Emphasis is also placed on related laboratory techniques. The following general areas are discussed: cell cycle; somatic cell aging; extracellular, cytoplasmic and nuclear matrices; transmembrane interactions; phosphorylation and homeostasis; growth factors; lymphoid cell cultures; monoclonal antibodies; mutagenesis and somatic cell genetics. Laboratory exercises and projects include techniques of cell culture, cell cycle analysis by fluorescence activated cell sorter, cell hybridization, and detection of extracellular and intracellular antigens by immunofluorescence.

4027B The Cancer Cell: lecture 2 hours, R. Rajaraman (Course Coordinator). Prerequisite: Microbiology 4026A or permission from the instructor. The class considers recent cellular and molecular biology of cancer cells viewed as microorganisms *in vivo*. Students participate by giving seminars on recent articles and by writing term papers on selected topics. The following general areas are discussed: types of tumors; the transformed phenotype; extracellular matrix and neoplasia; hormones and neoplasia; anchorage and growth control; analysis of malignancy by cell fusion; transformation by DNA and RNA viruses, and by radiation; chemical carcinogenesis; oncogenes and the origin of human cancers; interferon and

cancer; reverse transformation and chemoprevention of cancer; immunoresponse and cancer; cellular basis of metastasis.

4114B Topics in Basic and Medical Virology: lecture 2 hours, lab 3 hours, E.S. McFarlane (Course Coordinator), D.B. Stoltz, S.H.S. Lee, K.B. Easterbrook. Prerequisite: Grade of B- or better in 3114A. A class for advanced students in virology. Several aspects of virology are discussed in detail; e.g., virus structure and replication, viruses and cancer, viral genetics, virus-cell interaction.

4115B Topics in Immunology: lecture 2 hours, L.S. Kind. Prerequisite: A minimum grade of B- in 3115A. Students read and discuss articles from the current immunological literature. While all major areas of immunology are included, the emphasis is on topics previously studied in 3115A.

4301A/B Advanced Immunology I: Genetics of Immunoglobulins, the Major Histocompatibility Complex, and the T Cell Receptor: lecture, 3 hours, R.I. Carr. Prerequisites: prior course(s) in immunology and permission of the course coordinator. An advanced course concerning both basic and molecular genetics of immunoglobulins and T cell receptors, with particular emphasis upon the mechanisms responsible for receptor diversity. The genetics and biochemistry of the major histocompatibility complex will also be discussed.

4302A/B Advanced Immunology II: Cellular Immunology and Immune Regulation: course logistics are as given for 4301. An advanced course designed to examine the biological characteristics of cells that make up the immune system, the types of interactions that occur between them and the molecules involved in such interactions.

4403A Structure, Organization, and Replication of Genes: (see Biochem. Dept.)

4404B Gene Expression: (see Biochem. Dept.)

4700 Special Topics: Consult department.

4701A/B Special Topics: Consult department.

4900 Honours Research and Thesis

Cross-Listed Courses

Microbiol. 2100A is cross-listed with Biology 2100A.
 Microbiol. 2100B is cross-listed with Biology 2100B.
 Microbiol. 2110B is cross-listed with Biology 2110B.
 Microbiol. 3033A is cross-listed with Biology 3033A.
 Microbiol. 3114A is cross-listed with Biology 3114A.
 Microbiol. 3115A is cross-listed with Biology 3115A.
 Microbiol. 3118B is cross-listed with Biology 3118B.
 Microbiol. 4022A/B is cross-listed with Biology 4022A/B.
 Microbiol. 4024A is cross-listed with Biology 4024A.
 Microbiol. 4026A is cross-listed with Biology 4026A.
 Microbiol. 4027B is cross-listed with Biology 4027B.
 Microbiol. 4033B is cross-listed with Biology 4033B.
 Microbiol. 4114B is cross-listed with Biology 4114B.
 Microbiol. 4115B is cross-listed with Biology 4115B.
 Microbiol. 4301A/B is cross-listed with Biology 4301A/B.
 Microbiol. 4302A/B is cross-listed with Biology 4302A/B.
 Microbiol. 4403A is cross-listed with Biochemistry 4403A.
 Microbiol. 4404B is cross-listed with Biochemistry 4404B.
 Microbiol. 4900R is cross-listed with Biology 4900R.

Music

Chairperson of Department

W.H. Kemp

Professor

W.H. Kemp, MusBac, MusM (Tor.), AM (Harv.), DPhil (Oxon.) (Theory and History)

Associate Professors

R.D. Byham, BM, MM (Ill. Wesleyan), (History and Keyboard Skills)
 P. Djokic, BMus, MMus (Julliard), (Violin)
 D.M. Farrell, BA (St. Norbert Coll.), MMus, PhD (Wisc.), (Theory and Composition)
 E. Gonnella-Weich, Dipl. of Art (Dundee Coll. of Art), LRAM (Royal Academy Lond.), (Voice)
 J. Morris, BA (DePauw), (Voice)
 P.A. Perron, BMus (McG), MMusEd (Holy Names College), (Music Education)
 D.P. Schroeder, AMus, BA, MA (Western Ontario), PhD (Cantab.), (Theory and History)
 L. Stodola, BMus (Chic.), MMus (Julliard), (Piano)
 J.S. Tittle, BS (Kent State), MM, DMA (Wisc.), (Theory and Composition)
 C. van Feggelen, (Guitar and Lute)
 D.F. Wilson, BFA (Cam. Inst. Tech.), MMus (Roch.), PhD (Case W.R.), (History)

Senior Instructor

T. Zonneveld, Dipl. (Teach.), Dipl. (School Mus.), Dipl. (Performance), (Royal Conservatory, The Hague), (Piano)

Part-Time Faculty

N. Babineau (mus.ed. string studies)
 T. Hill, MA (Cal. Davis), (mus.ed. band studies)
 D. Palmer (jazz studies)
 J. Wood (mus.ed. classroom and rec. instruments)

Applied Skills Instructors

Flute: E. DuBois, BMus (Rochester), MMus (Emporia State)
 Oboe: M. Pheby, ARCT
 Clarinet: J. Rapson
 Bassoon: I. Rothwell
 Recorder: P. Evans
 Saxophone: D. Palmer
 Horn: S. Field, BMus (W. Ont.)
 Trumpet: J. Stern, BMus, MMus (New England Conservatory)
 Trombone and Tube: I. Cowie
 Cello: P. Djokic, MMus (Julliard)
 String Bass: L. Turofsky, BMus (Tor.)
 Percussion: J. Faraday
 Harpsichord: TBA
 Organ: D. MacDonald, BMusEd (Dal), DiplMus (Paris), MMA (McGill)

Staff Piano

Accompanist: H. Murray, BMus (Tor)
 Technician: F. Haines

The resources of the Music Department provide a thorough discipline to those whose demonstrated talent and specific pre-university training qualify them for specialization in music studies. Certain classes and ensembles are available to the non-specialist student who wishes to increase both musical awareness as a listener and involvement as a performer.

In the Bachelor of Music Program, the Department offers training to the prospective professional musician: performer, composer, theorist, historian or critic. Future teachers instructing in the elementary and secondary school classroom are provided with methods, skills and field experience in the Bachelor of Music Education Program. In our society today there are many

vocations in which a working knowledge of various aspects of music is a desirable part: librarianship, media programming and production, arts management, recreational and therapeutic work, to name only a few. A carefully chosen BA (General) or combined Honours program could furnish the basic equipment for further studies in preparation for such professions. The truly contemporary listener, too, must acquire style-specific tools, if there is to be an informed response to the musical experience.

Thus the University's Music Department is ready to serve many needs within a general standard of excellence. Crafts and skills, history, practice and appreciation are presented in studies flexible enough to be useful to each student's identity as a musical person.

Degree Programs in Music

Admission

Students wishing to enrol in a degree program offered by the Department of Music must fulfill the following admission requirements:

- (a) satisfy the requirements for admission to the Faculty of Arts and Science
- (b) demonstrate their proficiency as instrumental or vocal performers in an audition-interview
- (c) demonstrate knowledge of the basic rudiments of music theory (equivalent to Grade II Theory of the Royal Conservatory of Music of Toronto) and aural dictation: each assessed by written diagnostic tests as part of the audition-interview.

Applicants will be notified in writing as to their acceptance into one of the programs in music. Applicants who, in the estimation of the Auditioning Committee, show considerable musical talent but are in need of more emphasis on preparatory skills will be required to take some foundational classes. Applicants with severe background deficiencies will be advised to prepare again through private instruction before reapplying.

When making application for admission to the University, prospective music students should request the supplementary application form for the Department of Music.

Applications to the Department should be received by the end of April; audition procedures should be completed by the end of May to ensure admission and scholarship consideration.

Students wishing to transfer from another institution into the Second or Third Year of their chosen Music program must take validation examinations in history, theory, aural and keyboard skills, and their applied major instrument before transfer of credits can be considered. Failure to pass an examination will necessitate enrollment in the appropriate First or Second Year class.

Note: All students entering the First and Second Years of Music Studies are required to register in the Bachelor of Music program. Upon successful completion of the two-year core curriculum, students may either proceed to the Third Year of the BMus or transfer to the BMusEd or BMusED/BEEd programs.

Foundational Classes

These offerings are designed for certain prospective music majors who, in the opinion of the faculty, are in need of a more prolonged exposure to non-major levels of performance, music literature, and skills in musicianship.

Curriculum

Music 0070C Foundational Aural Perception (non-credit)
 Music 0071C Foundational Keyboard Skills (non-credit)
 Music 0100R Foundational Applied Skills (non-credit)
 Music 1000R Man and His Music
 Music 1001A Materials of Music
 Music 1002B Introduction to College Music Theory

1 Music Ensemble (non-credit)

Required Writing Class (from another department)
 2 other electives (from a third and a fourth department)

Special Note: Music classes 1000R, 1001A, and 1002B, although credit

classes, may not be counted toward the BMus, BMusEd, or BA degree with a major in Music; however, they may be counted as electives in other BA or BSc Degree Programs.

Standard for Foundational Classes

Note: The foundational music classes and the required writing class must be taken in the same academic year.

Minimum grades:

Music 0070C C+
 Music 0071C C+
 Music 0100R B
 Music 1000R C
 Music 1001A C
 Music 1002B C
 Writing Class C
 Each Elective C

Bachelor of Music (BMus)

The BMus is a four-year program with sixteen out of twenty classes in music. Upon successful completion of the second year, students may choose to concentrate in performance, music history and literature, or composition.

Common Curriculum

First Year: 1100R Applied Skills; 1350A History of Music I (Introduction); 1351B History of Music II (Baroque); 1201A Theory I, first term; 1202B Theory I, second term; 1270C Aural Perception I; 1271C Keyboard Skills I; and an Arts and Science Elective, one full credit (Writing Course Elective).

Second Year: 2100R Applied Skills; 2350A History of Music III (Classical); 2351B History of Music IV (Romantic); 2201C Theory II; 2480C Conducting; 2270C Aural Perception II; 2271C Keyboard Skills II; and an Arts and Science Elective, one full credit.

Concentration in Performance

Third Year: 3100R Applied Skills; 3350A History of Music V (Medieval and Renaissance); 3351B History of Music VI (Contemporary Music); 3280C Counterpoint; 3282C Orchestration; 3199C Recital; Music Elective, one half credit; and an Arts and Science Elective, one full credit.

Fourth Year: 4100R Applied Skills; 4199C Area Graduation Requirement (Recital); 4280C Advanced Harmony and Counterpoint; 4281C Form and Analysis; Music Elective, 1 ½ credits; and an Arts and Science Elective, one full credit.

Concentration in Composition

Third Year: 3100R Applied Skills; 3350A History of Music V (Medieval and Renaissance); 3351B History of Music VI (Contemporary Music); 3280C Counterpoint; 3282C Orchestration; 3210R Composition; and an Arts and Science Elective, one full credit.

Fourth Year: 4280C Advanced Harmony and Counterpoint; 4281C Form and Analysis; 4210R Composition; 4100R Applied Skill (or equivalent performance credit); 4299C Area Graduation Requirement (Composition); Music Elective, one half credit; and an Arts and Science Elective, one full credit.

Concentration in History and Literature

Third Year: 3100R Applied Skills; 3350A History of Music V (Medieval and Renaissance); 3351B History of Music VI (Contemporary Music); 3280C Counterpoint; 3282C Orchestration; 3310R Music in Canada; and an Arts and Science Elective, one full credit.

Fourth Year: 4280C Advanced Harmony and Counterpoint; 4281C Form and Analysis; 4368A & 4368B Special Studies; 4100R Applied Skill (or equivalent performance credit); 4399C Area Graduation Requirement (Thesis); Music Elective, one half credit; and an Arts and Science Elective, one full credit.

Standards

All students wishing to enter any third year class other than 3350A, 3351B, or 3312R in the BMus program, must successfully complete Music 2100R, 2201C, 2270C and 2271C and achieve an overall average of B- in the music classes of the first and second years, including a minimum standing of C in each of Music 1201A, 1202B and 2201C, and a minimum of B- in each of Music 2100R, 1270C and 2270C.

Students wishing to enter the concentration in performance must achieve an average of B+ in Music 1100 and 2100; in history and literature, an average of B+ in Music 1350, 1351, 2350 and 2351 and demonstrate acceptable writing ability; in composition, submit one or more original pieces for assessment by the composition faculty.

Students in the BMus program must maintain a minimum standing of B- in each of the music classes of the third and fourth years.

Students who at the end of the third year have not obtained at least five credits of B or better in their music classes above the 1000 level will not be admitted to the fourth year without the explicit recommendation of the Department and the prior approval of the Committee on Studies.

Students must achieve a minimum standing of C in each of their Arts and Science electives.

Bachelor of Music Education (BMusEd)

The BMusEd programs combine instrumental or vocal instruction; theoretical, aural and keyboard skills; historical knowledge; and the methods and repertoires needed by the music teacher in the elementary and/or secondary school classroom. Observation and field experience in classroom settings constitute an important part of the programs. Students will choose between curricula in Classroom Music and Instrumental Music.

Common Curriculum

First Year: 1100R Applied Skills; 1350A History of Music I (Introduction); 1351B History of Music II (Baroque); 1201A Theory I, first term; 1202B Theory I, second term; 1270C Aural Perception; 1271C Keyboard Skills; and an Arts and Science Elective, one full credit (Writing Course Elective).

Second Year: 2100R Applied Skills; 2201C Theory II; 2270C Aural Perception II; 2271C Keyboard Skills II; 2350A History of Music III (Classical); 2351B History of Music IV (Romantic); 2480C Conducting; and Education, equivalent of one full class.

Classroom Music

Third Year: 3100R Applied Skills; 3400R Elementary Methods; 3470C Field Experience; 3461C Advanced Choral Technique; 3350A History of Music V (Medieval and Renaissance); 3351B History of Music VI (Contemporary Music); and Education, equivalent of one full class.

Fourth Year: 4100R Applied Skills; 4400C Secondary Methods; 4470C Field Experience; 4482A Choral Arranging; Education, equivalent of one and one-half classes; and the equivalent of one full-credit elective in Music or Music Education.

Instrumental Music

Third Year: 3100R Applied Skills; 3350A History of Music V (Medieval and Renaissance); 3351B History of Music VI (Contemporary Music); Either 3480C Band Instruments, or 3481C String Instruments; Education, equivalent of one full class; 3400R Elementary Methods; and 3470C Elementary Field Experience.

Fourth Year: 4100R Applied Skills; 4400C Secondary Classroom Teaching Methods; 4470C Secondary Classroom Field Experience; 3282C Orchestration; 4480C Band Instruments II; Either 4481C Band Methods and Field Experience, or 4483C String Methods and Field Experience; one-half credit elective in Music or Music Education; and Education, equivalent of one full class.

Bachelor of Music Education/Bachelor of Education

The BMusEd/BEEd is a five-year integrated program combining training in Classroom Music or Instrumental Music (as described in the BMusEd degree) with additional training in either elementary classroom teaching or a second teachable subject appropriate for secondary school. The program includes methods and field experience classes in both Music and in the

second teaching area. The BMusEd/BEEd program leads to certification by the Nova Scotia Department of Education. For details of the BMusEd/BEEd students must consult with the Department's Music Education Programmer.

Standards

All students wishing to enter any third year class other than 3350A, 3351B, or 3312R in either the BMusEd or BMusEd/BEEd program, must successfully complete Music 2100R, 2201C, 2270C and 2271C and achieve an overall average of B- in the music classes of the first and second years, including a minimum standing of C in each of Music 1201A, 1202B and 2201C, and a minimum of B- in each of Music 2100R, 1270C and 2270C.

In order to qualify for the award of a BMusEd or BMusEd/BEEd degree, candidates must have obtained a minimum overall average of B- in their music and music education classes above the 2000 level and maintain a minimum overall average of B- in their education classes.

With special permission, a student in the BMusEd or BMusEd/BEEd program may give a graduation recital instead of a final jury exam.

Teacher Certification in Music

A student possessing an appropriate undergraduate degree in Music may enrol in a six-class program which may lead to certification by the Nova Scotia Department of Education. The applicant must possess a degree in Music from a recognized university.

In an audition-interview, an applicant must pass a written exam in theory, a keyboard proficiency test and an ear training exam (sight-singing and dictation) equal to the final examination standards in Music 2201C (Theory I), Music 2271C (Keyboard Skills) and Music 2270C (Aural Perception II). Failure to demonstrate satisfactory standards in any of these areas will require the student enrol in the appropriate class(es) in addition to the six classes listed below. The applicant must also demonstrate basic musicianship in his or her chosen performance idiom.

The program of study shall be formulated in a personal interview with a designated member of the music education faculty of the university's Department of Music and approved by the Department's Committee on Studies.

The program will normally include.

Music

3400R Elementary Music Methods
3470C Elementary Music Field Experience
4400C Secondary Music Methods
4470C Secondary Music Field Experience
Elective in Music or Music Education (one half credit)

Education

Special Education (One full credit)
Educational Foundations (Two full credits including a half class in each of Sociology, Philosophy, History, Psychology of Education.)

Since the maximum number of classes that may be taken in any academic year is 5, the remaining class (usually 2 half-classes in Education) may be taken in summer school in May-June and/or July-August prior to or following the actual year of study.

Bachelor of Arts (Major in Music)

The BA (General) with a major in music is a three year course, subject to the regulations described in the section *Arts and Science: General Faculty Regulations (Item 3)* and *Degree Programs (Item 5)*. Students are required to complete Music 1100R, 1350A, 1351B, 1201A and 1202B, 1270C and 1271C before entering the third year. Other classes, to a maximum total of 6 full credit classes, may be selected in consultation with the Department to suit a student's individual needs and interests. Music Education classes are not considered applicable to this degree. Students in the BA (General) program enrolled in Applied Skills courses are required to pass jury examinations.

Students wishing to transfer from another institution into this program may be required to enrol in an Applied Skills Class at the First-Year level, depending upon the standard of their performance proficiency demonstrated in the audition interview.

Classes for Non-Majors

Classes offered as arts electives for non-majors are as follows:

- 1000R Man and His Music
- 1001A Materials of Music
- 1002B Introductory Music Theory
- 2007R Guitar and Lute
- 2008R Modern Guitar
- 2087R Electronic and Experimental Music
- 2010R Music of Non-Western Cultures
- 2011R History of Opera
- 2012R Music and Psychology
- 2013R The Evolution of Jazz
- 2021R Music and Literature

Classes Offered

Studies in Music History

1350A History of Music I: lecture 3 hours, D. Wilson. Prerequisite: A basic knowledge of musical notation and terminology equivalent to Grade II Conservatory standard. An introductory survey of music of the Classical and Romantic periods. Available to non-music majors with permission of the instructor.

***351B History of Music II:** lecture 3 hours, D. Wilson. Prerequisite: 1350A. Normal Co-requisites: 1202B, 1270C, 1271C. A study of the history of the music of the Baroque period (c. 1600-1750) with an emphasis on the development of style and performance practices.

2350A History of Music III: lecture 3 hours, D. Schroeder. Prerequisites: 1202B, 1350A. Normal co-requisite: 2201C. A detailed study of music from the second half of the 18th and early 19th centuries.

2351B History of Music IV: lecture 3 hours, D. Schroeder. Prerequisites: 1202B, 1350A. Normal co-requisite: 2201C. A detailed study of music from the 19th and early 20th centuries.

3350A History of Music V: lecture 3 hours, D. Wilson. Prerequisites: 1202B, 1350A, or permission of the Department. A detailed study of the development of Western music in the Medieval and Renaissance periods with an emphasis on the development of style and performance practices.

3351B History of Music VI: lecture 3 hours, S. Title. Prerequisite: Music 1350A, 2351B. The main trends in 20th century "serious" music, with particular emphasis on "new" musical practices.

***3310 Music in Canada:** lecture 3 hours, W.H. Kemp. Prerequisite: permission of the Department. An historical survey of music in Canada with emphasis on the socio-economic factors essential to the successful transplantation and growth of European musical culture in Canada. The class gives practical experience in research skills as they pertain to the specialized area of Canadian music. Students must research and compose reports on both historical and contemporary topics.

***3311 History of Opera:** lecture 3 hours, W.H. Kemp. Prerequisite: permission of the Department. An historical and analytical survey of operatic compositions from 1800 to the present day; opera as drama; changing tastes in operatic productions; operetta and musical comedy.

***2310 Music in non-Western Cultures:** lecture 3 hours. Prerequisite: permission of the Department. The functions and styles of traditional musics outside the Western traditional repertoire of composed music.

***3312 Music and Psychology:** lecture 3 hours, W.H. Kemp. Prerequisite: permission of the Department. The interrelationship of music and psychology, as it relates to and informs the listener, student, educator and professional musician. Topics include a) the perception of tones as a foundation for the appreciation of musical experiences, music as passing time and as information; b) musical taste and aesthetics from a psychological point of view; c) the social psychology of music; d) theories of learning and of behaviour as appropriate to musical training and performance; e) the diagnostic and evaluative testing of musical aptitude

and ability; f) the function of music in therapy and in special education. A rudimentary knowledge of musical notation is a prerequisite to this study; no previous classes in Psychology are necessary.

***3313 The Evolution of Jazz:** lecture 3 hours, D. Palmer. A survey of the historical and social background of jazz and its musicians. The evolution of jazz styles is illustrated in live performances as well as on recordings. A knowledge of musical notation is not a prerequisite to this class.

3361A History of Dance: lecture 2 hours, P. Richards. The course will explore the development of dance from the Base dances of the Middle Ages, through the birth of ballet, to the dances of today, and will include an introduction to dance notation, as well as the practical and theoretical aspects of historical dance.

3370C Performance Practice: 18th and 19th Centuries: seminar 2 hours, D. Schroeder. Prerequisites: Music 1350A, 1351B, 2350A, 2351B. The principles of performance practice in 18th and 19th-century music will be discussed in the context of treatises, contemporary accounts, manuscripts and early editions. Areas to be covered include instruments, ornamentation, dance-related music, and problems of interpreting expression markings.

4368A & 4369B Special Studies: Prerequisites: 2350A, 2351B, 3350A and 3351B. Individually directed research and writing under the supervision of an appropriate member of the Department.

Studies in Music Literature

Study in depth of the history and repertoire of specific performance idioms.

***3352A Chamber Music, to 1800:** lecture 3 hours, R. Byham.

***3353B Chamber Music, 19th and 20th Centuries:** lecture 3 hours, R. Byham.

***3354A Keyboard Music to 1750:** lecture 3 hours, R. Byham.

***3355B Piano Literature, 19th and 20th Centuries:** lecture 3 hours, R. Byham.

***4370C The Organ and Its Literature:** lecture 2 hours, TBA

4389C Area Graduation Requirement (Thesis)

Theory and Related Skills TBA

0070C Foundational Aural Perception: lab 2 hours, P. Djokic. Designed for students with no experience in sight-singing or dictation, or for students needing extra and intensive exposure to these skills; may not be taken without co-related courses Music 0071C, 1001A, and 1002B. Includes scales, modes, two-part (duet) reading, elementary dictation. A non-credit class.

0071C Foundational Keyboard Skills: lab 2 hours, R. Byham. Designed for students with no experience in using the keyboard as a proficiency tool. Includes work in basic harmonization, cadences, introductory improvisation, scale building. Not a course in piano lessons or piano repertoire. May not be taken without Music 1001A, 1002B, and 0070C. A non-credit class.

1001A Materials of Music: lecture 2 hours, D.M. Farrell. An introduction to University music studies for prospective music majors recommended by audition to foundational level classes in music. A knowledge of music reading and rudiments is presumed. Extensive work in rudiments applied to all aspects of music learning; the phenomenon of the tonic-melodic, harmonic and formal; modes, pentatonic scale formation, dissonances, 2-part writing to encompass these; non-tonal formations; acoustics. Also open to non-majors.

Note: auditioned students will be advised to take a year of private studies, their preparedness falls below this introductory level.

1002B Introductory Music Theory: lecture 2 hours, D.M. Farrell. Prerequisite Music 1001A. Rhythm and phrase structures, "musica ficta" and elementary modulation in two and three part writing. Comparison of

tonality, atonality, modality, and chromatic tonality, exploration of chord building triadic and otherwise, simple (bar) chording; elementary diatonic harmony previewing the start of Music 1201A; four-part writing as an immediate transition to Music 1202B. Also open to non-majors.

1201A and 1202B Music Theory I: lecture 3 hours, S. Tittle. Prerequisites: permission of the Department; plus Royal Conservatory of Toronto Grade II Theory equivalent or 1001A/1002B. Normal Co-requisites: 1270C, 1271C. A thorough knowledge of musical rudiments is presumed. The class 1201A begins with a survey of musical phenomena in general, subsequently of tonal music in particular. The material in this survey is immediately applied to two- and three-part writing, stressing both the harmonic and contrapuntal dimensions. In the second term, 1202B (prerequisite 1201A), there is a concentration upon a complete grounding in the traditional four-part writing skills. This culminates in the study of the dominant seventh and elementary modulation.

1270C Aural Perception I: lab 3 hours, T. Zonneveld. Prerequisites: permission of Department; 0070C or equivalent. Normal Co-requisites: 1201A and 1202B, 1271C. A class designed to correlate with 1201A and 1202B. Melodic, harmonic, rhythmic, textural and stylistic factors are visualized, performed and dictated systematically. Labwork in ear-training and sight-singing is done three times per week. Each student is a member of a small working section.

1271C Keyboard Skills I: lab 2 hours, R. Byham. Prerequisite: permission of Department; 0071C or equivalent. Normal Co-requisites: 1201A and 1202B, 1270C. The development of basic skills in sight reading, score reading and harmonized accompaniment at the keyboard.

2201C Music Theory II: lecture 2 hours, D. Schroeder. Prerequisites: 1201A and 1202B, 1270C, 1271C. A continuation of Theory I, covering the study of complex modulation, altered chords and chromatic harmony. Emphasis is placed upon concepts of functional tonality by means of both written exercises in four-part harmony and analysis of Classic and Romantic compositions.

2270C Aural Perception II: lab 2 hours, L. Stodola. Prerequisites: 1201A and 1202B, 1270C, 1271C. This class provides further practice in melodic and harmonic dictation and sight-singing; it correlates with 2201C. A special component deals with solmization skills in sight reading.

2271C Keyboard Skills II: lab 2 hours, R. Byham. Prerequisites: 1201A and 1202B, 1270C, 1271C. A continuation of 1271C.

3270C Aural Perception III: lab 2 hours, P. Perron. Prerequisites: 2201C, 2270C, 2271C. Advanced sight-singing and dictation. Singing music of all periods on solfa syllables and letter names with emphasis on contemporary music. Dictation of modulating excerpts in four-part chorales. Chromaticism, modality, whole-tone and contemporary music are studied along with musical examples of more rhythmic complexity. Also included: singing and dictation of atonal compositions, advanced chords, sing and play exercises.

3280C Counterpoint: lecture 2 hours, D. Farrell. Prerequisite: 2201C. The development of skills in polyphonic architecture in two- and three-voice 18th century contrapuntal style using canonic techniques. An introduction to 18th-century counterpoint: inventions, canons, and fugue expositions, etc.

3282C Orchestration: lecture 2 hours, S. Tittle. Prerequisite: 2201C. A survey of the development of the orchestra and the orchestral instruments with an introduction to acoustics. Technique in the deployment of instrumental combinations is emphasized through practical exercises in scoring for a medium-sized orchestra common in the 20th century.

Fourth Year: 4280C Advanced Harmony and Counterpoint: lecture 2 hours, W. Kemp. Prerequisites: 2201C and 3280C. The application of acquired harmonic and contrapuntal technique to various instrumental and vocal textures and forms; chorale prelude and fugue.

4281C Form and Analysis: lecture 2 hours, W. Kemp. Prerequisites: 2201C, 2350A, 2351B and 3280C. Analytic study of the form and content of selected compositions in various styles and idioms.

Composition

3210, 4210 Composition I, II: S. Tittle, D.M. Farrell. Prerequisites: permission of the Department, an interview with the instructor, and the submission of a folio of original compositions for assessment by the composition faculty. Particular works are analysed to serve as a springboard for original composition by the student. Students' works are evaluated in small group discussions and in individual tutorial sessions.

2287 Electronic and Experimental Music: lab 3 hours, S. Tittle. Prerequisite: interview with instructor. Introduction to the experimental Sound Studio. Recording, mixing, and tape manipulation techniques; analysis and composition of tape music; voltage control concepts, synthesizer theory and practice. Composition and live performance with electronics; group improvisation with both studio and personal resources. Design and execution of live performance situations which may include verbal, visual and other theatrical elements.

***4271C Advanced Improvisation and Keyboard Harmony.** Prerequisite: permission of the Department and an interview with the instructor. Intended for keyboard students, the class involves the development of skills in transposition, score reading, and continuo realization.

4282A Choral Arranging: lecture 2 hours, D. Farrell. See 4482A, Music Education.

4299C Area Graduation Requirement (Composition)

Performance

Note: The various levels of applied study indicate the year of study in the Department and are not intended solely as an indication of relative standard. Term gradings are based upon progress as well as upon the actual performing standard displayed in the jury examination.

1100, 2100, 3100, and 4100, offered in all band and orchestral instruments, guitar and lute, piano, organ, harpsichord, recorder, voice. Normally all students receive a one hour weekly individual lesson in their major performance idiom. In addition to the one-hour lesson, and appropriate to the idiom, group instruction in technique and repertoire may be a required part of all sequences of Applied Skills classes.

0100R Foundational Applied Skills By special recommendation some music majors may be advised by the Auditioning Committee to begin individual lessons at a level prerequisite to Music 1100 as a non-credit class.

2260C Conducting: lab 2 hours, P. Djokic. Normal Co-requisites: 2201C, 2270C, 2271C. An introduction to the fundamentals of conducting.

3261C Advanced Choral Techniques: lab 2 hours, D. Wilson. Prerequisites: Music 2201C, 2270C, 2271C, 2260C. Study of the distinctive features of conducting choral ensembles with emphasis on rehearsal technique, score preparation, interpretation and group methods of building vocal tone. Practical experience in conducting.

3199C Recital: Required of all third year Bachelor of Music students whose concentration is in Performance.

4199C Area Graduation Requirement (Recital)

Music Education

Prerequisites for all classes: permission of the Department, and an interview with the designated member of the Music Education faculty.

Core Classes

3400 Elementary Classroom Teaching Methods: lecture 3 hours, P. Perron. An introduction to the development of a music program at the elementary level. Emphasis is on how to teach song materials, movement and creativity, reading and writing skills and what to listen for in music. The educational philosophies of Kodaly and Orff are examined in some detail. Solmization, hand signs, rhythm names and body co-ordination are some of the skills to be developed.

3470C Elementary Classroom Field Experience: P. Perron. Students must spend a minimum of 100 hours in various elementary schools during the school year practice teaching (75%) and observing master teachers (25%). This consists of one morning per week during the university year and a three week period in April-May.

3480C Band Instruments: lab 2 hours, staff. A practical introduction to the principal band instruments. Group instruction is offered in flute, oboe or bassoon, saxophone, trumpet or French horn, trombone and tuba, and percussion. This class normally is restricted to students majoring in wind, brass or percussion instruments.

3481C String Instruments: lab 2 hours, staff. A practical introduction in group lessons to the instruments of the string orchestra. This class normally is restricted to students majoring in a string instrument.

4400C Secondary Classroom Teaching Methods: lecture 1 ½ hours, P. Perron. An introduction to the development of a music program at the secondary level. Emphasis is on how to teach a general music class exploring the use of song materials, music theory, movement and creativity and listening skills.

4470C Secondary Classroom Field Experience: P. Perron. Students must spend a minimum of 100 hours in various secondary school classrooms during the school year practice teaching (75%) and observing master teachers (25%). This consists of one morning per week during the university year and a three week period in April-May.

4480C Band Instruments II: lab 2 hours, staff. A continuation of 3480C.

4481C Band Methods and Field Experience: lab 2 hours, T. Hill. Prerequisite: 3480A. A survey of the literature for band, band methods for schools and purchase and maintenance of band instruments; supervised band leadership practice in the school setting.

4483C String Methods and Field Experience: lab 2 hours, N. Babinéau. Prerequisites: 3480A; 3481C or permission. A survey of literature and string methods for schools and purchase and maintenance of string instruments; supervised string teaching practice in the school setting.

Electives

4481B Classroom and Recreational Instruments: lab 2 hours, J. Wood. The purpose of this course is to provide music students with skills and ideas that are practical and beneficial in music education. The student learns to play the ukulele to enable him or her to teach a ukulele class or to use the instrument as part of the general music program. He/she learns to play the string bass in a functional style suitable for accompanying both choral and instrument ensembles. The pedagogy is directed specifically toward class teaching of a ukulele group, which includes both instrumental and choral work. The philosophy and methods are applicable to all class teaching situations.

4482A Guitar in the Classroom: lab 2 hours, C. van Feggelen. Introductory guitar instruction including vocal/choral accompanying methods and techniques for the school classroom setting, tablature reading and finger-style playing, development of skills in a variety of accompaniment and rhythmic figurations. Practical applications will be available in Music 3470/4470C.

4471C Field Projects: Under supervision, students design a project that results in an in-depth study of the theoretical and practical aspects of a particular area of music education. The project entails library research as well as working with specialists in the field.

***4473C Contemporary Music in the Classroom:** lecture 2 hours, A. Tilley. A study of certain specific 20th-century works and trends; active music making in the classroom; survey of the literature related to the use of contemporary music materials in the classroom (Schafer, Self, Paynter, etc.).

***4474C The Recorder in the Classroom:** lab 2 hours, P. Evans. Technique, methods, and literature of the recorder family as applied in the school setting.

4482A Choral Arranging: lecture 2 hours, D. Farrell. Prerequisite: 3282C. Arranging for the school choral ensemble.

Classes Available to Non-Majors

1000 Man and His Music: lecture 3 hours, W.H. Kemp. Designed for the interested listener who desires to acquire an informed response to musical experiences. A knowledge of musical notation and terminology is not a prerequisite except for Foundational Music students assigned to this class. The class includes a survey of the evolution of music from primitive cultures to the modern age; music in contemporary society; music in non-Western civilizations; music and image; music and the related arts; the art and psychology of listening.

2007 Guitar and Lute: class 2 hours, ensemble, C. van Feggelen. Prerequisite: personal interview with instructor. For students with a serious interest in classical guitar and lute playing and for whom it is not possible to provide individual instruction. Basic playing technique and the history of fretted instruments.

2008 Modern Guitar: lab 2 hours, C. van Feggelen. Prerequisites: interview with instructor. A class for students with a serious interest in preparing for studio guitar playing and including jazz, folk, rock and accompanying idioms. Class instruction and ensemble playing in improvisation, score reading, chording and arranging.

2021R Music and Literature Since the Enlightenment: lecture 2 hours, D. Schroeder. An interdisciplinary class open to students not majoring in Music. There is no prerequisite. The discussion of music in this class assumes little or no musical background and literary works will be read in translation. About twelve major works (or smaller groups of works) will be considered. About half of these will focus on how different media can converge or digress on the same subject. Most of the remaining works will be large symphonic works which owe a clear debt to specific literary works or more general literary influences.

The following classes, previously described, are also available:

- 1001A Materials of Music
- 1002B Introductory Music Theory
- 2087R* 2287R Electronic and Experimental Music
- *2010* 2310 Music of Non-Western Cultures
- *2011, *3311 History of Opera
- *2012* 3312 Music and Psychology
- *2013* 3313 The Evolution of Jazz

Ensembles

Participation in both large and small ensembles is required of all students whose major field of study is music in each of the years of the degree programs. Details of specific participation requirements are available in the Department of Music.

Membership in the various ensembles is open to the University and the community by audition.

Following is a list of the ensembles sponsored by the Department of Music:

Dalhousie Chorale (W.H. Kemp): I. 0151, II. 0251, III. 0351, IV. 0451, V. 0551, Found. 0051.

Dalhousie Chamber Choir (W.H. Kemp): I. 0152, II. 0252, III. 0352, IV. 0452, V. 0552, Found. 0052.

Dalhousie Symphonic Wind Ensemble (TBA): I. 0153, II. 0253, III. 0353, IV. 0453, V. 0553, Found. 0053.

Dalhousie Chamber Orchestra (P. Djokic): I. 0154, II. 0254, III. 0354, IV. 0454, V. 0554, Found. 0054.

Dalhousie Jazz Band (D. Palmer): I. 0155, II. 0255, III. 0355, IV. 0455, V. 0555, Found. 0055.

Dalhousie Brass Ensemble (I. Cowie): I. 0156, II. 0256, III. 0356, IV. 0456, V. 0556, Found. 0056.

Dalhousie Musica Antiqua (D. Wilson): I. 0157, II. 0257, III. 0357, IV. 0457, V. 0557, Found.0057.

Dalhousie Percussion Ensemble (J. Faraday): I. 0158, II. 0258, III. 0358, IV. 0458, V. 0558, Found. 0058.

Dalhousie Opera Workshop (J. Morris): I. 0159, II. 0259, III. 0359, IV. 0459, V. 0559, Found. 0059.

Guitar Ensemble (C. van Feggelen): I. 0160, II. 0260, III. 0360, IV. 0460, V. 0560, Found. 0060

Small Ensembles (staff coaches): I. 0161, II. 0261, III. 0361, IV. 0461, V. 0561, Found. 0061.

Accompanying: I. 0162, II. 0262, III. 0362, IV. 0462, V. 0562, Found. 0062.

Chebucto Orchestra (by invitation, and Department permission): I. 0163, II. 0263, III. 0363, IV. 0463, V. 0563, Found. 0063.

Nova Scotia Youth Orchestra (by invitation, and Department permission): I. 0164, II. 0264, III. 0364, IV. 0464, V. 0564, Found. 0064.

Neuroscience

The last two decades have witnessed the remarkable emergence of a new, interdisciplinary field called Neuroscience which has as its primary goal the understanding of the brain. Neuroscience is now a rapidly developing research area which includes all aspects of the structure and function of nervous systems. Neuroscience involves a variety of experimental strategies to understand nervous systems. These include molecular, biochemical, behavioural, anatomical, physiological, and the developmental approaches. Although firmly grounded in the natural sciences, the scope of Neuroscience also encompasses fundamentally important philosophical issues, such as the nature of human thought and its mechanism. The program outlined below represents all of these approaches, with an emphasis on behaviour as the adaptive product of neural activity.

Knowledge obtained from research in Neuroscience is being increasingly applied to a variety of human health problems, including neurological conditions such as those occurring in Alzheimer's disease, Parkinsonism, and a variety of drug- or injury-induced behavioural disorders. Research in Neuroscience is also contributing new information related to the major psychiatric disorders, including affective disorders and the schizophrenias.

The BSc (Honours) program in Neuroscience is intended to serve as a preparation for graduate work in neuroscience, biological psychology, medicine, human communication disorders and related fields. Its interdisciplinary nature is reflected in the participation of faculty from several departments in the program, which is offered through the Department of Psychology. Students interested in the Neuroscience degree program should consult with either I.A. Melnertzhagen or B. Rusek in the Department of Psychology early in their undergraduate career, preferably by the end of their first year of study.

Structure

In the first year of study, students are required to take courses which provide a firm grounding in the physical and biological sciences. In subsequent years, the program includes 9 ½ credits in courses drawn from Neuroscience, Psychology and Biology. These include a number of required core courses which emphasize the acquisition and application of laboratory skills. Note that students intending to obtain an Honours degree in Neuroscience may not use Psychology as their minor subject, nor may Psychology Honours students use Neuroscience as a minor subject. It is

anticipated but not required that Neuroscience Honours students will have Biology as their minor subject.

Curriculum

Year I: Students entering the Neuroscience Honours program in their second year will normally have had the following courses in their first year of study:

Biology 1000R (Lab): Introduction
Chemistry 1100R or 1200R (lab): General Chemistry
Mathematics 1000A/B and 1010A/B, or 1500R: Calculus
Writing course

In addition, the following courses are recommended during the first two years of study: Psychology 1000R or 1010R: Introduction; and Physics 1100R or 1300R (lab): Introduction.

Year II: Required Courses:

Psychology 2070R: Introduction to Neuroscience; Psychology 2000A (lab): Research Methods; either Biology 2015R: Cell Biology and Biochemistry or Biology 2020A (lab): Cell Biology, with an additional one-half credit in Biology (not Biology 2012A/B).

Options: one additional credit from among the following:

Neuroscience 2140A/B: Learning
Neuroscience 2150A/B: Perceptual Processes
Psychology 2180A/B: Animal Behaviour
Psychology 2170A/B: Hormones and Behaviour
Neuroscience 2190A/B: Language and the Brain
Neuroscience 2270A/B: Human Neuropsychology
Biology 2012A/B (lab): Lab. Techniques: Cell & Molecular Biology

One and one-half credits in elective courses

Year III: Required: Neuroscience 3370A (lab): Neuroscience Laboratory; Neuroscience 3371B (lab): Advanced Neuroscience Lab.; Neuroscience 3440B (lab): Neuroanatomy.

Recommended: Psychology 3500R: Statistical Methods. It is recommended that students take Psychology 3500 in either their third or fourth year of study.

Options: one and one-half credits from among the following:

Neuroscience 3000R (lab): Independent Research
Psychology 3040R (lab): Learning and Motivation
Neuroscience 3050R (lab): Perception
Psychology 3070R (lab): Physiological Psychology
Neuroscience 3150A/B: Introduction to Hearing and Speech Mechanisms
Neuroscience 3160R (lab): Ethology
Neuroscience 3260A/B: Biological Rhythms
Neuroscience 3270A/B: Developmental Neuroscience
Psychology 3500R: Statistical Methods
Neuroscience 3590A/B: Perceptual Development
Neuroscience 3760A/B: Neuroethology

One and one-half credits in elective classes.

Year IV: Required: Neuroscience 4500R: Honours Thesis

Options: one credit in fourth year seminars from among:

Neuroscience 4000A/B: Senior seminar (topic open)
Neuroscience 4050A/B: Perception
Neuroscience 4070A/B: Neuroscience
Psychology 4160A/B: Topics in Behavioural Biology

One credit in courses from the third and fourth year lists above
Two credits in electives.

Notes:

1. In designing the first year of study, students should consider the requirements for a BSc degree as outlined in paragraph 11.1(a) in the Faculty of Arts and Science Calendar.

2. Biology 2015R (Cell Biology and Biochemistry), Biology 2020A (Cell Biology: Structure and Function) and Biology 3440B (Neuroanatomy; same as Neuroscience 3440B) cannot be counted as credits toward completing a minor in Biology.

3. Students are encouraged to consider the following cognate classes as electives. Courses marked with an asterisk are recommended electives in

the first or second year of study.

Biochemistry 4301B: Biochemical Communication
 Biology 3012A/Biochemistry 3200A: Introduction to Biol. Chemistry;
 Biology 3013B/Biochemistry 3300B: Intermediary Metabolism;
 Biology 3014B/Biochemistry 3400B: Nucleic Acid Biochemistry and
 Molecular Biology;
 Biology 4401R: Introduction to Pharmacology;
 *Chemistry 2400R: Organic Chemistry
 Philosophy 3480A/B: Mind and Brain
 *Physics 1100R/1300R: Introductory Physics

Classes Offered

Neuroscience 2070R Introduction to Neuroscience: (same as Psychology 2070R) lecture 3 hours, I.A. Meinertzhagen. Prerequisite: Psychology 1000 or 1010 or consent of instructor. For those not having Psychology 1000 or 1010, Biology 1000 and 2020 would be advantageous. Neuroscience is the newly evolving interdisciplinary field which aims to integrate findings in many diverse areas of brain research into a single systematic framework. This class introduces a number of aspects of this field emphasizing analyses which are precise at the neuronal level. A general introduction is provided by the vertebrate visual system, followed by analysis of the structure and function of neurons, including the ionic basis of their electrical activity and the neurochemistry of synaptic transmission between neurons, aspects of drug action, the control of activity in the motor nervous system and examples of the integration and development of nerve cells.

Neuroscience 2140A or B Learning: (same as Psychology 2140) lecture 3 hours, V. LoLordo. Prerequisite: Psychology 1000 or 1010. Traces the experimental study of learning from the turn-of-the-century research of Pavlov and Thorndike to the present. Development of the field of animal learning is described in terms of the ways in which particular conceptions of the learning process have guided experimentation, and have in turn been revised on the basis of the outcomes of that experimentation. Some important concepts discussed are: association, attention, biological constraints of learning, classical conditions, discrimination, expectancies, law of effect, learning-performance distinction, operant conditioning, S-S and S-R bonds, and stimulus control. The value of various approaches is discussed with respect to several goals: (1) providing general principles of learning; (2) understanding the behaviour of particular species; (3) direct application to human problems. Emphasis is on understanding why researchers in animal learning do what they are currently doing (given the goals and the historical context), rather than on learning a number of facts about animal learning.

Neuroscience 2150A or B Perceptual Processes: (same as Psychology 2150) lecture 3 hours, J. McNulty. Prerequisites: Psychology 1000 or 1010 or Biology 1000. Perception deals with the way in which our senses provide us with information about our environment. This class focusses on the process by which sensory experiences are coded, how they are interpreted by the nervous system, and how experience modifies perception.

Neuroscience 2190A or B Language and the Brain: (same as Psychology 2190) lecture 3 hours, M. Yoon. Prerequisite: Psychology 1000 or 1010. This class is an introduction to the study of languages that are considered as symbolic functions of the human brain. The main topics are the origin and diversity of languages; common properties and organizing principles of languages; the acquisition of languages by children; the brain structures involved in language and the effects of brain damage on language disorders.

Neuroscience 2270A or B Human Neuropsychology: (same as Psychology 2270) lecture 3 hours, S.R. Shaw. Prerequisite: Psychology 1000 or 1010. This class explores the organization of the human brain and its support systems, attempting to explain the complexity of both normal and abnormal function, as revealed by the consequences of accidents, defects, and surgical intervention, as well as animal models. Emphasis throughout is placed on trying to understand the mechanisms underlying phenomena. Aphasia, epilepsy, the involvement of certain

brain chemicals in behaviour, cerebral asymmetry, the potential for neural prostheses, the dispute over localization of function in the brain are examples of topics covered.

Neuroscience 3000R Independent Research in Modern Neuroscience: (same as Psychology 3000R) lab 4 hours, staff. Prerequisites: Psychology 2000A and previous or concurrent enrollment in two other 3000-level classes; and the prior consent of the instructor. Primarily for students wishing further experience and understanding of neuroscience research. A student in the class chooses a member of staff who serves as his/her class adviser throughout the academic year, and under whose supervision independent research is conducted.

Neuroscience 3050R Perception: (same as Psychology 3050R) lecture 2 hours, D.E. Mitchell. Prerequisites: Psychology 2000A and 2150. This class considers the way in which information about the world is provided by the senses and how we use this information in our behaviour. The material falls into four sections. (1) The methodological and theoretical problems peculiar to the study of sensation and perception; (2) The transformation of physical stimulus energy into neural energy; (3) The physiological and psychophysical analysis of the sensory systems with particular emphasis on vision; and (4) The development of perception and its relation to the anatomical and physiological development of the sensory pathways. The experimental work has been selected for its importance in the theoretical understanding of perceptual processes and consists of a general introduction to the apparatus and methods used in perceptual research.

Neuroscience 3150A or B Introduction to Hearing and Speech Mechanisms: (same as Psychology 3150) lecture 3 hours, D.P. Phillips. Prerequisites: Psychology 2150 or 3050; Psychology 2070 strongly recommended. Hearing and speech are two behavioural capacities of fundamental importance to normal human communication. This lecture course is designed to provide a basic understanding of the peripheral and central neural mechanisms of hearing, and of some psychological and physiological processes involved in speech production and speech perception. The course is intended for those students anticipating more advanced training in neural mechanisms of hearing, speech science, human communication disorders and/or audiology. The course emphasizes normal hearing and speech mechanism, but will address pathology where evidence from pathological subjects is pertinent to understanding normal function. Course content: introductory acoustics; structure and function of the outer and middle ears; structure and function of the cochlea; hair cell physiology and sensory transduction; coding of simple and complex sounds in the auditory nerve; sound localization mechanisms as an example of the correspondence between the physical properties of the stimulus, neural sensitivity and behavioural performance; theories of speech motor implementation; theories of speech perception; acoustic and linguistic contributions to speech perception.

Neuroscience 3160R Ethology: (same as Psychology 3160R) lecture 2 hours, lab 2 hours, J. Ferriss. Prerequisites: Psychology 2160A/B or Biology 1000. Ethology is the biological study of behaviour. It uses psychology, genetics, physiology, ecology and evolutionary theory to solve problems in the development, function and causation of behaviour across all animal species. These diverse approaches to the study of animal behaviour are presented in naturalistic and experimental situations. In laboratory exercises qualitative and quantitative records of behaviour are made in the field and in the laboratory. There are several group research projects (first term) and an individual research project (second term).

Neuroscience 3260A or B Biological Rhythms: (same as Psychology 3260) lecture 3 hours, B. Rusak. Prerequisite: Psychology 1000 or 1010 or Biology 1000. The temporal structure of animal and human physiology is governed by both homeostatic mechanisms and by a system of biological clocks. These internal clocks generate rhythms with various periods in virtually every physiological and behavioural system. Daily (circadian) clocks are the most prominent; they generate rhythms in sleep, reproduction, intellectual performance and many other functions. This course examines the nature of these biological clocks

and their physiological substrates, with an emphasis on the neural mechanisms involved in rhythm generation and synchronization in a variety of species. It also explores the hypothesized role of circadian mechanisms in sleep disorders, jet lag and depression.

Neuroscience 3270A or B Developmental Neuroscience: (same as Psychology 3270) lecture 3 hours, M. Yoon. Prerequisite: Psychology 2070 or consent of instructor. For those interested in the development of the structures and functions of the nervous system. The class introduces three main aspects: (1) Embryonic development of the nervous system; primary morphogenetic movements of cells, birth of neurones and neuroglial cells, and migration of neurones to specific places in the nervous systems. (2) Formation of functional interconnections among neural elements; synaptogenesis, topographic patterns of neural connections, synaptic organizations of various parts of the nervous system. (3) Specificity and plasticity in regeneration or reorganization of the neural connections following various experimental manipulations of the nervous system.

Neuroscience 3370A or B Neuroscience Laboratory: (same as Psychology 3370) lab 3 hours, S.R. Shaw. Prerequisites: Psychology 2000A and 2070 or 3270A. An introduction to several techniques used in contemporary neuroscience. Regularly scheduled labs with students working in pairs under supervision are supplemented by occasional lectures. The program aims at familiarizing students with electrical stimulation and recording methods and related techniques, and currently uses both sensory and motor nerve preparations. Structural analysis of the nervous system is introduced by way of Golgi neuroanatomy, and electromicroscopy of visual system or CNS.

Neuroscience 3371A or B Advanced Neuroscience Laboratory: (same as Psychology 3371) lab 3 hours, R. Croll. Prerequisites: Psychology 3370A and consent of instructor. This course is a second-term continuation of Psychology 3370A (Neuroscience Laboratory) for selected, advanced students from the first term. The course will offer training in numerous sophisticated techniques employed in modern neuroscience. These include intracellular and single unit extracellular electrophysiological recording, dye tracing techniques and immunocytochemistry. Students will be encouraged to undertake original research projects within the general framework of the laboratory exercise.

Neuroscience 3440A or B Neuroanatomy: (same as Biology 3440) lecture or lab 3 hours, D.A. Hopkins (Anatomy Dept.). Prerequisites: Biology 2020 or 2015 or permission of instructor. A survey of the histology, development and organization of the central nervous systems, with emphasis on the developmental and structural relationships between spinal cord and brainstem. The organization of cranial nerves and microanatomy of the brain stem is discussed. The organization of sensory and motor systems is presented in detail. The cerebral cortex, cerebellum, basal ganglia, and limbic system are also covered.

Neuroscience 3470A or B Comparative Vertebrate Neuroanatomy: Sensory Systems: (same as Anatomy 3450/Psychology 3470) lecture 3 hours, J. Matsubara. Prerequisites: Psychology 2040R, Biology 3440B or consent of the instructor. This course will include a survey of the various modalities found in the vertebrate kingdom with particular emphasis in the central brain structures associated with each sense. The aim of the class is to provide students with a general knowledge of the functional similarities and morphological diversities of neuroanatomical structures associated with each sensory system and their central pathways. Behavioural specializations co-evolving with special sensory pathways will be covered during lectures.

Neuroscience 3590A or B Perceptual Development: (same as Psychology 3590) lecture 3 hours, D. Mitchell. Prerequisite: Psychology 2000A. This class examines the development of visual and auditory capacities in human infants and in a variety of animal species with sensory systems like our own. The neural events that underlie these developmental changes in the various sensory pathways will be discussed. The class will also grapple with the old question of how early sensory experience influences our perceptual abilities.

Neuroscience 3760A or B Neuroethology: (same as 3760) lecture 2 hours, R. Croll. Prerequisites: Psychology 2000A or 2160 or 2070 or Biology 2020 or consent of the instructor. Neuroethology is the study of the neural bases of animal behaviour. The course will emphasize cellular approaches toward understanding the integrative mechanisms of the nervous systems which underlie complex behaviours. Feature detectors, command systems and motor programs generators will be examined in depth using examples from vertebrate preparations. Cellular bases of higher order functions such as motivation, learning and choice will be explored if time permits.

Neuroscience 4000A or B Senior Seminar: (same as Psychology 4000) lecture 2 hours, staff.

Neuroscience 4050A or B Topics In Perception: (same as Psychology 4050) lecture 3 hours, staff. This class is primarily a discussion of cortical organization in perception.

Neuroscience 4070A or B Neuroscience Seminar: (same as Psychology 4070) lecture 2 hours, M.G. Yoon. Prerequisites: Psychology 2070 and 3270 or consent of the instructor.

Neuroscience 4500R Honours Thesis: (same as Psychology 4500R) members of the department. Prerequisites: Restricted to honours students in their graduating year. The purpose is to acquaint the student with current experimental problems and research procedures in experimental neuroscience. Each student works with a staff member who advises the student about research in the major area of interest and closely supervises an original research project carried out by the student. Each student must submit a formal report of the completed research. The final grade is based upon the originality and skill displayed in designing the project and upon the submitted report and an oral presentation.

Oceanography

Chairperson of Department
A.J. Bowen

Professors

C. Beaumont, BSc (Sussex), PhD (Dal), FRSC
A.J. Bowen, MA (Cantab.), PhD (Calif.)
C.M. Boyd, MA (Ind.), PhD (Calif.)
R.O. Fournier, MSc (Wm. & Mary), PhD (URI)
C.J.R. Garrett, BA, PhD (Cantab.), FRSC
D.A. Huntley, BA (Cantab), PhD (Bristol)
E.L. Mills, BSc (Carl.), MS, PhD (Yale), FLS
P.J. Wangersky, ScB, (Brown), PhD (Yale)

Associate Professors

R.C. Cooke, BSc (Randolph-Macdon), PhD (Dal)
K.E. Louder, BA (Oberlin), MEd (Temple), PhD (MIT)
L.A. Mayer, BS (URI), PhD (Calif.)
R.M. Moore, BA (Oxon), PhD (Southampton)
B.R. Ruddick, BSc (UVic), PhD (MIT)

Assistant Professors

B.D. Johnson, BSc (N. Carolina S.U.), PhD (Dal)
J.A. Kozlow, BA (Harv.), BA (Wash.), PhD (Calif.)
M.R. Lewis, BS, MS (UMd), PhD (Dal)

Assistant Professor (NSERC Research Fellow)
K.R. Thompson, BSc, MSc (UManc), PhD (Livr.)

Research Associate (Research)

N.E. Balch, BA (UNB), MA (OXON), PhD (Dal), *Manager Dalhousie Aquatron*

Honorary Research Associates

J.S. Craigie, BA, MA, PhD (Qu.), Atlantic Regional Laboratory, NRC
 F.W. Dobson, BSc, MSc (Dal), PhD (UBC), Atlantic Oceanographic Laboratory, BIO
 R.W. Doyle, MSc (Dal), PhD (Yale), Dept. of Biology, Dal
 J.A. Elliott, BSc (U. of S.), MSc, PhD (UBC), Atlantic Oceanographic Laboratory, BIO
 Wm. G. Harrison, BS (N.C. State U.), PhD (N.C. State U.), Marine Ecology Laboratory, BIO
 C.E. Keen, BSc, MSc (Dal), PhD (Cantab.), Atlantic Geoscience Centre, BIO
 W.D. Jamieson, BSc, MSc (Dal) PhD (Cantab), Atlantic Research Laboratory, NRC
 S.R. Kerr, BSc (Carl.), MSc (Qu.), PhD (Dal), Marine Ecology Laboratory, BIO
 J.A. Novitsky, BSc (Penn. St.), PhD (Ore. SU), Dept. of Biology, Dal
 B.D. Patrie, BSc (StFX), MSc (McG), PhD (Dal), Atlantic Oceanographic Laboratory, BIO
 T.C. Platt, BSc (Nottingham), MA (Tor.), PhD (Dal), Marine Ecology Laboratory, BIO
 M. Sinclair, BSc Hons (Qu.), MSc (Southampton), PhD (Calif.) Fisheries & Oceans
 P.C. Smith, BSc MS (Brown), PhD (MIT/Woods Hole Oceanographic Inst.), Atlantic Oceanographic Laboratory, BIO
 S.D. Smith, BEng (McG), PhD (UBC), Atlantic Oceanographic Laboratory, BIO
 R.L. Stephenson, BSc (Trent), PhD (Canterbury), Fisheries & Oceans, St. Andrews, N.B.
 F.C. Tan, BSc (Taiwan), MSc (McG.), PhD (Penn. St.), Atlantic Oceanographic Laboratory, BIO
 D.G. Wright, BSc (Laurentian), PhD (UBC), Atlantic Oceanographic Laboratory, BIO

Honorary Adjunct Professors

B.T. Hargrave, BSc, MSc (Dal), PhD (UBC), Marine Ecology Laboratory, BIO
 S. Pearre, BSc (Virginia), MSc, PhD (Dal)
 D.J.W. Piper, BA, MA, PhD (Cantab.), Atlantic Geoscience Centre, BIO

Oceanography is an inter-disciplinary science that includes studies of tides and currents, the chemistry of sea water, plants and animals that live in the sea, and ocean bottom sediments and underlying crustal structures. Career oceanographers are employed in Canada in a few universities, in various federal laboratories that are engaged in both basic research and applied problems which meet a national need, such as fisheries investigations, exploration for offshore mineral resources, and studies of ice in navigable waters, and in a number of private companies interested in marine environmental protection or exploration.

A good background in basic science is a necessary prerequisite to entering the department. Properly prepared undergraduates are permitted to take one or more graduate classes as electives. There are graduate introductory classes which survey the entire field and advanced classes in each of the major specialties — physical, chemical, geological and biological oceanography, and fisheries biology.

In addition, several undergraduate classes are offered.

Classes Offered

1850R Introduction to Oceanography: lecture 3 hours, R.O. Fournier. Prerequisite: Restricted to second year, or more advanced students. A general survey of Oceanography showing how the oceans, which account for more than 70% of the earth's surface, function as a dominant environmental force. Consideration also is given to man's impact on this ecological system. Designed to give a background of feeling for the ocean, what oceanography is, and what oceanographers do. It is not a good "background to science" class, since little feeling will be obtained for scientific techniques which would otherwise be acquired in a laboratory class. Most of the material covered is descriptive rather than basic, inasmuch as it is impossible in the time allowed and the material covered to also teach the basic required sciences.

4110B Introduction to Geological Oceanography: lecture 3 hours, K. Loudon, L. Mayer. Prerequisite: Permission of the instructor. This is a one-term introductory course for new graduate students in oceanography who have little or no knowledge of geology or geophysics. The course content is mainly descriptive, and no subject is treated in great depth.

4120A Introductory Physical Oceanography: lecture 3 hours, B. Ruddick. Prerequisite: Permission of the instructor. This class explores some of 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, right 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.

4130A Introductory Chemical Oceanography: lecture 3 hours, some labs, R.M. Moore. Permission of the instructor. This course covers the major and minor constituents of sea water, the controls on its chemical composition, nutrient cycling and the chemical interactions between ocean and atmosphere. Other topics included are chemical tracers, and radiochemical dating methods, stable isotope studies, chemical speciation and chemical methods of sea water.

4150A Introductory Biological Oceanography: lecture 2 hours, lab 1 plus hours; M.R. Lewis. Prerequisite: Biology 2060 or 2046 or equivalent and permission of the instructor. Quantitative descriptions of biological oceanographic processes are used to explore interactions with physical and chemical processes in various oceanic ecosystems. Topics discussed range from factors affecting rates of microalgal photosynthesis to expected response of the ocean ecosystem to global variation in carbon dioxide and climate. Laboratory emphasizes independent, original research.

4160A Fisheries Oceanography: lecture 3 hours, staff. Prerequisite: Biology 2060A or 2046A. Familiarity with calculus and statistical concepts helpful but not required. Permission of instructor is required. The ecology of marine fisheries with emphasis on the factors affecting their production and population dynamics. Topics to be covered include the feeding, growth, metabolism of marine fish; reproductive and mortality patterns; fishery management models; community ecology; the ecology of the early life history; and the effects of climatic change.

4170B Introductory Physical and Chemical Oceanography: lecture 2 hours, A.J. Bowen, R.C. Cooke. A class restricted to third and fourth-year students. Prerequisite: Permission of the instructor. This course outlines concepts in physical and chemical oceanography with special emphasis on topics most relevant to ocean biology. The oceans as a physical system, water properties, basic dynamical concepts, the forces creating oceanic motion, ocean circulation, shelf and coastal processes. The oceans as a chemical system. Composition of sea water, control of pH and redox potential, nutrient chemistry, trace elements, organic materials, distributions and geochemical cycles.

4210B Time Series Analysis in Oceanography: lecture 3 hours, staff. Prerequisite: Permission of the instructor. Much of the data collected in oceanography and other earth sciences are in the form of a time series; measurements of variables as they change with time or place. A powerful way of interpreting and comparing time series is to separate them into contributions in different frequency bands. This course discusses ways in which this can be done, with particular emphasis on applied auto- and cross-spectral analysis, and filtering techniques.

4230B Biology of Phytoplankton: lecture 3 hours, some labs, M. Lewis. Prerequisite: Permission of the instructor. 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.

4311A/4312B Fluid Dynamics I and II: C.J.R. Garrett and staff. Prerequisite: This course is intended for first year graduate students in physical oceanography, but graduate students or senior undergraduates in

Mathematics or Physics are also invited to take the course (subject to the approval of the instructor). An introduction to the theory of fluid dynamics, with some emphasis on geophysically important aspects. Topics include: flow kinematics, equations of motion, viscous flow, potential flow and basic aerodynamics in the first term, and open channel flow, compressible, rotating and stratified flows, hydrodynamic stability, convection and turbulence in the second term. A knowledge of methods of mathematical physics is a desirable prerequisite. Some laboratory experiments on stratified and rotating flows are included in the second term.

4330B Benthic Ecology: lecture 3 hours, E.L. Mills. Prerequisite: Permission of the instructor. An advanced level course concentrating on the major problem 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 processes in the sediments. Year-to-year the course content changes, keeping up with current problems of research workers in this discipline.

4331B The History of Oceanography: lecture 3 hours, E.L. Mills. Prerequisite: Permission of the instructor. A one-term course for graduate students and senior undergraduates emphasizing the major developments leading to the present state of knowledge in biological, physical, chemical, and geological oceanography. Events and changes are set in cultural and social contexts. How have scientific forces, institutional developments, and social influences affected the acquisition of knowledge about the oceans?

4380B Marine Modelling: lecture 3 hours, M. Lewis. Prerequisite: Permission of the instructor. 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. Knowledge of computer programming is helpful but not a prerequisite.

4410R Dynamic Meteorology: lecture 3 hours, C.J.R. Garrett. Prerequisites: Physics 4310R and permission of the instructor. The basic laws of fluid dynamics are applied to studies of atmospheric motion, including the planetary boundary layer, synoptic scale disturbances (the familiar highs and lows on weather maps), front and global circulation. Emphasis will be placed on the blend of mathematical theory and physical reasoning which leads to the best understanding of the dominant physical mechanisms. The class includes an introduction to numerical techniques and their use in weather forecasting models and studies of climate.

Philosophy

Chairperson of Department
S.A.M. Burns

Professors

D. Braybrooke, BA (Harv.), MA, PhD (Corn.), FRSC. Also in Political Science
R.M. Campbell, BA (Harv.), PhD (Corn.)
W.F. Hare, BA (Lond.), MA (Leic.), PhD (Tor.), (Major appointment in Education Dept.)
R.P. Puccetti, BA (Ill.), MA (Tor.), Docteur de l'Université de Paris (Sorbonne)
P.K. Schotch, PhD (Waterloo)

Associate Professors

N.C. Brett, BA (New Hampshire), MA, PhD (Waterloo)

S.A.M. Burns, BA (Acad.), MA (Alta.), PhD (Lond.)
R.M. Martin, BA (Col.), MA, PhD (Mich.)
S. Sherwin, BA (York), PhD (Stan.)
T. Tomkow, BA (SFU), PhD (Caribab.)
T. Vinci, BA (Tor.), MA, PhD (Pitts.)

Assistant Professor

D. MacIntosh, BA (Queen's), MA (Waterloo), PhD (Tor.)

Adjunct Assistant Professor

A. Kernohan, SB (MIT), MSc (Tor.), MA (Dal), PhD (Tor.)

Beginning in Philosophy

There are many different ways of beginning in philosophy. The Dalhousie Philosophy Department offers three sorts of classes for beginners: (1) general survey introductions, which will give you a taste of a variety of questions and answers; (2) introductions to special areas; (3) logic, which is the study of the theory and techniques of good reasoning. Students wishing to major in philosophy are encouraged to begin with Introduction to Philosophy (either 1000 or 1010 or 2040 or 2050) in which a wide range of philosophical issues is discussed. But any student in any year may begin philosophy with a class that has no prerequisites. These include the 1000-level classes and many of the classes at the 2000-level. Any of these classes provides the student with a good introduction to philosophical thinking. Choose the class that best suits your interests - it's not necessary to start with a general survey. Some 2000-level classes have prerequisites which can be met either by a philosophy class or a class in another relevant discipline. The King's College Foundation Year satisfies the requirement of a previous philosophy class. Classes at the 3000-level and beyond usually have further requirements. See the class descriptions below.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

BA with major in philosophy: Students must take at least four full-year classes in philosophy beyond the 1000-level (two half-year classes may be substituted for a full-year class) including: (a) at least one logic class (half or full-year); (b) at least one history of philosophy class (half or full-year); (c) at least one full-year class or two half-year classes at the 3000-level or above which have philosophy prerequisites. All students planning to take a general degree in philosophy should first talk to an undergraduate advisor in the department.

BA with honours in philosophy: Students wishing to specialize in philosophy should take an honours course, the normal preparation for graduate study in philosophy. An honours course will include an honours qualifying essay and the equivalent of at least ten full-year classes in philosophy, including: (a) at least two half-year classes (or the equivalent) in logic; (b) at least two half-year classes (or the equivalent) in the history of philosophy; (c) at least six half-year classes (or the equivalent) at the 3000-level or above; (d) at least two half-year classes (or the equivalent) at the 4000-level. Students should contact the department for instructions regarding the honours qualifying essay.

Note: Two half-year classes at a certain level or in a certain area are considered the equivalent of one full-year class at that level or in that area. In the class descriptions to follow, "one class" unqualified will mean "one full-year class or two half-year classes." Also note that only classes whose titles begin with "Logic" or "History of Philosophy" may be used to satisfy the logic and history of philosophy requirements for a BA with major or honours in philosophy.

Class Descriptions

Note: Many classes are listed as being Exclusionary to one another. This means that students may not take both classes so designated.

The class numbers designate classes which, prior to 1984-85, were

numbered without the last digit (zero), e.g., the present class Philosophy 2130 was previously called Philosophy 213. The prerequisites and exclusionary designations below should be interpreted accordingly. Detailed descriptions are available from the department on request.

1000-Level

1000 Introduction to Philosophy: staff. (Exclusionary to 1010, 1020, 2000, 2040 and 2050.) An Introduction to a variety of philosophical problems, such as the relation of mind to body, freedom of the will, the foundation of morality, the existence of God, the nature of personal identity, and the possibility of knowledge based on reason and experience. Sections differ somewhat in approach and requirements. Consult the department to find out which ones especially suit you. This class *does not* satisfy the Faculty Writing Requirement.

1010 Introduction to Philosophy: staff. (Exclusionary to 1000, 1020, 2000, 2040, and 2050.) See description for 1000. This class *does* satisfy the Faculty Writing Requirement.

1030 Death and the Mind: R.P. Puccetti. (Exclusionary to 2030). An enquiry into the nature of death, the possibility of survival, immortality and reincarnation, and the relevance of belief in an afterlife to the way we live our lives. Note that this class satisfies the Faculty Writing Requirement.

1080 How to Win an Argument: T. Tomkow, half-year. (Exclusionary to 2150). This class is devoted to developing the practical skills involved in evaluating reasoning and producing convincing arguments. Note this class does not count toward satisfying the logic requirement for the major or honours program.

1100 Legal Thinking: N. Brett, half-year. Examination of controversial legal cases leading to increased understanding of the nature of law and the techniques of practical moral reasoning.

1111 Logic: Elementary Symbolic Logic: P. Schotch. (Exclusionary to 2110 and 2130.) An Introduction to an artificial language constructed so as to make the operations of reasoning more precise.

2000-Level

2030 Death and the Mind: R.P. Puccetti (exclusionary to 1030). See description for 1030, above. This class will be graded differently than 1030 and will not satisfy the Faculty Writing Requirement.

2040/2050 Introduction to Philosophy I and II: T. Vinc, half-year. See description for 1010 above. A student may take either or both half-year classes, but each is exclusionary to 1000, 1010, 1020, and 2000. Neither class satisfies the Faculty Writing Requirement.

2070 Justice, Law, and Morality: Concepts Version: D. Braybrooke. An Introduction to political philosophy and ethics. St. Thomas, Hobbes, Hume, Locke, Bentham, Mill, Marx, Rawls, and other authors are considered to help answer questions such as: What is justice? What is its role in society? This class and 2270 are cross-listed with Political Science. Together they provide a comprehensive survey of the history of political philosophy.

2080 Ethics in the World of Business: D. Braybrooke. Business practices are sometimes in accord with moral principles, sometimes at odds with them. Where in business is it easiest to be scrupulous? Where is it hardest? Could things be changed for the better, and, if so, what would be involved?

2130 Logic: Deduction: R.M. Martin, half-year. (Exclusionary to 1111 and 2110.) A systematic Introduction to the operations of formal deductive logic. The same topics are covered as in 1111, but at a quicker pace, with considerable attention devoted to the relation between artificial and natural language and to the philosophical problems that arise from the study of reasoning. No previous study of logic is presupposed.

2140 Logic: Logical Theory I: P. Schotch, half-year. Prerequisite: 1111 or 2130. An Introduction to meta-logic, with special attention to the soundness and completeness of formal systems, and to the philosophical evaluation of non-classical logics.

2160 Philosophical Issues of Feminism: S. Sherwin, half-year. An examination of various approaches to feminism, and of practical and theoretical issues associated with feminism, such as abortion, pornography, sexual harassment, and economic equality.

2175 Introduction to Philosophy of Education: W. Hare, half-year. A lecture/discussion class dealing with a broad range of philosophical questions about education including the use of slogans, multiculturalism, teacher education, and the role of the teacher. No prerequisites in philosophy but not recommended for first-year students. Students may also take Philosophy 2180. Cross-listed with Education 4221A.

2180 Issues in Philosophy of Education: W. Hare, half-year. An introductory level, lecture/discussion class dealing with some fundamental issues in philosophy of education, including indoctrination, open-mindedness and bias-free teaching. No prerequisites in philosophy but not recommended for first-year students. Open to students who have taken Philosophy 2175. Cross-listed with Education 4222B.

2190 Logic: Logic for Computing: P. Schotch, half-year. Prerequisite: One previous class in philosophy or computer science. This class introduces the concepts of elementary formal logic. Those aspects which apply to computing science, especially software design, are emphasized.

2200 Philosophy of Religion: R. Puccetti. An introduction to the philosophy of religion, examining such questions as: Why is religion so difficult to define? Is it rational to believe in a divine being? Can religious experiences be validated?

2250 Religion and Human Behaviour: Staff. A study of religion as a form of human experience and behaviour. Topics include: naturalistic theories of religion, the personal development of religion, religious conversion, meditation, and mysticism.

2260 Philosophy of Art: S.A.M. Burns, half-year. Examines questions such as: What is art? Can judgements of artistic value be rational and objective? Can fear of fictional objects be real fear? Can music be a language?

2270 Justice, Law, and Morality: Regimes Version: R. Eden. The problem of determining the best regime is considered through reading Tocqueville, Machiavelli, Hobbes, Montesquieu, Rousseau, Plato, and Aristotle. This class and 2070 are cross-listed with Political Science. Together they provide a comprehensive survey of the history of political philosophy.

2350 and 2370 History of Philosophy: Ancient Philosophy I and II: T. Vinc and S.A.M. Burns, half-year. Prerequisite: One previous class in philosophy. The beginnings of Western philosophy are studied in the writings of Plato, Aristotle, and their predecessors.

2410 Philosophy of Psychology: T. Tomkow, half-year. Prerequisites: One previous class in philosophy or psychology. An examination of philosophical issues arising from the scientific study of the mind.

2420 Philosophy of Biology: R. Campbell, half-year. Prerequisites: One previous class in philosophy or biology. An examination of philosophical issues arising from biology, such as the nature and implications of Darwinian evolutionary theory.

2510 Philosophy of Social Science: D. Braybrooke, half-year. (Exclusionary to 351.) Prerequisite: One previous class in philosophy, political science, economics, sociology or social anthropology. An examination of philosophical questions about the presupposition, aims, and methods of the social sciences, for example, whether the quantitative methods of the natural sciences are appropriate in the social sciences. Cross-listed with political science.

2540 Philosophy of History: D. Braybrooke, half-year. Prerequisites: One previous class in philosophy or history. Can the study of history be scientific? Are there any historical laws? Is history working toward some discernible goal?

2560 Marxist Theory: D. Braybrooke, half-year. Prerequisites: One previous

class in philosophy or political science. Marxist theory, both as philosophy and social science, is studied through an examination of major writings of Karl Marx. Same as Political Science 2455B.

2610 History of Philosophy: The Rationalists: D. Macintosh, half-year. Prerequisites: One previous class in philosophy. The philosophy of Descartes, Spinoza, and Leibniz.

2620 History of Philosophy: The Empiricists: S.A.M. Burns, half-year. Prerequisites: One previous class in philosophy. The philosophy of Locke, Berkeley, and Hume.

2660 Logic: Understanding Scientific Reasoning: Staff, half-year, each term. An introduction to the principles of scientific prediction and choice between different courses of action. The class examines the workings of chance, or probability, and the theory of games.

2700 Philosophy in Literature: R.M. Martin (exclusionary to 2705). A study of some philosophical themes in modern literature. All readings will be literary works. Cross-listed with Comparative Literature.

2705 Philosophy in Literature: R.M. Martin, half-year, (exclusionary to 2700). See description for Philosophy 2700.

2710 Existentialism: half-year, (exclusionary to 2170). A general introduction to existentialist themes and authors including Kierkegaard, Nietzsche, Sartre, and Camus.

2800 Ethics and Medicine: S. Sherwin. Modern health care generates moral problems which cannot be settled on the basis of medical knowledge alone but need to be considered in the light of moral philosophy. Among the problems to be considered in this class are: euthanasia, informed consent, confidentiality, paternalism, coercion, abortion, and the allocation of scarce resources.

3000-Level

3051 Theory of Knowledge: T. Vinci, half-year. (Exclusionary to 3050.) Prerequisites: Philosophy 2610 or 2620 or permission of the instructor. 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.

3060 Logic: Logical Theory II: P. Schotch, half-year. Prerequisites: 2140 or permission of instructor. Devoted primarily to the study of formal semantics and its relation to symbolic language.

3100 Ethics: R. Campbell. Prerequisites: Two previous classes in philosophy, preferably classes in history of philosophy and logic. 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*.

3170 Theories of Feminism: S. Sherwin, half-year. Prerequisites: Two previous classes in Philosophy or Women's Studies. 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.

3211 Philosophy of Law: N. Brett, half-year. (Exclusionary to 3210.) Prerequisites: One previous class in philosophy. A study of normative and conceptual issues arising from reflection on our legal system. Abstract legal principles and concepts are dealt with in the context of specific statutes and judicial decisions, e.g., the Narcotics Control Act, the Morgentaler case.

3300 Philosophy of Language: R. Martin, half-year. Prerequisites: Two previous classes in philosophy including one logic class, half- or full-year. What does it mean to say that the elements of language have meaning?

3360 History of Philosophy: Classical and Early Christian Philosophy: W.J. Hankey, J.P. Atherton. Prerequisite: Permission of the instructor. Special attention is given to Plato and Aristotle, and to the Greek philosophy of the first centuries A.D. and its influence on developing Christian thought. Same as Classics 3360.

3380 History of Philosophy: Medieval Philosophy: R. Crouse. Prerequisite: Permission of the instructor. Anselm, Aquinas, Ockham, some XIII Century Augustinians and Averroists and late Medieval mystics are studied most closely; attention is given to related political, literary, and theological concerns. Same as Classics 3380.

3440 Philosophy of Mind: T. Tomkow, half-year. (Exclusionary to 4460.) Prerequisites: Two previous classes in philosophy. A systematic study of the mind-body problem and/or theories of personal identity.

3460 Mind and Brain: R. Puccetti, half-year. Prerequisites: Two previous classes in philosophy. 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.

3530 Freedom, Action, and Responsibility: P. Schotch, half-year. (Exclusionary to 4450 and 4530.) Prerequisites: Two previous classes in philosophy. 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.

3630 History of Philosophy: Kant T. Vinci, half-year. Prerequisites: 2610 or 2620 or permission of the instructor. Special attention will be paid to Kant's metaphysics.

3640 History of Philosophy: Twentieth Century Philosophy: D. Macintosh, half-year. Prerequisites: One previous class in the history of philosophy or permission of the instructor. 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.

3670 Philosophy of Science: D. Macintosh, half-year. Prerequisites: At least two previous classes in philosophy, including one half- or full-year logic class such as 2660. Induction, probability, and explanation are studied with special attention to the nature of scientific theories. No scientific background is presupposed.

3851 Metaphysics: T. Tomkow, half-year. (Exclusionary to 3850.) Prerequisites: Two previous philosophy classes including at least one half- or full-year logic class. A study of topics such as the nature of substance and change, body and mind, cause and effect, and the concept of existence.

3900 Logic: Logic and Philosophical Analysis: Staff, half-year. Prerequisites: Two previous philosophy classes including one half- or full-year class in modern symbolic logic. 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 paradoxes, logicism and set theoretic paradoxes, trans-world identity, paradoxes of confirmation, counterfactuals, multi-valued logic, quantum logic, Arrow's theorem, analyticity and the *a priori*, negative existentials.

4000-Level

Note: Classes at this level are intended for advanced undergraduates with a strong background in philosophy. No specific prerequisites are listed, but it is assumed that normally a student will have already taken relevant classes at the 3000-level. Classes with titles beginning "Topics in . . ." have no description, since the selection of topics and instructor is determined after the time of calendar preparation. Interested students should consult the

department for up-to-date information.

4055 Topics in Epistemology: half-year.

4070 Topics in Philosophical Psychology: half-year.

4080 Topics in Logical Theory: half-year.

4115 Topics in Ethics: half-year.

4120 Theory of Rational Decision: R. Campbell, half-year. A study of foundational problems in contemporary theory of rational decision, drawing on work by philosophers, psychologists, economists and mathematicians.

4190 Topics in the History of Philosophy I: half-year.

4191 Topics in the History of Philosophy II: half-year.

4192 Topics in the History of Philosophy III: half-year.

4200 Topics in Normative Theory: half-year.

4215 Topics in the Philosophy of Law: half-year.

4220 Contemporary Philosophical Issues: staff, half-year. Intensive study of a few topics which are currently being debated and may fall outside of or cut across standard classification of areas of interest. Examples are: artificial intelligence, probability, sociobiology, causal theories, reduction.

4430 Game Theory as a Foundation for Ethics and Politics: D. Braybrooke, half-year. (Seminar in Philosophy, Politics and Economics.) The most innovative recent work in ethical theory has applied the theory of games to the perennial problem of the social contract. To what extent can any organized society to which people freely adhere be represented as constituted by rules arrived at by rational agents trying each to arrive at the best bargain about rules with the other agents present? These rules can be regarded simultaneously as the other foundation of political organization and as elementary rules of ethics, and a study of this topic forms the basis of the class. Cross-listed with Political Science 4485/5485 and Economics 4447/5447.

4470 Utilitarianism, Classical Liberalism, and Democracy: D. Braybrooke, half-year. (Seminar in Philosophy, Politics, and Economics) Prerequisite: Normally, classes in philosophy or political science or economics; consult instructor. The study of two beliefs characteristic of classical liberalism: that good government is strictly limited government, and that there is no standard for social policy beyond the combination of personal preferences. Cross-listed with economics and political science.

4480 Social Choice Theory: D. Braybrooke, half-year. (Seminar in Philosophy, Politics, and Economics). Prerequisite: See 4470. Arrow's theorem brings together the theory of voting and welfare economics, seemingly leading both (and the theory of democracy as well) to ruin. This class will consider how to cope with the problem. Cross-listed with Economics and Political Science.

4510 Topics in the Philosophy of Language: half-year.

4600 Philosophy of Religion Seminar: half-year.

4680 Topics in the Philosophy of Science: half-year.

4855 Topics in Metaphysics: half-year.

4940, 4980, 4980 (half-year) & 4950, 4970, 4990 (full-year) Directed Reading: staff. Prerequisite: Permission of instructor. Consult department for details. In special cases, classes to suit individual interests can be developed jointly by a student and an instructor.

Changes and Additions

As the Calendar goes to press before plans for the next academic year are

completed, there may be significant changes in the classes listed above. In particular, not all classes are offered in each academic year. Students should consult the Department for names of instructors and revisions.

Graduate Studies

The Department offers graduate classes leading to the MA and the PhD. Details can be found in the Calendar of the Faculty of Graduate Studies, and by consulting the Department's Coordinator of Graduate Admissions.

Physics

Chairperson of Department
D.J.W. Geldart

Emeritus Professor
W.J. Archibald, MA (Dal), PhD (Virg.), DSc (UNB), DSc (Dal), FRSC

Professors
D.D. Betts, MSc (Dal), PhD (McG), FRSC, *Dean of Faculty of Arts and Science*
M.G. Calkin, MSc (Dal), PhD (UBC)
D.J.W. Geldart, BSc (Acadia), PhD (McM) FRSC (*A.C. Fales Professor of Theoretical Physics*)
M.H. Jericho, MSc (Dal), PhD (Cantab.) (*George Munro Professor of Physics*)
D.B.I. Kiang, BSc (MtA), MSc, PhD (McM)
H.J. Kreuzer, MSc, DSc (Bonn) (*Killam Research Professor*)
G.F.O. Langstroth, BSc (Alta.), MSc (Dal), PhD (Lond.)
R.H. March, BSc, MSc (Dal), DPhil (Oxon.)
B.E. Paton, BSc, MSc (Waterloo), PhD (McG)

Associate Professors
B.L. Blackford, BSc (Acadia), MSc (MIT), PhD (Dal)
J.G. Cordes, MSc (Dal), PhD (Cantab.)
R.A. Dunlap, BSc (Worcester), AM (Dart.), PhD (Clark)
D.F. Goble, BSc, MSc (Alta.), PhD (Tor.), BE (Dal) (*Undergraduate Advisor and Coordinator, Diploma in Meteorology*)
S.T. Nugent, BSc (MUN.), BE (NSTC), MASc (Tor.), PhD (UNB), PEng
P.H. Reynolds, BSc (Tor.), PhD (UBC)
A.M. Simpson, BA (Cantab.), MSc, PhD (Dal) (*Graduate Student Coordinator*)
G. Stroink, BSc, MSc (Delft), PhD (McG), P Eng.
C.G. White, BSc, MSc (Dal)

Assistant Professors
D. Labrie, MSc, PhD (McMaster)
D.A. Tindall, BA, PhD (Cantab.)

Assistant Professor (Research)
K. De'Bell, BSc, MSc, PhD (London)

Research Associates
A.K. Das, DPhil (Oxon)
S. Fujiki, PhD (Tohoku)
Z. Stadnik, PhD (Jagellonian)

Post Doctoral Fellows
T. Ochiai, PhD (Rikkyo)
M. Shegelski, PhD (UBC)

Adjunct Professors
J.E. Aldrich, BSc, PhD (Notts.)
H.W. King, BSc, PhD (Birm.), DIC (Lond.), FRSA, F.Inst.P FIM, CEng, PEng

A.D.J. O'Neill, MSc (McG), PhD (Sask)
R. Ravindra, BSc (Kharapur), MA, PhD (Tor.) (Jointly with Religion)

MacGregor Teaching Fellows

Y. Bonh
J. Lant
D. Mclean
J. Zhang
D. Zhao

Senior Instructors

F.M. Fyle, MSc (Dal)
W. Zukauskas, BSc (Dal)

Physics is the study of the fundamental properties of energy and matter, and of the space in which they are found. It seeks to describe and explain the great diversity of nature with the fewest and simplest hypotheses, and to show the underlying similarities of seemingly diverse phenomena. It requires imagination disciplined by logic, and its success is judged by whether or not nature confirms its predictions when tested by experiment. An understanding of physics must be built on a good foundation. The various programs are arranged to do this in an orderly, efficient way.

First-Year Classes

There are three first-year classes. They all give a general introduction to physics, but each has its own particular approach and selection of topics. Only one first year physics class may be used for credit towards a degree.

Physics 1000: is a survey class offering a wide range of topics in both classical and modern physics. It is primarily intended for students in arts and science, has regular tutorials, no labs, does not use calculus, and is not normally accepted as a prerequisite for advanced physics classes.

Physics 1100: is primarily for students intending to make a study of a physical science or engineering; it has regular labs, no tutorials, uses calculus, and is the accepted prerequisite for advanced physics classes. Previous background in physics is desirable.

Physics 1300: is an introductory physics class which is oriented towards the health sciences and is primarily intended for students in biology, pre-medicine, pre-dentistry and allied health sciences. The class incorporates labs and tutorials, does not use calculus, and is not normally accepted as a prerequisite for advanced physics classes.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Degree Programs

Bachelor's Degree/Major in Physics

Students intending to major in physics should include Physics 1100 and Mathematics 1000A and 1010B or 1500R in their first-year program (Physics 1000 and 1300 are not normally included in a "Major"). Physics 2450, 3402A, 4020B may not be included in a "Major" to satisfy requirement 11.1 (b)(d). (These classes may, however, be taken as additional electives with a "major"). At least two 3000-level classes must be included, but in any one year, no student in a degree program may take only Physics 3000A/3010B and Physics 3340A/3350B.

BSc Major in Physics

(Example only, other possibilities exist):

Year I: 1100 (Math 1000A & 1010B), science, arts, elective.

Year II: 2200A, 2210B, 2300A, 2330B (Math 2000 or 2200), science, elective.

Year III: Two 3000-level Physics classes; one additional Physics class is

recommended; electives. A recommended selection includes 3140A, 3160A, 3170B, 3000A and 3010B.

BSc Major in Physics, with Diploma in Engineering

The physics content of this program might be as follows:

Year I: Physics 1100

Year II: Physics 2200A, 2210B, 2300A, 2330B

Year III: Physics 3160A, 3170B, 3340A, 3350B. Other possibilities exist.

For the remainder of the program, consult the Engineering Department.

Geophysics

For those interested in Geophysics, refer to classes 2050B, 3130B, 4270A, 4280B, and 4290A, listed under Geology.

BSc with Honours in Physics

All students who intend to take a BSc with Honours in Physics are encouraged to discuss their program with staff members of the department and to consult with the Chairman or Undergraduate Advisor of the Department at the beginning of the second year.

The following classes will normally be taken.

Year I: Chemistry 1100; Mathematics 1000A & 1010B or 1500R; Physics 1100; arts or science elective; and an arts elective.

Year II: Science elective; two mathematics classes; and Physics 2110 and 2120.

Year III: Arts or science elective; Mathematics 3110A, 3120B; and Physics 3000A, 3010B, 3090B, 3140A, 3200A, 3210B.

Year IV: Arts, science or mathematics elective; and four physics classes at the 4000 level including 4000A/B, 4100A/B, 4160A, 4151A, 4152B, 4230A/B. A thesis and a comprehensive examination are also required.

Students with special interests pick electives carefully. The following suggestions may serve as a guide.

Applied Physics Option: Physics 3340A, 3350B, 3440B, 3810B, 4220A, 4300A, 4330A, 4350B.

Theoretical Physics Option: Physics 4170B, 4180A/B, 4480A, 4650A/4660B; Mathematics 3050, 3320A, 4140A.

Program in Engineering-Physics

The physics department participates in, and is responsible for, teaching the physics components of the program leading to the degree of Bachelor of Engineering in Engineering Physics, awarded jointly by the Technical University of Nova Scotia and Dalhousie. For details consult the TUNS Calendar.

Combined Honours

Students interested in both Physics and another science may wish to take a BSc with Honours in Physics and the other subject combined.

Students contemplating such a program should in any case consult the Departments before the beginning of their second year of study.

Co-operative Education Program in Physics

The co-operative program provides physics students with an integrated pattern of academic study and supervised work terms in industry, government laboratories and institutes, etc. The program enables students to obtain a better appreciation of the practical problems they will face in their physics careers upon leaving the University. The work term experience gives students an opportunity to orient themselves at an early stage towards the practical application of their newly acquired knowledge, and adds to their motivation for academic study.

Eligibility: Students entering their second year of an honours program in physics or combined honours program at Dalhousie are eligible for admission.

The Work-Study Program: The program consists of 8 academic terms

and 4 supervised work terms. The academic program and required classes are the same as for the BSc degree with Honours in Physics. In addition, in year 2, Co-op students are required to participate in the non-credit class and lecture series "Scientific Methods."

Further Information: For further information contact the Program Co-ordinator, Co-operative Education Program in Physics, Department of Physics, Dalhousie University, Halifax, N.S. B3H 3J5.

Diploma in Meteorology

The one-year diploma in meteorology program consists of the following five classes: Physics 4500A/4510B, Physics 4520A/4530B, Physics 4540A/4550B, Oceanography 4410R, Oceanography 4120A, Math 4080B (or Oceanography 4210B). Students admitted to this program are eligible for consideration for AES-NSERC Studentships in Meteorology which, for 1987-88, are valued at \$5,000 per annum.

For admission into this program, which has a limited enrollment, a general BSc degree in Physics or other appropriate subject is required. A strong background in Physics and Mathematics is necessary, and classes taken should also include Statistics and Computing Science. For students enrolled in a BSc program at Dalhousie, the following classes are recommended: Physics 1100, 2200A/2210B, 2300A/2330B, 3160A/3170B, 4311A, 4312B; Math 1000A/1010B, 2000, 2030A/2040B, 2070A/2080B, 3110A/3120B; and Computing Science 1400A/1410B.

Classes marked * are not offered every year. Please consult the timetable on registration to determine if this class is offered.

Classes Offered

1000 Survey of Physics: lecture 3 hours, lab/tutorial 1 hour, C.G. White. A survey of physics, not normally accepted as a prerequisite to advanced classes in physics. It is designed for students in arts and science (and possibly also pre-medicine and pre-dentistry) who want to be exposed to a wide range of topics in physics. Topics covered include: motion, force, momentum, energy, heat, electricity and magnetism, waves, light, relativity, quantum theory and atomic radiations, the atomic nucleus and nuclear reactions, astrophysics and cosmology. Mathematics is used as a language for expressing the basic ideas of physics, but normally this is no more advanced than high school algebra and trigonometry. Problem sets are assigned on a regular basis. Help with these can be obtained at the afternoon tutorial hour or through the Physics Resource Centre. Two or three times each term the tutorial time will be used to carry out some simple laboratory experiments. Text: J.B. Marton, *Physics and the Physical Universe*, 3rd ed., Wiley.

1100 Introduction to Physics: lecture 3 hours (3 sections, section 03 for engineering students), lab 3 hours every 2nd week, D.F. Goble, M.G. Calkin, R.H. March. Primarily for students interested in the physical sciences. Students beginning this class should be familiar with algebra, graphs and trigonometry, should be taking Calculus (Math 1000/1010) concurrently, and should have a background in Physics equivalent to the Nova Scotia XII level. This class concentrates on three main areas: mechanics, oscillations and waves, and electricity and magnetism. As far as possible, the basic ideas are introduced through in-class demonstrations, enabling students to relate the verbal and mathematical descriptions to events in the real world. In addition, students are able to explore the physical world via labs every second week. Text: Serway, *Physics*, 2nd ed., Saunders.

1300 Physics In and Around You: lecture 3 hours, lab/tutorial 3 hours, G.F.O. Langstroth. An introduction to physics for students in biology, pre-medicine, pre-dentistry and allied health sciences, not normally accepted as a prerequisite to advanced classes in physics. After introducing basic concepts in physics, every opportunity is used to apply these concepts by using realistic biological examples, e.g., forces and torques are directly related to muscle action, fluids to blood circulation, sound to hearing. Students beginning this class should be familiar with trigonometry and algebraic equations. Text: Kane and Sternhelm, *Physics*, 2nd ed., Wiley.

2110/2120: These two classes are intended to be complementary, and for second-year honours students. Unless the circumstances are unusual, they should be taken together. The classes have a common laboratory, i.e., work

done in the laboratory periods is included in the grade for both classes. Prerequisites are also common: Physics 1100 and Mathematics 1000A and 1010B. (Statistics have shown that a student with less than a "B" grade in Physics 1100 can be expected to have difficulty with 2110 and 2120.)

2110 Mechanics and Waves: lecture 3 hours, lab 3 hours, D.A. Tindall. The first part deals with basic vector mathematics, Newton's laws of motion, motion in unaccelerated reference frames, the two principles of special relativity and their use in describing space and time intervals in unaccelerated reference frames, conservation of energy and momentum from both the classical and relativistic view point, and harmonic oscillations. The second part deals with wave motion in mechanics, electromagnetism, quantum theory. Fourier analysis of wave packets and pulses is included. Text: Berkeley Physics Course, Vol. 1 *Mechanics*, McGraw-Hill, 1973; Berkeley Physics Course, Vol. 3 *Waves and Oscillations*, McGraw-Hill, 1965.

2115 Mechanics: lecture 3 hours; as for 2110 but without labs. Permission of instructor required. Students may not register for both 2110 and 2115.

2120 Electricity: lecture 3 hours, lab 3 hours, C.G. White. The class begins by studying electrostatics, including the concepts of electric field and electric potential as physical quantities. Next, the motion of charge in conducting materials is discussed, leading to the solution of circuit problems involving capacitance and inductance. By considering the electric field of a moving charge in the light of the theory of relativity, the nature of the magnetic field is introduced and its properties discussed. Electric and magnetic fields in matter are also discussed. The laboratory work is designed to illustrate the physical principles discussed in the lectures and simultaneously to introduce students to the use of electronic apparatus and to the design of some simple circuits. Text: Berkeley Physics Course, Vol. 2 *Electricity and Magnetism*, 2nd ed., McGraw-Hill, 1984.

2125 Electricity: lecture 3 hours; as for 2120 but without labs. Permission of instructor required. Students may not register for both 2120 and 2125.

2200A/2210B: Applied Physics is designed to acquaint you with the wide range of physical principles at play in the world around us. These principles are discussed in class but the major emphasis is on the practical aspects of physics. In the lab, you learn to apply principles of physics and modern measuring techniques in the solution of practical problems found in the world of science and technology.

2200A Waves and Vibrations: lecture 3 hours, lab 3 hours, A.M. Simpson. Prerequisite: a first-year class in physics. Subject material: theory of measurements, mechanical vibrations, synthesis of waves, acoustics, resonance, interference. Text: A.P. French, *Vibration and Waves*, Norton.

2210B Electromagnetic Waves: lecture 3 hours, lab 3 hours, A.M. Simpson. Prerequisite: 2200A. Subject material: electromagnetic spectrum, geometric optics, interference, diffraction, matter waves, theory of solids, semiconductors. Text: D. Halliday and R. Resnick *Physics*, Part 2, Wiley, 1978.

2220A* Radiation Physics: lecture 3 hours, G.F.O. Langstroth. Offered in alternate years beginning in 1986/87. Prerequisite: first year physics or approval of instructor. Topics include the nature and origin of radiation, radioactive decay, the interaction of radiation with matter, and detection and measurement of radiation.

2230B* Radiation Physics, Applications: lecture 3 hours, G.F.O. Langstroth. Offered in alternate years beginning in 1986/87. Prerequisite: first year physics or approval of instructor, with preference given to students who have taken Physics 2220A. Emphasis is on applications in biology, physiology and medicine, and the discussion will focus on methods and devices employed in the investigation and treatment of living organisms, with particular attention to imaging techniques for the examination of internal organs.

2300A/2330B: For second year science and engineering students who wish to take a second class in physics, in addition to Physics 2200, 2210 or who for some reason are unable to take that class. Students may take third-year physics if they have taken this class and Physics 2200, 2210.

2300A Mechanics: lecture 3 hours, G.F.O. Langstroth. Prerequisites: Physics 1100, Mathematics 1000A and 1010B. The basic laws of classical mechanics. It covers similar material to that of Physics 1100 but with a more advanced mathematical treatment which allows for more detailed application of the basic laws to specific physical examples, e.g., examples involving rotation and planetary orbits. Text: Kleppner and Kolenkow, *An Introduction to Mechanics*, McGraw-Hill, 1973.

2330B Electricity and Magnetism: lecture 3 hours, B.L. Blackford. Prerequisite: Physics 2300A. The basic laws of classical electricity and magnetism and the application of these laws to the analysis of electric and magnetic fields in solids. The discussion of fields in solids leads to some reference to quantum effects. A brief treatment of some common electrical circuits is also included.

2450 Astronomy: lecture 1 hour, tutorial 1 hour, P.H. Reynolds. Prerequisite: One first-year science class. An introduction to Astronomy for science students. Topics discussed include: the observation and exploration of the planets, the origin and evolution of stars (including white dwarfs, pulsars, quasars, black holes), the structure of galaxies, and cosmology. Text: Kaufmann, *Universe*, Freeman, 1985.

2500* Astronomy and Introductory Astrophysics: lecture 3 hours, staff. Prerequisite: Physics 1100 or permission of instructor. This is a basic class designed primarily for students who may wish to pursue more advanced studies in astronomy or in astrophysics. It is appropriate for a physics major or an honours physics student. Mathematics and the laws of physics are applied to show how quantitative information follows from observational data, and how a consistent picture emerges of the structure and evolution of the universe. (*This class is not offered every year.)

3000A/3010B Experimental Physics: lab 6 hours, lecture 3 hours, G. Stroink. Prerequisites: For honours students, Physics 2110, 2120. For major students, Physics 2300A, 2330B, 2200A, 2210B. Exceptions have been made. Designed to give students a chance to do non-set experiments and thereby encounter and solve on their own the problems of experimentation. As the number of experiments is small (four to six), students should achieve a real understanding of a few physical phenomena. Topics cover a wide range of fields such as atomic physics, nuclear physics, solid state physics and electronics. A measurement of one of the fundamental constants such as c , G or e is required. Other than this the student is free to choose the field of experimental study.

3005A/3015B Experimental Physics: lab 6 hours, as for 3000A/3010B, but without the lectures. Available only to Engineering-Physics students from TUNS.

3090B Advanced Classical Mechanics: lecture 3 hours, M.G. Calkin. Topics include the principle of least action, Lagrange's equation, Hamilton's equation, Canonical transformations, Hamilton-Jacobi equation, motion of a rigid body, small oscillations. Text: Goldstein, *Classical Mechanics*, 2nd ed.

3140A Introduction to Quantum Physics: lecture 3 hours, J.G. Cordes. Prerequisite: Mathematics 2000 or its equivalent. This introduction to quantum physics first analyses difficulties of classical physics (black body radiation, radiation from accelerated charges and atomic spectra). The experimental basis of the wave-particle duality of light is discussed and the existence of diffraction patterns for particles is used to motivate the construction of wave equations for particles. The determination and interpretation of solutions of Schrödinger's equation is illustrated by simple examples. The three dimensional Schrödinger equation is discussed, with special emphasis on the hydrogen atom. The concept of electron spin is also introduced. Text: French and Taylor, *Introduction to Quantum Physics*, Norton, 1978.

3160A Topics in Physics: lecture 3 hours, R.H. March. Prerequisite: At least one second-year level physics class. An introduction to thermodynamics, statistical mechanics, diffusion and fluid mechanics.

3170B Topics in Physics: lecture 3 hours, B.E. Paton. Prerequisite: At least one second-year level physics class. This is complementary to 3160A. An introduction to optics and modern physics.

3200A Thermodynamics: lecture 3 hours, H.J. Kreuzer. Prerequisite: Some knowledge of partial derivatives; Mathematics 2000, or its equivalent, which may be taken concurrently with the class. An introduction to the laws and basic concepts in classical thermodynamics. Topics include equations of state, heat engines, thermodynamic functions, and phase equilibria. Text: Zemansky and Dittman, *Heat and Thermodynamics*, 6th ed.

3210B Statistical Mechanics: lecture 3 hours, D.D. Betts. Prerequisites: Physics 3200A, or its equivalent; Mathematics 2000, or its equivalent. In this class the tools are developed to link the physical laws of the microscopic world, and the underlying atomic processes of the laws of thermodynamics are explored. Text: Kittel and Kroemer, *Thermal Physics*, 2nd Ed., Freeman.

3250A/B Computational Methods in Physics: lecture 3 hours, lab 3 hours, K. DeBell. Prerequisites: Completion of a second year program in physics, including Mathematics 2000 or 2200, or special permission of the instructor. This course will provide experience in computer-based techniques for problem solving in physics. An essential part of the course is the use of computer facilities, replacing conventional laboratory experiences. Topics include data analysis, numerical and algebraic solutions of analytic problems, and computer simulations. Text: Koonin, *Computational Physics*, Benjamin & Cummins.

3340A Electronics: lecture 3 hours, S.T. Nugent. Prerequisites: Physics 2120 or 2300A/2330B; Mathematics 2200 or 2000 or 2480A/2490B. Topics include: carrier transport in semiconductors, properties of diodes and transistors, amplifiers, oscillators, modulation, demodulation and rectification, operational amplifiers, linear and nonlinear analog systems. Text: Seidman and Weltraub, *Electronics*.

3350B Networks, Lines and Filters: lecture 3 hours, staff. Prerequisite: Physics 2120 or 2300A/2330B, Mathematics 2200 or 2000 or 2480A/2490B. Topics include: network reduction; the 4-terminal network and solution by matrix methods, properties of distributed constant transmission lines, active and passive filters. Text: Papoulis, *Circuits and Systems*.

3402A The Rise of Modern Science: lecture/seminar 2 hours, R. Ravindra (Physics), J. Farley (Biology). (Same as Biology 3402A, History 3072A and Religion 3502A. Class description to be found under Biology 3402A.)

3440A/B Optics: lecture 3 hours, B.E. Paton. Prerequisite: Physics 2300A/2330B, or Physics 2120, or Physics 2210B and Mathematics 2200. Topics are selected from areas such as the radiation from accelerated charges, the statistical properties of the fields from assemblies of radiators, interference, diffraction, and the application of Fourier transforms to the structure of images, the resolving power of instruments and the characterization of coherence. The students should be familiar with vector analysis, Maxwell's equations and the use of complex exponential functions. In any one year, only one of 3440A and 3440B will be given.

3810B Micro-Computers and the Real World: lecture 3 hours, computer programming 1 hour, B.E. Paton. Prerequisite: Physics 2200A/2210B or 2110/2120. Subject material: measurement theory, modern sensors; microcomputer architecture; simple chip computers; software simulation of digital electronic circuits; machine language programming; assembly language programming; interfacing techniques; development of "intelligent" instruments. Text: Newell, *Introduction to Microcomputing*, 1982, Harper and Rowe.

4000A/B Advanced Lab: lab 6 hours, M.H. Jericho. Prerequisite: Fourth-year standing in physics or engineering-physics or permission from the instructor. This is a physics and engineering-physics laboratory class in which students in groups of two work largely on their own initiative. The student may select experiments from the fields of optics, acoustics, solid state devices and low temperature physics. Detailed laboratory reports on the experiments are required and students are expected to demonstrate a good grasp of underlying physical principles. In any one year, only one of 4000A and 4000B will be given.

4020B* Special Topics in the History and Philosophy of Science: seminar 3 hours, R. Ravindra.

4100A/B Electrodynamics: lecture 3 hours, B.L. Blackford. Topics include the wave equation and solutions, waves and metallic boundaries, the inhomogeneous wave equation, radiation from moving charges, scattering and dispersion. Text: Panofsky and Phillips, *Classical Electricity and Magnetism*. In any one year, only one of 4100A and 4100B will be given.

4151A Quantum Mechanics: lecture 3 hours, D. Klang. Prerequisite: Physics 3140A.

4152B Quantum Mechanics: lecture 3 hours, D. Klang. Prerequisite: Physics 4151A. Topics discussed include: concepts and formulation of quantum mechanics, harmonic oscillator, angular momentum, the central force problem and approximation methods. Text: Liboff, *Introductory Quantum Mechanics*.

4160A Mathematical Methods of Physics: lecture 3 hours, J.G. Corde. Prerequisite: Mathematics 3110A/3120B or permission of the instructor. Topics discussed include: complex variable theory, Fourier and Laplace transform techniques, special functions, partial differential equations. Text: Arfken, *Mathematical Methods for Physicists*, 3rd Ed., Academic Press, 1985.

4170B Topics in Mathematical Physics: lecture 3 hours, J.G. Corde. Prerequisite: Physics 4160A or permission of the instructor. This class is a continuation of Physics 4160A 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. Text: Arfken, *Mathematical Methods for Physicists*, 3rd Ed., Academic Press, 1985.

4180A/B* Nuclear Physics: lecture 3 hours, D. Klang. Prerequisite: Physics 3140A. This is an introductory class. Topics discussed include: nucleon-nucleon interactions, nuclear structure, gamma transitions, alpha decay, beta decay and nuclear reactions. In any one year, only one of 4180A and 4180B is given.

4220A* Microcomputer Based Instrumentation: lecture 2 hours, lab 3 hours, B.E. Paton. Prerequisite: Physics 3810B. 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. Text: Zaks: *Microcomputer Interfacing*. (*This class is not offered every year.)

4230A/B Introduction to Solid State Physics: lecture 3 hours, D.A. Tindall. Prerequisite: Physics 3140A or permission of the instructor. 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. Text: Kittel, *Introduction to Solid State Physics*, 6th Ed., Wiley.

4311A/4312B Fluid Mechanics I/II: This class is a cross-listing for Oceanography 5311A/5312B and is accepted as a physics class.

4330A Crystallography and Physical Properties: lecture 3 hours, H.W. King. Prerequisite: Physics 3140A or permission of the instructor. The concepts of crystal symmetry and crystal lattices are developed systematically. The symmetry of space groups is analysed and then applied to physical properties using tensor notation. The concept of space groups is developed and applied to crystal structure analysis by diffraction processes. The effect of defect crystal structures is considered in terms of electron transport properties and mechanical properties. Text: Nye, *Physical Properties of Crystals*, Oxford University Press.

4350B Energy, Sources and Conversion: lecture 3 hours, H.W. King. Prerequisites: Physics 3140A, Engineering 340A. Topics discussed include: extent and use of world energy supplies, thermodynamics of heat engines, thermojunction generators and refrigerators, solar generators, thermionic generators, fuel cells and related devices, chemical primary and secondary cells, magnetohydrodynamics, nuclear fission processes, and breeder reactors. Text: Angström, *Direct Energy Conversion*.

4460A/B* Optics: lecture 3 hours. Prerequisite: Physics 3440A/B. Registration requires prior Departmental consent. A continuation of Physics 3440A/B dealing with coherence, polarization, scattering by matter, the electromagnetic properties of matter, including crystals, reflection, refraction and double refraction. In any given year, only one of 4460A and 4460B will be offered.

4480A Applied Group Theory: lecture 3 hours. This is cross-listed with Mathematics 3320A, but for students in Physics 4480A, additional reading will be required. May not be offered in every year.

4500A Atmospheric Physics I: lecture 3 hours, D.F. Goble. Prerequisite: At least one third-year level physics class. Main topics covered in this class are atmospheric thermodynamics and atmospheric radiation. Reference: J.V. Iribarne and W.L. Godson, *Atmospheric Thermodynamics*, Reidel; G.J. Haltiner and F.L. Martin, *Dynamic and Physical Meteorology*, McGraw-Hill.

4510B Atmospheric Physics II: lecture 3 hours, D.F. Goble. Prerequisite: Physics 4500A. The major topic covered in this class is cloud physics. Other topics include atmospheric optics, atmospheric acoustics, lightning, and radar techniques. Reference: R.R. Rogers, *A Short Course in Cloud Physics*, Pergamon; J. Battan, *Radar Observation of the Atmosphere*, U. of Chicago Press; *Atmospheric Physics*, Readings from Scientific American, Freeman.

4520A General Meteorology I: lecture 3 hours, staff. Prerequisite: At least one third-year level physics class. This class provides students with an understanding of the origin and composition of the atmosphere, its thermal structure, the general circulation, air mass and frontal theory, weather generating physical processes and their consequences. Text: J.W. Wallace and P.V. Hobbs, *Atmospheric Science (An Introductory Survey)*, Academic Press.

4530B General Meteorology II: lecture 3 hours, staff. Prerequisite: Physics 4520A. This class expands on knowledge acquired in 4520A. Topics studied include hydrostatic stability and instability micro-scale phenomena, local wind systems, controls on weather and climate. Students are exposed to applications of meteorological knowledge and theory of problems in air pollution control, hydrology, agriculture and other fields. Text: J.W. Wallace and P.V. Hobbs, *Atmospheric Science (An Introductory Survey)*, Academic Press.

4540A Synoptic Meteorology I: lecture 2 hours, tutorial and laboratory 3 hours, staff. Prerequisite: At least one third-year level physics class. 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. The class includes a weekly three-hour tutorial-laboratory period during which graphical and computer methods are applied to the examination of real atmospheric systems.

4550B Synoptic Meteorology II: lecture 2 hours, tutorial and laboratory 3 hours, staff. Prerequisite: Physics 4540A. This class extends the analysis and diagnosis of atmospheric dynamics and weather processes introduced in Physics 4540A. Modern statistical and computer methods and satellite techniques are discussed. The class includes a weekly three-hour tutorial-laboratory period during which case studies of atmospheric systems and processes are carried out.

4650A/4660B Relativity and Cosmology: lecture and tutorials 3 hours, staff. Offered in alternate years. Prerequisites: Physics 2110 and 2120, Mathematics 3050R, or the consent of the instructor. The first half is devoted to the development of tensor analysis and the general theory of Relativity. Einstein's field equations are developed and some applications of models, based on these equations, are discussed. Topics include linearized gravitation and gravitational radiation, the experimental foundations of relativity, orbit theory, and black holes. The second half is devoted to understanding the theoretical and observational basis of modern physical cosmology in the light of the previously developed theory.

6890 Co-op 2nd Year Seminar: (non-credit).

8891 Co-op Work Term I

8892 Co-op Work Term II

8893 Co-op Work Term III

8894 Co-op Work Term IV

Graduate Studies

The Department of Physics provides courses of study leading to the advanced degrees of MSc and PhD. Areas of research undertaken at Dalhousie include: solid state, geophysics, medical physics, low energy nuclear physics, low temperature physics, theoretical physics, and oceanography. Further details are given in the Calendar of the Faculty of Graduate Studies.

Political Science

Chairperson of Department
G.R. Winham

Emeritus Professors

J.H. Aitchison, BA, BEd (Sask.), BSc (Lond.), PhD (Tor.)
J.M. Beck, MA (Acadia), MA, PhD (Tor.), FRSC
G. Grant, BA (Queen's), DPhil (Oxon), LLD (Trent), DLit (MtA), LLD (Dal)
LLD (Tor.), FRSC

Professors

P.C. Aucoin, BA (SMU), MA (Dal), PhD (Queen's)
R. Boardman, BSc, PhD (Lond.) (*Director, Centre for Foreign Policy Studies*)
E.M. Borgese (Professor of International Ocean Affairs)
D. Braybrooke, BA (Harv.), MA, PhD (Corn.), FRSC
D.M. Cameron, BA (Queen's), MA, PhilM, PhD (Tor.)
J.G. Eayrs, BA (Tor.), AM, PhD (Col.), FRSC (Eric Dennis Memorial Professor of Government and Political Science)
T.M. Shaw, BA (Sussex), MA (East Africa, Prin.), PhD (Prin.)
D.W. Stairs, BA (Dal), MA (Oxon.), PhD (Tor.), FRSC
G.R. Winham, BA (Bowdoin), Dip. in Int. Laws (Manc.), PhD (N.Car.)

Associate Professors

H. Bakvis, BA (Hons) (Queen's), MA, PhD (UBC)
D.W. Middlemiss, BA, MA, PhD (Tor.)
D.H. Poel, BA (Calvin), MA (West Michigan), PhD (Iowa)

Assistant Professors

R.G. Finbow, BA (Hons) (Dal), MA (York), MSc, PhD (London)
D.F. Luke, BSc, Msc, PhD (London)
J. Smith, BA (McM), MA, PhD (Dal)

Associate Professor (Research)

L. Dowdy, BA (Duke), MA, PhD (Tulane)

Assistant Professor (Research)

D. Jones, BA, (Dal), MA (Duke), PhD (Dal)

Adjunct Professor

S.K. Holloway, BA, MA, PhD (Ohio State)

Politics has been described as "Who Gets What, When, How, Why" in society. The study of politics, or Political Science is one of the oldest academic disciplines known to humankind. In Ancient Greece political philosophers concerned themselves with creating a good society, and balancing justice with order. Today, Political Scientists still study these

matters, but the discipline has grown to encompass many aspects of government, such as parliaments, electoral processes and constitutions; or external relations, including issues of war, peace and poverty.

Political Science is important to society because, in an age of complex government, an educated citizenry is the best safeguard for democracy. Political Science is valuable for individuals who want to know more about the values, laws, institutions and policy mechanisms that govern their lives in society; and as well, the differences between their system of government and those in other countries. Beyond this, Political Science is an especially useful preparation for students who wish to pursue careers in teaching, law, public service or business.

Dalhousie University's approach to Political Science is a blend of traditional and modern analysis. The Department offers work in classical political philosophers; and most courses emphasize government structure and policy making, including domestic public administration and foreign policy. Other courses deal with political behaviour such as public opinion or interest group activity. Classes in modern research methods, including quantitative analysis, are also offered.

The admission requirements for Political Science are listed under the Faculty of Arts and Sciences. There are no additional requirements for Political Science beyond those of the Faculty.

Students majoring in Political Science are encouraged to seek advice from Professors Herman Bakvis or Dale Poel, Co-ordinators of Major Programs, in developing a program of studies. Students taking an Honours Degree should seek advice from Professor Jennifer Smith, Honours Coordinator. Professor Peter Aucoin is the Coordinator of Graduate Studies.

Degree Programs

Students concentrating in Political Science may take a major program or honours program. The degree requirements are spelled out in University and Faculty Regulations, and in department regulations outlined below. The specific classes to be taken in each individual program are chosen in consultation with the relevant faculty adviser from the Department. Undergraduate programs may emphasize one of the sub-fields of Political Science or may consist of a general selection of classes from the Department's offerings.

Requirements — Major Program

In order to meet the requirements of a major program, a student must take at least four, but no more than eight, classes in political science in addition to an introductory class. All major students should take at least two full classes from among the second-year level offerings and these classes should be selected from at least two sub-fields. A minimum of two additional classes should be taken from third-year level offerings, and will be chosen in consultation with Departmental Co-ordinators for Major Programs.

Honours Program

An honours program normally consists of a first-year level class and not less than nine nor more than eleven additional classes in Political Science. Although nine to eleven classes represents the range allowed under the general university regulations, the Department recommends quite strongly that the normal honours program consist of nine classes past the first-year class, including the honours essay. The intent of this recommendation is to encourage our honours students to take supporting class work in related disciplines.

For the purpose of the honours program the Department has designated six second-year classes as honours core classes. Five of these core classes represent the political science sub-fields of Canadian politics, comparative politics, political philosophy (two classes) and international politics and the fifth represents the methodological basis for each of the sub-fields. The six core classes by area are as follows:

Canadian politics: PS 2200R Canadian Government and Politics
Comparative politics: PS 2300R Comparative Politics
Political philosophy: PS 2400R Justice, Law and Morality: Regimes Version or PS 2401R Justice, Law and Morality: Concepts Version
International politics: PS 2500R World Politics
Methodology: PS 2494R Introduction to Political Inquiry

An honours program in political science includes (i) at least three core

classes, of which one must be PS 2494R Introduction to Political Inquiry, and another must be either PS 2400R or PS 2401R; (II) at least four advanced classes at the third and/or fourth year level, including the honours essay.

The core class requirements are designed

- (1) to give breadth to the honours program,
- (2) to provide all honours students with a grounding in the normative questions of the discipline as well as the foundations of empirical inquiry, and
- (3) to expose prospective honours students to the various sub-fields that may be chosen for emphasis in individual programs.

Overall, these requirements leave a minimum of two optional credits, which may be taken at the second, third or fourth-year levels.

In the exceptional case of students who have delayed their decision to enroll in an honours program until late in their third year, or who have decided at the end of their general program to pursue an Honours Certificate, third-year or higher level classes may be substituted on occasion for one or more of the core classes. Such substitutions, however, must reflect the same distribution of areas within the discipline as is represented by the core-class requirements, and they must have the approval of the Honours Supervisor. Students who think they may eventually pursue an honours degree or certificate are strongly advised to complete their core-class requirements as early in their undergraduate careers as possible.

The honours essay is counted as one credit. It is prepared during the fourth year under the supervision of a faculty member. The essay shows the student's ability to develop a systematic argument with reference to pertinent literature and other such data or analytical materials as may be appropriate. The credit number for the honours essay is PS 4800. Informal arrangements are usually made for honours students in the last year to meet with some regularity to discuss and ultimately present the work represented in their essay. A guide for preparing the honours essay is available from the Department Office.

Combined Honours

Several of the more common honours programs are: Political Science and Philosophy; Political Science and History; Political Science and Economics; Political Science and Sociology; and Political Science and International Development Studies. Students interested in taking any of these combined honours programs or in discussing other possible programs should consult with the Chairman of the Department or his deputy.

Graduate Studies

The Department offers MA and PhD programs in Political Science, details of which are given in the Calendar of the Faculty of Graduate Studies.

Undergraduate Advisory System

The Department maintains a general Undergraduate Advisory System. A student wishing to have a member of the Political Science Department as undergraduate advisor must be either:

- (a) enrolled in a first-year level class and contemplating a program in Political Science (in which case the advisor is normally the instructor of that class) or
- (b) registered for a program in Political Science.

Upon entering the program a student may indicate a choice of advisor. Normally the advisor is a faculty member teaching in the student's sub-fields of concentration (if any). The student's choice will be respected unless the member chosen is unable to serve in this capacity. Students who have no preference, but would like nonetheless to have an advisor assigned to them, should consult with Professors Bakvis or Poel.

The advisory relationship may be ended by the student at any time and for any reason. One faculty member may continue to advise the same student throughout his program. The role of the advisor is to be available to the student throughout the year as a consultant on broad academic matters. The advisor is not a tutor with regard to specific classes. Students should consult their advisors with regard to the general structure of their programs and any proposed course changes.

Classes Offered

Numbering System for Classes

Class descriptions are listed by four-digit numbers under headings:

Introductory
Canadian Government and Politics
Comparative Government and Politics
Political Theory and Methodology
International Politics and Foreign Policy

The first digit of each class number thus indicates year, or level, of class. Except for 1000-level classes, the second digit denotes the sub-field within which the class is listed. Thus PS 3540B/5540B is a class open to third-year level and graduate students, in the sub-field International Politics and Foreign Policy, offered during the second term of the academic year.

No student may take more than one first-year level class but some second-year level classes require no prerequisite. The prerequisites listed with each class are intended to show the sort of preparation the instructor anticipates. A student will usually take one second-year course in a field before taking a 3000-level course in the same field (e.g., PS 2200R before taking PS 3250R). Students without the appropriate 2000-level course may obtain admission to 3000-level courses only with special permission of the instructors of those courses.

Introductory

1100 Section 1, Introduction to Political Science: lecture 3 hours, D.F. Luka. As a bridge between the study of political philosophy and the study of political institutions, the theories and principles of liberal democracy are examined, with references to British political experience and a more detailed examination of the constitutions, governments and politics of Canada and the United States.

1100 Section 2, Introduction to Political Science: lecture 3 hours, staff. This class works through two outstanding recent contributions to political science. *Size and Democracy*, by R.A. Dahl and E.R. Tuft; and *Politics and Markets*, by C.E. Lindblom. These books serve to introduce students, not only to some current grand issues in politics, including the opposition of capitalism to socialism, but also to several branches of political science, and the methods used in them.

1101 Section 1, Introduction to International Politics and Foreign Policy: lecture and intended discussion 3 hours, J. Eayra. To provide a framework for analysis and understanding of contemporary international events, this class deals with the variety of "actors" in world politics (principally but not exclusively states), and examines some concepts in the field. 1101 is recommended for students planning to take 2500, in their second year.

1103 Section 1, Introduction to Political Science: lecture 3 hours, R. Boardman. A guide to politics and government in Canada, the United States and Britain. Aspects of British, Soviet and other countries' political systems are introduced, and the class begins with a look at some of the perennial issues of political life and democracy.

Canadian Government and Politics

2200 Canadian Government and Politics: lecture 3 hours, J. Smith. Prerequisite: An introductory political science class or instructor's permission. The class begins by examining the Confederation debate, 1864-67, and then turns to the constitution of the new federation, the British North America Act. Its development via constitutional amendment and the practice of judicial review is studied. A review of the Canada Act, 1982, completes this section of the course. The second section deals with governmental institutions, the Crown, cabinet government and Parliament. The third and final section covers elections, the electoral system and political parties.

2228B Government-Business Relations in Canada: lecture and discussion 2 hours; H. Bakvis. Prerequisite: An introductory political science class, or instructor's permission. The aim of this class is to explore the interaction between business and government in Canada and, more generally, the role of government in economic life. The objectives are to

Introduce students to the policy instruments deployed by governments to promote and regulate business activities in a market economy; the political values and interests which pertain to such promotion and regulation; and the manner in which the private sector seeks to affect the formulation and implementation of government policy. The class is of interest to Commerce and other students not majoring in political science since many of the topics are approached with a view to their practical importance.

3205B/5205B Canadian Political Thought: seminar 2 hours, J. Smith. Prerequisite: Class in Canadian Politics or permission of the instructor. 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. We examine these controversies as they have been articulated in speeches, pamphlets and articles by people active in public life.

3208/5208 Canadian Provincial Politics: lecture and seminar 2 hours, D.H. Poel.* Prerequisite: PS 2200. An emphasis on cross-provincial, empirical research is combined with an interest in the value context of provincial policy.

3212B/5212B The Politics and Government of Nova Scotia: seminar 2 hours, P.C. Aucoin.* Prerequisite: Political Science 2200R or permission of the instructor. This research seminar examines the governing of Nova Scotia from the perspective of the provincial system. The topics considered encompass: the political environment; political parties and elections; executive organization and administrative processes; executive-legislative relations; provincial-municipal relations; intergovernmental relations in the Maritimes; provincial-federal relations; and provincial public policy. As a research seminar students not only must prepare and present papers for class discussion they also must conduct primary research for most if not all topics in addition to reading secondary materials.

3216A/5216A Local and Regional Government: lecture and discussion 2 hours, D.M. Cameron.* Prerequisite: PS 2200 or its equivalent. Topics to be discussed include theories of local government, the history of local government in Nova Scotia and Canada, various organizational forms, finances and intergovernmental relations. Special attention will be paid to local government reform and to metropolitan government.

3220A/5220A Intergovernmental Relations in Canada: seminar 2 hours, H. Bakvis. Prerequisite: PS 2200 or permission of the instructor. The territorial division of political power and the relations that have developed between governments are considered, with emphasis on the impact on policy outcomes.

3221B/5221B Case Studies in Intergovernmental Relations: seminar 2 hours, D.M. Cameron.* Prerequisite: PS 3220A/5220A or PS 3204. Building on the foundations established in 3220A/5220A, this class will explore in depth several published case studies involving relations between governments in Canada in specific policy areas. Students will present and defend one or more seminar papers.

3224A/5224A Canadian Political Parties: lecture and discussion 3 hours, H. Bakvis.* Prerequisite: PS 2200 or instructor's permission. The Canadian party system, viewed as an integral part of the entire political system, presents a number of interesting questions for exploration.

3228B/5228B Interest Groups: Function and Management: 2 hours, H. Bakvis. 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 programs. 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 course will be a discussion of the internal management of groups. This discussion will include a review of how membership is secured and retained; 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 course will examine the role of interest groups in policy processes and the relationship between that role and the prospects for democracy in western politics.

3230B/5230B Canadian Cultural Policy: seminar, 2 hours, staff. This course examines the evolution of cultural policy in general and the regulation of broadcasting and telecommunications, funding of the arts and federal-provincial sharing of responsibilities in particular. Canada's cultural sovereignty has been asserted by various royal commissions, task forces, committees and governmental agencies since the 1920s. The seminar will examine the historical development of cultural politics, their collective coherence and their future prospects in the context of continued federal spending restraint and talk of free trade.

3250R/5250R Canadian Public Administration: seminar, 2 hours, P. Aucoin. Prerequisite: PS 2200R or permission of the instructor. This course examines organization and management for public administration in the Canadian government. The course is divided into two major parts. In the first term the organization of the Canadian government is examined with respect to the principal structures and processes of the executive and administrative arena: cabinet, central agencies, departments and ministers, crown corporations and regulatory boards, royal commissions and task forces. This part concludes with a consideration of the structures and processes of the legislature in relation to the administration of public affairs. In the second term, the major management functions of government are considered: planning, budgeting, regulating, staffing collective bargaining, evaluating, reporting and auditing. This part concludes with a consideration of administration law and responsibility. This is a seminar course in which students prepare papers on the above topics and present them for class discussion.

4204/5204 Advanced Seminar in Canadian Government and Politics: seminar, 2 hours, D. Cameron. Prerequisite: Open to graduate and fourth-year Honours students in Political Science only. This class will examine, through student papers, reading and discussion, the principal characteristics of Canadian government and politics. The class will be both extensive and intensive: extensive in the range of topics that will be examined; intensive in the depth with which the topics will be examined. Each student will prepare and present two major papers, one each term.

4240/5240 Sections 1 and 2, Policy Formulation in Canada: seminar 2 hours, P. Brown. Prerequisite: Intended for 4th-year Honours students, others with instructor's permission. A comprehensive examination of the three critical questions in the study of policy formulation in Canada: 1. The function of the state; 2. The question of why governments develop policies in these areas; 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.

Comparative Government and Politics

2300 Comparative Politics: lecture 2 hours, D.F. Luke.* Prerequisite: An introductory political science class, or instructor's permission. The methodology and scope of comparative politics, including a comparative analysis of culture, behaviour, and institutions. Topics are approached through studies of a variety of Western liberal democratic, communist, and Third World countries.

2308A West European Politics: lecture 2 hours, R. Boardman. Prerequisite: Introductory political science class or instructor's permission. An introduction to politics in selected countries of Western Europe. These will usually include France, West Germany, and Italy. The focus is on the institutions of government, political parties and other aspects of political systems.

2307B Politics in Eastern Europe: lecture 2 hours, R. Boardman. Prerequisite: Introductory political science class or instructor's permission. A look at the Soviet political system and its role in structuring political systems in other east European states. The class focuses on the nature of

communist parties in these countries, the role of ideology, and the workings of the policy process.

2321B Political Behaviour: lecture and discussion 2 hours, D.H. Poel.*
Prerequisite: An introductory political science class or instructor's permission. How individuals gather information about, form general orientations toward, and learn to participate (or not to participate) in the polity. Research methods used in analyzing political behaviour form an important secondary consideration.

2330 Politics Through Literature: lecture and discussion 2 hours, staff.* (not restricted to Political Science majors) What is suggested by *Through* is a notion that literature is a "medium" for political understanding or explanation and political learning. During the first term we use a variety of fictional works to dissect key political concepts. In the second term we isolate within literature explanatory theories of complex political situations.

2370 U.S. Government and Politics: lecture and discussion 3 hours, staff.
Prerequisite: An introductory political science class, or instructor's permission. The class provides a survey of American political institutions, public policies, and public participation in politics. The presidency, Congress and bureaucracy are examined along with the interplay of private interest groups and the role of political parties. Course assignments allow students to pursue individual interests in American politics or public policy.

2372A British Politics: lecture and discussion, 2 hours, staff. This course studies the contemporary problems in Britain that have emerged in the post-war period: economic stagnation, the decline of the two-party system, regional disparities and the social malaise that has accompanied economic decline and rising unemployment. A consideration of the historical evolution of the British political system will provide the framework for assessing competing explanations of the current political, economic and social crisis.

3301B/5301B Comparative Development Administration: seminar 2 hours, D.F. Luke.* Prerequisite: Political Science 2300 or equivalent or instructor's permission. This seminar provides an opportunity to examine some epistemological (e.g., ideology) and methodological (e.g., level of analysis) issues as a background to the study of some persistent themes in the policy/administration interface (e.g., state economic management, planning, the capacity and responsiveness of administrative institutions) in the Third World with some comparisons of Western and Communist experience.

3303B/5303B Human Rights and Politics: lecture and discussion, 2 hours, staff. Prerequisites: PS 1100 or 1103 and, preferably, PS 2300, PS 2305; PS 2400 or PS 2401; or with the permission of the instructor. Issues arising from the claim to rights and from alleged infractions of rights which continue to arouse a great deal of public controversy within individual states and also within the international community are examined by type and by the bases of the claims to such rights. The approach is comparative, and students undertake case studies relating to the general topics.

3304B/5304B Comparative Federalism: seminar, 2 hours, H. Bakvis.* 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.

3310B/5310B Politics in Modern France: seminar, 2 hours, staff. This is a survey course of the French political systems and its notion of "constitution". The course will comprise lectures, class discussion, and written assignments and/or examinations. The language of instruction is French; however, students taking the course as a credit in Political Science may submit written work in English.

3315B/5315B African Politics: seminar, 2 hours, T.M. Shaw. (Intended for students in African Studies, Political Science and International Development Studies, and can be matched with Political Science 3540A on the Foreign Policies of African States.) The political economies of several black African states are analysed focussing on the elusiveness of independence and development, examining the variety of responses to the problems of dependence and underdevelopment. Although the concentration is on the

countries of east and west Africa, its investigation of several characteristic African phenomena constitutes a general introduction to African government.

3331A/5331A Political Problems in Imaginative Literature: seminar, 2 hours, staff*. The imaginative literature of politics, in contrast to the empirical approach, has highlighted the tragic element of political life. One source of the not-so-rare tragic dimension of politics is the attempt to allocate values across cultural systems. This term the class explores the phenomenon of inter-cultural politics in a variety of settings, both historical and contemporary. Political Science 2330, though not a prerequisite, would be desirable background.

3340A/5340A Problems of Development — The Politics of New States: discussion and seminar, 2 hours, T. Shaw.* A survey of theories of and policies about dependence, underdevelopment and peripheral social formations. Particular emphasis on modernisation and materialist modes of analysis, and on orthodox and radical strategies of development. Topics treated include social contradictions (e.g., class, race and ethnicity); industrialism; self-reliance; Basic Human Needs; ideology, militarism; technology; gender, anarchy, authoritarianism; and decay.

3345A/5345A South Africa — The Dynamics of Political Groups and Group Domination: seminar, 2 hours, staff. Prerequisite: An introductory political science class or instructor's permission. The class begins with a preliminary discussion of what constitutes a political group, and how and why some groups seek to dominate others. It then examines the modes of White domination in South Africa, the causes of its persistence and the reactions of the subordinate Black peoples of South Africa.

3360B/5360B Politics in Latin America: seminar, 2 hours, staff. Latin America, the twenty-three countries south of the United States (and with a population of more than 400 million) is an area in which public attention is rapidly growing. This course seeks to analyze the fundamental institutions and policies which have fashioned its development (and underdevelopment). Specific case histories will be examined to show the "unrevolutionary" nature of its society and political structures from Central and South America (Guatemala and Chile, for example) — as well as the exceptions to these (Cuba and Nicaragua). Among other topics, the role of militarism, the Doctrine of National Security, the abuse of human rights, the changing role of the Church, external involvement, the revolutionary tradition, and the structure of government, will be studied. The objective of the course is to provide a basic grasp of the central elements which have determined (and continue to determine) its troubled political life.

4301A/5301A Comparative Theory: seminar, 2 hours, staff. Prerequisite: This course is a core offering for MA and PhD candidates, and will be open to 4th year (with permission from the instructor) only where direct application to Honours thesis research can be demonstrated. This course will initially look into the history and epistemological foundations of "Comparativism" as an approach and method of political analysis. Our ultimate concern will be to ascertain the explanatory utility of various theories of comparative analysis: development-modernization, systems, structural-functionalism, elite and class theories, etc. Students will survey a common set of readings and participate in weekly seminars. A final critical essay will cover all of the key topics of the term and identify pitfalls and opportunities each candidate has discovered as "comparativism" may apply to his/her future research.

Political Theory and Methodology

2400 Justice, Law and Morality, Regimes Version — The Problem of Regimes in Political Philosophy: lecture, 2 hours, staff (same as Phil. 2270). This introduction to political philosophy explores the problem of the best regime. Questioning how the media shape our opinions, we discover the problem of the tyranny of the majority. Tocqueville argued that democracy would become a subtle form of Hobbesian tyranny if individualism were not checked. We will trace the origins of this problem to Machiavelli, Hobbes, and Montesquieu and ask why Tocqueville rejected Rousseau's alternative to bourgeois civil society. Finally we consider the alternative to democracy proposed by Plato and Aristotle. N.B.: This class is complementary to the other version of Justice, Law and Morality. It may be taken for credit before, after, or concurrently with the other class (except

that students who took Philosophy 2070 or Political Science 2400 before the academic year 1983-84 must satisfy the instructor that they have not already had the version in question). Either class satisfies the minimum requirement in political philosophy for an honours degree in Political Science.

2401 Justice, Law and Morality, Concepts Version — Concepts and Arguments in Political Philosophy: lecture, 2 hours, D. Braybrooke, (same as Phil. 2070). An introduction to the history of political philosophy, and also to philosophical ethics. In the first term, the natural law view of justice expressed by St. Thomas confronts the savage realism of Hobbes's *Leviathan*. The concept of justice has had a mixed career since Hobbes's time. In Locke's and Hume's doctrines it is narrowly tied to the defense of property. Sometimes, as with Bentham and Mill, it has appeared redundant; and Marx held that it would be superseded. In our own time, a major effort has been made by John Rawls to restore justice to the central place in ethics. His theory is considered at length at the end of the second term, after examining Lon Fuller's equally contemporary account of the extent to which law must be moral to be genuine.

2402 Representative Government in Theory and Practice: lecture and discussion, 2 hours, staff. Hamilton pointed out that the science of representative government is a modern discovery from which many of our institutions, and indeed our modern forms of government in general, are derived. In this class we try to recover this science, reconsidering achievements in practice.

2455A/5455A Marxist Theory and Its Upshot in the Modern World: seminar, 2 hours, staff. Prerequisite: A class in Philosophy or a class in Political Science. Marxist theory, both as philosophy and as social science, is examined with special emphasis on major writings of Karl Marx.

2494 Introduction to Political Inquiry: lecture and discussion, 3 hours, staff.* A variety of methods employed in contemporary political analysis to explain political events are analysed critically, including consideration of the general question of the requirements of explanation in political science. Casual explanation and problems in the development and verification of social scientific theory are emphasized. A particular substantive issue unifies discussion of the various methods of explanation and a research project in that issue permits the use of some of the tools of analysis discussed in connection with social scientific theory.

3430A/5430A The Political Philosophy of Plato: seminar, 2 hours, staff.* This class studies one of Plato's dialogues on politics in depth.

3435A/5435A Machiavellian Politics: seminar, 2 hours, staff.* This seminar explores Machiavelli's contributions to modern politics and political science.

3438B/5438B Rousseau and the Founding of Modern Democracy: seminar, 2 hours, staff.* The origins of modern democracy are explored through a study of Rousseau's political philosophy. Attention is given to Rousseau's defense of democracy against earlier critics, and to his understanding of the founding of a democratic society. Seminar participation constitutes part of the grade.

3451A/5451A The Critique of Democracy in Modern Political Philosophy: lecture and seminar, 2 hours, staff.* An introduction for citizens who wish to reflect critically on the character of representative government, on liberal democracy, and on the kind of commercial republic in which we live in North America, using the works of Montesquieu (who defended the commercial republic) and Nietzsche (who attacked it).

3487A/5487A Research Methods and Data Analysis: seminar, 2 hours, staff. Prerequisite: Political Science 2494 or equivalent undergraduate introduction to quantitative analysis/statistics. The seminar will produce the assumptions, procedures, and problems of empirical investigation in political science. Topics in design, measurement, and analysis will be considered through readings and computer based exercises using available data sets.

4479B/5479B Classical Liberalism, and Democracy: (seminar in Philosophy, Politics and Economics) 2 hours, second term, D. Braybrooke. (Same as Phil. 4470B/5470B and Econ. 446B/547B.) Prerequisites:

Previous classes in all three subjects or an advanced undergraduate level in at least one of them. Students taking the class for a credit in philosophy should have had a class in logic (2000 or 2010 or 2020) and one in ethics (3100); students taking the class for a credit in political science should have had at least one 3000-level class in political science; students taking the class for credit in economics should have had at least one 330-level class in that subject. The impact on political philosophy of two leading beliefs characteristic of classical liberalism is covered: first, the belief that good government is strictly limited government; and second, the belief that there is no standard of personal welfare, or of the common good, beyond personal preferences and points on which the preferences of different persons agree.

4480A/5480A Social Choice Theory: (seminar in Philosophy, Politics and Economics) 2 hours, D. Braybrooke.* (Same as Phil. 4480A/5480A and Econ. 448A/548A.) Prerequisites: The same as for PS 4479B/5479B. Kenneth Arrow's Nobel Prize winning theorem, to the effect that no device of social choice meets an apparently minimal set of weak standards, has seemed to lead two traditions of thought to ruin. One is the theory of voting. The other is welfare economics. After tracing the two traditions that converge in Arrow's theorem, we study the theorem itself and then consider the continuing disarray into which formal social choice theory (and hence the basic theory of democracy) has been thrown by the theorem.

4485B/5485B The Theory of Games as an Approach to the Foundations of Ethics and Politics: (seminar in Philosophy, Politics and Economics) 2 hours, D. Braybrooke.* The most innovative recent work in ethical theory has applied the theory of games to the perennial problem of the social contract. To what extent can any organized society to which people freely adhere be represented as constituted by rules arrived at by rational agents trying each to arrive at the best bargain about rules with the other agents present? These rules can be regarded simultaneously as the foundation of political organization and as elementary rules of ethics, and a study of this topic forms the basis of the class.

4490B/5490B The Logic of Questions, Policy Analysis and Issue Processing: (seminar in Philosophy, Politics and Economics) 2 hours, D. Braybrooke.* (Same as Econ. 449B/549B and Phil. 4490B/5490B.)

4496B/5496B Philosophy of Social Science: seminar, 2 hours, D. Braybrooke. Prerequisite: A class in social science or a class in philosophy; both are desirable. This class will identify three active sides of social science — naturalistic, interpretative, critical. It will consider how, in methods and sorts of questions, inquiries on the critical side reduce to a mixture of activities on the other two. It will then explore in detail the intimate relations between naturalistic and interpretative inquiries. (Same as Philosophy 2510B.)

International Politics and Foreign Policy

2500 World Politics: lecture and discussion, 2 hours, J.G. Eayra. A continuation of 1101, this class examines techniques of statecraft, surveys the "assaults" upon order, justice and well-being of which the actors of world politics are capable, and explores the available "constraints" upon such actions afforded by international systems and methods. 2500 is recommended for students who have taken 1101 in their first year.

2510 Canadian External Relations: lecture and discussion, 3 hours, D.W. Stairs. Prerequisite: An introductory class in political science or instructor's permission. A general survey of Canadian foreign and defence policies and of the processes by which these policies are made. Some of the persistent pressures and constraints which Canadian policy makers are forced to take into account are examined.

3531A/5531A The United Nations in World Politics: seminar, 2 hours, T.M. Shaw.* Prerequisite: A class in international politics or with the instructor's permission. The evolution of the United Nations from its early concentration on problems of collective security, through the period of preventive 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.

3535B/5535B Towards a New World Order: seminar, 2 hours, E.M. Borgese. A practical examination of the economic relations between the developed and developing countries in international politics. The background of this examination will be the "New International Economic Order," a program launched in the United Nations General Assembly in May 1974 intended to promote economic development in the Third World, and to bring the developing countries into "\$1 "active, full and equal participation" in the international community. Coursework includes readings, class discussions, term paper and final paper.

3537R/5537R Management and Conservation of Marine Resources: seminar, 2 hours, E.M. Borgese. This is an intensive program 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 institutions infrastructure, regional cooperation and cooperation work international institutions.

3540A/5540A Foreign Policies of African States: discussion and seminar, 2 hours, T.M. Shaw. An overview of modes and levels of analysis for Africa and of salient cases from that continent; a survey of issues (e.g., intervention, integration, conflict, development, diplomacy, futures) and of examples (e.g., Botswana, Nigeria, Senegal, Tanzania, Zaire and Zimbabwe). Students concentrating on international relations, development studies, or African politics find that this class fits their programs.

3544B/5544B Conflict and Cooperation in Southern Africa: lecture and seminar, 2 hours, T.M. Shaw. An introduction to the international relations of Southern Africa, which provides a study of regional political economy with both empirical and theoretical significance. The primary focus is on regional conflict and integration, especially on the liberation movements and regional coalitions.

3570/5570 Canadian Foreign Policy: seminar, 2 hours, D.W. Middlemiss. Prerequisite: A class in international politics, modern Canadian history, or with the instructor's permission. The seminar examines post-World War II Canadian foreign policy in three parts: 1. A detailed analysis of major policy developments using the case study approach. 2. An investigation of selected contemporary themes, issues, and problems. 3. A broad analytical overview of factors which help "explain" the form and content of Canadian policy.

3571/5571 Strategy and Canadian Defence Policy: seminar, 2 hours, D.W. Middlemiss. Prerequisite: A class in international relations, or the instructor's permission. This seminar examines post-World War II Canadian defence policy in three parts: 1. An analysis of important cases of policy development. 2. An investigation of certain persistent themes and current issues (e.g., Canada-U.S. defence relations; defence funding; weapons procurement; the role of women in the forces; civil-military relations, etc.). 3. An assessment of the major determinants of policy and prescriptions for the future.

3572/5572 American Foreign Policy: seminar, 2 hours, staff. Prerequisite: A class in American politics, American history, or international politics, or the instructor's permission. Why Americans make the kind of foreign policy they do and the decision process and relevant methodologies for examining decision strategy are examined. Students develop an ability to explain foreign policy decisions of the United States. The class is a seminar with regular readings, discussions, and class reports of ancillary readings. One research paper for the year is presented orally in class. Other requirements include short essays and a final exam.

3573R/5573R Soviet Foreign Policy: seminar, 2 hours, staff. This class will examine the institutions and decision processes of Soviet defense and foreign policy making. Reference will be made to recent issues in Soviet policy, and where relevant, the historical background of these issues will be analyzed. Coursework will include readings, seminar discussions and presentations and papers.

3575B/5575B Nuclear Weapons and Arms Control in World Politics:

seminar, 2 hours, D.W. Middlemiss. Prerequisite: A class in international relations, defence policy, or the instructor's permission. The seminar examines the technological, doctrinal, and political aspects of the nuclear weapons "problem" and the arms control "solution." It also assesses the fate of contemporary nuclear arms control efforts.

3590/5590 The Politics of the Sea: seminar, 3 hours, E.M. Borgese. 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 on-going negotiations are covered. There is a great deal of ground to be covered so preference is given to graduates although mature students from other relevant disciplines are welcome.

3596A/5596A Theories of War and Peace: seminar, 2 hours, D.W. Middlemiss. Prerequisite: A course in international relations, or the instructor's permission. This seminar examines critically a broad range of theories regarding the causes, persistence, and termination of organized, collective, international violence. Explanatory factors and evidence will be drawn from the disciplines of anthropology, biology, economics, psychology, sociology and international relations.

4520/5520 Theories of International Relations: lecture and discussion, 2 hours, G.R. Winham. A brief survey of the discipline of international relations is presented. Three problems of international relations: conflict and war; the nature of economic disparities and imperialism; and the organization and interaction of nation-states are focussed upon. The class is a study in politics, but course readings are multidisciplinary. Students read the works of historians, economists, social psychologists and the work of political scientists. Students participate regularly in seminars and write a series of essays during the year.

3601/5601 Readings in Political Science: staff. A full-year reading class, taught only by special arrangement between individual students and individual instructors.

3602A/5602A Readings in Political Science: staff. A first-term reading class, taught only by special arrangement between individual students and individual instructors.

3603B/5603B Readings in Political Science: staff. A second-term reading class, taught only by special arrangement between individual students and individual instructors.

4600 Honours Essay

Psychology

Chairperson of Department
V.M. LoLordo

Professors

P.J. Dunham, MA, PhD (Missouri)
J.C. Fentress, BA (Amherst), PhD (Cantab.)
W.K. Honig, BA (Swarthmore), PhD (Duke)
R.M. Klein, BA (SUNY), MA, PhD (Oregon) *Graduate Studies Coordinator*
V.M. LoLordo, AB (Brown), PhD (Penn.)
J.A. McNulty, MA, PhD (Tor.)
I.A. Meinertzhagen, BSc (Aberdeen), PhD (St. Andrews)
D.E. Mitchell, BSc, M.App.Sc. (Melb.), PhD (Berkeley)
S. Nakajima, BA (Chiba), MA (Wash.), PhD (McG.)
K.E. Renner, BS (Penn.), MA, PhD (Northwest)
R.S. Rodger, MA (Edin.), PhD (Bell.)
B. Rusak, BA (Tor.), PhD (Berkeley)
M.G. Yoon, BS (Seoul), PhD (Berkeley)

Associate Professors

J. Barresi, BSc (Brown), MA (S. Calif.), PhD (Wisconsin)
 K. Bloom, BSc (Loyola), MA, PhD (N.Car.)
 R.E. Brown, BSc (Victoria), MA, PhD (Dal) — *Undergraduate Coordinator*
 S.E. Bryson, BA (Guelph), PhD (McG)
 J.W. Clark, MA (McG), PhD (Qu.)
 B. Earhard, BA, MA, PhD (Tor.)
 B.R. Moore, AB (Emory), PhD (Stan.)
 M. Ozier, MA, PhD (Tor.)
 R.L. Rudolph, MA (DePauw), PhD (N.Car.)
 S.R. Shaw, BSc (Lond.), PhD (St. Andrews)

Assistant Professors

A.J. Cohen, BA (McG), MA, PhD (Qu.)
 J.F. Connolly, AB (Holy Cross), MA (Saskatchewan), PhD (London)
 R.P. Croll, BSc (Tufts), PhD (McG)
 M.T. Legerstee, BA (Simon Fraser), MA, PhD (Univ. Quebec)
 D.P. Phillips, BSc, PhD (Monash)

Adjunct Assistant Professors

J. Fisk, BSc, MA, PhD (UWO)
 N.V. Swindale, BSc (Sussex), PhD (Cantab.)

Senior Instructor

R.S. Hoffman, BSc (Col. Coll.), MA (Dal)

Instructor

G.A. Eakes, BA, PhD (Berkeley)

Postdoctoral Fellows

C. Beaulieu, PhD (Laval)
 S. Kurumiya, PhD (Osaka)
 D.J. Moore, BA, PhD (Texas)
 A. Saul, BA (Cal Tech), PhD (Brown)
 C. Shaw, PhD (Hebrew Univ., Jerusalem)
 F. van Huizen, Doctoraal (Free University, Amsterdam), PhD (Univ. of Amsterdam)
 D.A. Williams, BA (Manitoba), PhD (Minn.)

Research Associate

A. Fröhlich, Diplom, Dr. rer. Nat. (Freie Universität Berlin) (Mt. St. Vincent)

Psychology is an experimental science; its purpose is to discover the conditions which control the activities of animals and people, to measure these conditions and the responses they produce, and to use this knowledge to invent ways of predicting behaviour and changing it. It is a subject for inventive but also scientifically rigorous people; better suited to those who want to find out for themselves than to those who want to be told what to believe.

Psychology at Dalhousie treats behaviour as a natural phenomenon, and in that sense shares much with the other life sciences. Today, for example, the boundary that historically has separated psychology from zoology, physiology, or even cellular biology has begun to blur. On the other hand, important ties are being made to such disciplines as anthropology and sociology. The student will find that the diverse subject matter includes three major levels of analysis: the organism, the organism's biological machinery, and the broader social-environmental context in which particular behaviour patterns are expressed. Meaningful integration of these diverse levels and forms of analysis is an intellectual challenge of major proportions. Similarly, the time perspectives of immediate causation, development, evolution, and function all contribute to the modern approach to behavioural science; each must be evaluated in relation to the others.

Degree Programs**BA or BSc**

Students enrolled in the bachelor's (i.e., three-year) program must take at least four and no more than eight full credits beyond the introductory level in their area of concentration. Required classes for students who intend to major in Psychology are listed below. Although there is considerable freedom of choice, it is important for the prospective major to plan ahead carefully. If you need advice planning your program, see Dr. R. Brown, Dr. B. Earhard, or Dr. R. Rudolph.

Requirements for a bachelor's degree

1. A grade of C or better in Psychology 1000 or Psychology 1010
2. Psychology 2000A
3. At least three more 2000-level classes (either full or half credits)
4. At least two more full credits in Psychology from 3000-level classes, one of which is a laboratory class.

BA or BSc with Honours in Psychology (Major Program)

Students enrolled in the major honours program must take at least nine and no more than eleven full credits beyond the introductory level in their area of concentration. Requirements for the Honours Degree in Psychology are listed below.

It is recommended that students in this program take 2000A and 2500B and as many classes from the core program (see requirement 3 below) as possible in the second year. Honours students are advised to complete Psychology 3500 prior to the fourth year. 4000-level seminars may be taken in the third and fourth years. 2000 or 3000 level classes may be taken at any time provided that the student meets the necessary prerequisites.

Although there is considerable flexibility for the student, it is important to plan carefully (this is especially true for those considering graduate work in Psychology). If you would like to be admitted to the honours program or if you need advice in planning your program, see Dr. B. Rusak or Dr. R. Rudolph.

Requirements for an Honours Degree in Psychology

1. A grade of C or better in Psychology 1000 or Psychology 1010
2. A grade of B or better in Psychology 2000A; Psychology 2500B
3. At least four more 2000-level classes (either full or half credits).
4. Psychology 3500.
5. At least two full credit classes at the 3000-level, one of which is a laboratory class.
6. Psychology 4500 (Honours Thesis)
7. At least one full credit of 4000-level seminars
8. At least one more full credit of Psychology at or beyond the 3000-level.

Combined Honours

It is possible for students to take an honours degree combining psychology with a related arts or science subject. In such a combined honours program the student must take eleven full credits beyond the 1000-level in two areas of specialization, with not more than seven full credits in either area. The student in the combined honours program normally writes a thesis (or the equivalent) in the elective major area in which the majority of classes are taken. Any student intending to take a combined honours degree should consult with the two respective departments to arrange program details.

Other Programs

A variety of other programs is available in cooperation with other departments. These programs are designed to meet the needs of students whose specific interests may lie in areas other than those covered by the major and honours programs offered by the department. Interested students should contact Dr. R. Rudolph, or Dr. B. Rusak for further information.

Financial Aids

Teaching Assistantships, Research Assistantships, and NSERC Summer Student Fellowships are available, during both the academic term and the summer vacation, to students who are taking an honours degree in psychology. Details of these assistantships and of the stipends may be obtained from Dr. G. Eakes or Dr. R. Brown.

Classes marked * are not offered every year. Please consult the current timetable on registration to determine if this class is offered. Classes marked A or B are half-credit classes, offered in one term only, not both.

1000 Introduction to Psychology: lecture 3 hours, staff. Students

interested in the biological and social bases of behaviour in both man and animals may complete the class with an understanding of how the senses work and of how, for instance, we learn to see; of the different kinds of memory in man, how they operate, and how they are affected by disorders of the brain; of the way in which hereditary and environmental factors interlock to produce these complex sequences of behaviour which distinguish one species from another; of the way in which children learn their native language; of how the form of an animal society can be predicted from a knowledge of a limited number of ecological facts. Psychology 1000 meets three hours a week for lectures. The grade is based on a number of examinations given at intervals throughout the year.

1010 Introduction to Psychology: tutorials 3 hours, R. Rudolph. The content of Psychology 1010 is similar to that of Psychology 1000 but the manner of teaching differs. In Psychology 1010 there is neither a fixed pace nor covering the content of the class, nor regularly scheduled lectures. Instead, students work through the readings at their own pace, and, when they think that they have mastered a unit of the readings, attend an individual tutorial. The tutorial consists of a brief test on the readings followed by a review of the test and a discussion with the tutor. If the tutor judges the student's understanding of the unit to be inadequate, the student returns for another tutorial on the unit after additional preparation. Tests on a unit of work may be re-written until understanding is achieved and demonstrated. The grade for the class is based on the number of units passed by the end of the year.

2000A Methods in Experimental Psychology: lecture 2 hours, lab 2 hours, P. Dunham and other members of the department. Prerequisite: A grade of C or better in Psychology 1000 or 1010. An introduction to the methodological tools research psychologists use to study behaviour. Emphasis is placed on experimental design and the legitimacy of inferences derived from experimental results. Lectures proceed from a discussion of the general problems of using the scientific method in studying behaviour to a more specific examination of the analytic procedures commonly employed to investigate human and animal behaviour. Students conduct and analyze in written reports a series of experiments in the laboratory that illustrate important concepts discussed in class.

2020 A or B Psychological Aspects of Social Issues: lecture 3 hours, K.E. Renner. Prerequisite: Psychology 1000 or 1010. Most of the important social issues of our time have implications for human adjustment, for the forms of our social institutions, and for the relationships between people and between people and their institutions. Topics vary according to current issues. Selected topics are examined in greater detail to provide a context for formulating general psychological concepts and theoretical issues. The logical implications of the analysis for prescriptions for the future are pursued.

2030 Psychological Measurement: lecture 3 hours, R.S. Rodger. Prerequisite: Psychology 1000 or 1010. After some of the abstract properties of measurement systems are described, aspects of psychological measurement are discussed. Further elaboration of measurement procedures in Psychology requires a knowledge of statistical theory. The required amount of this theory is given and used in the context of signal detection theory and the analysis of data from paired comparison experiments. The class ends with consideration of mental test technology. Exercises are scheduled regularly for students to do out of class. A knowledge of higher mathematics is not required: high school arithmetic and algebra are generally sufficient.

2070 Introduction to Neuroscience: lecture 3 hours, I.A. Meinertzhagen. Prerequisite: Psychology 1000 or 1010 or consent of instructor. For those not having Psychology 1000 or 1010, Biology 1000 and 2020 would be advantageous. Neuroscience is the newly evolving interdisciplinary field which aims to integrate findings in many diverse areas of brain research into a single systematic framework. This class introduces a number of aspects of this field emphasizing analyses which are precise at the neuronal level. A general introduction is provided by the vertebrate visual system, followed by analysis of the structure and function of neurons, including the ionic basis of their electrical activity and the neurochemistry of synaptic transmission between neurons, aspects of drug action, the control of activity

in the motor nervous system and examples of the integration and development of nerve cells.

***2080 A or B Social Psychology:** lecture 3 hours, J.W. Clark. Prerequisite: Psychology 1000 or 1010. Some major issues in social psychology are introduced through a critical analysis of theories and research in which the behaviour of the individual is seen as a product of the social context. The student reads papers on such topics as helping, obeying, oppressing, liking and hating. Questions on those papers are to be answered out of class and submitted at intervals throughout the term. The lectures are intended to promote a close and sceptical evaluation of the readings.

2090 A or B Developmental Psychology: lecture 3 hours, staff. Prerequisite: Psychology 1000 or 1010. The origins of human behavioural development from a biological and psychological perspective.

2120 A or B Clinical Psychology: lecture 3 hours, J. Connolly. Prerequisite: Psychology 1000 or 1010. Restriction: This class may not be taken concurrently with Psychology 3120. An introduction to the use of psychological principles to define, assess and treat abnormal human behaviour. Topics covered include: the nature and history of clinical psychology; training in clinical psychology; research methods; psychological functions and dysfunctions; assessment methods; and intervention techniques. The functions of clinical psychologists in various settings such as general hospitals, mental health clinics, industry and the justice system are presented. Attention is given to issues of diagnosis from both psychiatric and psychological perspectives. Assessment of personality as well as intellectual and neuropsychological functioning is discussed. Intervention techniques such as behavioural and cognitive therapies are examined. The emphasis of the course is on the experimental psychology foundations upon which clinical psychology rests; experimentally verified assessment and intervention procedures are given particular attention. Different theoretical orientations to abnormal behaviour (e.g. the medical model and the behavioural/psychological model) are examined.

2130 A or B Introduction to Cognitive Psychology: lecture 3 hours, B. Earhard. Prerequisite: Psychology 1000 or 1010. Lectures focus on the processes involved in transforming sensory information into the meaningful, coherent world of everyday experience we know. Initially, emphasis is on the visual system, and how information within that system is structured and organized, followed by a consideration of the character of the internal representations used in thinking and remembering.

2140 A or B Learning: lecture 3 hours, V. LoLordo. Prerequisite: Psychology 1000 or 1010. Traces the experimental study of learning from the turn-of-the-century research of Pavlov and Thorndike to the present. Development of the field of animal learning is described in terms of the ways in which particular conceptions of the learning process have guided experimentation, and have in turn been revised on the basis of the outcomes of that experimentation. Some important concepts discussed are: association, attention, biological constraints of learning, classical conditioning, discrimination, expectancies, law of effect, learning-performance distinction, operant conditioning, S-S and S-R bonds, and stimulus control. The value of various approaches is discussed with respect to several goals: (1) providing general principles of learning; (2) understanding the behaviour of particular species; (3) direct application to human problems. Emphasis is on understanding why researchers in animal learning do what they are currently doing (given the goals and the historical context), rather than on learning a number of facts about animal learning.

2150 A or B Perceptual Processes: lecture 3 hours, J. McNulty. Prerequisite: Psychology 1000 or 1010 or Biology 1000. Perception deals with the way in which our senses provide us with information about our environment. This class focusses on the process by which sensory experiences are coded, how they are interpreted by the nervous system, and how experience modifies perception.

2160 A or B Animal Behaviour: lecture 3 hours, B.R. Moore. Prerequisite: Psychology 1000 or 1010 or Biology 1000. An examination of the natural and, to a lesser extent, the laboratory behaviour of several intensively-studied groups of animals. Foraging and communication, predation and defense, sex and aggression, homing and migration are studied as they

occur in such organisms as bees and ants, moths, bats, chimpanzees and various birds.

2170 A or B Hormones and Behaviour: lecture 3 hours, R.E. Brown. Prerequisite: Psychology 1000 or Biology 1000. An introduction to the endocrinological bases of mammalian social behaviour. Emphasis is on the mechanisms by which the hormones of the hypothalamus, pituitary gland, gonads and adrenal gland control sexual, aggressive and maternal behaviour. Other topics covered are: hormone receptors in the brain; the menstrual cycle and human reproduction; puberty; sex differences in the brain; the pineal gland; neuro-transmitters; pheromones; crowding and social stress.

2190 A or B Language and the Brain: lecture 3 hours, M. Yoon. Prerequisite: Psychology 1000 or 1010. This class is an introduction to the study of languages that are considered as symbolic functions of the human brain. The main topics are the origin and diversity of languages; common properties and organizing principles of languages; the acquisition of languages by children; the brain structures involved in language and the effects of brain damage on language disorders.

2270 A or B Human Neuropsychology: lecture 3 hours, S.R. Shaw. Prerequisite: Psychology 1000 or 1010. This class explores the organization of the human brain and its support systems, attempting to explain the complexity of both normal and abnormal function, as revealed by the consequences of accidents, defects, and surgical intervention, as well as animal models. Emphasis throughout is placed on trying to understand the mechanisms underlying phenomena. Aphasia, epilepsy, the involvement of certain brain chemicals in behaviour, cerebral asymmetry, the potential for neural prostheses, the dispute over localization of function in the brain are examples of topics covered.

***2280 A or B Personality:** lecture 3 hours, J. Barresi. Prerequisite: Psychology 1000 or 1010. In this class a person is treated as a unified whole. Personality deals with questions like: Is a science of persons possible? What forms can it take? Are there types of personalities, or is each individual's personality unique? Is an individual's life history an expression of his or her personality, or is personality description merely a summary statement of behaviour whose cause lies elsewhere?

2370 A or B Drugs and Behaviour: lecture 3 hours, staff. Prerequisite: Psychology 1000 or 1010. An introduction to behavioural pharmacology. Topics to be covered include drug classification, mechanisms of action, and behavioural and physiological effects of drugs. Students will be expected to learn the fundamentals of neuroanatomy, neurophysiology, and neurochemistry in order to understand the effects of drugs on the brain. Particular emphasis will be placed on the following drug groups: alcohol, opiates, amphetamines, neuroleptics, and benzodiazepines. Conditioned tolerance to drugs, conditioned analgesia, and the role of drugs in the treatment of clinical disorders including depression, anxiety, and schizophrenia.

2480 A or B Adaptive Behaviour: lecture 3 hours, J. Fentress. Prerequisite: Psychology 1000 or Biology 1000. Adaptation between organisms and their environments is a common theme that can be used to link research in the behavioural and biological sciences. In this course three basic issues are addressed: (1) How do we evaluate the balance among internal and external events that define adaptive behaviour? (2) How do we separate individual properties of adaptive control systems while also determining rules by which these properties fit together? (3) How do genetic substrates and developmental events combine to set the boundaries of adaptive performance? Answers to these questions rest upon the dual tendencies for adaptive systems to be both interactive and self-organized. Underlying issues here are examined with current data from behavioural and biological disciplines, in which different specific adaptations, different levels of organization and different time frames of operation are compared.

2500B Contemporary Research Problems in Psychology: lecture 2 hours, lab 2 hours, R.S. Rodger, R. Hoffman, G. Eskes and staff. Prerequisite: 2000A, with grade of B or better. For prospective honours students as a continuation of Psychology 2000A, this class introduces students to the design, execution and analysis of independent research. Each student

works with a supervisor on a one to one basis preparing a research project which the student then conducts, while the lecture periods are devoted to an introduction to the design and statistical analysis of experiments. In the lab meetings, the student will give oral reports on the proposed research, and at the end of the course formal oral reports will be given in an all-day conference for the entire class. A formal written report on the research is submitted at the end of the term. Students other than honours students may only take the class with permission of the instructor.

3000 Independent Research in Modern Psychology: lab 4 hours, staff. Prerequisites: Psychology 2000A and previous or concurrent enrollment in two other 3000-level classes; and the prior consent of the instructor. Primarily for students wishing further experience and understanding of psychological research. A student in the class chooses a member of staff who serves as his class adviser throughout the academic year, and under whose supervision independent research is conducted.

3010 Advanced General Psychology: lecture 2 hours, tutorials 3 hours, R. Rudolph. Prerequisite: The consent of the instructor. For the advanced student, a review of general psychology with the aim of consolidating the student's knowledge. The method is unconventional. With the assistance of the instructor, the student prepares the material assigned to Psychology 1010 at a level which enables him or her to instruct introductory students in individual tutorials. Ideally, prospective students should consult with Dr. R. Rudolph in the spring.

3020 Community Psychology: lecture 1 hour, lab 2 hours, K.E. Renner. Prerequisites: Psychology 2000A, and 2020. A cooperative relationship is established with local community and social action groups in which current issues or problems become the focal point for a field laboratory course. Topics vary from year to year. Classroom work centres on concepts of community psychology and on teaching field research skills and techniques.

3040 Learning and Motivation: lecture 2 hours, lab 2 hours, B.R. Moore. Prerequisite: Psychology 2000A and 2140. An examination in detail of a few selected topics within the field of learning and conditioning. The emphasis is on identification and clarification of fundamental processes, their boundaries, biological significance and evolutionary history. Conventional wisdom is accepted only as a last resort. We work from original papers and monographs rather than secondary sources. After suitable preparation, students move toward guided original research on questions arising from readings and discussion. The first half of the course, approximately, is a seminar; the remainder is research.

3050 Perception: lecture 2 hours, lab 3 hours, D.E. Mitchell. Prerequisite: Psychology 2000A and 2150. This class considers the way in which information about the world is provided by the senses and how we use this information in our behaviour. The material falls into four sections. (1) The methodological and theoretical problems peculiar to the study of sensation and perception; (2) The transformation of physical stimulus energy into neural energy; (3) The physiological and psychophysical analysis of the sensory systems with particular emphasis on vision; and (4) The development of perception and its relation to the anatomical and physiological development of the sensory pathways. The experimental work has been selected for its importance in the theoretical understanding of perceptual processes and consists of a general introduction to the apparatus and methods used in perceptual research.

3070 Physiological Psychology: lecture 2 hours, lab 3 hours, S. Nakajima. Prerequisite: Psychology 2000A. Permission of the instructor is required to take this class for lab credit. Physiological psychology is concerned with the biological explanation of psychological phenomena. Students should have a working knowledge of concepts and methods in experimental psychology. Emphasis is on psychological issues with the answers sought in physiological terms. Students taking this class not for a lab credit will participate in seminar and demonstration.

3080 Experimental Social Psychology: lecture 3 hours, lab 1 hour, J. Barresi. Prerequisite: Psychology 2000A. This class involves the study of individual behaviour as a function of social stimuli with emphasis on

extensive student research projects and class presentations. The class develops from discussion of research designs and methods to the study of basic processes such as person perception, social comparison, and social influence, including behaviour within groups and the relations between groups.

3091 A or B Methods In Developmental Psychology: lecture 3 hours, staff. Prerequisite: Psychology 2000A. How are questions concerning human development formulated and answered? In this course, special attention is paid to laboratory and field procedures for studying changes in behaviour over time. These procedures are examined in the context of biological, social, perceptual, and cognitive development.

3120 Issues In Clinical Psychology: lecture 2 hours, seminars 2 hours, S. Bryson. Prerequisite: Psychology 2120 or permission of instructor. As with most areas of any science, sacred cows roam at large in the field of clinical psychology. The purpose of this class is to sit on the horns of the dilemmas and slaughter the beasts. A second goal is to learn how to present, listen, and participate in seminars. The issues include such topics as altered states of consciousness, concepts of intelligence, approaches to psychological testing, theories of schizophrenia, theories of therapies, women and madness, and death.

3130 Cognitive Psychology: lecture 2 hours, lab 2 hours, R. Klein. Prerequisites: Psychology 2000A, and either 2130, 2150, 2270 or consent of instructor. Cognitive psychology deals with how we gain information about the world, how such information is represented and transformed as knowledge, how it is stored and how that knowledge is used to direct our attention and behaviour. It involves the processes of perception, memory, attention and thinking. This class focuses not only on what is known about human cognition, but also on techniques cognitive scientists have developed to discover this knowledge.

3150A or B Introduction to Hearing and Speech Mechanisms: lecture 3 hours, D. Phillips. Prerequisites: Psychology 2150 or 3050; Psychology 2070 strongly recommended. Hearing and speech are two behavioural capacities of fundamental importance to normal human communication. This lecture course is designed to provide a basic understanding of the peripheral and central neural mechanisms of hearing, and of some psychological and physiological processes involved in speech production and speech perception. The course is intended for those students anticipating more advanced training in neural mechanisms of hearing, speech science, human communication disorders and/or audiology. The course emphasizes normal hearing and speech mechanisms, but will address pathology where evidence from pathological subjects is pertinent to understanding normal function. Course content: introductory acoustics; structure and function of the outer and middle ears; structure and function of the cochlea; hair cell physiology and sensory transduction; coding of simple and complex sounds in the auditory nerve; sound localization mechanisms as an example of the correspondence between the physical properties of the stimulus, neural sensitivity and behavioural performance; theories of speech production; theories of speech perception; acoustic and linguistic contributions to speech perception.

3160 Ethology: lecture 2 hours, lab 2 hours, J. Fentress. Prerequisites: Psychology 2160A/B or Biology 1000. Ethology is the biological study of behaviour. It uses psychology, genetics, physiology, ecology and evolutionary theory to solve problems in the development, function and causation of behaviour across all animal species. These diverse approaches to the study of animal behaviour are presented in naturalistic and experimental situations. In laboratory exercises qualitative and quantitative records of behaviour are made in the field and in the laboratory. There are several group research projects (first term) and an individual research project (second term).

***3190 Psychology of Language:** lecture 3 hours, staff. Prerequisite: Psychology 2000A. Psychology 2130, 2140, 2150 or 2270 are suggested. Enrolment is limited to 3rd and 4th year students or by special permission of the instructor. The ability to translate complex ideas into a string of words which can then be understood by a listener is quite an accomplishment. Yet, nearly every human acquires this ability within the first few years of life.

The psychology of language explores questions on this topic through a combination of lectures, demonstrations, and student research projects.

3260 A or B Biological Rhythms: lecture 3 hours, B. Rusak. Prerequisite: Psychology 1000 or 1010 or Biology 1000. The temporal structure of animal and human physiology is governed by both homeostatic mechanisms and by a system of biological clocks. These internal clocks generate rhythms with various periods in virtually every physiological and behavioural system. Daily (circadian) clocks are the most prominent; they generate rhythms in sleep, reproduction, intellectual performance and many other functions. This course examines the nature of these biological clocks and their physiological substrates, with an emphasis on the neural mechanisms involved in rhythm generation and synchronization in a variety of species. It also explores the hypothesized role of circadian mechanisms in sleep disorders, jet lag and depression.

3270 A or B Developmental Neuroscience: lecture 3 hours, M. Yoon. Prerequisite: Psychology 2070 or consent of instructor. For those interested in the development of the structures and functions of the nervous system. The class introduces three main aspects: (1) Embryonic development of the nervous system; primary morphogenetic movements of cells, birth of neurones and neuroglial cells, and migration of neurones to specific places in the nervous systems; (2) Formation of functional interconnections among neural elements; synaptogenesis, topographic patterns of neural connections, synaptic organizations of various parts of the nervous systems. (3) Specificity and plasticity in regeneration or reorganization of the neural connections following various experimental manipulations of the nervous system.

***3360 A or B Human Sociobiology:** lecture 3 hours, staff. Prerequisite: Psychology 1000 or 1010 and 2000A. Some differences in behaviour may be heritable, just as some physical differences are. Insofar as this is true, these behavioural differences are subject to both natural and sexual selection. Sociobiology aims to understand how the behaviour of animals and men has evolved in response to these selective pressures. An introduction to the central questions of sociobiology.

3370 A or B Neuroscience Laboratory: lab 3 hours, S.R. Shaw. Prerequisite: Psychology 2000A and 2070 or 3270A. An introduction to several techniques used in contemporary neuroscience. Regularly scheduled labs with students working in pairs under supervision are supplemented by occasional lectures. The program aims at familiarizing students with electrical stimulating and recording methods and related techniques, and currently uses both sensory and motor nerve preparations. Structural analysis of the nervous system is introduced by way of Golgi neuroanatomy, and electronmicroscopy of visual system or CNS.

3371 A or B Advanced Neuroscience Laboratory: lab 3 hours, R. Croll. Prerequisites: Psychology 3370A/B and consent of instructor. This course is a second-term continuation of Psych. 3370A (Neuroscience Laboratory) for selected, advanced students from the first term. The course will offer training in numerous sophisticated techniques employed in modern neuroscience. These include intracellular and single unit extracellular electrophysiological recording, dye tracing techniques and immunocytochemistry. Students will be encouraged to undertake original research projects within the general framework of the laboratory exercises.

3470A/B Comparative Vertebrate Neuroanatomy: Sensory Systems: lecture 3 hours, instructor T.B.A. This course will include a survey of the various sensory modalities found in the vertebrate kingdom with particular emphasis on the central brain structures associated with each sense. The aim of the class is to provide students with a general knowledge of the functional similarities and morphological diversities of neuroanatomical structures associated with each sensory system and their central pathways. Behavioural specializations co-evolving with special sensory pathways will be covered during lectures.

3500 Statistical Methods In Psychology: lecture 2 hours, practicum 2 hours, staff. Prerequisite: Psychology 2000A and 2500B. This class is primarily intended for honours students, but other students are admitted with the consent of the instructor. This class is designed to enable students to

understand parametric and nonparametric statistical procedures and their descriptive and inferential application to behavioural research. In addition, students learn to execute computer programs for data organization and analysis. Course work includes lecture, seminar, and statistical/computer assignments.

3590 A or B Perceptual Development: lecture 3 hours, D. Mitchell. Prerequisite: Psychology 2000A. This class examines the development of visual and auditory capacities in human infants and in a variety of animal species with sensory systems like our own. The neural events that underlie these developmental changes in the various sensory pathways will be discussed. The class will also grapple with the old question of how early sensory experience influences our perceptual abilities.

Psychology 3760 A or B Neuroethology: lecture 3 hours, R. Croll. Prerequisites: Psychology 2000A or 2160 or 2070 or Biology 2020 or consent of the instructor. Neuroethology is the study of the neural bases of animal behaviour. The course will emphasize cellular approaches toward understanding the integrative mechanisms of the nervous system which underlie complex behaviours. Feature detectors, command systems and motor program generators will be examined in depth using examples from vertebrate preparations. Cellular bases of higher order functions such as motivation, learning and choice will be explored if time permits.

4000 Level Seminars

These seminars (4000-4580) are intended for 3rd and 4th year honours students. Others may enrol in these classes only with special permission of the instructor. The topics covered in these classes vary from year to year. Consult the department for the specific course descriptions.

4000 A or B Senior Seminar: 2 hours, staff.

4001 A or B Contemporary Issues in Psychology: 2 hours, staff. For course description see instructor.

***4040 A or B Applications of Conditioning and Learning:** 2 hours, V.M. LoLordo. Topics may include: (1) Clinical and social applications of learning principles; (2) Pain, fear, and stress.

***4050 A or B Topics in Perception:** 2 hours, staff. This class is primarily a discussion of cortical organization in perception.

***4070 A or B Neuroscience Seminar:** 2 hours, M.G. Yoon. Prerequisites: Psychology 2070 and 3270, or consent of the instructor.

***4080 A or B Topics in Social Psychology and Personality:** 2 hours, J. Barresi.

***4090 A or B Development of Social Behaviour:** 2 hours, staff.

***4120 A or B Topics in Clinical Psychology:** 2 hours, J. Connolly.

***4130 A or B Topics in Human Information Processing:** 2 hours, M. Ozler.

***4140 A or B Animal Learning Topics:** 2 hours, V.M. LoLordo. This is a seminar in which selected topics in animal learning are reviewed in some detail. The emphasis is on cognitive aspects of learning. The class is a directed study, and may involve participation in research.

***4160 A or B Topics in Behavioural Biology:** 2 hours, B. Rusak.

***4230 A or B Human Performance Topics:** 2 hours, J. McNulty.

***4440 A or B Topics in Cognitive Development:** 2 hours, staff.

4500 Honours Thesis: members of the department. Prerequisites: Restricted to honours students in their graduating year. The purpose is to acquaint the student with current experimental problems and research procedures in experimental psychology. Each student works with a staff member who advises the student about research in the major area of

interest, and closely supervises an original research project carried out by the student. Each student must submit a formal report of the completed research in APA style. The final grade is based upon the originality and skill displayed in designing the project and upon the submitted report.

4580 History of Psychology: seminar 2 hours, J.W. Clark. Prerequisites: Restricted to honours students. Preparatory reading: It would be advantageous to read E.G. Boring's *History of Experimental Psychology* before the class starts. This class discusses the evolution of thought about some psychological issues that have been of central concern throughout man's intellectual history. The understanding of such issues is traced in the writings of the major contributors from antiquity to the emergence of experimental psychology in the nineteenth century, and their development is examined in the work of psychologists in the early years of this century.

Religion

Note: See under Comparative Religion. The name of the department has been changed to the Department of Comparative Religion.

Russian

Professor

Y.Y. Glazov, PhD (Oriental Inst.), F, (Moscow)

Assistant Professors

J.A. Barnstead, BA (Oakland), AM (Harv.), (Chair)
I. Vitins, BA (Mich.), PhD (Calif.),

The Russian Department offers classes in Russian language, literature, and culture. Since the Soviet Union plays a crucial role in today's world and makes important contributions in a wide variety of scientific, technical, and humanistic fields, knowledge of its linguistic and cultural backgrounds can prove advantageous in many areas of study. Students in the sciences and mathematics find Russian especially useful, as it can give them a lead of six months to a year over those who must wait for journals to be translated.

In the language classes emphasis is placed on gaining a thorough grasp of Russian grammar and an extensive speaking, reading, and writing vocabulary.

One of the richest areas of Russian life is its literature. Dostoevsky, Tolstoy, Chekhov, Pasternak, Solzhenitsyn and many other Russian writers have made significant contributions to world culture. Classes in Russian literature are generally offered in English and in Russian in order to give as many students as possible the opportunity to become acquainted with its masterpieces.

Classes in Russian culture and civilization are intended to introduce students to art, architecture, music, religion, and other areas of Russian life which are necessary to understand the language and literature. Films, guest speakers, and evenings of Russian poetry are scheduled periodically.

Major or honours students may, with the approval of the Department of Russian, take up to one year (5 full credits) of work at a University in the Soviet Union and receive credit at Dalhousie.

Degree Programs

Classes in the Russian Department are open to students either (1) as electives in any degree program; or (2) as constituents of a major or honours degree in Russian; or (3) with classes in another foreign language forming parts of a combined honours degree.

Classes Offered

I. Classes in Language

1000 Elementary Russian: lecture 4 hours, no prerequisites. For students who have little or no previous knowledge of the Russian language. Equal emphasis is placed on developing oral and reading skills with a sound grammatical basis.

1050 Reading Russian: lecture 3 hours, no prerequisites. This class provides a knowledge of Russian grammar sufficient to read technical materials with the aid of a dictionary and covers rudiments of pronunciation. In the second semester the student is introduced to the specialized vocabulary of his particular field. This class does not qualify students to take Russian 2000.

2000 Intermediate Russian: lecture 4 hours. Prerequisite: Russian 1000 or equivalent. A continuation of Russian 1000. Oral and reading skills and a further knowledge of grammar are developed through the study of Russian texts.

3000 Advanced Russian: lecture and discussion 4 hours. Prerequisite: Russian 2000 or equivalent. Conducted in Russian. Following a thorough review, this class concentrates on expanding all aspects of the student's knowledge of Russian grammar. Texts are read extensively and intensively. Discussion and compositions are based on the assigned readings.

3010B Grammar: (See listing under Russian Studies Program.)

3030B Conversation: (See listing under Russian Studies Program.)

3050B Vocabulary Building: (See listing under Russian Studies Program.)

3060B Phonetics: (See listing under Russian Studies Program.)

3100A Intensive Russian Grammar: (See listing under Russian Studies Program.)

4000 The Structure of Contemporary Standard Russian: lecture and discussion. Prerequisite: Russian 3000 or permission of the instructor. Required for honours candidates. Conducted in Russian. Systematic study of the structure of Russian: analysis of special problems in phonology, morphology, syntax, and stylistics. Tailored to the individual needs of the student, with emphasis on practical applications of linguistic insights.

4800A Old Church Slavonic: lecture 2 hours. Prerequisite: Russian 3000. A survey of Old Church Slavonic grammar accompanied by intensive study of its canonical texts.

4820B Historical Phonology and Morphology of Russian: lecture 2 hours. Prerequisite 4800A. An outline of the evolution of the sound pattern and grammatical structure of Russian from their roots in Common Slavic to the present. Representative readings from Old and Middle Russian texts.

II. Classes in Literature and Culture

2020A/B Russian Literature and Culture: lecture and discussion 2 hours, no prerequisites. Conducted in English. The class traces developments in classical Russian literature, as well as in the Russian arts: painting, sculpture, theatre, and music. Religious and secular ideas of 19th century Russia are also discussed.

2100A/B Pushkin and his Age: Conducted in English with section in Russian for majors. A close study of the poetry and prose of Russia's greatest poet, and other writers of the "Golden Age of Russian Poetry." Works to be read will include the major narrative poems, *Eugene Onegin*,

the "Little Tragedies," Boris Godunov, *The Balkin Tales*, as well as the poetry of Baratynsky, Batyushkov, Lermontov, Yazykov. No knowledge of Russian is required.

2050 Survey of Russian Literature: lecture 2 hours, no prerequisites. Conducted in English with section in Russian for majors. Required for majors and honours candidates. The first half of this class concentrates on the outstanding writers of the nineteenth century, including Pushkin, Gogol, Dostoevsky, Turgenev, and Tolstoy. The second half of the class is devoted to the study of such authors as Chekhov, Gorky, and leading post-revolutionary writers and poets: Mayakovsky, Sholokhov, Pasternak, and Solzhenitsyn.

2070A/B Russian Literature and Culture after Stalin's Death: lecture and discussion 2 hours, no prerequisites. Conducted in English. The literary, cultural, and political history of Russia after Stalin's death in 1953. Among the major issues considered are the significance of Stalin's death, the "Thaw" and de-Stalinization, Pasternak, Solzhenitsyn, Nadezhda Mandelstam and Sakharov. Revival of the intelligentsia and religious trends. Relationships of Russia and the West. Official and non-official culture.

2240A/B Theories of Literature: lecture and discussion 2 hours, no prerequisites. Conducted in English. This class surveys Russian thought about literature from mediaeval times to the end of the nineteenth century, then concentrates on a more detailed study of twentieth century theories. Emphasis is on the complex interrelationships of modern Russian theories of literature with their Western counterparts, e.g. Formalism and American "New Criticism." Topics treated include Formalism, early Marxist criticism, Socialist Realism, post-Stalin Marxist criticism, Structuralism, and the Tartu School of semiotics. Student discussions and papers apply the principles of a given school to practical criticism of works of their choice, demonstrating the strengths and weaknesses of each theory.

2340A/B Russian Modernism: lecture and discussion 2 hours, no prerequisites. Conducted in English. A study of trends in literature and the arts at the turn of the century. Known as "The Silver Age," this is one of the most innovative and dynamic periods in Russian culture.

2500A/B Tolstoy: lecture and discussion 3 hours, no prerequisites. Conducted in English. An introduction to the work of this enigmatic spiritual giant of Russian literature; the impact of his philosophy and writing on world literature and thought. Reading includes the epic *War and Peace*, *Anna Karenina*, and the controversial *Kreutzer Sonata*.

2520A/B Chekhov and Turgenev: lecture and discussion 3 hours, no prerequisites. Conducted in English. Close analysis and discussion of the major works of Turgenev, sensitive portrayal of socio-political and psychological issues of the second half of the nineteenth century in Russia, and Chekhov, unequalled short-story writer and radical innovator in modern theatre.

2800A/B Russian Satire and Humour: lecture and discussion 2 hours, no prerequisites. Conducted in English. Russian satirical and humorous literature written within the last two centuries. Russian satire and humour have made a great contribution to the world's treasures in this genre. Students read masterpieces by Gogol (*Dead Souls*) and Dostoevsky (*The Devils*). Lectures cover some of the immortal comedies of Russian literature and the early humorous stories of Chekhov. For the period after the 1917 Revolution stories by Soviet satirists, including Zoshchenko and Bulgakov, are discussed as well.

2750A/B Dostoevsky and the Russian Idea: lecture and discussion 2 hours, no prerequisites. Conducted in English. Dostoevsky's novels are of the highest importance in understanding the fate of Russia and the thoughts of other great Russian authors and thinkers. *Crime and Punishment* and *The Brothers Karamazov* are taken as the basis for discussion. The works of I. Turgenev and Lev Tolstoy are discussed together with the ideas of such great Russian philosophers, V. Solovyev and N. Berdyaev.

2760A/B Dostoevsky and Western Literature: lecture and discussion 2 hours, no prerequisites. Conducted in English. With all his love for Russia, Dostoevsky treasured the West and its literature. It is impossible to

understand Dostoevsky and his main novels, including *The Idiot* and *The Devils*, without *Hamlet* by Shakespeare, *Don Quixote* by Cervantes, *Faust* by Goethe, some plays by F. Schiller, etc. The class traces the influence of Western ideas on Dostoevsky and his influence on such Western thinkers as Nietzsche and Freud.

3090A Soviet Society Today: (See listing under Russian Studies Program.)

3120A Intensive Russian Prose and Poetry: (See listing under Russian Studies Program.)

3250A/B Literature of Revolution — The 1920's in Russian Literature: lecture and discussion 2 hours, no prerequisites. Conducted in English. A study of experiment and submission during one of the most exciting, diverse, and frustrating periods in Russian letters. "Socialist realism" was not yet official doctrine; innovation in literature was tolerated. Writers openly pondered the role of the individual and culture in the new collective society. Close reading and discussion of texts by Pasternak, Babel, Zamiatin, Olesha, Pilnyak, Zoshchenko, and Bulgakov.

3270A/B The Russian "Heroine": lecture and discussion 2 hours, no prerequisites. Conducted in English. The strong spiritual and moral force which Russian women have exerted on their society is richly reflected in literature. The class focusses on the portrayal of several literary heroines and discusses their impact on both the literary imagination and society. Their number includes Pushkin's Tatyana, Dostoevsky's Sonya Marmeladova and Nastasya Filippovna, Tolstoy's Anna Karenina, Gorky's Mother and Bulgakov's Margarita.

3330A/B The Russian Short Story: lecture and discussion 2 hours, no prerequisites. Conducted in English. On the basis of ten to twelve Russian masterpieces in the short story genre, students have a chance to trace the development in this field from Pushkin and Gogol, through Turgenev, Tolstoy, Dostoevsky to the best short stories of post-revolutionary writers, including I. Babel, M. Zoshchenko, B. Pilnyak, A. Platonov.

3500A/B Gogol and his Tradition: lecture 3 hours, no prerequisites. Author of "Overcoat," "Nose," *Taras Bulba*, *Dead Souls*, Gogol has been proclaimed "a pathological liar and honest anatomist of the soul, jejune jokester and tragic poet, realist and fantasist." An in-depth study of this major writer and his impact on the work of Dostoevsky, Kafka, Bely and Bulgakov.

4300 Russian Poetry: lecture and discussion. Prerequisite: Permission of the instructor. Conducted in Russian. Required for honours candidates. A combination of an introduction to the theory of poetry with close analysis of masterpieces of nineteenth and twentieth century Russian poetry chosen to fit the interests of the individual student.

4950A/B, 4960A/B, 4960 Russian Special Topics: staff. Prerequisite: Permission of the Department. Conducted in Russian. Offers the student an opportunity to work with an advisor in researching subjects which are not regularly taught in the Department. Students who wish to register for a specific program should consult the chairman of the Department.

Russian Studies Program

Participating Faculty

Yuri Glazov (Professor of Russian)
Norman Pereira (Professor of History)
Ieva Vitins (Assistant Professor of Russian) (Coordinator)
John A. Barnstead (Assistant Professor of Russian)

The Russian Studies Program, the only one of its kind in Canada, is a special inter-disciplinary course of instruction which allows Dalhousie students (as well as students from other Canadian universities) to undertake intensive study of the Russian language, both here and in the Soviet Union. In order to participate, students must be able to demonstrate competence in the Russian language equivalent to two years of university classes (at Dalhousie these are Russian 1000 and Russian 2000) with a mark of "B" or better. The duration of the program is one academic year, the first half of which is at Dalhousie, University of Alberta, or some other Canadian university, the second half of which is at the Pushkin Institute in Moscow, Moscow Pedagogical Institute, or Leningrad State University. Enquiries and applications should be addressed to the Administrator of the Program.

Classes at Dalhousie, September to December

3090A Soviet Society Today: N.G.O. Pereira. Conducted in Russian. See History 3090A.

3100A Intensive Russian Grammar: lecture 10 hours. Soviet language specialist. Conducted in Russian. Approximately one-half of class time is devoted to grammar and reading. The remaining time is devoted to conversation and pronunciation. The class meets for five two-hour sessions each week. There is one written composition per week of 2-3 pages. The instructor works closely with individual students. This is a six-credit-hour course.

3120A Russian Prose and Poetry: lecture and discussion 5 hours. Conducted in Russian. The students read, translate and critically interpret a number of the best short stories of such great Russian authors as Pushkin, Tolstoy, and Chekhov, and poems by Lermontov, Mayakovsky, Mandelstam, and Pasternak. Original texts are supplied with vocabularies and grammatical notes. This is a six-credit-hour course.

3150A Russian Society, Literature and Arts: lecture and discussion 2 hours, staff. Conducted in Russian. The course, read in Russian by various faculty members, aims to provide students with necessary knowledge of Russian literature, history, fine arts, religious and philosophical ideas.

Classes at the Pushkin Institute, Moscow or Leningrad State University, February to June

3010B Grammar: Intensive study of the finer points of Russian grammar. Topics include verbs of motion, aspect, impersonal constructions, government and agreement, and other themes. Six credit hours.

3030B Conversation: Systematic development of conversational ability on everyday themes: transport, city services, theatre, sport, shopping, the library, the Soviet educational system, the structure of the Soviet government, etc. Three credit hours.

3050B Vocabulary Building: Extensive and systematic study of the Russian lexicon: differentiation of synonyms; stylistic differences. Three credit hours.

3080B Phonetics: Comprehensive study of Russian pronunciation: language laboratory training and techniques of correcting pronunciation. Three credit hours.

Sociology and Social Anthropology

Chairperson of Department
Victor Thiessen

Professors

J.H. Barkow, AB (Brooklyn), AM, PhD (Chi)
D.H. Clairmont, BA, MA (McM), PhD (Wash U)
R.C. Kall, BA (Dal), BD, MA (Tor), PhD (McG)
L. Kasdan, MA, PhD (Chi)
J.J. Mangalam, PhD (Corn)
W.N. Stephens, AB (Colo), MA (Bost), EdD (Harv)

Associate Professors

R. Apostle, BA (Simon Fraser), MA, PhD (U Calif)
P.M. Butler, BA, MA, PhD (Tor)
D.H. Elliott, BA (Yale), PhD (Pitt)
J.L. Elliott, BA (Wells), MA (Kan.), PhD (Pitt)
H.V. Gamberg, BA (Brandels), A.M., PhD (Princ)
N.W. Jabbra, BA (U Calif at Santa Barbara), MA (Ind), PhD (Catholic)
V.P. Miller, BA (U California at Berkeley), MA, PhD (U Calif at Davis)
J.G. Morgan, BA (Nott), MA (McM), DPhil (Oxon), *Undergraduate Advisor*
J. Stolzman, BA (Ore), MS (Fla), PhD (Ore)
V. Thiessen, BA (Man), MA, PhD (Wla)

Assistant Professors

M.E. Binkley, BA, MA, PhD (Tor)
P.G. Clark, BA, MA (McM), PhD (UBC)
S. Pollock, BN (Man), BA, PhD (Warwick)

Lecturer (part-time)

C.J. Manderson, BA (Notre Dame, B.C.), MA (Dal)

Adjunct Professor

J.C. Pooley, Teach Cert (Bede Coll), Dip PE (Carnegie Sch PE), MS, PhD (Wla)

Adjunct Associate Professors

B. Keddy, BScN (MSVU), MA (Dal), PhD (Dal), RN
J.L. McMullan, BA, MA (Sir George Williams), PhD (L.S.E.)
B. Raymond, MA (U California at Berkeley), PhD (Chi)

Adjunct Assistant Professors

J. Benoit, BA, MA (Guelph), PhD (Hopkine)
A.F. Davis, BA (St. Mary's), MA (Man), PhD (Tor)
S. Shaw, BPE (Dal), MSc (Dal), PhD (Carleton)

Research Associate

C. Irwin, BA (Man), PhD (Syracuse)

Sociology and Social Anthropology

This Department offers classes and programs of study in the related disciplines of sociology and social anthropology.

Social Anthropology and Sociology are related and overlapping disciplines. Although in some universities these disciplines are found in separate departments, this Department and many of its classes blur the distinction between them and emphasize the areas of overlap. The Department is committed to a program which stresses the areas of convergence between the two disciplines.

Sociology

As a social science, sociology seeks to apply the scientific method to

human behaviour. In doing so, it makes two assumptions, that human social life exhibits regularity and recurrent patterns, and that people are essentially social animals. The sociological enterprise focuses upon social relationships, social institutions, and processes of social change. No single approach to these complex phenomena has been found adequate. As a result, a wide range of explanatory models and perspectives has evolved.

Sociology provides a context within which students learn to think critically about their social environment; become aware of the impact of social forces on their lives and the lives of others; and develop skills of analysis useful in understanding and managing their social environment. Many students find a sociology major helpful in preparing for social work, nursing, personnel management, and other occupations dealing directly with people. A well-trained sociologist will be acquainted with overlapping areas in Social Anthropology.

Social Anthropology

Anthropology is a diverse discipline whose branches study the human species in all of its physical, cultural, and linguistic diversity in both space and time. It consists of four sub-disciplines: Archaeology, Linguistics, Physical Anthropology, and Social Anthropology. The major focus is upon classes in Social Anthropology, although classes in other areas may be offered.

Social Anthropology is a strongly comparative field, which is concerned with the complete range of human societies in all historical and geographic settings. In the past, emphasis in Social Anthropology was on non-industrial and small-scale societies, but in recent years attention has been paid to industrial and industrializing societies and to the various groups that comprise them. Social Anthropology aims at generalizations by comparing structures and processes in major institutions within societies (kinship, political, economic, and religious) as well as between societies. A well-trained social anthropologist will be acquainted with overlapping areas in Sociology.

Career Options

Career possibilities in sociology and social anthropology include research and other positions in government, industry, or university, and teaching at the high school or university levels.

Degree Programs and Course Offerings

Degree Programs

The department offers a major in Sociology and Social Anthropology leading to the BA degree. It offers honours BA degrees in Sociology and in Social Anthropology.

BA Degree

Students enrolled in the BA (i.e., three-year) degree program must take at least four and no more than eight classes beyond the introductory level in Sociology and Social Anthropology. Depending on their interests, they may take mainly sociology classes or mainly anthropology classes, or they may combine the disciplines.

Required Classes

1. *Introductory Level* Either SSA 1000, 1100, or 1200.
2. *Theory* Either SSA 2240 A or B or SSA 2250A/B.
3. *Research Methods* SSA 2010A is required. SSA 2011B is recommended.
4. *Third Year Seminar* One class (either 2 half-classes or a full-year class) must be a third year seminar.

Suggested Class Structure

Year I: SSA 1000, 1100, or 1200; at least one introductory class in Economics, Political Science, Psychology, History or Biology; and three other classes chosen from fields other than Sociology and Social Anthropology.

N.B. One class must satisfy the writing requirement (Arts and Science regulations 11.1.a).

Year II: SSA 2010A, 2011B, and 2240 A or B or 2250 A/B; 1 ½ — 2 other classes in Sociology and Social Anthropology; and two electives.

Year III: At least one third year seminar in Sociology and Social

Anthropology; two other classes in Sociology and Social Anthropology; and two electives.

Honours BA Programs

An Honours degree is normally the required preparation for graduate study in Sociology and Social Anthropology. Students interested in honours programs should consult the Department's Undergraduate advisor, Dr. J.G. Morgan, as early in their course of studies as possible.

Students may choose to register in an honours program *either* in Sociology, or in Social Anthropology. At least nine classes, and no more than eleven classes, beyond the introductory level must be taken in the areas of concentration. Each program consists of several required classes (see below), other classes selected according to the student's interests in consultation with the Undergraduate Advisor, and an honours thesis paper. Students with the honours concentration Sociology may not declare Social Anthropology as their minor subject; students with the honours concentration Social Anthropology may not declare Sociology as their minor subject. (See Faculty of Arts and Science Regulations 11.4 for general information and requirements).

Required Classes for Honours Degrees

A. Social Anthropology Program: 2010A Introduction to Social Research, 2011B Research Design, 2250A or B Introduction to Social Anthropological Theory, at least one credit (or at least two half credits) in a geographical area class(es) (2370 People and Cultures of the World I, 2380 People and Cultures of the World II, 2355 Native Peoples of North America, 2390 Social Anthropology of the Middle East, 3185 Issues in the Study of Native Peoples of North America), 3415A or B Social Statistics, 3116A or B Issues in Social Research, 4000 Seminar in Social Anthropology, and 4590 Honours Seminar in Social Anthropology.

B. Sociology Program: 2010A Introduction to Social Research, 2011B Research Design, 2240A or 2240B Introduction to Sociological Theory, 3115A/B Research Methods, 3415A/B Social Statistics, 3401A History of Sociological Thought, 3405B Contemporary Sociological Theory, and 4500 Honours Seminar in Sociology.

The honours thesis paper is produced for the class 4500 (Sociology) or 4590 (Social Anthropology). This fulfills the Faculty of Arts and Science Honours Qualifying Examination requirement.

Note: For students who entered the honours program prior to 1985-86, the required core classes described in the 1984-85 calendar will apply.

Combined and Unconcentrated Honours

Combined honours programs can be arranged between Sociology or Social Anthropology and some other appropriate discipline. Combined honours in Sociology and Social Anthropology, however, is not possible. Students wishing to arrange combined or unconcentrated honours programs are advised to seek the counsel of the departments involved as early as possible.

African Studies Program

The Department is cooperating with several other departments in the African Studies Program. Interested students should contact Professor J. Barkow.

Canadian Studies Program

The Department is cooperating with several other departments in offering a Canadian Studies Program. Interested students should contact Professor P. Clark.

International Development Studies

The Department is cooperating with several other departments and with Saint Mary's University in offering a BA and Honours BA in International Development Studies. Interested students should contact Professor N.W. Jabbra.

Women's Studies Program

The department is cooperating with several other departments in the Women's Studies Program. Interested students should contact Professor N.W. Jabbra.

Sociology and Social Anthropology Classes Offered

Please Note:

No student may receive credit for more than one introductory level class (1000, 1100, 1200) in Sociology and Social Anthropology.

All students (whether Sociology and Social Anthropology majors or not) must have SSA 1000, 1100, or 1200 as a prerequisite for any class on the 2000 or higher levels; or obtain permission from each instructor involved. There may also be additional prerequisites required. No student may receive credit for more than one introductory level class (1000, 1100, or 1200) in Sociology and Social Anthropology.

Some classes listed may not be offered in a given academic year. Consult the timetable for details.

1000 Culture and Society: An introduction to the comparative study of human society from the parallel perspectives of Sociology and Social Anthropology. The principal focus is on continuity and change in a variety of societies ranging from simple hunting and gathering societies to highly complex industrial societies.

1100 Introduction to Anthropology: This class introduces students to all subfields of anthropology while emphasizing the socio-cultural. Topics considered include: the variety of human cultures and societies and how they are organized and function, the relationship between ecology and culture, human evolution, nonhuman primate behaviour, principles of archaeology, and the study of languages around the world as they relate to the cultures of which they are part.

1200 Introduction to Sociology: This class introduces students to basic sociological concepts, the logic of social inquiry, and major theoretical and methodological issues in the field. Substantive course contents include the study of culture, socialization, deviance, social organizations, institutions, social roles, and demography. Emphasis is on the study of modern industrial societies with special attention given to Canadian society.

2000 Archaeology: An Introduction: This class covers the following topics: archaeology and its relationship to history and prehistory, the origins and growth of the discipline of archaeology, the application of archaeological techniques in the field of prehistory, the excavation of a site, the establishment of a chronological framework, and the reconstruction of the historical past.

2010A Introduction to Social Research: This class provides an introduction to basic research skills used by anthropologists and sociologists to investigate and analyze social phenomena. The class is organized into three modules each of four weeks duration. The first module emphasizes the effective use of existing information, with particular emphasis on library research techniques and resources. The second module provides an introduction to computers and demonstrates a variety of computer based research activities. The third module stresses the evaluation of research and provides the student with both the skills and opportunity to assess critically and professionally the work of empirical anthropologists and sociologists.

2011B Research Design: Prerequisite: SSA 2010A or consent of instructor. The class is organized around four 3-week modules, representing a survey of the major research designs employed in anthropology and sociology. Module I deals with the design of experiments and simulations; Module II examines historical and comparative research designs; Module III treats survey-based designs; Module IV examines designs based upon fieldwork and observation.

2020 Comparative Sociology/Social Anthropology: The starting point is the vision of the founders of sociology that the discipline was to be a comprehensive and comparative science of society. Modern sociologists view comparative studies primarily in large scale cross-societal terms, while modern social anthropologists (equally the intellectual descendants of the founding fathers) tend to be more interested, in addition to a comparative approach, in the natural history of smaller societies, and in applying the methods learned in these to more complex societies. The first part is

devoted to a treatment of several topics from the social anthropological perspective. The second part treats the major figures and ideas in social anthropology and sociology from a historical perspective. Student field projects are an important part of the learning process in addition to the more usual kinds of assignments.

2030 Deviance and Social Control: Groups make formal and informal rules in an attempt to regulate and make predictable the behaviour of their members. Violations of these rules occur in many different ways and stem from various causes. This class examines both the processes by which groups make rules and the reasons why these rules are violated. Specific issues such as crime, delinquency, narcotic addiction, alcoholism, prostitution, suicide, and minority group relations are discussed in this context.

2040 Social Stratification: Aspects of social inequality in modern industrial society. The formation of classes, status groups, and organized political expressions is considered. Questions of the distribution of power and wealth in society, the existence of power elites or governing classes, the impact of bureaucracy on class relations, the extent to which major economic inequalities have been reduced in this century, and problems of the mobility of individuals and groups through the stratification systems are analyzed. Theoretical discussions in the class are largely concerned with the ideas of Karl Marx and Max Weber, but attention is also paid to contemporary theoretical approaches to stratification.

2050 Sociology of Religion: The relations between religious beliefs and human behaviour and social structure. Major themes include: the impact of social structure on the development of belief systems; the question of whether beliefs guide and direct human behaviour; the formal organization of religious institutions; and social psychological considerations of religious behaviour. The primary focus is on current religious movements in Canada.

2060 Social Gerontology: (Same as Nursing 4900A) A general introduction to social gerontology, in which emphasis will be placed upon the historical and philosophical development of the study of aging in Canada, theories of aging, current social and economic programs for the elderly both in Canada and to some extent cross-culturally, and various pertinent social-psychological aspects of the aging process. The class familiarizes students with some of the problems people experience as a consequence of aging in Canadian society and provides an understanding of the socio-economic factors relevant to these problems.

2070 Socialization: Socialization is the process by which a society's values and customs are perpetuated, passed along to the younger generation. This is seen as the function of certain institutions, such as the family, the churches, and the schools. These, however, require support from the larger social milieu. Our own rapidly changing society appears to be at a point of crisis in this regard. Recent social changes have undermined traditional means by which children acquire a sense of allegiance to their elders, and take to themselves the society's major values. This change is described, along with the situation of modern parents, who must train their children in the absence of certain traditional supports. The class moves through four units: responsibility training, lifetime human development and life-histories; personal change and adjustment of university students; and outside-the-classroom youth programs. For each of these the student writes a paper.

2080 Communities: An examination of a wide variety of territorially based residential groups such as the large metropolitan centre, the rural village, and the intentional community. Major themes include: evolution of the modern city, urbanization, rural depopulation, ecology of the city, neighbourhood social networks, behaviour in public places, minority subcommunities, and urban planning.

2090 Youth Organizations: Based on a comprehensive survey of those organized activities for teenagers in North America which attempt to give substantial socialization experiences to the youth who participate. Organizations which offer leadership training, high school clubs and extra-curricular activities, youth programs by the churches, programs of volunteer work and paid employment, junior auxiliaries of political parties and military reserve units, hobby groups, cities' recreation departments, sports programs,

summer camps and travel programs, wilderness and environmentalist groups are reviewed, along with such organizations as the Y, the Scouts, 4-H, and Junior Achievement. Cities' information offices, voluntary action centres, learning exchanges, and other systems for disseminating information about youth programs are also reviewed. Certain towns and cities are compared with respect to their offerings for teenagers. Persons who have had experience in youth work, or as teachers or parents, are especially invited to enroll.

2100 Ecology and Culture: This class deals with the ways in which different environments affect how people live, relate to one another, think, and organize themselves. The major focus is on how cultural choices are influenced and constrained by the relationships among ecology, technology, and how people are making a living. Examples of hunter-gatherer, horticulturalist, rancher and farmer cultures are used as illustrations. Classes are a combination of lecture and seminar sessions.

2110 Canadian Society: An analysis of selected aspects of Canadian society employing theoretical perspectives and empirical materials to develop a composite view of the society as a whole through understanding the interrelationships among its parts. Major foci include the integration and survival of Canadian society, structural change, and the management and consequences of inequality. Prospects for the future of Canada are discussed in terms of these characteristics.

2120 Minority Groups: The social status of minority groups is examined in the light of contemporary theories of prejudice and discrimination. The societal consequences of discrimination are considered with respect to their effect on both minority and majority groups. Emphasis is on an analysis of Canadian minorities.

2130 Formal Organizations: This class makes a critical study, from the comparative point of view, of theoretical models for the analysis of bureaucratic organizations. Students examine the classical, structural-functional, and management-science approaches to organizations. The class entails a systematic survey of the sociological literature on this subject, with special concentration on organizational structure, strategy and decision-making.

2140 Work and Industry: The social relations of industry at both the micro- and macrosociological levels of analysis. The class deals primarily with the productive system and attendant industrial institutions of advanced capitalist society. Major topics for investigation include the industrialization process, the social structure of industry, the development of trade unionism, and the sociology of work relationships.

2150 Mass Society: The origin of modern, post-industrial mass society. Problems associated with industrialization, cybernation, leisure, technology, and environmental degradation are examined in detail. Various attempts at solution of these problems are analyzed. The rise of the expert and of counter-cultural movements are given particular attention. Theoretical and methodological innovations for future forecasting are introduced.

2160 Sociology of Occupations: Sociological views of the occupational structure, and of the constraints and influences that bear upon persons in various occupations. During one half of the class, students are helped with personal career plans.

2170A Political Sociology: Introduces students to the major concepts and theories which inform the sociological study of politics. In addition to this general orientation, particular attention is devoted to the role of power and ideology in Western society, the interplay between economy and polity in contemporary North America, and political transformation as a social process.

2180 Criminology: Crime as a form of social deviance. The significance of official crime rates is analyzed, and the various forms of criminal structure and behaviour are examined. The second part of the class deals primarily with societal response to offenders, tracing the judicial and correctional processes in Canada.

2190 Sex Roles in Cross-Cultural Perspective: Taking a broad

comparative framework, we examine sex roles in the contexts of daily life, of economics, politics, kinship, social stratification, religion and values, and socialization. With these data as background, we then look at sex roles in Canada and in Nova Scotia. Students of either sex are invited to take this class.

2200 Sociology of the Family: Family in one form or another is an aspect of all societies. It is the most important agent of early socialization and personality formation. The first term is devoted to a consideration of some of the cross-societal characteristics of the family in general, and of the extended family as found in traditional societies in particular. The second term is devoted to a consideration of family characteristics in urban-industrial societies, concentrating on the nuclear family with particular reference to the Canadian scene. An attempt is made to understand the processes by which family structures and functions have changed through time as societies evolved from a traditional to an urban-industrial social organization.

2220 Social Psychology: Groups influence individuals and individuals react (resist, adapt to, cooperate with, or use to their own advantage) to these influences. The processes involved in such person-group relationships are explored in a number of different settings, such as the family, mental hospitals, and universities. The class will focus on both a critical review of actual studies done and on social-psychological interpretations or theories of these findings.

2230 Psychological Anthropology: Prerequisite: Either SSA 1000, 1100, or 1200, or Psychology 1000. The overlap between psychology and anthropology. Topics include: culture and personality, culture and mental health, psychiatry in other cultures, cross-cultural differences in learning, and the evolution of human psychological characteristics. A paper is required.

2240 A & B Introduction to Sociological Theory: An introduction to some of the major approaches taken by sociologists to understand the nature of society. The early foundations of social thought are surveyed with emphasis on the emergence of sociology as a discipline in the nineteenth century. The contributions of prominent theorists — Durkheim, Marx, Mead, Spencer, and Weber — are stressed. The most important sources of virtually all the varieties of sociological theories of the twentieth century are found in these thinkers. Specific contemporary approaches to be considered include functionalism, conflict theory, social action theory (including symbolic interactionism and ethnomethodology), and exchange theories.

2250A or B Introduction to Social Anthropological Theory: The foundations and development of social anthropology. The growth of theory in social anthropology is stressed, with special attention paid to major schools of thought and the work of prominent individuals within those schools, including Cultural Evolution and Morgan; Historical Particularism and Boas; Functionalism and Malinowski and Radcliffe-Brown; Culture and Personality; Cultural Ecology and Steward; and the directions in which contemporary social anthropology points. Special efforts are made to expose students to the original writings of prominent anthropologists.

2260 Culture and Political Behaviour: Political systems examined comparatively. The relation between political and other social institutions and analysis of the organization of conflict in non-Western societies. The relation of tribal and peasant politics to national politics in developing countries seen in a comparative framework.

2290 Belief Systems: The study of non-Western belief systems. Emphasis is on the religion of small-scale societies, treated from the perspective of religion as a system of symbols giving meaning to the universe and one's place in it. Topics include religion as a biological phenomenon, the nature of ritual, religion and healing, religion and altered states of consciousness, sorcery and witchcraft, and religion and culture change.

2355 Native Peoples of North America: A survey class of the cultures of the peoples who inhabited North America at the time Europeans came to this continent. Following a review of prehistory, the class uses an ecological perspective to examine the geographic culture areas and representative tribes in them. As time permits, the class concludes with a consideration of

native ethnohistory of North America and the situation of contemporary native peoples.

2370 Peoples and Cultures of the World I: Each year, the Peoples class surveys the peoples of a specific geographic area. The class includes background material on geography, climate, and history. Its focus is on the people themselves, their social organization and political, economic and kinship systems; and their problems of modernization and development. Consult the department to find which regions are to be offered in a particular year.

2380 Peoples and Cultures of the World II: See class description above.

2390 Social Anthropology of the Middle East: We know the Middle East as the cradle of civilization, the scene of the Crusades, and the focal point for a variety of international tensions. But beyond history book and newspaper are real people with their own modes of social organization, values, ways of thinking and making a living, and their own valued resources. If Western nations, including Canada, are to deal effectively with this increasingly important region, their people must come to understand the values and aspirations of the people of the Middle East.

In this class we touch upon some of the common trends and diversities which characterize the region from Iran and Afghanistan to Morocco: geography and population; ethnic groups and languages; religion; social organization; modes of subsistence; values; and the impact of the West.

2400 Medicine and Health Across Cultures: Every culture has its own concepts of health and nutrition, its own treatments and practices. The strengths and weaknesses of our own system grow clearer when medical anthropologists compare it with that of other societies. This class's specific topics vary from year to year but always include: native theories of the etiology of illness, transcultural vs. culture-specific disease syndromes, pregnancy and childbirth in other cultures and our own; senescence and death viewed cross-culturally, the conflict between traditional medical systems and the Western physician and hospital, patients' expectations and the medical subculture, the physician as secular priest, and food and nutrition across cultures. Special attention is paid to Canada's native and immigrant peoples.

2500 Sociology of Health and Illness: An introduction to sociological analyses of health, illness, and health care. Class topics include the experience of illness, socioeconomic and cultural variations in patterns of illness, social behaviour and its effects on health, the social production of health and illness, occupational hazards, the relationship between mental and physical health, the organization of health care, hospital and community care, health care workers, inequalities in health and health care.

2600 Food and Nutrition Across Cultures: Our bodies determine nutrition, our environments limit what may be available, and our cultures decide what is to be considered "food." This class joins the anthropology of food with the cross-cultural study of nutrition. Topics include definitions of the edible, nutrition and modernization, ecology and food, food taboos, age and gender differences in food prescriptions and proscriptions, dieting and obesity, food and religion, cannibalism, the symbolic meaning of eating and food, and food shortages.

2700A Sociology of Mediation: Mediation is a process where a neutral third party assists two contending parties to reach an agreement. It is a rapidly growing form of conflict resolution, particularly in North America. This class will apply sociological research to the various types of mediation such as: divorce mediation, victim-offender mediation, community mediation, etc. Mediation will be studied as a social movement, as an organizational form and as a small group process. Although this class does not teach the student how to be a mediator, it does complement non-credit programs providing mediation training.

3010 Sociology of Work Roles: A seminar which examines development and change in work roles and the labour process. Among the topics covered are labour-management relations, job satisfaction, the quality of working life, professionalization, the working poor, and gender patterns of work. Underlying processes of power and control in the labour process, and of status and earnings attainment will be emphasized.

3020B Comparative Economic Organizations: Critical examination of the nature of economic organizations. Emphasis is on how economic activities are organized in various cultures, from primitive to modern, with particular focus on development trends. Consideration is also given to alternative and futuristic models.

3030 Social Problems and Social Policy: This class focuses on the nature of social problems and social policy in advanced industrial societies. It adopts a social movement perspective, exploring the processes whereby agitation on behalf of undesirable but remedial social conditions leads to changes in social policy. Among the areas treated in depth are crime prevention, the quality of work life, race relations, deviance, and poverty and inequality.

3080B Modernization and Development: Change, modernization, and development as distinct but related notions. Beyond examining the meanings and implications of these terms, an attempt is made to outline some of the complex processes involved in planning for national development of traditional societies. For purposes of concrete illustration, the class will focus on the problems of South Asia and appropriate areas of Canada.

3070 Human Nature and Anthropology: Prerequisite: Either SSA 1000, 1100, or 1200, or an introductory class in psychology or biology. Can anthropologists explain why we feel sexual jealousy or why we tend to follow a dominant leader in times of stress? Can the evolutionary theories explaining why we have fingerprints and flat nails explain our behavioural traits? This class reviews theory and data on the evolution of human mind and culture in order to construct a theory of human nature. Its perspective and contents include much of what some have categorized as "human sociobiology," "Darwinian anthropology," and "Darwinian psychology." Evaluation will be based on essay exam, and a term paper.

3080 Linguistics and Anthropology: A seminar which examines aspects of linguistics relating to anthropology. Students learn to transcribe utterances phonetically, then to apply this knowledge as they study the relation of language and culture in both western and non-western societies. The history of anthropological linguistics is reviewed, with attention paid to North American workers in the field. Each student prepares an oral presentation and writes a term paper.

3090A/B Population and Society: An analysis of the interrelationships of population and social structure. The class examines changes in size, structure, and distribution of world population in terms of the three major demographic factors: fertility, mortality, and migration, with emphasis on their social, economic, and political causes and consequences.

3095A/B Demographic Techniques: Prerequisite: SSA 2010 or permission of the instructor. This class will explore the demographic techniques used to describe the dynamics of population structure. Various demographic sources ranging from census to church records will be examined. Basic techniques for determining rates and measures of fertility, mortality, morbidity and growth as well as more advanced methods using computer programs and simulations will be discussed. Students will be expected to complete a project using primary sources. A knowledge of logarithms and high school algebra is required.

3110 Sociology of Leisure: (same as Leisure Studies 3491B) This class looks at the phenomenon of leisure from a sociological perspective. Emphasis is on leisure research and the application of sociological theories to the study of leisure. Topics include: the social organization of leisure; the leisure industry and the roles of the state, the mass media, culture and leisure; and leisure and disadvantaged groups, e.g., women, the elderly, the unemployed, and minority groups.

3115A/B Research Methods: Prerequisite: SSA 2010A and SSA 2011B or consent of the instructor. This class discusses the construction of theory, the formulation of research problems, research designs, measurement, methods of data collection, and analytic theory testing. Special attention is given to the sample survey as one of the main methods of social science research. Practical experience in survey methods is provided through a class project.

3116A/B Issues in Social Research: Prerequisite: SSA 2010A and SSA 2011B or consent of instructor. This class focuses on various methodological issues such as causal analysis, qualitative research, measurement theory. The specific class content in a given year is available through the Department.

3120 Social Conflict: Introduces students to the various analytical perspectives sociologists have employed to understand the patterning and consequences of conflict in society. In this regard particular attention is devoted to the functional, coercion, and Marxian theories of conflict. This class is also concerned with conflict in contemporary society, with special reference to patterns of conflict and change in Canada.

3135A/B The Social Organization of Health Care: The social organization of medicine and the politics of health are examined. Particular attention is paid to environmental and occupational health issues in light of technological and social change. Epidemiological patterns of morbidity and mortality are assessed. Students are responsible for seminar presentations in areas of interest.

3140 Sociology of Mental Disorders: Mental disorders as both a social and sociological problem. Social factors in the definition, incidence, etiology, and treatment of mental disorders are examined. Societal views toward and responses to so-called mental illness are reviewed and analyzed from a sociological perspective. Other topics include the social role of the mental patient and the development of mental health policy in Canada. The class adopts a seminar format and evaluation is based primarily on essays or a term paper.

3145 Gender and Health: The class focuses upon 3 major areas in the relationship between gender and health: (a) The relationships among gender stereotypes and food, sexuality and body image, dieting and health; (b) Reproduction and childcare including birth control, menstruation, menopause, reproductive technology, childcare and child health; (c) Health care and health care workers — an analysis of earning, both paid and unpaid. Topics include sexual inequality in health care, health policy, family relationships and health care responsibilities.

3150 Sociology of Education: The nature of human learning within its cultural context. Analysis of social learning mechanisms and processes receives major consideration.

3160 Dawn of Civilization: The processes of development of civilization in the New and Old Worlds examined from the viewpoints of current anthropological and archaeological research. The role of environment, ideology, technology, and population as causal and/or limiting factors will be examined, as well as those features which differentiate civilizations from other forms of society. Different explanations for the rise and decline of early civilizations are tested against the archaeological record.

3170 Sociology of Sport and Recreation: (same as Phys. Ed. 4490A/B) A survey class which views the interrelationships among sport, recreation, culture, and society from a sociological perspective. The class provides the student with a broad overview of selected sociocultural factors which help to explain the incidence, form, and regulation of sport and specified recreational elements in contemporary society.

3180 Issues in the Study of Society: 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.

3185 Issues in the Study of Native Peoples of North America: This seminar is concerned with the historical background of the Native-European contact situation in North America and with issues arising from this background. Students will research and present reports on issues which are significant to themselves and important to native groups. Topics covered may vary from year to year, but will normally include a combination of historical issues such as culture change and acculturation among specific groups, and contemporary issues such as land claims, government policy,

and social conditions of natives. Prerequisite for the class is SSA 2355 or written consent of the instructor.

3190 Social Movements: The general topic of unstructured group activity encompasses phenomena traditionally classified as collective behaviour incidents, as well as reformist and revolutionary social movements. Although there is considerable overlap, the collective behaviour literature tends to focus on relatively brief and spontaneous activities, such as panics, disasters, and crazes, while work on social movements examines relatively more organized and enduring group activities which still fall outside the realm of normal institutions. This class investigates problems emerging from both areas of concern. Emphasis is given to relevant Canadian materials.

3200B Comparative Social Organization: The ways in which human beings organize themselves in common purpose. Examples of such ways include kinship structures, voluntary associations, role structures, class and caste systems, and networks. We emphasize pre-industrial societies and non-industrial sectors of industrial societies, placing them in a comparative framework.

3205 Ethnicity, Nationalism, and Race: This class begins with a consideration of the concepts of ethnic group and race, and proceeds to a view of ethnic group formation and change. Next, systems of ethnic stratification are surveyed. The class concludes with the study of policies concerning ethnic relations, ethnic nationalist movements, and problems of race and ethnic relations. Both Canadian and comparative data, particularly from developing countries, are included.

3210 Continuity and Change in Rural Societies: An examination of the ways of life of the majority of humanity. The focus is upon groups making their living from primary production (farming, fishing) or artisan production. The structures developed and strategies employed at the local level as well as in situations of subordination to more powerful institutions and groups are of particular concern. The perspective taken is comparative with cases from the western world contrasted with other areas.

3220B Coastal Communities: (same as Environmental Studies 5180B) 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 may make to understanding the dynamics of these communities. Major (though not exclusive) emphasis is on North Atlantic communities.

3250 Sociology of Science and Ideas: In the attempt to understand the reciprocal interaction between science and society we stress a comparative approach, examining science in different cultural groups and different historical periods. Various modern scientific disciplines are compared in different countries, including developing and developed countries, with differing economic and political organizations. The social organization of science is investigated through the application of micro-sociological analysis (e.g. small groups and organizational sociology theory). In particular, we focus upon tensions and conflicts within the scientific community which are understandable in sociological terms. We examine innovation and change within the scientific community, including the processes by which new fields emerge and new ideas are evaluated.

3260A The Development of Sociology as a Discipline: The Sociology of Sociology. Main concern is the manner in which sociology came to be a distinct field of enquiry in the late nineteenth century, and why it took the forms it did. Special attention is given to the divergent paths of Sociology in the United States, Great Britain, Germany, and France in order to analyze the relationship between the sociological enterprise and its social context. Prior classes in the history of sociological thought and in the sociology of knowledge are advantageous.

3270 Sociology of Careers: Careers in the humanitarian, social service, working-with-people area receive special emphasis, as do sociological studies of the unemployed. This is a seminar for graduate students and advanced undergraduates, with individualized research projects.

3280 Youth Crime: Prerequisite: SSA 2030 or 2180. This class deals with criminal offences committed by young persons. Etiologies drawn from various disciplines are examined and evaluated. A secondary focus concerns the criminal justice system as it applies to young offenders.

3285 Sociology of Criminal Law: Prerequisite SSA 2030 or 2180. This class includes an examination of the philosophy and origins of criminal law, with emphasis on the Canadian experience. Current issues related to revisions to the Canadian Criminal Code and the Young Offenders Act (1982) receive major emphasis.

3290 Corrections: Prerequisite: SSA 2030, 2180. This class traces the difficulties of the penal system in Western societies, with particular reference to Canadian corrections. The effectiveness of current methods is assessed in terms of their aims and objectives. Problems of the evaluation of current practice receive major consideration. Examination of conventional and innovative programs in community-based treatment is included.

3300 Cross-Cultural Study of Socialization: In this class the student (1) is introduced to the cross-cultural research method, and (2) becomes expert on the ethnographic literature on one of the world's major culture areas as it treats a problem. The student writes at least one major paper, and participates in one or more (probably two) cross-cultural investigations.

3310 Time and Society: The organization and utilization of time in human societies. We examine several attempts by social scientists to develop theories (and perhaps revise them) through the empirical examination of patterns and correlates of time use in different societies and cultures. We study both preiterate and developed societies and utilize both anthropological (e.g. ethnographies) and sociological data (e.g. surveys). The class is conducted as a seminar with discussion of assigned readings and class reports dealing with ancillary readings. Students must participate regularly in the seminar and make oral presentations of their research papers. One or two short research papers are required in the first half year, with a major paper due in the spring. Topics for these papers are developed in consultation with the instructor. The final class grade is based on the following criteria: Seminar presentations and discussion (25%), short paper(s) 25%, and a major paper (50%).

3401A History of Sociological Thought: Selected theorists in the history of sociological thought. Students make one oral presentation and present a written report at the end of the term.

3405B Contemporary Sociological Theory: A number of recent theoretical developments in sociology are critically examined. The choice of specific theoretical topics is left up to the instructor.

3415A/B Social Statistics: Prerequisite: SSA 2010A and 2011B or consent of instructor. There are three main components to this class: (1) lectures, in which the logic of statistical inference is presented; (2) laboratories, in which computer programs such as SPSS are utilized; and (3) analysis of sociological data. Students are required to interpret the results of the analysis in two drafts of the same paper. An appreciation of the interplay among methods, theory and statistics is emphasized. A grasp of Grade 9 algebra is assumed.

4000 Seminar in Social Anthropology: Offered sporadically, this seminar is designed to allow small groups of students to pursue a particular area in social anthropology for which no regular class is offered. The topic and requirements for the class are jointly decided by the students and the professor involved.

4500 Honours Seminar in Sociology: Consult the Department's Undergraduate Advisor for details of this class.

4510A Readings in Sociology/Social Anthropology: Prerequisite: Written permission of instructor. In a reading class the student is assigned to a member of staff for regular meetings to discuss readings in a selected area. Papers and research projects are expected.

4510B Readings in Sociology/Social Anthropology. See class description above.

4520A Readings in Sociology/Social Anthropology. See class description above.

4520B Readings in Sociology/Social Anthropology. See class description above.

4590 Honours Seminar in Anthropology. This class carries two credits. The student writes an honours thesis under the supervision of his/her principal adviser.

Spanish

Chairperson of the Department
J.E. Holloway

Professors
S.F. Jones, BA (Benn.), MA (Calif. Berkeley), PhD (Harv.)
A. Ruiz Salvador, BA (Brandeis), AM, PhD (Harv.)

Associate Professors
J.E. Holloway, BA (No. Colo.), MA (Wyoming), PhD (Duke)
J.M. Kirk, BA (Sheff.), MA (Queen's), PhD (UBC)

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

After Chinese and English, Spanish is the most widely spoken language in the world. It is the native tongue of well over 300 million people living in 22 countries.

Spanish-speaking nations are making international headlines and students of political science, economics, commerce, sociology-anthropology, literature, history, and other academic disciplines feel increasingly interested in this area of the world. Students from these departments are welcome to take our classes on Spanish and Latin American culture, civilization, history, and politics. These classes are conducted in English, the reading is in translation, and there are no prerequisites.

Knowledge of the Spanish language will be useful to all Canadians seeking careers as members of the foreign service, business, interpreters, translators, teachers, professors, critics, editors, journalists, and many others. Our beginning language course especially emphasizes conversational Spanish.

It is a widely recognized fact that some of the best novels and poetry are coming out of Latin America today, providing stimulating and challenging material for many of our literature classes.

If your tastes and abilities lie in the direction of Spanish or Latin American studies, you should consider the possibility of taking Spanish as an area of concentration in a General Bachelor's degree course, a Bachelor's degree with Honours in Spanish, or with Honours in Spanish and another subject combined. An undergraduate concentration in Spanish, followed by training in Management Studies, for example, could lead to a variety of possible careers in the Spanish-speaking world in international business and public service.

The Salamanca Program at the Colegio de Espana
The Salamanca Program is a special inter-disciplinary course of instruction designed to allow Dalhousie students to undertake both an intensive study of the Spanish language and courses in Hispanic culture. In order to participate, students must normally have completed Spanish 2010B with at least a standing of 'B.' The program takes place during the fall, lasts for one

term, and is offered at the Colegio de Espana in Salamanca, Spain. Dalhousie University will grant 2-½ credits to those students who successfully complete their courses in Spain. Enquiries and applications should be addressed to the Coordinator of the Program.

Spanish Studies to be taken at the Colegio de Espana
Spanish 3100A Advanced Grammar: (1 credit)
Spanish 3120A Spanish Art: (½ credit)
Spanish 3140A Spanish Literature: (½ credit)
Spanish 3160A Spanish History: (½ credit)

Spanish Degree Programs

Bachelor's Degree

Course should consist of at least four full-credit upper level classes taken in the second and third year, four of which must be conducted in Spanish. Any student who wishes to deviate from these basic requirements should consult the Department Chairman.

Bachelor of Arts with Honours in Spanish

Course should include:

Year I: Spanish 1020; Spanish 1100, 1110; and three electives.

Year II: Spanish 2000, 2010, 2500, 2510, plus two other 2000 level classes; a class in the minor subject; and one elective.

Year III: Spanish 3020, 3030, plus two other 3000 level classes; a class in the minor subject, and an elective in a subject other than that of the previous year.

Year IV: Three Spanish classes to be chosen from the upper-level program; and two electives (may be Spanish).

In addition, students are required to write an Honours essay, in Spanish, supervised by a member of the Department.

Bachelor of Arts with Combined Honours in Spanish and Another Subject

Programs may be arranged by consultation (as early as possible) with the departments concerned.

Notes

(1) The "other" classes chosen as electives in the programs outlined above must satisfy general degree requirements.

(2) Combinations of classes other than those set forth above may be chosen after consultation with the Department Chairman.

(3) A student may, with the permission of the Department, be admitted to a Spanish course at an advanced point because of prior knowledge of the language. Such a student, however (except as he may be granted transfer credits in the usual way), must normally take the same total number of classes as other students in the same course.

Classes Offered

Classes marked * are not offered every year. Please consult the timetable on registration to determine if this class is offered.

1020R Beginning Spanish: staff, discussion and conversation 3 hours, language lab as needed. For students with no knowledge or only a slight knowledge of Spanish. For students wishing to achieve proficiency in spoken and written Spanish. *Spanish One*, a textbook written and taught by members of the Department, avoids the usual chalk-and-blackboard dialogues often used in the classroom. Instead, it deals with the kinds of topics and controversial subjects that people in Spanish-speaking countries are likely to discuss: the pros and cons of going to university, the success and failure of marriage, the generation gap, women's lib, the population and pollution crises, and other items of human and social interest.

1100A/B Spanish Civilization: Ruiz Salvador, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. Although it may sound

self-evident to Canadian students, this class deals with Spain and the Spaniards. What Spain is and who the Spaniards are, however, may not be that clear-cut for Spaniards themselves. This class is a search for Spain throughout her history (Roman, Arab, Jewish, and Christian Spain), her art, literature, four main languages, and customs. The goal is a clearer picture of one of the most perplexing components of Western Civilization.

1110A/B Latin American Civilization: Kirk, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. The aim of this class is to provide the non-specialist with a basic understanding of this complex — and fascinating — world area. The first half of the class examines the development of Latin America from pre-Columbian times to the Mexican Revolution. In the second half, by means of a careful study of selected texts, the class examines the way in which the reality of Latin America has shaped a continental cultural identity, producing one of the most dynamic, "readable" world literatures.

2000A Intermediate Spanish: staff, discussion and conversation 3 hours, language lab as needed. This class continues the work done in *Spanish One*. Supplementary reading as necessary.

2010B Reading and Conversation: staff, discussion and conversation 2 hours. Emphasis is on perfecting conversational skills as the reading material is discussed in class.

***2070A/B Area Studies on Mexico and Central America:** Kirk, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. Following an examination of the Indian heritage, and the colonial legacy of the *conquistadores*, the class deals principally with the contemporary period, examining the Mexican Revolution and its aftermath, Petroleum Power, the Somoza dynasty, Nicaragua under the Sandinistas, the U.S. role in the region, the human rights situation in Central America, the current El Salvador crisis, and probable developments in the region. The class is designed to provide an understanding of the contemporary reality of this volatile region, in many ways a microcosm of the crucial situation of Latin America as a whole.

***2080A/B The History of Modern Spain:** Ruiz Salvador, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. This course focuses on four main historical periods: the Republic of 1931, the Civil War (1936-1939), General Franco's Spain (1939-1975), and the post-Franco Restoration of the Monarchy.

***2090A/B Women in Latin America:** Jones, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. This class has four main objectives: (1) to examine assumptions about women held by the major academic disciplines; (2) to test these assumptions in the perspective of current research and individual experience; (3) to study traditional and changing sex roles in Latin America, with particular emphasis on Cuba; (4) to explore new alternatives for men and women in our society.

***2110A/B The Cuban Cultural Revolution:** Kirk, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. Cuba, the only Communist society in the Western Hemisphere, has undergone a dramatic political and economic transformation. The Revolution has also brought about changes in education, the arts, the role of women, race relations, and athletics. The class focuses on the problems and achievements of the Revolution, the peculiarities of Communism in a Caribbean society, and its effect on literature and the arts.

***2120A/B The Spanish Inquisition and Its Challengers:** Jones, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. During the time of the Reformation, many Spanish thinkers came to believe that the Church had long since failed to interpret correctly and teach effectively Christ's message. The Church had become a powerful institution, and viewed the criticism as an attack on its authority. It responded by persecuting the dissenters and organizing a movement later known as the

Counter Reformation. This class attempts to examine the process by which ideas eventually may become distorted when they are institutionalized, and the methods by which progress and change can come about in spite of the efforts of the establishment to repress dissension.

***2130A/B Latin American Dictators in the Novel:** Kirk, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. The history of Latin America since independence has been characterized by the rise to power of countless dictators. Some of the best Latin American novels portray these almost mythical figures who to this day wield absolute power in many countries. The class examines the literature and history of this phenomenon with particular attention to the twentieth century, and attempts to discover its roots in militarism, underdevelopment, and imperialism.

***2210A/B The Novel of the Mexican Revolution:** Kirk, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. The Mexican Revolution (1910-1917) is the first people's revolution of the twentieth century. The prerevolutionary situation, the war, and its aftermath, resulted in some of the finest Latin American novels. This class views these works against the historical and social background of contemporary Mexico.

***2220A/B Masterpieces of Spanish Theatre:** Jones, lecture and discussion 2 hours, conducted in English.

***2230A/B Contemporary Latin American Prose:** Holloway, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. This class samples short stories and novels of contemporary prose from throughout Latin America. Included are works by such outstanding experimental writers as Julio Cortázar, Juan Rufo, Carlos Fuentes, Alejo Carpentier, García Márquez and José Donoso — authors whose vigorous narrative, technical innovation and synthesis of surrealism, myth, and magical realism evidence not only a "new consciousness" in Latin America, but perhaps a rejuvenation in prose art of global consequence.

***2240A/B Contemporary Latin American Prose, Part II:** Holloway, lecture and discussion 2 hours, conducted in English, no prerequisites. This class is a continuation of Spanish 2230A/B, but may be taken independently of it.

2500A/B Introduction to Spanish Literature: Ruiz Salvador, lecture and discussion 2 hours, conducted in Spanish. Study of illustrative works.

2510A/B Introduction to Latin American Literature: Holloway, lecture and discussion 2 hours, conducted in Spanish. Introduction to major authors and trends in recent Latin American literature. Study of illustrative works.

***3010A/B Workshop in Advanced Oral Spanish:** staff, lecture and discussion 3 hours, conducted in Spanish. This class intends to build vocabulary, increase fluency and enhance the style of spoken Spanish through continued development and intensive use of oral Spanish skills.

3020A/B Translation: staff, lecture and discussion 2 hours. Exercises in translation from Spanish to English and from English to Spanish.

3030A/B Composition: staff, lecture and discussion 2 hours. Training towards accuracy in writing Spanish. Vocabulary building, free composition.

***3070A/B Contemporary Latin American History:** Kirk, lecture and discussion 2 hours, conducted in English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. This class examines the underlying structures of Latin America through a consideration of the major political and social trends in the continent. After a brief historical overview it studies both general currents (e.g. the Church's role, militarism's growth, and U.S. influence) and specific developments, such as the Mexican and Cuban Revolutions, Petroleum Power in Mexico, Chile under Allende and Pinochet, and the Sandinistas' Nicaragua. This helps the student understand the present-day reality of this important world area.

***3200A/B Cervantes:** Jones, lecture and discussion 2 hours, conducted in

English, no prerequisites. Open to students in all departments. No knowledge of Spanish necessary. This class examines Cervantes' philosophy of life through an analysis of his great masterpiece, *Don Quixote*. In this precursor of the modern novel, Cervantes studies human nature in all its many aspects. Life is presented as a complex and ironic interplay of idealism and disillusionment, appearance and reality, chivalrous love and worldly love. All truth is relative, but the ultimate irony is felt by the reader himself who discovers, in the end, that Don Quixote's view of the world is superior to that of all the "sensible" people who judged him to be mad.

*3210A/B **Borges:** Holloway, lecture and discussion 2 hours, conducted in Spanish. The Cervantine tradition of fiction dealing with a problematical reality persists in twentieth century Hispanic literature, and its most noted continuator is Jorge Luis Borges. Renowned for his fantastic, metaphysical short stories, Borges is one of the leading figures in contemporary world literature, and perhaps the greatest living writer in the Spanish language. This class serves as an introduction to his work and its relationship to the currents of contemporary literature and thought which inform it.

*3220A/B **Galdós:** Ruiz Salvador, lecture and discussion 2 hours, conducted in Spanish. A liberal thinker who studiously confronted the social conditions of his day and sought to counteract the prejudices of a formalistic, authoritarian society, Benito Pérez Galdós (1843-1920) was Spain's foremost socio-psychological novelist, or, perhaps, literary social psychologist. Pre-eminent in his own country, Galdós must also be considered one of the most vital and representative novelists of the nineteenth century in Europe. This class focuses on *Fortunata y Jacinta*, his masterpiece.

*3230A/B **Literature of the Spanish Civil War:** Ruiz Salvador, lecture and discussion 2 hours, conducted in Spanish. A study of representative works.

*3500A/B **Contemporary Spanish Literature:** Ruiz Salvador, lecture and discussion 2 hours, conducted in Spanish. A study of representative works.

*3510A/B **Contemporary Spanish American Literature:** Holloway, lecture and discussion 2 hours, conducted in Spanish. A study of representative works.

3670A/B **Directed Reading in Spanish American Literature**

3675C **Directed Hispanic Studies**

3960A **Reading course for majors**

3990B **Reading course for majors**

*4040A/B **Advanced Style and Syntax:** staff, lecture and discussion 2 hours.

*4500A/B **Golden Age Theatre:** staff, lecture and discussion 2 hours.

*4510A/B **Golden Age Poetry and Prose:** staff, lecture and discussion 2 hours.

4980A **Reading course for Honours students**

4985C **Independent Advanced Hispanic Studies**

4990B **Reading course for Honours students**

Statistics

Statistics is the discipline which is concerned with the organization, display and interpretation of data. By a study of the uncertainty inherent in scientific hypotheses, statistics enables us to make inferences based on observations with error about these hypotheses.

There are several honours programs and an advanced major program in Statistics available to students. Any student interested in such a course of study should consult the Director of Statistics, Department of Mathematics, Statistics and Computing Science.

20-Credit Major

The department is able to offer a major in the 20-credit program. For further information refer to specific regulations for the 20-credit programs on pages 33 to 41.

Honours in Statistics

The honours program in Statistics will provide students with a comprehensive knowledge of both theoretical and applied statistics and will enable students to move easily into challenging employment or graduate work in statistics.

Entering students should take Math 1500 or 1000/1010 and Computing Science 1400/1410 during their first year.

The program of study for years 2, 3 and 4 is as follows:

Year 2: Statistics 2070A, 2080B, Mathematics 2030A and 2040B or 2130R, 2000R or 2500R.

Year 3: Statistics 3360A, 3460B, 3340A, 3390B; Mathematics 3090A, 3080B or 3100B or 3111B.

Year 4: Statistics 4080R, 4620A.

In addition 3-7 further ½ classes are required from Statistics 3390, 4080, 4090, 4100, 4350, 4370, 4390 to make up the usual 9-11 class concentration.

Honours Comprehensive Examination

Prerequisite: Successful completion of the third year Honours Statistics program. The student will carry out an independent statistical study or act as a major statistical contributor to a research project under the supervision of a faculty member. In addition the student will participate in the statistical consulting service through consulting workshops.

Combined Honours

Students interested in taking honours in statistics and another subject should consult the Director of Statistics through whom a suitable course of study can be arranged.

Co-Operative Education Program

The Co-operative education program integrates the usual honours program of 8 academic terms with 4 work terms of relevant industrial/laboratory employment. The work terms, each of 4 months duration, are spent in industrial, business and laboratory positions primarily in the Maritime region. The work experience helps students see the applicability of their training in mathematics, statistics and computing science and helps them make intelligent career choices. Upon successful completion of the program the student receives the Honours Degree and the University transcript indicates that the program was a co-operative one.

It is possible to complete a Co-op degree in 4 and 1/3 years, although students should expect to take 5 years. There is some freedom in how the work-term/academic-term sequences may be arranged and students should be prepared to be flexible.

Students interested in a Co-op program in statistics or a combined

program with statistics should consult the Director of Statistics or the Director of Co-op Education in the Department of Mathematics, Statistics and Computing Science, preferably early in their course of study.

More details on the Co-op program appear in the main entry for the Department in the Calendar.

Classes Offered

Credit may not be obtained twice for the same class even if the numbers have been changed.

1060A/B Introductory Statistics for Science and Health Sciences: (Same as Mathematics 1060A/B). lecture 3 hours, tutorial 1 hour. Prerequisite: Nova Scotia Mathematics 442 or equivalent. Through extensive use of illustrative real-life examples drawn from a wide variety of disciplines, the student is introduced to the basic concepts of statistics, data reduction, estimation and hypothesis testing. The emphasis is on statistical concepts, rather than mathematical manipulations. The principal aim is to enable students to identify and formulate the statistical aspects of real-life problems and to become familiar with the statistical vocabulary most commonly used in scientific journals. The student requiring a more extensive exposure to the statistical methods of scientific experimentation should follow this class with Statistics 1070. Topics include descriptive statistics, elementary probability and distributions, estimation, hypothesis testing and regression. Statistics 1070 is a natural sequel for this class. Students may obtain credit for only one of Statistics 1060, 2070 and Economics 2222. Students planning to take higher level statistics classes are strongly advised to take Statistics 2070/2080 instead of 1060/1070.

1070A/B Statistical Techniques of Scientific Experimentation: (Same as Mathematics 1070A/B). lecture 3 hours, tutorial 1 hour. Prerequisite: Statistics 1060. A continuation of 1060 including a collection of techniques widely used in the experimental sciences. Topics include multiple regression and correlation analysis, analysis of variance, and curve fitting techniques. The presentation of these topics includes consideration of the statistical aspects of experimental design. The objectives are (1) to explain what information can be obtained from experiments through use of these techniques; (2) to explain the assumptions that must be satisfied before these techniques can be applied. (3) to illustrate the nature and methods of the necessary computations. Students may obtain credit for only one of Statistics 1070, 2080 and Economics 2223. Students planning to take higher level statistics classes are strongly urged to take Statistics 2070/2080 instead of 1060/1070.

2070A/B Introduction to Probability and Statistics I: (Same as Mathematics 2070A/B). lecture 3 hours. Prerequisite: Mathematics 1000 or 1500. A basic introduction to the concepts of probability and statistics. The subject matter is developed systematically with an emphasis on results of an important practical nature. The class is well suited for any student with a knowledge of calculus who wants a basic understanding of statistical procedures and tests. Topics include descriptive statistics, counting techniques, combining elementary probabilities, normal theory estimation and inference for one and two samples, one way analysis of variance and simple linear regression. Not more than one-half credit can be given for Statistics 1060 and 2070 and Economics 2222.

2080B Introduction to Probability and Statistics II: (Same as Mathematics 2080). 3 hours. Prerequisites: Statistics 2070, and Mathematics 1010 or Mathematics 2030. Some knowledge of matrices is assumed. A continuation of 2070A, this class deals with commonly used data analysis techniques and related topics in probability theory and mathematical statistics. Topics include discrete and continuous random variables, sampling distributions, central limit theorem, multiple regression analysis, analysis of variance, inferences for binomial data, contingency tables. Natural sequels for this class are Statistics 3340, 3360, 3380, 3460, 4350 and 4390. Not more than one-half credit can be given for Statistics 1070 and 2080 and Economics 2223.

2090A Intermediate Statistics for Health Sciences: (same as Nursing 5000A, PE 5003A, Pharmacy 5960A) Prerequisite: Statistics 1060 or equivalent. This class is designed so that students will be able to select appropriate statistical methods to analyse categorical, ordinal and

measurement data to carry out the analysis on the computer using the MINITAB and GLIM statistical languages. Topics to be covered include least squares methods and F-test in multiple regression and analysis of variance via regression, analysis of crossed and nested designs, rank methods, analysis of count or frequency data with log linear models, power of a test. This class is intended primarily for graduate students and is NOT available for credit in the Faculty of Arts and Science.

3340A/B Regression and Analysis of Variance: (Same as Mathematics 3340). lecture 3 hours. Prerequisites: Statistics 2070/2080 and Mathematics 2030, or an equivalent knowledge of matrices. An introduction to regression with emphasis on the practical rather than the theoretical aspects. Topics include: fitting a straight line in matrix terms and fitting of general linear models, analysis of residuals. Transformation of data, correlation, multiple and polynomial regression, weighted least squares, indicator variables, selecting the best regression equation, analysis of variance models and an introduction to non-linear least squares. This class makes extensive use of computer packages.

3360A/B Probability: (Same as Mathematics 3360). lecture 3 hours. Prerequisites: Statistics 2070/2080 and Mathematics 2000. An introduction to the basic concepts of probability to illustrate the great variety of practical applications of probability in science and industry. Topics include: (a) Fundamentals; (b) the classical models; binomial and hypergeometric, the multinomial, the Poisson, exponential, and the uniform distributions; (c) definitions of random variables, independence, functions of random variables, and distributions of sums of independent random variables; (d) conditional events and their probabilities; their uses; (e) laws of large numbers and the Central Limit Theorem. Examples illustrating the applicability of probabilistic formulations are taken from the natural and physical sciences.

3380A/B Sample Survey Methods: (Same as Mathematics 3380). lecture 3 hours. Prerequisite: Statistics 2070/2080. The development of design and analysis techniques for sample surveys. Topics include simple, stratified and systematic random sampling, ratio and regression estimation, sub-sampling with units of equal and unequal size, double-multistage and multiphase sampling, non-sample errors and non-respondents.

3390A/B Statistical Computing: (Same as C.S. 3390). lecture 3 hours. Prerequisites: Statistics 2080, Mathematics 2040, Computing Science 1210 or 1410. The course will provide an introduction to the principal computational methods which are important for data analysis. Major analyses usually require extensive computing; hence techniques which ensure the validity and accuracy of the computations are necessary. Topics covered will include numerical computations, linear models, Monte Carlo methods and random number generators.

3460A/B Intermediate Statistical Theory: (Same as Mathematics 3460). lecture 3 hours. Prerequisites: Statistics 2070/2080 and 3360. This class provides an intermediate level coverage of statistical theory to provide a framework for valid inferences from sample data. The methods developed are based on the likelihood function and are discussed from the frequentist, likelihood, and Bayesian approaches. The problems of point estimation, interval estimation and hypothesis testing and the related topics of sampling distributions, sufficiency, and Fisher Information are discussed.

4060R Advanced Statistical Theory: lecture 3 hours. Prerequisites: Statistics 3360, 3460 and Mathematics 2000. This course 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. The basic ideas of robustness will be introduced followed by a discussion of goodness of fit models. The final part of the course will examine the asymptotic behaviour of a number of the statistical procedures developed in the course.

4080A/B Statistical Analysis of Spatially Coherent Systems: (same as Mathematics 4080A/B) lecture 3 hours. For Mathematics majors the recommended prerequisite is Statistics 4370. For students in physical

science, the natural prerequisite is Physics 4540. Techniques for the analysis of modelling of statistical relationships within a spatially coherent system are studied. Practical constraints in the construction of models and of estimation and prediction schemes for natural processes are illustrated with examples from weather and climate studies.

4090A/B Probability: (same as Math 4090). For description see Math 4090.

4100A/B Topics In Advanced Probability and Statistics: lecture 3 hours. Prerequisites: Statistics 3360, 3460. This course is normally offered as a graduate course (Statistics 5100) but is open to advanced students with the permission of the instructor.

4350A/B Applied Multivariate Analysis: lecture 3 hours. Prerequisites: Statistics 3340 and Mathematics 2130 or 2040 or 2270. The class deals with the stochastic behaviour of several variables in systems where their interdependence is the object of analysis. Greater emphasis is placed on 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.

4370A/B Stochastic Processes: lecture 3 hours. Prerequisite: Statistics 3360. A development of concepts of (a) Markov chains and continuous time Markov processes, (b) vector independence and the multivariate normal distribution, (c) stationary time series. Emphasis is on practical applications. The ability to translate from a physical context into the language of probability model is stressed. This class is a natural sequel to Statistics 3360. Here, the notions of time and space indexing of probability models are introduced, and conditional probability techniques are developed to deal with models of natural phenomena.

4390A/B Time Series Analysis and Forecasting: lecture 3 hours. Prerequisite: Statistics 3340. The analysis of univariate time series data is discussed. Topics include stationarity, transformation, differencing, autocorrelation, autoregressive-moving average models, identification, estimation, diagnostic checking and forecasting. The emphasis will be on model building using the approach of Box and Jenkins. Other topics such as exponential smoothing, seasonal adjustment and multivariate models may also be covered.

4620A/B Data Analysis: lecture 3 hours. Prerequisite: Statistical techniques useful as background for this class would include any techniques covered in Statistics 2070/2080, 3340, 3360 or 3460 although it is not necessary to have taken all of these prerequisites. Admission to the class is by consent of the instructor. A problem-oriented approach to statistical analysis. The problems discussed are based on real life data. Students are encouraged to develop novel approaches for data analysis problems of case studies. Some general techniques which arise in non-traditional data analysis are presented in this class.

8700 non-credit) Co-op Seminar

8701 (non-credit) Co-op Seminar

8850 Honours examination

8891 Co-op Work Term I

8892 Co-op Work Term II

8893 Co-op Work Term III

8894 Co-op Work Term IV

8895 Co-op Work Term V

Theatre

Chairperson of Department
P. Perina

Student Advisor
R.G. Merritt

Professor
A.R. Andrews, BA, Dipl. Ed., MA (Leeds), PhD (Ill.) FRSA

Associate Professors
R. Doyle
B. McKay
R.G. Merritt, AB (Corn.), MA (N.Car.), PhD (Tul.)
D. Overton, BA, MA (UBC), PhD (Calif.)
P. Perina, MA, Dipl. Scenography (Prague)

Lecturer
K. Handerek, MA, BEd MFA, (Alta)

Production Manager
D. Griffin

Special Instructors
Clare Bader (Acting)
Kathryn Edgett (Acting)
Bruce MacLennan (Light and Sound)
Mary McMurray Pigot (Acting)
David Porter (Properties)
Lynn Sorge (Costumes)
Rhea Theriault (Costumes)
Ian Thomson (Construction)
Garry Wilson (Acting)

Theatre is a rich, complicated performing art that involves refined creative work in many different fields.

The Dalhousie Theatre Department offers different ways to study the theatre: (1) You can undertake programs that lead to a university degree: an Honours BA (4 years), a General BA (3 years); (2) You can enroll in a training program in costume studies that leads to: a Certificate (2 years), a Diploma (3 years); (3) You can select certain theatre classes to reinforce and complement your studies in other disciplines offered by the university; (4) You can enroll in one class, from a special group, as a part-time or extension student.

Basically, the degree programs involve a curriculum of theatre classes, and a selection of other classes in different disciplines. The university has a set of regulations which specify how these programs must be arranged. These regulations are all listed earlier in this calendar, and prospective students should refer to them to become aware of the opportunities offered. There are a surprising number of different ways to arrange one's studies; what we recommend is the basic structure you should follow if theatre is your primary interest.

Degree Programs

Note: Honours programs may not be available. Interested students should contact the Department.

BA with Honours in Theatre (4 years)

Students who wish to follow a program of theatre studies that keeps the whole of the theatre in perspective choose this program. They must maintain a high scholastic level of performance to remain in this program (B- or better in all classes.) Only theatre classes are listed.

Year 1: Theatre 1000, 1050.

Year 2: Theatre 2000, 2011A/B, 2012A/B, and choice of 2100A/B, 3100A/B, or 2700.

Year 3: Theatre 3500 and choice of two of 3000, 3600, or 4200.

Year 4: Theatre 4900, and choice of two of 3600, 4200, 4700, 4710

BA with Combined Honours (4 years)

It is possible to follow a program of studies that leads to Combined Honours in two subjects. Students interested in constructing such a program should start by seeing both Chairpersons of the disciplines they wish to combine. From that point a suitable program can be constructed.

BA in Theatre (Acting) (3 years)

If accepted as a result of audition you pursue the following program:

Year 1: Theatre 1500, Theatre 1050, plus three classes in other subjects.

Year 2: Theatre 2011A/B, 2012A/B, Theatre 2800/2810/2820, plus one class in another subject.

Year 3: Theatre 3800/3810/3820 and either 3500 or 2100A/3100B, plus one class in another subject.

BA with Honours in Theatre (Scenography & Technical Scenography) (4 years)

People from very different backgrounds are attracted to the study of scenography. Students with considerable art school or architecture background are offered especially tailored programs, and should contact the scenography professor to work out a suitable program of studies in scenography. Students starting with a keen interest and little formal background in art or architecture are admitted if they meet the university entrance requirement, and should then plan to follow the following program:

Year 1: Theatre 1000, 1050; plus three classes in other subjects.

Year 2: Theatre 2700, 2011A/B, 2012A/B, 2060/2070; plus one class in another subject.

Year 3: Theatre 3060/3070; plus two of 2000, 2100A/B plus 3100A/B, 3500, 3710, 4200; plus one class in another subject.

Year 4: Theatre 4900; plus two of 3600, 4200, 4700, 4710; plus two classes in other subjects.

Students wishing to pursue the scenography specialty are urged to make an appointment with the scenography professor before they register to ensure they plan their specific program in line with their particular needs.

BA with a Major in Theatre (3 years)

You can take a "major" in theatre in a three-year BA program (15 classes). This requires at least four and not more than eight theatre classes beyond the 1000-level.

Year 1: Theatre 1000, 1050; plus three other classes of your choice.

Year 2: Theatre 2011A/B, 2012A/B plus up to three of 2000, 2100A/B plus 3100A/B, 2700; plus elective(s).

Year 3: Up to four of 3000, 3500, 3600, 4200; plus elective(s).

Combined BA/BEEd

The Theatre Department in conjunction with the Education Department offers a 4-year program leading to the BA and BEEd degrees. The outline of this program is as follows:

Year 1: (5 Credits) Theatre 1000, Theatre 1050, an approved writing class (1 full credit), introductory class in minor area* (1 full credit), and Arts and Science elective (1 full credit).

Year 2: (5 Credits) Theatre 2000, Theatre 2100A/B plus 3100A/B, further

classes in minor area* (2 full credits), ½ credit class in educational foundations, ½ credit Arts and Science or other elective.

Year 3: (6 Credits) Theatre 3000, Theatre 2011A/B, Theatre 2012A/B, further classes in minor area* (2 full credits at 2000+ level), two ½ credit classes in educational foundations, and one credit Arts and Science or other elective.

Year 4: (6 Credits) Education 4620, one credit class in Field Experience, one credit in methods area (elementary option: 2 credits), one credit in special education, ½ credit class in educational foundations, further class in minor area* (1 full credit), and ½ credit Arts and Science or other elective.

*The minor area must be a recognized teachable subject. For further information, consult the Theatre Department.

Costume Studies, Certificate in 2 years, Diploma in 3 years

This professional program is designed for the student whose goal is the professional theatre or the fashion industry. Students must meet university entrance requirements. Students in this program do not have to take classes outside of theatre. Students are required to work on departmental productions as a means of gaining proficiency in garment assembly. In order to maintain a harmonious student/teacher relationship only twenty-five students will be enrolled in the first year, fifteen students in the second year and five in the third year. The third year prepares the student for professional work, either in the fashion industry or in the theatre.

Facilities

The department is located in the theatre wing of the Dalhousie Arts Centre. The theatre wing is a self-sufficient unit involving one proscenium theatre, two studios, and supporting workshops.

The department is developing close collaboration in certain theatre work with the Neptune Theatre and other regional theatres.

Some theatre classes by the nature of the work involved have a restricted enrollment. All students wishing to take any class in theatre should therefore first consult with the department.

Please note: Theatre by its nature requires evening work. Students, especially in acting, scenography, and costume classes, are advised not to undertake evening work or classes.

Classes in the Degree Program

Year 1

1000 The Nature of the Theatre: 3 hours, Merritt, Overton, 6 credit hours. This class provides an introduction to the nature of the production process and theatre through lectures, discussion, demonstration, script analysis, and practical scene work.

1050 Theatre Organization and Stagecraft: lecture 2 hours, labs 4 hours, Perina and staff, 6 credit hours. An introduction to theatre production, providing initial contact with scenography. Basic theatre construction, common materials used for construction, stage properties and costumes, knowledge of basic theatre lighting and sound equipment, and the methods and procedures for working with all of them efficiently, creatively and safely make up the substance of this class. Students who intend to major in the theatre programs must take this class. It is also a prerequisite for the scenography classes. Because of the required evening production work, those enrolling in this class must avoid permanent evening commitments other than departmental theatre activity during the academic year. There are certain lab charges connected with this class.

***1300 Introduction to Film:** 3 hours, Merritt, 6 credit hours. This class considers aspects of film history and theory, but its primary emphasis is on film criticism and the sociology of film. Some films are presented in class, but students are also required to attend films presented elsewhere. The class presents reviews of films and considers such specific aspects as directing, acting, cinematography, editing, imagery, and screenwriting. The intent of the class is to provide an overview of the nature of film, its effect on the public as a mass medium, and its dual role as both an art form and a commercial entertainment.

1500 An Introduction to Theatre Studies (Acting I): 6 hours, Handerek/McKay and acting staff. Prerequisite for Theatre 2800. Entrance to the class is by audition only. The first year in a course designed for the student interested in a professional acting career. The class concentrates on opening up and developing the emotional and imaginative range of the student through a series of improvisational and textual exercises. There is also concentration on the development of vocal and physical techniques for the actor. Emphasis is also placed on the discipline necessary in the professional theatre.

Year 2

2000 Theatre Performance 1: 4 hours, Overton, 6 credit hours. Prerequisite: Theatre 1000. Designed to provide exposure to the production/performance process for those who do not intend to pursue a career in the professional theatre. Through a workshop/discussion approach, basic performance problems are considered and the student is given the chance to experiment with various solutions in a performance situation. The ability to articulate solutions both verbally and nonverbally is developed. The class may result in a public performance.

2011A/B The History of the Theatre from its Origins to the Renaissance: 3 hours, Andrews *et al.*, 3 credit hours. This class gives students an opportunity to study various aspects of the early history of theatre. Specific topics covered include the origins of theatre, the Greek theatre, the Roman theatre, the medieval theatre and the theatres of the Italian Renaissance and of Shakespeare. Although there is no formal prerequisite for the class, students should normally be in their second year of study. A background in theatre, history, and/or dramatic literature will be an advantage. Text: O.G. Brockett, *History of Theatre* (most recent edition).

2012A/B The History of the Theatre from Renaissance to the Twentieth Century: 3 hours, Andrews *et al.*, 3 credit hours. This class is in a sense the sequel to Theatre 2011A/B, though that class is not a prerequisite. It aims to study the development of the theatre in Europe and North America from the Renaissance to the twentieth century. There is no prerequisite, but students should normally be in at least the second year of study. A background in history, theatre and/or dramatic literature will be an advantage. Text: O.G. Brockett, *History of Theatre* (most recent edition).

***2020 Modern Dance:** 4 hours of movement, 6 credit hours (summer session only). The theories and techniques of modern dance; the use of space, rhythm, dynamics, kinesthetics, aesthetic awareness and composition. The development of personal expression through the medium of dance is also encouraged within the class.

2060/2070 Technical Scenography I: 6 hours, Perina *et al.*, 12 credit hours. Prerequisite: Theatre 1050. This class is concerned with the progressively more complex problems of the preparation of theatre production in lighting, sound, construction, photography, and properties. The theory behind the operation of these crafts, the advances in technology and their expense and adaptability, form part of this class. Lecture periods are concerned with Stage Management, Technical Drawing, Theatre Organization and Administration as well as other related topics. Workshop preparation in light and sound, darkroom, properties, and construction is integrated with crew responsibilities in department productions. There are certain lab charges connected with this class.

2100A or B Dramatic Structure: 3 hours, Merritt, 3 credit hours. Prerequisite: First year writing requirement. The analysis of plays as vehicles for performance, involving a detailed study and comparison of specific dramaturgical problems and the ways they have been handled by various playwrights. Specific problems such as the rhythms of dramatic structure, the languages of the theatre and the orchestration of audience response are dealt with. The plays studied are drawn from a wide range of genres, styles, and historical periods.

2700 Scenography I: 6 hours, Perina, 6 credit hours. Designed to give students basic visual judgement and understanding. In the first half, it follows the Bauhaus approach to graphic design but adapts it to the needs of three-dimensional theatre space. In the second half the class teaches perspective; the final project is to integrate all the previous material and

apply it to simple stage composition. Throughout the year analysis and criticism of various works are encouraged. The texts followed are Gyorgy Kepes' *Language of Vision* and Johannes Ihen's *The Elements of Colour*. Students wishing to take this class should consult with the instructor.

2800/2810/2820 Acting II: 15 hours, Handerek/McKay and acting staff, 18 credit hours. Prerequisite: Theatre 1050, and a grade of at least C in Theatre 1500, permission of instructor. The second year of the actor training course. The concentration is on the development of textual, vocal and physical techniques for the actor. In the acting classes there is work on a series of scene study exercises utilizing the emotional and imaginative work started in the first year. Classes will normally involve dance, movement, singing, makeup, etc. The student is required to perform two or more roles in major or minor productions.

Year 3

3000 Theatre Performance II: 4 hours, Overton, 6 credit hours. Prerequisite: Theatre 2000. An exploration of the production/performance process on a more sophisticated level than Theatre 2000. Some performance experience is assumed among the participants, and the emphasis is on developing and refining performance skills. The class may result in a public performance.

3060/3070 Technical Scenography II: 6 hours, Perina and staff, 12 credit hours. Prerequisites: Theatre 2011A/B, 2012A/B, 2060/2070 and 2700. An advanced class in production technology. Students work intensively in one of the areas of: construction, properties, lights and sound, or stage management. Lecture periods are devoted to Administration, Publicity, Advanced Techniques, and other related topics. Lectures are common to all students. Each student serves as crew head for at least two departmental productions. There are certain lab charges connected with this class.

3100A or B Practical Theatre Criticism: 3 hours, Merritt, 3 credit hours. Prerequisite: Theatre 2100A/B or permission of instructor. The class is concerned primarily with the relationship between the critic and the play in performance. Some of the theoretical bases of criticism are considered, but the emphasis is on ways in which critics and critical theories can have a positive effect on the modes, methods, and styles of theatre production.

3500 The Modern Theatre: 2 hours, Andrews, 6 credit hours. Prerequisite: Theatre 2011A/B, 2012A/B, or permission of instructor. The modern theatre has been characterized by successive bursts of creative energy and experiment. This class gives an opportunity to study these developments in detail and to examine several important theatrical theories. Their implementation in particular plays and in theatrical practice is also examined.

3600 The Playwright in the Theatre: 4 hours, Merritt, 6 credit hours. Prerequisite: Theatre 2100A/B or permission of the instructor. The play as a vehicle for performance rather than as a literary work. Through weekly writing exercises dealing with specific dramaturgical problems, the craft of playwriting is explored. Simultaneously, a basis for understanding the nature of dramatic forms is provided through detailed analysis of the structure and techniques of plays representing a broad spectrum of styles, genres, and historical periods. With this background, the class then writes plays (both individually and collaboratively) which are then revised, critiqued, given a public presentation, and rewritten.

***3710 Scenography:** 6 hours, Perina, 6 credit hours. Prerequisites: Theatre 2011A/B, 2012A/B, 2060/2070, and 2700. For theatre honours and special scenography students only. It builds on the knowledge from the previous class in the field, Theatre 2700, as far as visual knowledge is concerned, and from technical knowledge acquired in Theatre 2060/2070. Students concentrate on learning in more detail about three-dimensional theatrical space, its dynamics and composition. At the same time, they learn technical drawing for the theatre and the methods of executing constructionally a designed work. They are introduced to the directorial/scenographic relationship. The texts followed are John R. Walker's *Exploring Drafting: Basic Fundamentals* and Willis Wagner's *Modern Woodworking*.

3800/3810/3820 Acting III: 15 hours, Handerek/McKay and acting staff,

18 credit hours. Prerequisite: Theatre 2011A/B, 2012A/B, class in dramatic literature, a grade of at least B in Theatre 2800/2810/2820; permission of instructor. The advanced class in the acting course. Added to the core acting, voice, text and movement sections are dance, Shakespeare, solo singing and audition techniques for the actor. The student is required to perform four featured roles in major productions.

Year 4

*4200 (Education 4820) Developmental Drama: 3 hours, 6 credit hours. A class which shows anyone involved or interested in the development of children or adults how drama can be used both to guide personal development and to heighten learning ability. The class considers how best to adapt developmental drama to school situations or organized groups. Improvisation, theatre games and dramatizations of social issues make up part of the class; various approaches to drama in education are considered. Regular practice runs through the class, and each student must develop individual practical workshops.

*4800 Directing: 4 hours, 6 credit hours. Prerequisites: Only available to honours theatre students who have taken Theatre 1050, 2011A/B, 2012A/B, 2700, 2800/2810/2820 or 2000, and 3600. The procedures that lead to theatrical events are analysed. Requirements include the directing of scenes from plays, and at least one fully achieved production. The class is normally only available to honours theatre students in the fourth year of their program.

*4700 and *4710 Special Topics, Faculty: 6 credit hours each. Prerequisite: Permission of department. The student explores in detail particular areas of the theatre of special interest, with the guidance of members of the faculty. Frequency and the length of meetings are decided to meet the needs of the particular topic or project under study. The class is open only to fourth-year honours theatre students.

*4800/4810/4820 Acting III: Handerek/McKay and acting staff, 18 credit hours. Prerequisite: Theatre 3800/3810/3820 and either 3500 or 2100A/B plus 3100 A/B, and consult departmental chairman. An advanced class in exercises and scene study, as well as interview and audition techniques.

*4900 Dramatic Theory and Criticism, and the Aesthetics of the Theatre: 4 hours, Andrews, 6 credit hours. Prerequisites: Theatre 2011A/B, 2012A/B and 3500. All of the arts face a profound problem in the attempt to establish criteria for evaluating creative activity. This class tackles that problem in the theatre. It looks at the various hypotheses and critical strategies that have been devised hitherto, and attempts to judge their present worth. It also asks what critical values are necessary for the survival and future growth of the theatre.

Classes in Costume Studies

These classes make up an entire program. They are not available for credit towards a degree, i.e. BA programs. Students accepted for the Costume Studies program concentrate their work solely on these classes.

Year 1

1750 Costume Studies I: 4 hours daily, Doyle and staff, 30 credit hours. A basic outline of the history of costume; a history of textiles; pattern drafting; a designer's method for the media; and practical costume construction. There are certain lab charges connected with this class. The content of Theatre 1050 forms a component of Theatre 1750.

Year 2

2750 Costume Studies II: 4 hours daily, Doyle, visiting professional designers and staff, 30 credit hours. Prerequisite: Theatre 1750, and the content of Theatre 1050, permission of the instructor. This covers advanced pattern drafting; decoration techniques; millinery; costume accessories; the wearing of costume; and costume making. There are certain lab charges connected with this class. The content of Theatre 2011A/B and 2012A/B may be a component of this class.

Year 3

*3750 Costume Studies III: In residence and professional theatre

apprenticeship, Doyle, 30 credit hours. Prerequisites: The content of Theatre 2011A/B and 2012A/B, Theatre 2750, permission of the instructor. On the basis of outstanding performance in the first two years, five or six students are selected for the third year. During this year, these chosen students are responsible for the total production of costumes required for use within the theatre department. It is intended that during part of this year the student is placed under the supervision of the Costume Studies director to assist in bridging the gap between student projects and the profession. During this year, these students learn to direct and supervise hired staff within the specific needs of today's professional theatres. They also learn all aspects of budgeting related to costume design and manufacture for major stage productions. There are certain lab charges connected with this class.

Please note: Classes marked with asterisk (*) may not be offered on a regular basis. For details consult department.

Transition Year Program

In 1982, the Transition Year Program became a department in the Faculty of Arts and Science. It is a special one-year program designed for Black and Native students.

While preparing its members for admission to regular programs at the beginning of their second year on campus, the Program introduces students to the University in a variety of ways. Its curriculum, which includes a variable number of credit courses, can be adapted to individual needs and objectives. Most students take courses in Black and Native Studies, Student Skills, English and Mathematics. They also choose a regular first-year elective that is of personal interest to them. Classroom instruction is complemented by an orientation week, special lectures, tours, workshops, field trips and counselling.

The Program's staff are drawn from the Dalhousie University Community as well as the Nova Scotian Black and Native Communities. Guest lecturers come from all parts of the world.

Black, non-status Indian and Metis students accepted into the Program are eligible for comprehensive bursaries during their transition year. If they successfully complete this qualifying year, they become eligible for continued partial support as long as they remain in good academic standing and progress towards a first degree.

Status Indian students attending the Program are fully funded through the Department of Indian Affairs' "University and College Entrance Preparation Program."

Although enrollment is limited to ensure that each student receives considerable personal attention, highly motivated Native and Black students of all ages and educational backgrounds are encouraged to apply. The TYP welcomes applications from students who did not complete high school or the courses required for university entrance, students who completed a general or mixed high school program and those who, although they may have received low grades in any type of program, can demonstrate intellectual potential in other ways.

The Program has no absolute entrance requirements. Admission criteria are flexible, and the Admissions Committee considers each case comprehensively on its own merits. The candidate's overall maturity and seriousness of purpose are vitally important.

For further information or application forms, please contact:

Director, Transition Year Program
Dalhousie University, Halifax, N.S. B3H 3J6
Telephone: (902) 424-3730

Deadline for receipt of applications for the following September:
February 1st.

Women's Studies

Faculty

J. Crowley, PhD (History)
 J. Fingard, PhD (History)
 N. Jabbra, PhD (Sociology and Social Anthropology)
 S. Jones, PhD (Spanish)
 T. Laidlaw, PhD (Education) (*Acting Coordinator*)
 J. Parpart, PhD (History, Development Studies)
 S. Pollack, PhD (Sociology and Social Anthropology)
 S. Sherwin, PhD (Philosophy)
 M. Stone, PhD (English)
 N. Trèves, PhD (French)
 M. Turner, PhD (History, Development Studies)

This interdisciplinary program is designed for students who wish to focus on Women's Studies as the major concentration of their undergraduate degree. The goal of the Women's Studies major is to demonstrate the usefulness of gender as a category of analysis. Students will develop interconnections among the fundamental questions raised by scholarship on women through a selection of courses in the humanities and social sciences. Because this major is interdisciplinary, a student will also gain a perspective on women's experiences through the examination of other issues such as race, class and cultural differences, that are central to the study of gender. A critical awareness of methodology in the organization of knowledge and the framework for analysis is important throughout the body of the student's work.

Program Structure

The BA degree in Women's Studies includes one required half credit course at the 1000 level (Women's Studies 100 at Mount Saint Vincent University) and four to eight full credit courses above the 1000 level to be selected from the list of core courses in consultation with an advisor. A minimum of one of these classes must be on or above the 3000 level and must be taken from a minimum of three disciplines. In addition, the student may choose other courses from a list of related courses, remembering that:

- one course must satisfy the writing requirements
- at least 7 full credits shall be beyond the 1000 level
- some of the classes have prerequisites.

A related course is one in which the topic and/or approach is pertinent to Women's Studies and in which the professor has agreed to permit the student to submit work on women-related topics. Students should consult an advisor for the list of related courses.

Appropriate courses offered at Mount Saint Vincent University and Saint Mary's University may also be selected, subject to the rules and regulations of the Faculty of Arts and Science at Dalhousie regarding transfer credits and in consultation with an advisor.

Core Courses

Women's Studies

100 Focus on Women: An interdisciplinary course presenting a variety of perspectives on the role, function and expression of women.

Education

4021A Gender Relations: Identification and analysis of problems deriving from gender relations form the core of this class. Emphasis is placed on female roles both historically and in contemporary society. Attention is paid to the influence of education—both formal and informal—in the development and perpetuation of gender relations.

4022B Gender Relations: Prerequisite: Education 4021A or permission of the instructor. This course is a continuation of Education 4021A. The class is run as a seminar and focuses on issues pertinent to gender relations, including work, health, and sexuality.

English

2221 Fictions of Development: Fictions of development are novels or short stories focusing on the crises and the conflicts involved in growing up, finding a vocation, and finding oneself. This course studies representative fictions of development ranging from 19th century classics like *Jane Eyre* to contemporary works like *The Color Purple*. Special attention will be given to the interaction between psychological theories and literary depictions of human development and ways of writing about them.

French

2021A/B Images of Women in French Literature: This course studies selected texts written by women from the Middle Ages to the 20th century, reflecting upon their condition. Writers include Christine de Pisan, Louise Labé, Mme de la Fayette, Mme de Staël, Simone de Beauvoir and Christine Rochefort. This class is taught in French.

History

3350A/B Family and Community in North America 1600-1900: The family in North American history from the period when the family was a model for social relations to the time when it was seen as a private refuge from society at large. Among the topics considered are the role of the family in rural and urban communities; the demographic transition from high fertility and mortality, the construction of the family's responsibilities in economic life and education; the role of ideology in shaping sex roles and child rearing, and the relations of family and community according to ethnic group, class and economic setting.

3461A/B Women and Development in Africa: This course examines the economic, political and social roles of African women from precolonial to modern times. It analyzes women not as objects, but as actors who participate in the political and economic processes affecting their lives.

3811 Women in Capitalist Society: The North American Experience: An examination of the impact of industrialization and urbanization on "woman's sphere" in society and of the emergence of various strains of feminism in the 19th and 20th centuries.

3812 Women in Socialist Societies: Investigates the progress made towards the achievement of equal status for women in societies dedicated in principle to equality for all. Case studies will range from Cuba to China.

Philosophy

2160A/B Philosophical Issues of Feminism: An examination of various approaches to feminism, and of practical and theoretical issues associated with feminism, such as abortion, pornography, sexual harassment, and economic equality.

3170A/B Theories of Feminism: Prerequisites: Two previous classes in Philosophy or Women's Studies. 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.

Sociology

2190 Sex Roles in Cross-Cultural Perspective: Taking a broad comparative framework, we examine sex roles in the contexts of daily life, of economics, politics, kinship, social stratification, religion and values, and socialization. With these data as background, we then look at sex roles in Canada and in Nova Scotia. Students of either sex are invited to take this class.

3180 Gender and Health: The course focuses upon three major areas in the relationship between gender and health: food, reproduction, and health care. Topics include gender stereotypes and food consumption, sexuality, dieting, birth control, childbirth, menstruation, menopause, reproduction technology, health workers, caring in the family, health policy, sexism in

medicine, hospital and community care. This is a discussion course and students are responsible for class participation, and research in their selected area.

Spanish

2000A/B Women In Latin America: This class has four main objectives:

1. to examine critically, assumptions about women held by the major academic disciplines;
2. to test these assumptions in the perspective of current research and individual experience;
3. to study traditional and changing sex roles in Latin America, with particular emphasis on Cuba;
4. to explore new alternatives for men and women in our society.

Conducted in English, no prerequisites. Open to students in all departments.

School of Dental Hygiene

Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5

Faculty 1987-88

Professor

M.G.E. Forgay, Dip DH (Eastman), BA (Sask), BEd (Man.), MA (UBC),
Professor and Director of School of Dental Hygiene

Associate Professor

K.F. MacDonald, Dip DH (Forsyth), BS (Boston), MEd (Dal)

Assistant Professor

G.M. Butt, Dip DH (Dal), BA (St. Mary's)

Lecturers

E. Andrews, Dip DH (Dal), FDA (NSIT), BSc (Acadia)
D. Chalmers, Dip DH (Dal), BSc (Dal)
P. Grant, Dip DH (Dal), BA (St. Mary's)
M.E. Kinnear, Dip DH (Dal)
D. A. MacDonald, Dip DH (Dal)
T. Mitchell, Dip DH (Dal), BSc (Dal)
N. Prowse, Dip DH (Dal), BSc (Acadia)
G. Steeves, Dip DH (Dal)

Instructors

T. Harris, Dip DH (Dal)
C. Keyser, Dip DH (Dal)
D. Morash, Dip DH (Dal)

Dental Hygiene was first offered as a formal educational program in 1913 at the Fones Clinic in Bridgeport, Connecticut, USA. Since then the profession has grown steadily and there are now more than two hundred dental hygiene programs in North America. In recent years, the movement has spread to other countries as well. In 1961 a diploma course 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 dental 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 schools of dental hygiene.

Courses in the program in dental hygiene are offered within the Faculties of Arts and Science, Medicine and Dentistry. 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.

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 may be obtained from the School of Dental Hygiene.

Diploma

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

Admission

Applicants must have completed Nova Scotia Grade XII (or its equivalent) with high standing in five academic subjects including Chemistry, Biology and English, (applicants whose native language is French may substitute classes in French for classes in English. However, instruction at Dalhousie is in English and the applicant must be proficient in English.)

The remaining two subjects may be chosen from Mathematics, Sciences, History and Languages. One of the two subjects, however, may be chosen from additional subjects not mentioned above, offered in high schools and approved through the Faculty of Arts and Science.

Applicants who have completed the entrance requirements and who are mature applicants, members of a minority group and/or have significant related health professions background may be requested to submit additional information in support of their application for review by the Admissions Committee.

Admission of Applicants from the U.S.A.

Further information can be obtained by writing to the Admissions Office at Dalhousie.

Note

The admission requirements for entrance to the School of Dental Hygiene will change commencing in 1989. Applicants must have completed at least five full credit university level courses including classes in biology, psychology, sociology, an approved writing course, and one elective. Applicants must have grade 12 chemistry or equivalent.

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 to be considered by the Admissions Committee. However, applications filed by the deadline can be completed any time up to June 30th and will be considered when completed if unfilled places remain in the entering class. Preference will be given to residents of the Atlantic provinces, but applications by qualified students from other provinces or countries will be considered. Up to 10% of first year positions may be allocated to applicants from outside the Atlantic region.

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, it would be advantageous to forward an interim transcript. However, a final transcript must be forwarded on completion of these credits.

To ensure physical and mental fitness, medical and dental certificates must be completed on behalf of each applicant on forms provided during the admissions process.

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. In exceptional circumstances, certain of these regulations may be waived or modified by the Faculty Admissions Committee.

Applicants may be requested to make themselves available for an interview or orientation program.

Academic Year

The academic year for the first year in Dental Hygiene begins in early September and continues until the latter part of May. The academic year for the second year in Dental Hygiene begins 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.

Class Work and Promotion

Students must prepare such 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.

A student will not be permitted to enter the class of any year until she/he has passed in all subjects of the previous year.

Examinations

In order to qualify for admission to examinations, candidates must attend the prescribed classes of the curriculum regularly and punctually. Under ordinary circumstances, candidates will not be considered qualified for admission to examinations if absences have exceeded 10% of the prescribed class hours.

Course Grades

Upon completion of a course a student is awarded a grade of A, B, C, D, FM, or F. In this system A is the highest passing grade and D is the lowest passing grade; FM is a failing grade that allows an otherwise qualified candidate to take a supplemental evaluation; F is a failing grade disqualifying the student from further evaluation without repeating the course and the entire academic year:

The Faculty concerned is responsible for defining the requirements for grades, A, B, C, D, FM and F. If Faculty also wish to award one of the grades: A+, A-, B+, B- in a clinical course, definitions of these requirements must be available as well.

Grade Point Equivalents and Averages

Grade point equivalents are used to calculate grade point averages.

Grade	Point Equivalent
A (A+, A-)	4
B (B+, B-)	3
C	2
D	1
FM, F	0

Calculation of Average

Each course is assigned a weight based on its length and the mix of lecture, laboratory or clinical components. An individual student's point equivalent for each course is multiplied by the course weight. The student's grade point average is calculated by adding up the weighted grade point equivalents earned for all the separately numbered courses for the academic program year and dividing by the sum of the course weights for all classes.

Supplemental Examinations

A candidate who has received FM grades in not more than two subjects of any year and who has attained the required grade point average of 2, is entitled to supplemental examinations in such subjects, provided she/he is qualified in attendance and class work for admission to examination. A candidate who has failed in more than two subjects in any one year or who has received an F grade in any course or has received a grade point average less than 2, does not receive any credit for work done in that year.

Supplemental examinations are held on the day specified in the academic calendar, and during the regular examinations in the Spring, but at no other times and are written at Dalhousie unless approval is obtained to do otherwise.

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

Application for admission to a supplemental examination must be made on or before July 15th on the application form which may be obtained from the School of Dental Hygiene Office and must be accompanied by the proper fees.

On passing a supplemental examination or evaluation the candidate receives no higher than the lowest passing grade.

Promotion and Graduation

First-year students are not promoted unless they have passed all subjects and obtained a grade point average of 2.0. If a student has a grade point average of 2.0 or greater, and, after supplemental examinations are completed, has not more than one failure, the student may register for that one course and any courses in which the final grade (supplementals excepted) was D in the next regular session. If a grade of C or better is earned in the repeated course(s), the student will be promoted to second year. A student thus repeating a course(s) is not permitted to register

concurrently for any other courses offered by the School of Dental Hygiene. Before proceeding to second year, the student must demonstrate an appropriate level of competence in clinical skills.

Students in second year cannot graduate unless they have passed all subjects, obtained a grade point average of 2.0 in all clinical subjects, a grade point average of 2.0 in all didactic subjects. If a student has an overall grade point average of 2.0 or greater and, after supplemental examinations are completed, has not more than one failure, the student may register for that one course and any courses in which the final grade (supplementals excepted) was D in the next regular session. If a grade of C or better is earned in the repeated course(s), the student will be recommended for graduation. Such students must make arrangements for and demonstrate continuing clinical competence.

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 \$250.00 fee for the use of instruments. Students must purchase uniforms and lab coats as specified as well as the textbooks required for each of the classes.

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.

Academic Program

The following classes are required for a Diploma in Dental Hygiene:

First Year

Dental Anatomy — DH1706A: Structure of human teeth: reproductions of tooth forms by drawings and carvings.

Preclinical Dental Hygiene (1) — DH1703R: Objectives and principles of oral hygiene, instrumentation in oral prophylaxis, laboratory and clinical practice of techniques.

Dental Biomaterials Science — DH1709B: Study of materials used in dentistry; lectures, demonstrations, and laboratory exercises. The class on Dental Biomaterials for the dental hygiene students is approximately 40 hours. Emphasis is placed upon instructing the student as to the reasons why specific materials are employed, and the ways in which these materials react to the oral environment.

English: An introductory class in University English. (See English 1000 in the Arts and Science section of the Combined Undergraduate Calendar) or approved alternate writing course.

Oral Biology — DH1705R: The objective of this class is to introduce the subject of craniofacial embryology and histology and to make it clinically relevant by correlating developmental, microscopic, anatomic, and clinical aspects of the subject. Both developmental and pathologic correlates are discussed. This class is offered jointly by the Department of Oral Biology, Faculty of Dentistry and the Department of Anatomy, Faculty of Medicine for both first year dental students and first year hygiene students jointly.

Anatomy — 103C: This class is taught by the Department of Anatomy in the Faculty of Medicine and designed especially for Dental Hygiene students. Scope and sequence are co-ordinated with Physiology 101C which is taken concurrently.

Physiology — 101C: This class is taught by the Department of Physiology and Biophysics in the Faculty of Medicine. The lectures are coordinated with Anatomy 103C which is taken concurrently.

Microbiology — 1100A: Study of microorganisms.

Periodontics — DH1701R: An introduction to Periodontology, the study of diseases affecting supporting structures of the teeth.

Radiology — DH1702R: A series of lectures, laboratory exercises and

clinical training, covering the technical aspects of radiology and the hazards and safety of radiation.

Dental Hygiene Restorative — DH1707B: Instruction in restorative procedures. This class includes lecture and laboratory procedures in the placing, contouring and finishing of all plastic restorations in prepared teeth.

Psychology: A special class to meet the needs of the profession commencing in second term and continuing in second year.

Nutrition and Biochemistry — DH1708B: Aspects of Biochemistry relevant to nutrition are discussed in connection with each nutrient.

Dental Health Education — DH1704R: Introduction to recent oral hygiene concepts. Using simple patient simulation exercises, students are encouraged to develop dynamic approaches to patient education.

In addition to the courses listed, students are required to obtain certification in CPR.

Second Year

Clinical Dental Hygiene — DH2706R: Clinical practice in dental hygiene care.

Dental Specialties — DH2701R: Idiosyncrasies of treatment within the dental specialties.

Pharmacology — DH2715B: Pharmacology of drugs used in dentistry.

General and Oral Pathology — DH2702R: The study of the basic principles concerning disease in general and those affecting the hard and soft tissue structures of the oral cavity in particular. Rotation to the Mouth Clinic and clinical aspects of diseases of the mouth are included in this class.

Sociology: See Sociology 1000, in Faculty of Arts and Science Calendar.

Applied Nutrition for Preventive Dentistry — DH2704A: Concerned with the changing nutritional needs throughout the life cycle with particular emphasis to their application in preventive dentistry. Also concerned are some of the socio-economic and cultural determinants of food habits.

Periodontics — DH2709R: Continuation of the study of oral manifestation of disease affecting supporting structures of the teeth, commenced in the first year.

Psychology — DH2710A: Continuation of the relation begun in first year of this subject area to the specific needs of the profession.

Orientation to Dental Practice — DH2717B: A series of lectures on topics in practice management of special interest to the dental hygienist, including an introduction to principles of management, selection of personnel, job hunting skills, management skills, office systems and processes, and professionalism.

Dental Hygiene Jurisprudence — DH2716B: A series of lectures on topics relating to the responsibilities of both the dentist and the dental hygienist, including principles of law, dental standards, interpersonal legal relations, consent to treatment, patient records, licensure and discipline, human rights legislation, malpractice insurance, employment contracts, and the hygienist as expert witness.

Dental Hygiene Ethics — DH2712A: A series of lectures and seminars on ethics and their application in the dental hygiene field. Topics include beneficence, respect for autonomy, informed consent, paternalism, distribution of care, prevention vs. crisis treatment, and models of health and disease.

Community Oral Health Education — DH2711R: Program planning, instructional methods and media used in teaching oral health, including nutrition counselling related to dental disease control, smoking and oral

health, and fluoridation. Extensive field experience is arranged.

Seminar on Special Needs Populations — DH2703B: Student discussions (seminar format) on selected populations including the elderly, the medically compromised patient, and the disabled. Second semester student presentations on topics of own choice.

Patient Management Seminars — DH2707R: A series of monthly seminars which focus on clinical patient care activities of third and fourth year dental students as well as second year dental hygiene students and dental assisting staff. Occasional chart audits provide a focus for assessing the management capabilities of students in each vertical group.

Dental Oncology — DH2705A: The study of dentistry in relation to the patient receiving cancer treatment.

Table Clinic DH2601B: Students in second year will prepare and present a table clinic on a topic of interest in research or clinical practice. The presentation is graded on a pass/fail basis. All presentations are judged in a public presentation for prizes.

In addition to the courses listed, students are required to obtain a certificate in First Aid (St. John Ambulance) and to be re-certified in CPR.

Faculty of Health Professions

Faculty Regulations 1988-89

Introduction

The Faculty of Health Professions consists of the School of Nursing, College of Pharmacy, School of Recreation, Physical and Health Education, School of Physiotherapy, School of Occupational Therapy, School of Human Communication Disorders, the Maritime School of Social Work and the School of Health Services Administration. The various undergraduate programs are described in the College and School sections of the Undergraduate Calendar. Details of the graduate programs offered in the College and the Schools are described in the calendar of the Faculty of Graduate Studies.

Officers of the Faculty

Dean of the Faculty of Health Professions
Tonka, Robert S., BPharm, PhD (Wales), FPS, FIBiol.
Assistant Dean
TBA
Secretary
Smithie, Carol L., BScN (UBC), MSc, (Ed.), (Dal), RN
Administrator
Cole, Lorna J.

A Note on the Various Regulations Affecting Undergraduate Students

In addition to the University regulations in the Undergraduate Calendar, the Faculty regulations apply to all undergraduate programs in the Faculty of Health Professions. Certain special regulations are listed in the Calendar entries for the College and the various Schools. Students should realize that if the Faculty does not cite a regulation or indicate to the contrary in its regulations, the Faculty of Arts and Science Undergraduate Regulations will apply to undergraduate students in the Faculty of Health Professions.

Admission Requirements

General admission requirements and procedures with the exception of those for Mature Students are the same as those for the Faculty of Arts and Science (see 5. Admission Requirements pages 25 and 26; also 7. Admission to Classes, 8. Registration and 9. ID Card all on page 26 in the Faculty of Arts and Science section of the Undergraduate Calendar*). For special and additional admission requirements and procedures, consult the relevant School or College section of the Calendar.

Mature Students

Regulations concerning admissions are not applied rigidly. Applications from persons who lack the normal qualifications, particularly those who have been out of school for some years, are invited. Acceptance may be granted if the admissions committee is satisfied that their standing is such that they may be suitable for, and expected to benefit from, university work. Applicants should submit information about previous studies and relevant experience. Interviews may be required.

This regulation applies to all mature students wishing to enter undergraduate programs in the Faculty of Health Professions with the exception of the Bachelor of Social Work program where the School Admission Requirements will apply.

Mature students are advised to contact Henson College at 424-2526.

1. Counting of Classes for Two Undergraduate Degrees

A student who already holds an undergraduate degree from Dalhousie, or another recognized university, and who wishes to obtain an undergraduate

degree from the Faculty of Health Professions, must fulfill the requirements of the second degree and meet the following stipulations.

(a) Only classes that are applicable to the course of study for the degree from the Faculty of Health Professions may be counted for credit;

(b) Each class carried forward must bear a grade of C (or equivalent) or better;

(c) Grade requirements of the School or College must be met in all new classes.

(d) No more than half the classes required for an undergraduate degree in Health Professions may be carried forward from an earlier degree.

2. Transfer Credit

(a) To obtain a first degree from the Faculty of Health Professions all or most of the advanced work of the program (i.e. at least half the classes taken in the second and subsequent years of study) must be taken at Dalhousie.

(b) No classes taken at another institution will be counted towards fulfilling the requirement of a Bachelor degree in the Faculty of Health Professions without advance approval from the Department, School or College concerned.

See also the Faculty of Arts and Science section of the calendar — 13. Transfer Credit (page 28) where, with the exception of (c) and (f), all regulations in the subsection also apply to undergraduate students in the Faculty of Health Professions.

3. Advanced Placement

Advanced knowledge of a subject is not to be confused with transfer credits from another university. Advanced knowledge grants exemption for a past class but requires substitution for another. Transfer credit grants credit for a class and does not require substitution.

4. Class Changes

Class changes will not be permitted during the first week after commencement of classes in any session. Deadlines for class changes appear in the Almanac of the calendar. Students must complete the appropriate class change form which must be approved by the instructors of the classes concerned, the advisor in the School or College, and by the Registrar.

5. Part-time Students

5.1. Restriction

Because of the restriction in the duration of undergraduate studies (see Regulation 7), the opportunity for part-time study is limited in the majority of programs in the Faculty of Health Professions.

The exceptions are the undergraduate programs in the School of Recreation, Physical and Health Education, the Maritime School of Social Work, the Bachelor of Nursing programs for Registered Nurses and the Bachelor of Science (Physiotherapy) for students who hold a diploma in Physiotherapy.

5.2 Changing from Full-time to Part-time Status

A registered student who wishes to drop classes and thereby change from full-time to part-time status must obtain written approval from the College or School.

6. Audit of Classes

Students registered at Dalhousie may, with the permission of the instructor concerned, audit any class in the Faculty of Health Professions, provided that it is clearly understood that they will not be eligible to write examinations in the class and will not in any circumstances be granted credit for it. See Faculty of Arts and Science Regulation 18. Audit of Classes (page 29) in the Calendar (no-degree students see Regulation 21).

7. Duration of Undergraduate Studies

With the exception of the undergraduate programs in the School of Recreation, Physical and Health Education and the Maritime School of Social Work to which the Faculty of Arts and Science Regulation 17. Duration of Undergraduate Studies (page 29 of the Calendar) applies, students in the Faculty of Health Professions are normally required to complete their undergraduate studies within six years of first registration in professional classes or within five years in the post-diploma degree program

* Thereafter to be called the Calendar.

in Physiotherapy. This rule applies to such classes for transfer credits as well. The Faculty Committee on Studies after a hearing by the School or College Committee on Studies may grant permission to continue studies beyond this period subject to conditions specified by the Committee.

8. Assessment

The Faculty of Arts and Science Regulation 19, Assessment and its subsections 19.1 to 19.9 (page 29 and 30 in the Calendar) apply to the Undergraduate programs and students in the Faculty of Health Professions apart from the following exceptions and differences:

8.1 Examinations and Tests

No tests or examinations may be held between the end of classes and beginning of the official examination period, with the exception of those activity modules and laboratory classes in which special facilities are required.

8.2 Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar.

8.3 Incomplete

Faculty of Arts and Science Regulation 19.5 Incomplete applies with the following exceptions. These are classes which require field work during the summer months. At the present these are Health Education 1295; Leisure Studies 4498; Physical Education 3398 and 3402; Nursing 2100, 2220, 3100, 3240 and 3250; Pharmacy 3000B, Occupational Therapy 2221B, 3320, 3321B and 4420A/B; Social Work 4020 and 4020B; and Physiotherapy 3500B. Students taking any of these classes in their final year should note that they will not be able to graduate at the Spring Convocation.

8.4 Supplemental Examination

Supplemental examination for classes other than A classes (given in the fall term) must be written in the following August.

The eligibility requirements for sitting supplemental examinations and the number of supplemental examinations permitted are as stated in the School/College section of the Calendar.

9. Repeating Classes for Which a Passing or Failing Grade has been Awarded

With the approval of the School or College Committee on Studies a student may repeat a class or sit a remedial examination. If a student repeats a class for which a fail or pass grade has been received or sits a remedial examination only the most recently obtained grade will be used for the purpose of calculating grade point averages. The original grade will remain on the transcript along with the new grade. For scholarship, the Dean's List and University Medal considerations, and for the granting of a degree with distinction, all grades will be used.

10. Grade Points and Grade Point Average

Within the Faculty of Health Professions, a grade point average system has been instituted. A letter grade of A+, A, or A- equates to 4 grade points; B+, B, B-, 3 points; C, 2 points; D, 1 point; FM and F, no points. In addition, the Schools and College have a computation of grade point averages and cumulative requirements for each year. The grade point average is computed as follows: the number of grade points is multiplied by the number of credit hours for that class; the sum of these products is then divided by the total number of registered credit hours to obtain a grade point average for the year's performance.

11. Grade Points for Classes Transferred from Other Institutions

The amount of credit but no grade points is recorded for a Health Professions or Arts and Science class transferred from another institution with the following exception:

Where an external class is taken to pursue a program of study and the class is approved in advance by the School/College Committee on Studies the grade will appear on the transcript but will not be used to calculate the grade point average.

12. Required Standing

12.1 Grade Point Average Requirements and Minimum Standing

Each School or College has individual grade point average requirements and minimum standing. Refer to the specific School or College section of the Calendar for further details.

12.2 Student Progress Review

The Committee on Studies of each School or College regularly review each student's performance. A student's performance may also be reviewed by the Faculty Committee on Studies. Students whose work is unsatisfactory may be required to withdraw from their present course of study, reduce their course load, withdraw from the class or classes concerned, or be excluded from the relevant examinations.

12.3 Failure to Meet Academic Requirements

A student has not fulfilled the requirements for a class when the minimum accepted grade set by the School or College has not been met. This minimum grade could be a D in some cases and a C or B- in others.

13. Workload

For normal workloads in the Faculty, see the individual School or College section of the Calendar. Written permission from the School or College Committee on Studies is required if the normal workload is to be exceeded. Applications from students who give good reasons for wishing to take an overload, and who in the preceding year completed a full program in good standing, will be considered. Such permission will not normally be granted to any student in the first year of study, or to any student who, in the preceding academic year, obtained a grade point average of less than 2.5.

14. Required Withdrawal

Any student who has not met the minimum grade point average requirements at the end of the Spring term is considered to have failed the year and is required to withdraw from the School/College and Faculty. Such students should also consult their School/College calendar which might have additional School or College specific information on Required Withdrawal.

15. Readmission after Required Withdrawal

Subject to the regulations of the School or College, a student who has failed a year may apply for readmission. Since there is a limited enrolment in most programs, the decision to readmit will be made by the School or College.

A student who fails a year on two occasions will not be eligible to return to the School or College in which the student was registered as either a full-time or part-time student. An appeal against the application of this rule may be addressed to the Faculty Committee on Studies but will be allowed only if illness has seriously interrupted the student's studies and this is established by submission to the Chairperson of the Faculty Committee of a medical certificate from the physician attending the student at the time of the illness, or in other very exceptional circumstances.

16. Withdrawing from Classes

The last dates for withdrawing from "A," "B," and classes which run throughout the whole year without academic penalty are published in the Almanac at the front of the calendar. After these dates all classes for which a student remains registered will be recorded. A grade of W for withdrawal after the deadline will be treated as an F when the grade point average is calculated and in determining the pass list. To withdraw from classes, students must complete the appropriate class change form which must be approved by the instructor concerned and signed by the Director and submitted to the Registrar. (The withdrawal will be effective only when the class change form is received by the Registrar). Additional conditions include: (a) no classes may be dropped after the last day to withdraw, as indicated in the Almanac, (b) classes may not be added to replace withdrawn classes after the second week of the term in which that class begins except in special circumstances, and (c) students may not transfer from full to part-time status by withdrawing from classes after the deadlines listed in the Almanac.

17. Withdrawing from the University or Changing to Part-time Status

Registered students who wish to withdraw from the University, or who wish to change from full to part-time status by dropping classes, must obtain written approval from the School or College and submit the appropriate forms to the Registrar. Students should not discontinue attendance at any class until their application has been approved.

Students must be aware of the fact that non-attendance, by itself, does not constitute withdrawal.

18. Off-Campus, Summer School and Correspondence Classes

18.1 Required Standing and Equivalence

In all cases, off-campus, summer school and correspondence classes offered by other institutions must have been passed at an adequate level and can be accepted only if they are closely equivalent in content to classes normally given at Dalhousie as confirmed by the particular Department at Dalhousie.

18.2 Limits on Credit (Summer School and Correspondence Classes)

Provided regulation 18.1 is observed, up to six credits (36 credit hours) from summer school and correspondence classes may be accepted towards the requirements of a degree. No student may receive more than two full credits (12 credit hours) by correspondence courses.

18.3 Limits on Credit (Off-Campus Classes)

A maximum of three credits (18 credit hours) classes may be taken as off-campus classes, whether offered by Dalhousie or taken at another university under a concurrent registration.

18.4 Maximum Workload (Summer School)

Students may not take classes totalling more than one and one-half full credits in any one summer session (nor may the workload in any one week exceed one-quarter of a credit). Not more than two and one-half full credits can be obtained at Summer School in any one academic year. In all cases, permission to exceed the maximum workload must be obtained in advance from the School or College Committee on Studies.

18.5 Credit for Summer School Classes at Other Universities

Students who wish to take a Summer School class at other Universities to be counted for credit towards a Dalhousie degree must:

- obtain a Letter of Permission from the Registrar's Office at Dalhousie University;
- obtain a Summer School Calendar from the University which the student hopes to attend;
- make an application to the Director of the School or College;
- submit to the School or College the calendar indicating the class the student wishes to take;
- obtain the approval in advance from the Director of the School or College.

19. Classes Taken at Other Universities Under Concurrent Registration

Students who wish to take classes at other institutions while registered at Dalhousie, whether in the academic year or in summer sessions, must obtain approval *in advance* on a form available at the Registrar's office. A letter of permission will be provided if approval for the classes is given. The workload at the other institution must conform to the workload limitations at Dalhousie. The class fee will be paid by Dalhousie University if:

- the student is registered and pays fees as a full-time student at Dalhousie University;
- the classes are approved as part of the student's program; and
- the class is not part of a summer school program.

Classes taken elsewhere under Concurrent Registration are treated as transfer classes for purposes of record. The grade will appear on the transcript but will not be used to calculate the grade point average in accordance with Faculty Regulation 11 and not more than half of the work of any three or four year degree program may be by transfer credit.

20. Appeal

Students may appeal decisions pertaining to the College's or a School's interpretation of academic rules and regulations to the Faculty of Health Professions Committee on Studies. Normally, appeals to this committee occur after appeal procedures at the School or College level have been exhausted. Copies of Faculty appeal procedures may be obtained from the Director of the College or a School or from the Dean.

21. Special Students "No Degree"

Definition (University Regulations page 18).

Special students: students who are not candidates for a degree or diploma but who wish to take one or more university classes which may be allowed for credit. This is not the same as auditing a class. Special students *must satisfy normal admission requirements*.

Faculty Regulation:

Students requesting special status must provide evidence of their academic or high school record to date and declare whether or not they have previously applied to a degree program in the Faculty and whether they were rejected.

- Students wishing to enroll as special students in classes that form part of degree programs in the Faculty of Health Professions must have the signed approval of the *Chair of Admissions* of the degree program. Students wishing to enroll as special students in Social Work classes should refer to Maritime School of Social Work regulation for off-campus classes.
- Students who have applied for admission to a degree program in the Faculty of Health Professions and have been rejected or have been dismissed or asked to withdraw from a degree program *will not be allowed to enroll as special students in any classes that form part of any of its degree programs*. Such students who wish to enter or continue their chosen area of study must reapply for admission as regular full-time or part-time students. If they wish to change their program of study they must apply for admission to that program as a regular full-time or part-time student.
- Students who have been signed into classes by professors in Departments or Schools without the approval of the Chair of the Admissions Committee of the particular degree program, in which the class forms a part, will not be granted special status or be allowed to register in the class.

22. Awards for Academic Excellence

22.1 Dean's List

Full time

The Faculty of Health Professions recognizes students with good academic records by placing their names on the Dean's List. Full-time students* are considered annually for the Dean's List using the following criteria:

- The recipient will have satisfactorily completed at Dalhousie University, the regular minimum credit hours and non-credit courses required by a School or College during the regular academic year and prior to September registration;
- When Dalhousie University Summer School courses are taken, these will be included in the calculations of the grade point average for the academic year (September 1 — August 31) in which they are taken;
- The recipient must obtain a grade point average of 3.55 or better.
- Normally only the top 15% of students in each School/College will be eligible for the Dean's List provided the Grade Point Average of 3.55, or better, is met.

Part-time

Part-time students will be eligible for Dean's List when they have completed the number of credits equivalent to full-time* program year as designated by the respective School or College.

For calculation purposes, credits will be considered in order of their appearance on the marks printout following completion of Summer School courses and the satisfactory completion of all required clinical or work placements. When more than the required credit hours have been accumulated during a normal period of consideration, the appropriate portions of credits will be used for calculations.

The recipient must obtain a grade point average of 3.55 or better.

Normally only the top 15% of students in each School/College will be eligible for the Dean's List provided the Grade Point Average of 3.55, or

better, is met.

*Consult each School or College section of the Calendar for the details of what constitutes full-time status in any one year.

22.2 Degree with Distinction

(a) The candidate must fulfill the requirements for obtaining a degree as detailed in the Calendar by a School or College of the Faculty of Health Professions.

(b) All credits earned at Dalhousie University towards the baccalaureate degree are included in the calculation.

(c) The candidate must have a cumulative grade point average of 3.66 or better.

22.3 University Medal

A University Medal is awarded once a year at Spring Convocation to a graduating student in Nursing; Pharmacy; Recreation, Physical and Health Education; Physiotherapy and Occupational Therapy who meets the following requirements:

1. The candidate must have completed, as a minimum, credit hours equivalent to the final three years of study within a given School or College of the Faculty of Health Professions.
2. All credits taken at Dalhousie towards the baccalaureate degree will be used in calculations.
3. The candidate must have a cumulative G.P.A. of 3.80 or better.
4. The candidate must have the highest cumulative average of his/her School or College. (Letter grades will be converted to numerical values based on the Sinclair Formula.)

School Of Nursing

Academic Staff 1985-89

Robert S. Tonka, B Pharm, PhD (Wales), FPS, FI Biol., *Dean of the Faculty of Health Professions*

Director

To be appointed.

Acting Director

Deborah L. Tamiyn, BN (McG), MEd (Ott), RN

Professors

Judith A. Ritchie, BN (UNB), MN (U.Pitts), PhD, RN

Phyllis Noerager Stern, DNS, MS, BS (Calif.)

Associate Professors

Frances Gregor, BN, MN (Dal), RN

Mona June Horrocks, BSN (UBC), MS-PsychN, MS-CHN Post Masters Degree, CMHN (UCSF)

Jean M. Hughes, BN (Dal), MS (Boston), RN

Barbara Keddy, BScN (MSVU), MA, PhD (Dal), RN

Elizabeth Lambie, BSc (Home Ec.) (Acad.), MPH (Nutrition) (Mich.), PDT

Marlyn S. Riley, BN (Dal); MScN (W. Ont.), RN

Denise Sommerfeld, BScN (MSVU), MSN (UBC), RN

Miriam Stewart, BScN (McM), MN (Dal), RN

Patricia L. Sullivan, BScN (MSVU), MSN (Boston), PhD (Alta.), RN

Julla Wong, BScN (MSVU), MScN (W. Ont.), RN

Shirley Wong, BScN (MSVU), MScN (W. Ont.), RN

Assistant Professors

Margaret Arkle, BN (Dal), MS (Boston), RN

Joyce E. Carver, BN (Dal), MEd (Medla) (Boston), RN

Suzanne Caty, BN (McG), MSc (U. de Montreal), RN

Barbara L. Downe-Wamboldt, BN (Dal), MEd (Dal), Dipl PH (Dal), RN

Mary Lou Ellerton, BScN (Ott.), MN (McG), RN

Heather D. Fraser-Davey, BScN (MSVU), MSc (A) (McG), PhD (Dal), RN

Geraldine Hart, BN (McG), MSN (UBC), RN

Ruth E. May, BA (Wellesley), CNM, RN

Donna M. Meagher, BScN (MSVU), MS (McM), RN

Patricia Melanson, BN (Ott.), MN (Dal), RN

Lynette L. Mensah, BN (Dal), MA, DPHN (Dal), SCM (England), RN

Tania Noide, BSc PHN (Ott.), MPH (Hawaii), SRN, SCM (England), RN

Carol L. Smillie, BScN (UBC), MSc (Ed.) (Dal), RN

Deborah L. Tamiyn, BN (McG), MEd (Ott.), RN

Lecturers

Linda M. Berry, BN, MN (Dal), Dipl Neg Ed (U West Indies), SRN, SCM (England)

Florence Myrick, BN (Memorial), MScN (W.Ont.), RN

Rosemarie A. Pogoda, Cert. CHN (Man.), RN

Mary Stevenson, BSc (U.Edin.), RGN (Aberdeen), SCM (Scotland), CTCM & H (England)

Florence A. Tarrant, Dipl.OP and CHN (Dal), RN

Vicki E. Turner, BSN (Boston), MSN (Hawaii), RN

Senior Instructors — Skills Laboratory

Elciæ Bethune, BScN (MSVU), RN

Barbara Bleasdale, BN (Dal), RN

Special Lecturer

Eric Mintz, BSc (York)

Honorary Appointments

Mariene Grantham, MSc (A), BScN, PHN (W.Ont.), RN

Elizabeth Lethbridge, MN (Dal), BN (McG)

Preceptors

Many nurses, health-care professionals and persons in other disciplines give of their time and expertise to assist in the education of the nursing students in all years of all programs. These valuable preceptors are too numerous to list, but are a vital part of the program. Names can be obtained by contacting the School of Nursing.

The School of Nursing was organized in 1949. A five-year basic program in nursing leading to the degree of Bachelor of Nursing Science and also a one-year program for registered nurses leading to the diploma in Public Health Nursing or in Teaching and Supervision in Schools of Nursing were offered. In 1961 the School of Nursing became a constituent part of the newly established Faculty of Health Professions. The basic degree course of study was reorganized again in 1966 into an integrated program. In September 1968, the 3-year Bachelor of Nursing program for registered nurses was completely revised to provide depth and continuity in the professional course and a wider choice of liberal arts subjects. A two-year diploma program in Outpost Nursing designed to prepare registered nurses for positions in remote areas of northern Canada began in September 1967. The School next offered a 4 year integrated Bachelor of Nursing degree program, a 3 year integrated program for Registered Nurses and a 15 month program leading to a Diploma in Outpost and Community Health Nursing. In September 1985 a Bachelor of Science in Nursing was implemented. This program replaces the 4 year BN Basic degree and will replace the Post-RN BN degree.

Bachelor of Science (Nursing) Degree Program

In September 1985 the School of Nursing introduced a program leading to a Bachelor of Science (Nursing) degree. The four year program is for students with no previous nursing knowledge and experience (basic students). Students who have a diploma in nursing (Post-RN students) will be admitted to the Bachelor of Science (Nursing) degree program and have a shorter program as described later.

Purpose of Baccalaureate Nursing Education

The purpose of baccalaureate nursing education is to prepare professional nurses to provide nursing services to clients in a variety of settings. The aim of professional nursing is to promote health, prevent illness, provide care for the sick and injured and facilitate rehabilitation. Students in the baccalaureate program are socialized into the professional role of nursing by learning activities which will enhance their competency as health care providers, increase their commitment to a professional career, facilitate their working as colleagues with other health professionals and increase their understanding of the impact of social, organizational and political systems on health care.

Graduates of this baccalaureate nursing program will be prepared to provide leadership, to pursue graduate studies and to contribute to the growth of their professional organizations and of society.

Program Objectives

The graduate of this baccalaureate program will be prepared to:

1. Use scientific knowledge in the application of the nursing process when caring for clients in different stages of health and illness.
2. Use therapeutic communication in the development of a professional helping relationship with clients.
3. Use critical thinking in nursing.
4. Serve as an advocate to protect the rights, diversity and worth of clients.
5. Use the process and products of research to enhance clinical practice.
6. Collaborate with others in the delivery of health care.
7. Demonstrate leadership in nursing and within the health care delivery system.
8. Use knowledge of the process of change within the political, social and health care systems in the practice of nursing.
9. Assume responsibility and accountability for learning and competency in her/his nursing practice.

Bachelor of Science (Nursing) Degree Program Basic Students

The Bachelor of Science (Nursing) degree is a four year program. Graduates are eligible to write examinations for membership in the Registered Nurses' Association of Nova Scotia.

Admission Requirements

A satisfactory completion of Nova Scotia Grade XII is required.

Grade XII English, Chemistry and Mathematics are required.

Grade X, XI or XII Biology is required - (at least one high school level biology).

A 70% overall average and 70% average in the required subjects.

Prospective applicants must apply via the Registrar's office. Applications close on March 1, applications will be assessed after that date and successful applicants will be notified of acceptance after May 1.

Priority consideration will be given:

- first to permanent residents of Nova Scotia, and Prince Edward Island.
- second, to permanent residents of other Canadian provinces.
- third to all other applicants.

Immunization

Before commencing studies in first year, students must show proof of current immunization against tetanus, diphtheria, polio, measles and rubella. Immunization against Hepatitis B is recommended for all students and is available through Dalhousie Health Services at a cost of \$155. (based in 1987-88 cost). Evidence of tuberculin testing (mantoux) must also be shown. TB testing can be done by the Public Health Nurse. If TB testing cannot be done in local areas, it can be done by the Dalhousie Health Services. This information must be sent to the Admissions secretary, School of Nursing before September 1st. In subsequent years TB testing will be done yearly through the Dalhousie Health Services.

CPR & Basic First Aid Certification

All students must show proof of CPR and Basic First Aid certification before entering second year. This proof is to be sent to the Admissions Secretary before September 1st. Taking a cardio-pulmonary resuscitation course and basic first-aid course are the student's responsibilities both in time and cost. Students who have not met this requirement will not be allowed to start 2nd level nursing classes.

Degree Requirements

A student must obtain a minimum cumulative GPA of 2.0 throughout the entire undergraduate program. A student must accumulate a minimum of 123 credit hours and have successfully completed all compulsory classes, as well as the necessary number of elective classes. The degree must be completed within 6 years of commencing the nursing classes, although credit will be given for Arts and Science, Faculty of Health Professions and Management Studies classes that are up to ten years old by the date the degree is completed.

Grade Point Average Standards (GPA)

The grade point average system is described in the Faculty Regulation 10.

The GPA is calculated at the end of the nursing academic year (April or June). All credits from Dalhousie to be used as credits toward the attainment of a nursing degree are used in the GPA calculation.

Students must attain a GPA of 2.0 at the end of the first academic year in order to progress to second level nursing classes. Students must maintain a cumulative GPA of 2.0 in order to progress to third and fourth level nursing classes. Failure to meet the GPA requirements or failure in a required class may result in the student being required to withdraw from the School.

Grades

The passing grade for all nursing classes is a C grade. Students must attain a C in both the theory and clinical/laboratory components of any given

nursing class.

The following grading system is used for nursing classes:

A+, A, A-
B+, B, B-
C+, C, C-
FM
F

Supplemental Exams

Supplemental exams may be written in the following nursing classes: N1010A/B, N2020A/B, N2030A/B, N2040A/B, N3010A/B, N3020A/B, N3030A/B, N4010A/B, N4030A/B, and nursing electives, if certain conditions are met. These conditions are: the student's grade is a FM (marginal failure), and if the faculty member has indicated that supplemental exams are permissible and the Faculty Regulations 8.4 and Arts and Science Regulation 19.9. regarding supplemental exams are followed.

Requirements for Promotion

Besides meeting the GPA requirements students must meet the following requirements for promotion:

Year I to Year II: A student must pass *all* first year level classes in order to advance to second year nursing classes.

Year II to Year III: A student must pass *all* second year nursing classes, Microbiology 1100A and Math 1080A/B.

Year III to Year IV: A student must pass *all* third year nursing classes with the exception of N3210A/B.

Prerequisites for Specific classes

Prerequisites for specific nursing classes are listed with each individual class description.

Normal Workload

The program consists of 123 credit hours (20.5 credits), these are divided to give the following yearly normal workload:

Year I: a normal workload is considered 30 credit hours (5 credits)

Year II: a normal workload is considered 36 credit hours (6 credits)

Year III: a normal workload is considered 28 credit hours (4.5 credits)

Year IV: a normal workload is considered 29 credit hours (5 credits)

Course of Study

The following is an outline of classes that are normally taken each year and includes in brackets the credit hours assigned to each class.

First Year: Chemistry 143R (6), Anatomy 101A (3), Physiology 101R (6), Psychology 1000R (6), Sociology 1000R (6), Nursing 1010B (3).

Second Year: Microbiology 1100A (3), Math 1080A/B (3), Nursing 2010A/B (2), Nursing 2020A/B (2), Nursing 2200A (3), Nursing 2030A/B (2), Nursing 2040A/B (2), Nursing 2210B (4), Nursing 2220 (6) and 9 credit hours of electives chosen from any Faculty at Dalhousie. These electives should be at the 2000 level or above. Nursing 2220 is a six week clinical nursing class usually starting toward the end of April.

Third Year: Nursing 3010A/B (2), Nursing 3020A/B (2), Nursing 3200A/B (3), Nursing 3210A/B (3), Nursing 3220A/B (4), Nursing 3030A/B (3), Nursing 3230B (6), Nursing 3240 (3), Nursing 3250 (3), Human Sexuality Workshop Part I (non-credit). Nursing 3240 & 3250 are two clinical nursing classes of 3 weeks each that normally start towards the end of April.

Fourth Year: Nursing 4200A/B (4), Nursing 4010A/B (3), Nursing 4020A/B (1), Nursing 4030A/B (3), Nursing 4210A/B (3), Nursing 4220A/B (3), Nursing 4230A/B (4), one elective in nursing (3), and Nursing 4240 (5).

Human Sexuality Workshop Part II (non-credit). Nursing 4240 is a 5 week clinical class normally starting toward the latter part of the winter term.

Bachelor of Science of Nursing Degree for Registered Nurses

The Bachelor of Science (Nursing) degree for registered nurses consists of 77 credit hours of University study distributed as follows: required non-nursing classes, 33 credit hours; required nursing classes, 35 credit hours; electives, 9 credit hours. Students may complete the program through either part-time or full-time study. The program can be completed in two calendar years of full-time study provided resources allow required nursing classes to be offered during the summer session. Otherwise, students without transfer credits can complete the program in two full-time and one part-time academic years (Sept. - April) of study. Part-time students who wish to change their status to full-time must write their request to the program coordinator by March 1.

Admission Requirements

The requirements for admission to the BSc (N) for registered nurses are as for the BSc (N) basic program (i.e. N.S. grade XII or equivalent with English, Chemistry, Math, and Biology and a 70% average). In addition to these requirements, the applicant must: (a) submit evidence of current registration as a nurse in Nova Scotia or the province or country of residence; and (b) present transcript of R.N. examinations.

Admission under mature student status may be granted. Regulations concerning mature admissions are not applied rigidly. Applications from persons who lack the normal qualifications, particularly those who have been out of school for some years, are invited. Acceptance may be granted if the admissions committee is satisfied that their standing is such that they may be suitable for, and expected to benefit from, university work. Applicants should submit information about previous studies and relevant experience. Interviews may be required. Upgrading in certain required subjects, e.g. Chemistry, Mathematics, may be recommended.

Each applicant will be considered individually. Priority will be given to Nova Scotia and Prince Edward Island residents and Armed Forces personnel to be posted in Nova Scotia. Registration requirements are governed by the Registered Nurses Association Act of Nova Scotia (1985).

Foreign students applying for admission follow admission requirements as outlined in section 5.2 of the University Calendar. In addition, they must be eligible for registration as a nurse in Nova Scotia in accordance with the Act stipulated above. Applicants may be required to do some aspects of nursing content and practice if insufficiency in these areas are evident and are required for eligibility to register as a nurse in Nova Scotia.

Degree Requirements

A student must obtain a minimum cumulative grade point average of 2.0 throughout the entire undergraduate program. A student must accumulate a minimum of 77 credit hours and have successfully completed all compulsory classes, as well as the necessary number of elective classes. The degree must be completed within six years of commencing the nursing classes, although credit will be given for Arts and Science and Management Studies classes that are up to ten years old by the date the degree is completed.

Grade Point average Standards (GPA)

The grade point average system is described in the Faculty of Health Professions regulations. A student must maintain a cumulative grade point average of 2.0 to progress from one year of the program to the next. The GPA is calculated at the end of each academic year. For Part-time students the GPA is calculated when 30 credit hours of study are completed. All credits from Dalhousie to be used as credits toward the attainment of a nursing degree are used in the GPA calculation. Failure to meet the GPA requirements as printed in the School regulations in the Undergraduate Calendar or failure in a required class may result in the student being required to withdraw from the School. The passing grade for all nursing classes is a C grade.

Other Regulations

Students must submit proof of current registration as a nurse in Nova Scotia

or their province or country of residence each year they are enrolled in nursing classes with a clinical practice component. All other regulations are as outlined in the BSc(N) Basic stream in the University Calendar, including Immunization, Grades, and Supplemental Exams.

Normal Workload

The 77 credit hours of study may be completed over three academic years of full-time study with a normal yearly workload as follows: Year 1: 25 credit hours; Year 2: 26 credit hours; Year 3: 26 credit hours.

Course of Study

With the help of an academic advisor, each student is able to map out an individual course of study. An individual course of study may be affected by the actual classes given in an academic year as well as in which semester (Fall, Winter, Summer) they are given. Certain classes may have pre-requisites as noted in the class descriptions. Students are encouraged to complete most of the required non-nursing classes before starting nursing classes. N2230 is a pre-requisite for all clinical nursing classes and is normally a pre-requisite for all other nursing classes. Non-clinical nursing required or elective classes may be taken before or concurrently with N2230 only by special permission of the class professor. Anatomy and Physiology are normally pre-, or co-requisites for N2230A/B. The course of study varies considerably when the student applies accepted transfer credits toward the degree program. Transfer credit regulations are as outlined under the Arts and Science section of the University Calendar.

The required non-nursing classes are (credit hours in brackets): Anatomy 101A (3), Physiology 101R (6), Chemistry 143R (6), Psychology 1000R (6), Sociology 1000R (6), Microbiology 1100A (3), Math 1080A/B (3). The nine credit hours of electives may be chosen from any Faculty and should be at the 2000 level or above.

Required Nursing Classes

N2010A Helping Relationships and Nursing	2
N2230A/B Advanced Concepts and Skills of Nursing Practice	4
N3020A Teaching and Learning and Nursing	2
N3220A/B Family Nursing	4
N3030B Nursing Research	4
N4010A Trends and Issues in Nursing	3
N4020A Advanced Skills in Helping Relationships and Interviewing	1
N4030A Leadership in Nursing Practice	3
N4200A Community Health Nursing: Theory and Practice I	4
N4230B Community Health Nursing: Theory and Practice II	4
Human Sexuality Workshop	
Nursing Electives	6

The 5 credit hours of nursing electives are chosen from:

N4300/4400 Series of nursing electives	3
N2020A Growth and Development and Nursing	2
N2040B Nutrition and Nursing or	2
N4800B Interdisciplinary Course in Human Nutrition	3
N3010A Pathophysiology and Nursing	2
N3200A Nursing the Adult/Elderly I	3
N3210A/B Nursing Parents and Newborn	3
N3230B Nursing the Adult/Elderly II	6
N3250 Clinical Nursing IV	3
N4210A/B Nursing the Child/Adolescent	3
N4220A/B Mental Health and Psychiatric Nursing	3
N4900A An Interdisciplinary Approach to Gerontology (Social Perspectives)	3
N4910B An Interdisciplinary Approach to Gerontology (Health Perspectives)	3

Post RN students are not required to take N1010B (3), N2030B (2), N2200A (3), N2210B (4), N2220 (6), N3240 (3), and N4240 (5).

Class Descriptions

Required Non-nursing classes

Class descriptions for Chemistry 143R, Anatomy 101A, Physiology 101R, Psychology 1000R, Sociology 1000R, Microbiology 1100A, Math 1080A/B and potential electives can be found in the calendar under specific departments/faculties.

Required Nursing Classes

N1010B Introduction to Professional Nursing: 3 credit hours; 3 lecture hours/week. Focuses on the development of professional nursing, in the context of social and political climates with emphasis on nursing in Canada in the past, present and future. Major concepts and theories are introduced including the role of professional nursing, health, illness, individuals, families and communities as clients and the environment in which nursing is practiced.

N2010A/B Helping Relationships and Nursing: 2 credit hours; 1 lecture and 2 laboratory hours/week. Introduces helping relationship theory involving the nurse and individual clients. The dynamics of therapeutic communication are addressed with an opportunity in a laboratory setting for the development of skills necessary to facilitate client exploration and understanding. Role playing is used to practice communication skills.

N2020A/B Growth and Development and Nursing: 2 credit hours; 2 lecture hours/week. Examines concepts and theories of normal growth and development of the individual from conception to old age. Roles and developmental stages are analyzed in regards to clients' attaining/maintaining an optimal level of health. Provides a foundation for nursing based on an understanding of an individual's needs through normal developmental stages and in times of situational crises.

N2030A/B Pharmacology and Nursing: 2 credit hours; 2 lecture hours/week or 1 lecture and 2 laboratory hours/week. Application of general principles of pharmacology to nursing practice. Content areas will include drug actions on body systems and drug actions in specific conditions, as well as potential side effects. Principles guiding the nurse in the administration of drugs are studied. Students practice drug preparation and administration in a laboratory setting.

N2040A/B Nutrition and Nursing: 2 credit hours; 2 lecture hours/week. Introduces the science of nutrition as it applies to nursing. Content is organized around nutritional needs during developmental stages and in situations of health and illness. Environmental factors which influence clients' nutritional status are examined with emphasis on nursing interventions which promote an optimal level of health.

N2200A Concepts and Skills of Nursing Practice I: 3 credit hours; 2 lecture and 2 laboratory hours/week. Focuses on the role of the nurse in helping the individual meet basic needs and attain/maintain an optimal level of health. Nursing process is outlined and the assessment phase is covered in depth. Nursing and other relevant theories are discussed in N2200A. The student learns to do a health assessment. Assessment of diminished ability to meet basic needs caused by illness and/or hospitalization is also covered. Clinical skills related to the care of the ill are introduced.

N2210B Concepts and Skills of Nursing Practice II: 4 credit hours; 2 lecture and 4 laboratory hours/week or 2 lecture and 6 clinical hours/week. Prerequisites N2200A, N2020A, N2010A. Focuses on the role of the nurse in helping the individual who is experiencing an altered ability to meet basic needs and attain/maintain an optimal level of health. Builds and extends directly on the content and theories discussed in N2200A. The student learns to do a health assessment. Assessment of diminished ability to meet basic needs caused by illness and/or hospitalization is also covered. Clinical skills related to the care of the ill are introduced.

N2220 Clinical Nursing I (Summer Session): 6 credit hours; 40 clinical hours/week x 6 weeks. Prerequisites N2210B, N2030B. A clinical nursing experience focusing on the care of the individual with a health problem, who has an altered ability to meet basic needs and attain/maintain an optimal level of health. Gives the students an opportunity to practice and consolidate concepts, theories and skills learned in previous classes. Clinical experience is mainly in a hospital setting.

N2230 Advanced Concepts and Skills of Nursing Practice: 4 credit hours; 2 lecture, 2 laboratory and 3 clinical hours/week. For Post-RN's only. Prerequisite: registration as a nurse in Nova Scotia or province or country of residence; Anatomy 101A and Physiology 101R or permission of the professor. Focuses on the development and the role of nursing as a

profession through an examination of nursing and other theories relevant to nursing practice. Laboratory and clinical experiences provide opportunity to practice comprehensive health assessment skills and study the relationship between theory and practice.

N3010A/B Pathophysiology and Nursing: 2 credit hours; 2 lecture hours/week. Prerequisite N2210B or N2230B or equivalent or with permission of course professor. Focuses on pathophysiological alterations from normal health. Manifestations of both acute and chronic illnesses are explored in terms of structural and functional changes from normal physiological function. Provides a foundation for understanding the physiological basis of nursing care.

N3020A/B Teaching and Learning and Nursing: 2 credit hours; 2 lecture hours/week. Focuses on the role of the nurse as an educator. Principles and theories of teaching and learning are addressed to help clients acquire knowledge, skills and attitudes that enable them to attain/maintain an optimal level of health.

N3030A/B Nursing Research: 3 credit hours, 2 lecture and 2 tutorial hours/week. Prerequisite Math 1060. Focuses on the application of the research process to nursing. Content areas include the logic and thought processes basic to research, research methodology measurement techniques, ethical and legal implications of nursing research and analysis of the growing body of research based nursing knowledge.

N3200A Nursing the Adult/Elderly with a Health Problem: Theory and Practice: 3 credit hours; 1 lecture and 6 clinical hours/week. Focuses on family-centered nursing management of adult and elderly clients with short-term acute health problems. Nursing and other relevant theories are applied to the nursing process in the care of individuals. Clinical experiences are mainly on short term surgical units.

N3210A/B Nursing the Parents and Newborn: Theory and Practice: 3 credit hours; 1 lecture and 6 clinical hours/week. Examines the physiological, psychological and sociological determinants of the childbearing experience and the nurse's role with individuals and families in this phase of their development. Clinical experience involves individuals and families during the pre-natal, intra-partal and post-partal periods of pregnancy.

N3220A/B Family Nursing: Theory and Practice: 4 credit hours; 2 lecture and 6 clinical hours/week or 2 lecture hours/week, 2 laboratory hours/week and 3 clinical hours/week. Prerequisite N2230 for RN's. Students use the nursing process in the care of the family unit. Examines nursing, cultural, sociological and psychological theories and concepts and their relationships to the development of nursing skills necessary for the provision of care to the family unit. Clinical experience is in community settings.

N3230B Nursing the Adult/Elderly with a Health Problem: Theory and Practice: 5 credit hours; 2 lecture and 9 clinical hours/week. Prerequisite N3200A, N3010A, N3020A. Focuses on family-centered nursing management of adult and elderly clients with chronic health problems. Emphasis is placed on theoretically based nursing strategies aimed at helping clients live with a chronic health problem. Clinical experiences are in hospitals and long term care settings.

N3240 Clinical Nursing II (Summer Session): 3 credit hours; 40 clinical hours/week x 3 weeks. Prerequisites N3230B, N3200A. Focuses on nursing care of ill adult and elderly clients in hospital or long-term care settings with the purpose of consolidating learning from N3200A, N3230B.

N3250 Clinical Nursing III (Summer Session): 3 credit hours; 40 clinical hours/week x 3 weeks. Prerequisites N3200A, N3230B for Basic students; N3220 for RN's. Focuses on nursing care of clients (individuals, families and aggregates) at various levels of health and illness. The experience offers the student an opportunity to promote health, prevent illness and provide care for the ill and facilitate rehabilitation in community settings. Clinical experiences are with formal health care agencies such as Department of Health, VON and Occupational Health.

N4010A/B Trends and Issues in Nursing: 3 credit hours; 2 lecture hours/week. Provides the learner with opportunities to develop skills in analyzing contemporary issues in nursing and health care delivery systems that have impact on the profession of nursing. Students consider historical, present and future perspectives of specific issues in order to work toward resolution of issues.

N4020A/B Advanced Skills in Helping Relationships and Interviewing: 1 credit hour; ½ hour lecture and 1 laboratory hour/week. Prerequisite N2010. An advanced course in helping relationship theory involving a client population of individuals, families, and groups in a variety of clinical settings. Communication strategies for problem solving in complex health situations are addressed.

N4030A/B Leadership in Nursing Practice: 3 credit hours; 2 lecture hours/week. Prerequisite N3220 or special permission to take concurrently for RN's. Focuses on the knowledge, skills and attitudes which facilitate leadership in nursing practice. Introduces theories, concepts and behaviours associated with leadership roles and explores them in relation to nursing. The Basic students will have an opportunity to practice leadership skills in a clinical setting during N4240.

N4200A Community Health Nursing: Theory and Practice I: 4 credit hours; 1 lecture, 1 tutorial and 7 ½ clinical hours/week. An introduction to nursing and public health practice applied to the promotion and preservation of health, and the prevention of illness in client groups and communities. The philosophical basis, role, setting and functions of community health nursing are examined. Emphasis is on assessing and planning nursing interventions with communities and groups. Clinical experiences are in a variety of community settings.

N4210A/B Nursing the Child/Adolescent with a Health Problem: Theory and Practice: 3 credit hours; 1 lecture and 6 clinical hours/week. Focuses on a family-centered approach in the application of the nursing process to the care of children/adolescents with a health problem. Theories and concepts which help the student understand the impact of illness and hospitalization on the client are studied. Clinical experiences are mainly in a hospital setting.

N4220A/B Mental Health and Psychiatric Nursing: Theory and Practice: 3 credit hours; 1 lecture and 6 clinical hours/week. Focuses on the nurse's role in working with clients (individuals and families) experiencing acute illness, and emotional concerns and disorders. Includes the concepts of mental illness, and psychiatric treatment and rehabilitation. Emphasis is placed on psychiatric nursing theories to promote communication skills. Clinical experiences are in mental health agencies and hospitals.

N4230B Community Health Nursing: Theory and Practice II: 4 credit hours; 1 lecture, 1 tutorial and 7 ½ clinical hours/week. Prerequisite N4200A. Builds on the content of Community Health Nursing I with a focus on intervention strategies and evaluation methodology for the practice of community health nursing with client groups and communities. Examines the development of the health care delivery system: its function and the forces affecting its future. Clinical experiences are in a variety of community settings.

N4240 Clinical Nursing IV: 5 credit hours, 40 clinical hours/week x 5 weeks. Prerequisites N4010, N4020A, N4030A, N4200A, N4210A/B, N4220A/B, N4230B. This senior clinical nursing class provides students with an opportunity to consolidate their nursing knowledge and skills with multiple clients as well as practice leadership skills learned in N4030A. Clinical experience is in hospital settings and the students may be able to choose a clinical setting based on their learning needs and special interest.

N4300B/N4400B Series. Electives in Nursing (Non Clinical Classes): 3 credit hours. Students may select one elective in nursing from those offered in the last year of the program. All electives may not be offered in a given calendar year. Consult department for choice of electives being offered each year.

N4310B Advanced Clinical Decision Making in Nursing: 3 credit hours, 2 lecture and 2 laboratory hours/week. Simulated learning experiences similar to highly specialized clinical situations found in an acute care hospital.

N4320B Transcultural Nursing: 3 credit hours, 3 lecture hours/week. Cultural factors affecting health, health services, practitioners and nursing care will be studied. Principles and tools of transcultural nursing care will be studied using simulated and real cross-cultural nursing situations.

N4330B Self-Directed Learning Projects in Nursing: 3 credit hours, flexible lecture and laboratory hours. A student may carry out an independent study or project related to the theory or practice of nursing, under the direction of the faculty facilitator and a resource person. Students will be encouraged to systematically identify, plan, execute and evaluate a learning project in nursing that will meet a specific need, interest or deficit in their present day nursing practice.

Human Sexuality Workshop: This is a required 15 hour non-credit workshop designed to provide students with an understanding of matters concerning human sexuality in a forum with members of Nursing, Medicine and Theology. The course is taught in the third and fourth years of the basic degree program. Post RN students normally take the course during their final years of study.

Classes Offered by Other Faculties

Classes offered by other faculties may be found in the calendar of the respective faculties. The following are of particular interest to the School of Nursing.

Chemistry 143R Introductory Chemistry and Biochemistry: 6 credit hours, lecture 3 hours, lab/tutorial 2 hours. Material in the first term is given by the Department of Chemistry and includes the fundamentals of general organic chemistry. In the second term medically relevant biochemistry is taught by the Department of Biochemistry.

Microbiology 1100A: 3 credit hours, lecture 1 hours, lab 2 hours. This class is given by the Department of Microbiology of the Faculty of Medicine to meet the needs of the students in the Faculty of Health Professions. Elementary bacteriology and immunology includes a study of the structure and physiology of microorganisms, the ways microorganisms cause disease in man and the ways they affect man's well-being. Laboratory work provides experience in the cultivation, isolation and identification of microorganisms and demonstrates their various activities.

Anatomy 101A: 3 credit hours, 4 lecture hours and labs T.B.A. This class is taught by the Department of Anatomy, and is an introductory anatomy class for health professional students. The class uses a systems approach to examine the microscopic and gross anatomy of the human body.

Physiology 101R: 6 credit hours, 2 lecture hours, tutorial/labs 1-3 hours. This class is taught by the Department of Physiology and is an introductory physiology class for health professional students. The functions of body organs and body systems and the integration of functions in the whole organism are studied.

Bachelor of Nursing Degree Program for Basic Degree Students

The School of Nursing offers a course leading to the degree of Bachelor of Nursing, organized in three ten-month years and one (final) academic year. Graduates are eligible to write examinations for membership in the Registered Nurses' Association of Nova Scotia. This program will be phased out after the 1987-88 academic year. New students are not admitted to this program. During the 1987-88 year only year IV will be offered.

Grade Point Average Standards (GPA)

The grade point average system is described in Faculty Regulation 10.

The GPA is calculated at the end of the nursing academic year (April or June). All credits from Dalhousie to be used as credits toward the

attainment of a Nursing degree are involved in the GPA calculation.

Students must maintain a cumulative GPA of 2.0 in order to progress to the fourth level nursing classes. Failure to meet the GPA requirements or failure in a required course may result in the student being required to withdraw from the school.

Duration of studies see Faculty Regulation 7.

Degree Requirements

A student must obtain a minimum cumulative GPA of 2.0 for the entire undergraduate program and accumulate a minimum of 120 credit hours.

Grades

The following clinical classes require a C grade for passing: N1100, N2100, N3100, N4100.

Curriculum

The required classes for the students enrolled in this program total to 120 credit hours. There are eleven compulsory nursing classes for a total of sixty-six credit hours: Nursing 1000, 1100, 2000, 2100, 3000, 3100, 4000, 4100, 4300, 4400, and 4500 or 4600. The general education classes total 54 credit hours. Twenty-four credit hours are compulsory classes: Biology 1000 (6); Chemistry 143 (6); Anatomy 101C (3); Physiology 101C (3); Microbiology 100A (3); and Math 1060A/B (3). The remaining thirty credit hours are elective classes normally to be taken from the Faculty of Arts and Science, Faculty of Administrative Studies, or other approved courses from the Faculty of Health Professions. At least two of these elective classes must be beyond the 100/1000 level, one of which must be a social science; they may be in separate subjects or both in the same subject. The selection of the elective classes or any change in these shall be discussed with the faculty adviser. The nursing classes are introduced in the first year and are correlated with the general education classes throughout the four-year period. Nursing classes may consist of lectures, discussions and laboratory periods, the clinical classes extend from September to June for the first three years of the program. Nursing laboratory sessions take place in hospitals and community agencies within and outside the metro area. The laboratory sessions are under the direction of faculty members. The student's total educational experience is planned and directed by the University.

The primary objective of the basic undergraduate four year degree program is to prepare nurse practitioners capable of functioning in our rapidly changing society. The student is helped to develop both technical skills and the ability to think critically and creatively. The graduate of the program is able not only to give nursing care but to modify this care and assume new functions as the nature of nursing changes. To this end, the curriculum is integrated around core concepts and basic principles. Each of the traditional nursing specialties - medical-surgical, psychiatry, maternal-child, community health - is presented throughout the four years, at progressively increasing levels of complexity. Nutrition and pharmacology (given in cooperation with the College of Pharmacy) are also integrated with the program. There is considerable emphasis on the interplay among the physiological, psychological and socio-cultural factors affecting the nursing process. The curriculum also stresses the team approach to the delivery of health services and the nurse's role as an effective member of the health team. Throughout the four years, selected clinical learning experiences involve the student in caring for patients with problems related to concurrent lecture content.

In this period of four years the student is prepared for the practice of nursing as required by the Registered Nurses' Act of Nova Scotia. On completion of the fourth year the student is eligible to write the examinations conducted by the Registered Nurses' Association of Nova Scotia, which is a requirement to practice as a registered nurse in Nova Scotia.

Bachelor of Nursing Degree for Registered Nurses

The BN program for Registered Nurses consists of 15 classes. The Post RN students will be admitted to the new Bachelor of Science (Nursing) degree in September, 1987 and the BN degree program for registered nurses will end in October, 1991.

The program may be completed on a part-time or full-time basis. Part-time students who wish to change their status to full-time must write their

request to the program coordinator by March 1.

A student normally must complete undergraduate studies within six years of first registration in a nursing class and within ten years of taking Arts and Science credits for the total program. The four nursing classes at 4000 level are normally taken during the final year of study. Normally no more than two Arts and Science electives may be taken during the two summer sessions immediately following completion of the 4000-level classes (one class in each session).

Students with transfer credits from other universities who want to complete the program in two calendar years require permission to take nursing 3700 concurrently with the four nursing classes at the 4000 level. A maximum of 45 credit hours (7 ½ classes) in transfer credits may be used in the program, provided they are applicable to the program and in accordance with Arts and Science regulations on transfer credits.

Admission Requirements

Requirements for admission to the Post RN Degree Program are set out in the Admissions section of the General Undergraduate Information and Regulations at the front of this calendar. In addition to these requirements, the applicant must (a) submit proof of current membership in the Nurses' Association of the country or province of residence; (b) present transcript of RN examination or equivalent; (c) have one year working experience as a registered nurse. Priority consideration will be given:

- first to permanent residents of Nova Scotia and Prince Edward Island,
- second to permanent residents of other Canadian provinces,
- third to all other applicants.

Priority will also be granted to Post RN students under the auspices of DND, DOT and the RCMP.

Grade Point Average Standards

The grade point average system is described in Faculty Regulation 10. A student must maintain a cumulative GPA of 2.00 to progress from one year of the program to the next.

Degree Requirements: A student must obtain a minimum cumulative GPA of 2.0 for the entire undergraduate program and accumulate a minimum of 90 credit hours. Students must submit proof of current Nursing registration each year they are enrolled in the nursing program.

Curriculum

The classes for students enrolled in this program consist of 9 general education classes and 6 nursing classes.

1. The general education classes include the following required classes: (1) a science class (which may be chosen from Biology, Chemistry, Mathematics, Physics, Anatomy 101A, and Physiology 101R) (2) Education 4340 and (3) Mathematics 1060A or 1060B (Statistics). The remaining 6 ½ classes are electives. These electives are to be taken from the Faculty of Arts and Science, Faculty of Administrative Studies or approved classes from the Faculty of Health Professions. Four of the electives must be beyond the 100/1000 level. Selection of one social science within the electives, and of two or three classes in one discipline, is advised.

2. The required nursing classes are as follows: N2700, N3700, N4300, N4400, N4500 or N4800, and N4700. Additionally, students are expected to attend an interdisciplinary workshop on human sexuality. This is held in the first part of the fall term. It is normally attended during the students' final year of study.

Sample courses of study vary considerably depending on the number of applicable transfer credits, number of summer session courses taken and whether study is full or part-time. Sample courses of study to complete the program in two calendar years (using transfer credits) and sample courses of part-time study are available from the program co-ordinator. Each student arranges their study plan individually in consultation with an assigned faculty advisor.

Sample Course of Full-Time Study - 3 academic years (Sept-April)

Second Year: A Science, Education 4340, Nursing 2700, Arts and Science Electives

Third Year: Math 1060A or B (Statistics) (½ credit), Nursing 3700, 3-½ Arts and Science Electives (3 of which are at the 200/2000 level or above)

Fourth Year: Nursing 4300, 4400, 4500 or 4600, 4700, Interdisciplinary Human Sexuality Workshop; 1 Arts and Science Elective (at 200/2000 level or above)

All elective classes are subject to the approval of a faculty advisor. For the description of Arts and Science subjects see the Faculty of Arts and Science section of this calendar.

Grades

The following clinical classes require a C grade for passing: N2700, N3700, N4700, and N4800.

Class Descriptions

All classes are 6 credit hours unless otherwise stated.

N2700 Theoretical Foundations of Nursing: lecture 2 hours, lab 2 hours/week. Clinical Practicum: Students work with patients or clients throughout the academic year and make application of theory and concepts from the class. The broad concepts of stress and adaptation are the core of this class. It focuses on a conceptual framework for nursing with reference to its relevance (1) as a theoretical foundation for professional nursing; (2) for planning patient care, and (3) for the study of nursing practice. The relationship between theory and practice is emphasized.

N3000 Nursing Science V. Adaptation to Long-Term Health Interruptions: September-April, lecture 4 hours/week. Prerequisites: N2000, N2100, Microbiology 100A, Chemistry 143, CPR Certificate. N3000 focuses on the adaptation of the individual and family in the community to a long-term health problem. Related nursing interventions designed to help the individual and family attain/maintain their optimal level of functioning are stressed. The concepts developed in N1000 and N2000 are continued and expanded. Emphasis is on the integration of knowledge for application in the nursing process.

N3100 Nursing Science VI. Nursing Care of Clients with Long-Term Health Interruptions: September-April, 13 hours/week, plus tutorial 1-½ hours/week; May-June, 5 day/week for 6 weeks. Prerequisites: N2000, N2100. During the N3100 the student applies knowledge gained from N3000 by caring for individuals and families with long-term health problems. The student has the opportunity to work in the home, the hospital, and other community settings. Using a health team approach, students develop plans for helping people with whom they work, to meet their long-term health needs. Emphasis is on the identification of health teaching needs of these clients and the implementation of a plan to meet these needs. The nursing process is used as the major problem-solving method. Self-evaluation of nursing care is encouraged, and the student is assisted, as required, in selecting alternative nursing actions.

N3700 Community Health Nursing: lecture or seminar 4 hours/week, clinical practicum 2 hours/week. Prerequisite: N2700. An introductory class to examine current and future professional nursing roles that are effective in the home and the community outside the hospital. The focus is on theories and concepts that facilitate study of man's health needs across the life span with reference to global, transcultural and Canadian regional views of family and community health. Students explore and apply some of the basic concepts and tools of public health practice and how it contributes to health care delivery. Emphasis is on health care of families, how to identify their health needs and the community resources, nursing knowledge and skills required to meet them. Clinical practicum includes working directly with one or more families in the home and/or community, as individual students and with other health team workers, to deliver health care. The student's previous experience is considered in order to plan this practicum at the level of student need.

N4000 Nursing Science VII September-April: lecture 2 hours/week. Prerequisites: N3000, N3100. N4000 deals with theoretical concepts and their relationships to nursing. The main emphasis is on learning and using a comprehensive approach to health care for individuals, families and communities.

N4100 Nursing Science VII: September-March, 12 hours/week plus 1 hour/week tutorial. March-April 40 hours/week for 5 weeks. Prerequisites: N3000, N3100 the student applies knowledge gained in N4000. Emphasis is on working as a responsible and interdependent member of the health team. Tutorials assist students in the integration of theory and practice.

N4300 Seminars in General Nursing lecture 2 hours/week. Students analyze current issues in nursing and in the community and consider the professional nursing role in today's society.

N4400 Introduction to Nursing Research: lecture 2 hours, lab 2 hours to be arranged. Prerequisites: Mathematics 1060A. A study of the logic and thought processes basic to research, research methodology, and measurement techniques.

N4500 Nursing — A Management Process: lecture 2 hours/week. An introduction to current state of management study and practice with application to nursing. Topics include: theories and patterns of organization, organizational decision making, planning and change. The nurse's role in the health agency is studied. Team leadership, staffing, staff development and evaluation are considered.

N4600 Nursing — A Teaching Process: lecture 3 hours with Teaching Practice Period included. The components of the teaching process, and teaching strategies are introduced. These concepts are useful for the teaching in a school of nursing and for the nurse practitioner involved in inservice and patient education. A variety of curriculum development concepts are introduced, which involve setting up educational objectives, selecting and organizing learning experiences, practice teaching experiences and evaluating the effectiveness of classes and educational programs.

N4700 Analysis of Theory and Concepts in Nursing: lecture 2 hours/week, lab 2 hours/week. Pre-requisites: N2700 and N3700 or permission of the professor. In the first part of the course, broad concepts are examined and analysed in relation to nursing theories as the core of the class. In the second part of the class, students have the opportunity to further test their conceptual framework through seminars and practicum related to areas of specific interests. Students choose one of two components offered in the second part: self-directed learning project or physical assessment. Anatomy and physiology is normally pre-requisite for students selecting physical assessment. Both components may not be available in summer session classes.

N4800B/PH4850B/PT 3090B/HE2250B Interdisciplinary Course in Human Nutrition: 3 credit hours, normally spring term, E. Lamble. Prerequisite: Biology 1000 or at the discretion of the professor. The class is an interdisciplinary study of the basic principles of nutrition needs throughout the life cycle. Physiological, psychological, socio-economic, physical, educational and cultural determinants are explored to explain why the nutritional status of Canadians can vary and how this variation affects the development of chronic disease. Special emphasis is given to community nutrition in the Atlantic Region.

N4900A ISSA 2060 An Interdisciplinary Approach to Gerontology (Social Perspectives): lecture 3 credit hours, lecture 3 hours/week. This is a multidisciplinary class in Gerontology with a focus on the presentation of historical and current research studies in the field of social gerontology, primarily from a Canadian perspective. This class represents the wide range of study which is reflected in most of the sciences and humanities.

N4910B An Interdisciplinary Approach to Gerontology (Health Perspectives): lecture 3 credit hours, lecture 3 hours/week. This multidisciplinary class in Gerontology focuses on the presentation of health issues and relevant research studies in the field of aging. Various health professionals working with this age group participate, to emphasize the interdisciplinary nature of gerontology. This class is not open to students in the Basic BN degree.

Diploma Program for Registered Nurses in Outpost and Community Health Nursing

A 15-month program in Outpost and Community Health Nursing is offered in cooperation with the University Medical School and Medical Services Branch, Health and Welfare Canada, and prepares registered nurses for positions in Canadian outpost settings where nurses are the only resident health-care professionals. Instruction during the program is highly individualized and clinically oriented. One academic year, extending over a period of approximately eight months, is spent at the University. This is followed by a 28-week, University-directed Internship located in remote areas of Canada. A diploma in Outpost and Community Health Nursing is awarded at the completion of the program. Students are admitted to the program in September and in January. A shortened stream beginning in September 1987 is offered for nurses with a baccalaureate degree in nursing.

Admission Requirements

- Nova Scotia Grade XII or equivalent;
- Current registration in a province or territory in Canada or recognized equivalent;
- At least one year of work experience as a registered nurse;
- Admission preference is given to nurses currently employed by Medical Services Branch, Health and Welfare Canada. Other nurses are considered for admission if they agree to employment with Medical Services upon completion of the program;

Fees and a living allowance are paid by Medical Services Branch, Health and Welfare Canada, to all students. In return, all students are committed to a period of employment with Medical Services after completion of the program.

Course of Study for Outpost Nursing

First Year: to be spent at the University: Nursing 0550 A, 0551 B, 0640 B, 0930 A or B, 0940 A or B, 0950 A or B, 0980 A, 4800 B. Health Education 1163A.

Internship: in remote areas of Canada: Nursing 0193 A or B, 0191 A or B, 0198 A or B.

Graduate Program

For details of the Master's in Nursing program, please consult the Faculty of Graduate Studies calendar.

Class Descriptions

All Outpost nursing classes (numbered N0550 through HE1163A) are open only to students enrolled in the Outpost nursing program.

N0550A Community Health Nursing and Health Education: lecture 4 hours/week. An introduction to theories, concepts, roles, tools and functions of community/public health nursing. Emphasis is on assessing, planning and evaluating nursing interventions with communities and groups in cross-cultural settings. Principles and theories of teaching and learning are examined with a focus on the nurse as an educator.

N0551B Family Nursing: lecture 3 hours/week. An introductory class examining theories, concepts and nursing skills necessary for the provision of care to the family unit. Man's health needs throughout the lifespan are examined and the influences of social and cultural factors explored. Clinical practice includes supervised home visiting to a family in the community. It offers the student an opportunity to provide nursing care at various levels of health and illness as an individual and a member of the health team.

N0640B Mental Health Issues: Mental health, as influenced by cultural, environmental, and developmental factors is addressed. Communication, leadership and problem solving skills are fostered through seminar

discussion. Crisis theories and resolutions are explored. Emphasis is on transcultural community health nursing.

N0930A or B Clinical Medicine: Common medical problems are addressed in seminars, clinical teaching and guided experience at local hospitals under the direction of University Medical School personnel and Outpost Nursing Instructors. Skill in taking histories and performing physical examinations is developed. Instruction and supervised practice in basic laboratory procedures is provided by the staff of the provincial pathology laboratory.

N0940A or B Clinical Obstetrics and Gynaecology: A program of seminars, clinical teaching, and practical experience is conducted under the direction of University Medical School personnel and Outpost Nursing Instructors. This class emphasizes the evaluation and care of the normal obstetrical patient and her family. Attention is given to common gynaecological problems. Supervised clinical experience is provided at the Grace Maternity Hospital. Discussion of common abnormal conditions and their recognition is included.

N0950A or B Clinical Paediatrics: Common paediatric problems are addressed in seminars, clinical teaching and guided experience at the IWK Hospital for Children under the direction of University Medical School personnel and Outpost Nursing Instructors. Clinical placement in the office of a practicing paediatrician is arranged. Skill in taking histories and examining children is developed. Consideration is given to normal growth and development and the health supervision of the well child.

N0960B Clinical Surgery: This class is designed to prepare the student to care for patients with minor surgical problems and to recognize and provide emergency care for patients with more serious conditions. An introduction to commonly encountered eye problems is included. This class is directed by University Medical School personnel and Outpost Nursing Instructors.

N0191A or B Field Experience In Community Health Nursing: A six week period of supervised field experience in community health nursing is arranged at a northern health centre for outpost nursing students during their internship. It is designed to enable the student to practice, in a northern setting, the community health teaching offered previously in the program.

N0193A or B Hospital Clinical Practicum: A 14-week period of supervised clinical experience at a small northern hospital is arranged for outpost nursing students during their internship. This experience builds on clinical teaching offered previously in the program and provides opportunity for students to strengthen clinical skills and judgement in a practice setting. Student experience is directed by the medical staff of the hospital and an Outpost Nursing Instructor. Assignment to medical-surgical, obstetrical, paediatric, and ambulatory patients is arranged. Students have opportunity, under supervision, to care for women during labour and to conduct normal deliveries.

N0195A or B Nursing Station Field Experience: A six-week period of supervised field experience at a northern nursing station is arranged for outpost nursing students during their internship. This placement is designed to integrate teaching previously given during the program and also to provide opportunity for students to become familiar with the types of administrative and supervisory problems which a nurse encounters in this setting. Attention is given to problems relating to living and working within an unfamiliar culture and in a remote area.

HE1163A: See description in Health Education section of the calendar.

N4800 Human Nutrition — Interdisciplinary Course: See above description under this class title.

School of Nursing Regulations

1. All students must observe the University Regulations and those of the Faculty of Health Professions.

2. As an academic requirement, students are assessed in each year on their aptitude and fitness for the profession of Nursing. A student who, in the

judgement of the faculty, fails to attain a satisfactory standard in this assessment may be required to withdraw from the School.

3. Students in the Baccalaureate Degree Programs are responsible for (a) the purchase of uniforms including caps and shoes and a watch with a sweep hand or a digital watch with seconds display, (b) cost of accommodation and travel while on a clinical experience in areas outside the Metro area including the summer clinical. Additional expenses are incurred by the student in the Basic Baccalaureate Degree Programs for field experience, books, first aid course, CPR course, print fees, graduation pin, equipment, and nurse registration examinations. Each student must also purchase name tags and crests from the University.

4. All Nursing students will have \$155. added to their student fees for the cost of a Hepatitis B vaccination. The student has the option of either getting the vaccination or not. If the student decides not, the \$155. will be refunded.

5. In view of the restriction on the size of classes in the School of Nursing, any applicant who has been advised of provisional acceptance must pay an additional acceptance deposit of \$100 within three weeks of such notification towards their tuition. This deposit is refundable if the applicant withdraws before July 1.

6. Also because of enrolment limits on class size, all part-time students who wish to change their status to full-time must present this request in writing to the program co-ordinator by March 1.

7. Adviser-Advisee Program. Each student is assigned to a faculty member from the academic advisory committee. The purpose of this committee is to help students plan their academic program, approve class selection and discuss academic progress or difficulties.

8. Students wishing to appeal a decision based on faculty regulations or decisions should follow the School Appeal Procedure. All students are given a copy of the Appeal Procedure and it is also available from the Coordinators.

School of Nursing Bursaries and Awards

For information on all prizes, bursaries, scholarships, and loans, consult the booklet "Scholarships, Prizes, and Financial Aid," issued by the Dalhousie Awards Office. For further information consult the Director of Awards, Dalhousie University.

School of Occupational Therapy

School of Occupational Therapy Academic Staff 1988-1989

Robert S. Tonks, B.Pharm, PhD (Wales), FPS, FI Biol., *Dean of the Faculty of Health Professions*

Barbara J. O'Shea, DipP & OT (Tor.), BSc (Queen's), MS (Colorado State), *Director and Associate Professor*

Assistant Professor

Elizabeth Townsend, DipP & OT (Tor.), BSc (OT) (Tor.), MAdEd (St FX)

Lecturers

Susan E. Doble, BSc (OT) (UWO), MS (Boston)

John W. Grainger, BSc, MSc (Waterloo)

Myra S. Kennedy, BOT (McGill), MA (Econ.) (Manchester)

Hell Munroe, Dip COT (St. Andrews), Cert FE (Jordanhill), MEd (Aberdeen)

Fieldwork Coordinator

Elizabeth B. Bell, DipP & OT (Tor.) BSo (Queen's), MS (Virginia Commonwealth)

Provincial Fieldwork Coordinators

New Brunswick: Carol A. Morrison, BSc (OT) (McGill)
 Newfoundland: Brenda Head, Dip OT (Alta.)
 Nova Scotia: Sandra Quirk, Dip OT (Queen's)
 Prince Edward Island: Margaret Anne Coles, BSR (UBC)

Honourary Appointments

William A. Birnie, MD, FRCP(C), Assistant Professor, Department of Psychiatry, Faculty of Medicine
 R. William Currie, BSA, MSc, PhD (Man), Assistant Professor, Department of Anatomy, Faculty of Medicine
 Alistair Munro, MD, FRCP(C), Professor and Head, Department of Psychiatry, Faculty of Medicine
 Patricia A. Pearce, MD, CCFP, FRCP(C), Lecturer, Department of Psychiatry, Faculty of Medicine
 Brenda Ryan, BA (St FX), MBA (Dal), Department of Health, Province of Nova Scotia
 Margaret Spindler, DipP & OT (Tor.), Director, Motivational Therapy, Nova Scotia Hospital
 Joan Veronel, BSc (OT) (Tor.), Director, Occupational Therapy, IWK Hospital for Children

Regional Accredited 1987 Fieldwork Programs

Practising occupational therapists in the Atlantic region give their time and expertise to a structured practical fieldwork program. It enables students to integrate theoretical knowledge with practice and to demonstrate their knowledge and professional competence in actual practice situations. Occupational therapists in the following places serve as preceptors to students.

New Brunswick

Centracare, Saint John
 Chaleur Regional Hospital, Bathurst
 Dr. Everett Chalmers Hospital, Fredericton
 George Dumont Hospital, Moncton
 Forest Hill Rehabilitation Centre, Fredericton
 Moncton City Hospital, Moncton
 Saint John Regional Hospital, Saint John
 Worker's Rehabilitation Centre, Grand Bay

Newfoundland

Children's Rehabilitation Centre, St. John's
 General Hospital, St. John's
 Salvation Army Grace Hospital, St. John's
 Melville Hospital, Goose Bay
 St. Clare's Mercy Hospital, St. John's
 Waterford Hospital, St. John's
 Western Memorial Hospital, Corner Brook

Nova Scotia

Ark Industries, Bridgewater
 Camp Hill Hospital, Halifax
 Cape Breton Hospital, Sydney
 Eastern Shore Memorial Hospital, Sheet Harbour
 Halifax Infirmary, Halifax
 Izaak Walton Killam Hospital for Children, Halifax
 Nova Scotia Hospital, Dartmouth
 Nova Scotia Rehabilitation Centre, Halifax
 Valley Health Services, Waterville
 Victoria General Hospital, Halifax

Prince Edward Island

Community Occupational Therapy Services:
 King's County, Montague/Souris
 Prince County, Summerside
 Queen's County, Charlottetown
 Hillsborough Hospital, Charlottetown
 Prince County Hospital, Summerside
 Queen Elizabeth Hospital, Charlottetown

The School of Occupational Therapy is a regional school serving the four Atlantic Provinces. It provides the only occupational therapy educational program in the region.

What is Occupational Therapy?

Occupational therapy is a health profession concerned with restoring optimal physical and mental function in disabled individuals from all age groups, and assisting them to resume a responsible role in the family and in society. "Occupation" refers to all activities in which someone (child or adult) engages, including (but not restricted to) work-related activities. The occupational therapist evaluates function through an analysis of human activities, relationships and situations. Occupational therapy utilizes activities which are appropriate to the person served and which have been scientifically selected to accomplish a specific functional goal. These may include personal care, play, homemaking, vocational, leisure and social activities. Occupational therapy services are best delivered in the community within the normal environment of the client, although initial treatment frequently occurs within a hospital or rehabilitation setting. The disabled person is taught to set realistic goals and to acquire, through directed experiential learning and problem-solving, adaptive skills which enable resumption of a productive and satisfying role in society.

Career Opportunities

Occupational therapy practice is broad in scope and offers a wide range of career opportunities for both men and women as it is directed towards preventing or reducing the effects of dysfunction arising from any cause in any age group. Job opportunities exist for occupational therapists in acute and chronic care hospitals, mental retardation facilities, mental health centres, rehabilitation centres, nursing homes and community service agencies. Career opportunities for occupational therapists in schools, government, industry and correctional services are increasing. Occupational therapists may find careers in administration, education, research or consulting. Normally, graduate education would be required for careers in education and research.

Licence to Practice Occupational Therapy

In some provinces, occupational therapists require a licence to practice. The School of Occupational Therapy has no jurisdiction in matters relating to licencing. These functions are entirely under the control of the provincial licencing body as distinct from the professional organization. Information may be obtained on provincial licencing regulations from: the Nova Scotia Association of Occupational Therapists, PO Box 3361 Halifax South, Halifax, Nova Scotia, B3J 3J1; the New Brunswick Association of Occupational Therapists, c/o Occupational Therapy Services, Workers Rehabilitation Centre, PO Box 3087, Station B, Saint John, New Brunswick, E2M 4X7; the Prince Edward Island Association of Occupational Therapists, PO Box 2227, Charlottetown, P.E.I., C1A 3N3; or the Newfoundland and Labrador Association of Occupational Therapists, PO Box 5423, St. John's, Newfoundland, A1C B1B.

Professional Associations

The Canadian Association of Occupational Therapists represents the professional interests of occupational therapists across Canada at the national level. Membership is encouraged for students and graduates. Information on membership may be obtained from the School or by writing directly to: the Canadian Association of Occupational Therapists, 110 Eglinton Ave. W., 3rd Floor, Toronto, Ontario, M4R 1A3. Internationally, occupational therapy standards of education and practice are set and maintained by the World Federation of Occupational Therapists.

Provincial professional organizations represent the interests of occupational therapists within a province. Further information may be obtained by writing directly to the organization. In the Atlantic region, these are: the Nova Scotia Society of Occupational Therapists, PO Box 3381, Halifax South, Halifax, Nova Scotia, B3J 3J1; the New Brunswick Society of Occupational Therapists, c/o Occupational Therapy Dept., Dr. Everett Chalmers Hospital, Priestman St., Fredericton, New Brunswick, E3B 5N5; the Prince Edward Island Occupational Therapy Society, PO Box 2777, Charlottetown, Prince Edward Island, C1A 3N6; the Newfoundland & Labrador Association of Occupational Therapists, PO Box 5423, St. John's, Newfoundland, A1C B1B.

Program Objectives

The Bachelor of Science program in Occupational Therapy at Dalhousie

University is designed to prepare generalist occupational therapists to be competent, responsible practitioners in the health care system of the Atlantic region. This honours baccalaureate program has been designed to emphasize the theoretical foundation and scientific principles which form the basis for occupational therapy practice. With this knowledge base, the students are guided in the development of the skills required by entry level occupational therapists through fieldwork experiences integrated with the academic curriculum.

The School of Occupational Therapy at Dalhousie University is a regional school serving the four Atlantic Provinces. Since many practice settings in the Atlantic region are non-traditional in nature, the program is designed to provide students with opportunities to apply and practice skills in a variety of settings and with a range of clients from different age and diagnostic groupings. With this background, graduates will be prepared to accept the challenge of expanding the occupational therapy services in the Atlantic region.

The educational approach used in the Occupational Therapy program at Dalhousie University is one which encourages creative problem solving and the application of scientific principles to the occupational therapy process. The medium of occupational therapy is presented as purposeful activity in its broadest context. Students have an opportunity to familiarize themselves with a wide range of activities and to become adept at analyzing activities for therapeutic use.

The emphasis on the scientific nature of Occupational Therapy practice is continued through the fourth year of the program in which students are required to complete a clinical research project in conjunction with their final fieldwork placement. This project addresses a clinical research question pertinent to occupational therapy practice in Atlantic Canada.

The Bachelor of Science (Occupational Therapy) program embraces the educational standards of the Canadian Association of Occupational Therapists (CAOT) and is fully accredited by that body. Graduates are eligible to take the Certification Examination offered by CAOT. Successful completion of this examination is required for membership in CAOT and for licensure to practice in provinces where practice is governed by statute.

Program

The degree of Bachelor of Science (Occupational Therapy) requires a minimum of four years of University study. The program of study requires at least one year of general science followed by three years of occupational therapy. Applicants must successfully complete the prescribed first year course of study in the Faculty of Arts and Science at Dalhousie University or the equivalent program at another recognized university before they can be considered for admission to the School of Occupational Therapy. These requirements must be completed by May in the year of expected admission to the School of Occupational Therapy.

Fieldwork

Fieldwork is the practical component of the educational program in which students have direct contact with patients or clients outside the academic setting. It enables the student to apply theory to practice, to consolidate and integrate knowledge, and develop interpersonal and professional skills.

All fieldwork is completed in full-time blocks which are integrated with the academic program. Adoption of the block design for the program permits full use of clinical facilities throughout the Atlantic region and allows students the opportunity of gaining experience in other parts of Canada as well. The second year of the program has a normal academic schedule followed by four weeks of fieldwork. In the third and fourth year, a 6-week block and a 7-week block respectively of full-time clinical practice is included within the second academic term. During the 1237.5 fieldwork hours, each student must gain a balance of experience in the treatment of both physical and psychosocial dysfunction. As far as possible, students are also encouraged to gain experience in at least one specialized program such as programs for children or elderly people or programs in the community. Students may be assigned to fieldwork placements in occupational therapy programs in any of the four Atlantic provinces. Each student must complete at least one regional placement outside the Halifax/Dartmouth area and one 8-week placement outside the Atlantic region for which there is a \$25.00 placement fee. Students are responsible for the placement fee and for travel and living costs associated with fieldwork.

Fieldwork hours are completed in the following pattern, calculated on the

basis of a 37.5 hour week

4 weeks following Year 2: (OT 2221) 150.0 hours

6 weeks during Year 3: (as part of OT 3320R) 225.0 hours

8 weeks following Year 3: (OT 3321) 300.0 hours

8 weeks following Year 3 or Year 4: (OT 4420) 300.0 hours

7 weeks during Year 4: (as part of OT 4421R) 262.5 hours

TOTAL: 34 weeks; 1,237.5 hours

Application for Admission

Students considering occupational therapy should consult with the School of Occupational Therapy as soon as possible, preferably before their first registration in Arts and Science. In the Faculty of Arts and Science at Dalhousie University the required first-year classes are: Psychology 1000 or 1010, Sociology 1000, 1100, or 1200, one elective (writing class), two classes from: Biology 1000, Chemistry 1100, 1110, 1120, or 1200, Physics 1000, 1100 or 1300. Students who complete the equivalent prescribed first-year program at any recognized university will be given equal consideration for transfer into the School of Occupational Therapy. Since enrolment in the program is limited, applicants should note that admission is on a competitive basis with preference given to residents of the Atlantic Provinces. Selection is based on completion of prerequisites, academic achievement and personal suitability for occupational therapy. Selection procedures may require an interview and personal evaluation.

Application for admission to the School of Occupational Therapy for the final three years of study is completed through the Registrar's Office using the appropriate forms. An application fee is required of all applicants. Applications must be submitted prior to the closing date published in the Almanac at the front of this calendar but admissions decisions are not made until after this date. It is the responsibility of each applicant to ensure that her/his application file is complete.

A completed application for the School of Occupational Therapy consists of:

1. the completed application form
2. the application fee
3. an official transcript for high school matriculation studies including standing in Nova Scotia Grade XII level mathematics or the equivalent.
4. official transcripts for previous and current university level courses including the prescribed first year Arts and Science classes with interim marks for classes currently in progress. (On completion of studies in progress, applicants must arrange for a final official transcript to be forwarded to the Admissions Office.)
5. an autobiographical letter as described in the application information available from the Registrar's Office.
6. one confidential assessment by a class professor (as described in the application materials) sent by the professor to the Admissions Office.

Regulations

All students are required to observe the University and Faculty of Health Professions regulations as described in this calendar.

School of Occupational Therapy Regulations

1. Workload

Students must have their program approved by their faculty advisor in the School of Occupational Therapy before registration each year. In seeking this approval, students should have determined their eligibility for the proposed classes by having satisfied the prerequisites prescribed. The elective classes must be at the 2000 level or higher. Electives should be chosen to expand knowledge in an area of special interest of relevance to occupational therapy. Electives must be approved by Director or faculty advisor. Except in special circumstances, a student's workload must not exceed the maximum workload described in Course of Study below. A maximum course load is 38, 35, and 34 credit hours respectively in years II,

III, and IV (see Faculty Regulation 13). For the purposes of residency and scholarship requirements 30 credit hours is considered a full course load in all years.

2. Methods of Assessment

Examinations may be oral, written, (closed or open book) or practical; under supervision or take-home. To gain credit toward a degree or diploma, students must appear at all examinations, prepare such essays, projects, exercises, reports, etc., as may be prescribed, attend the classes of their prescribed course to the satisfaction of the instructors and, in classes involving field or laboratory work, complete such work satisfactorily.

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 including information on the availability of a supplemental examination and the proportion of the grade to which such an examination would apply; within four weeks after the beginning of each term instructors must report to the Director the method of evaluation to be used in each class.

3. Examinations and Tests

Periods of approximately two weeks in the spring and one and one-half weeks in December are set aside for the scheduling of formal written examinations by the Registrar. Instructors wishing to have examinations scheduled by the Registrar for their classes must so inform the Registrar at the beginning of the 3rd week of classes in the fall and spring terms. Instructors may also arrange their own examinations at times and places of their choosing during the formal examination periods, with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority. No tests or examinations covering the work of a whole term shall be held during the last two weeks of classes in the term. No tests may be held between the end of classes and the beginning of the official examination period. Students may contact the School for assistance if they are scheduled for more than two examinations on the same day.

4. Grade Requirements for Academic Classes

A student must obtain a grade of at least C in each professional class for that class to be counted as a credit for the degree or as a prerequisite for another professional class. A student who earns a grade of less than C in a professional class but is otherwise still eligible to continue in the School of Occupational Therapy may be eligible for a supplemental examination (Regulation 17). If not the student must repeat that class to obtain a grade of C. Professional classes are all classes with Occupational Therapy numbers.

Passing grade in all non-professional required classes and electives is D. In grade point average calculations a D counts 1 point (see Faculty Regulation 10).

5. Grade Requirements of Fieldwork Classes

Fieldwork is graded on a Pass/Fail system. A student must obtain a passing grade in each fieldwork and clinical class in order to be eligible to proceed in the program.

6. 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 within four weeks of the required date for submission of grades in that class to the Registrar's Office.

Exceptions to this rule will normally be extended only to classes which require fieldwork. At present these classes are Occupational Therapy 2221B, 3320R, 3321B, 4420A/B and 4421R. Students taking any of these classes which require fieldwork in the summer following their final year should note that they will not be able to graduate at the spring convocation.

7. Grade Point Average Requirements

In each year of study in the School of Occupational Therapy, a student must obtain a minimum grade point average of 2.00 and maintain a cumulative grade point average of 2.00 or higher (see Faculty Regulation 10).

8. Requirements for Promotion

Promotion each year is dependent upon satisfactory completion of fieldwork

and achievement of academic requirements. The fieldwork requirement for promotion is satisfactory completion of OT 2221 and OT 3321 for promotion to third year and fourth year respectively. Academic requirements for promotion each year are: (a) a cumulative GPA of 2.00 or higher, (b) a passing grade in all required classes.

9. Degree Requirements

To satisfy requirements for the Degree of Bachelor of Science in Occupational Therapy, a student must:

- a) accumulate at least 135 credit hours (or the equivalent for a transfer student) including all prescribed classes, with a cumulative GPA of at least 2.00, and
- b) satisfactorily complete 750 hours of fieldwork experience, additional to credit classes (OT 2221: 150 hours, OT 3321: 300 hours, OT 4420: 300 hours).

Note: Credit hours are accumulated only when a passing grade, including a passing grade obtained on supplemental examination, has been achieved for a credit class.

10. Duration of Studies

See Faculty Regulation 7.

11. Class Changes

Faculty Regulation 4 applies to all classes in Occupational Therapy with the exception of 4000 level B classes (except 4418B to which Regulation 4 applies).

The last day for adding all other 4000 level B classes in the School of Occupational Therapy is Friday of the first week following study break (see almanac).

The last day for withdrawing from all other 4000 level B classes in the School of Occupational Therapy without academic penalty is Friday of the second week following study break.

12. Degree with Honours Requirements

Residency requirements: Candidates must have completed the equivalent of three years of full time study in the School of Occupational Therapy (90 credit hours minimum).

Academic and fieldwork requirements: All classes taken while registered in the School of Occupational Therapy will be included in the GPA calculation to determine honours standing. Honours standing is achieved by students who satisfy degree requirements with a cumulative GPA of 3.35 or higher, have no grade in an advanced class (2000 level and above) less than B and achieve a grade of A in OT 4421R.

13. Degree with First Class Honours Requirements

Candidates must satisfy the residency requirements stated above. First class honours standing is achieved by students who satisfy degree requirements with a GPA of 3.75 or higher, have no grade in an advanced class (2000 level and above) less than B and achieve a grade of A in OT 4421R.

14. Required Withdrawal From the Program

A student normally must withdraw from the program if at the end of the academic year:

- (a) less than 22 credit hours have been accumulated in that year for full time students or less than the number of credit hours in which the student was registered have been accumulated for part-time students or
- (b) having accumulated sufficient credit hours the required cumulative GPA is not attained.

A student who fails a repeated class (academic or fieldwork) normally must withdraw from the program.

15. Probation

A student with a cumulative G.P.A. of 1.8-2.0 and, for full-time students, who has accumulated at least 25 credit hours during the year, may be

granted probationary status at the discretion of the School Committee on Studies. A student granted probationary status must achieve a cumulative G.P.A. of 2.0 for the next year or be required to withdraw from the program. A student whose grades fall within the probationary level a second time will be required to withdraw from the program.

16. Appeals

A student wishing to appeal a decision based on School regulations, should in the first instance attempt to resolve the issue with the instructor(s) concerned in academic classes or with the fieldwork coordinator and preceptor in fieldwork classes before proceeding according to School Appeal Procedures, a copy of which may be obtained from the School Office. Briefly, such an appeal should be addressed to the Chairman of the School Committee on Studies and must clearly state the arguments and expectations of the petitioner (see Faculty Regulation 20).

17. Supplemental Examinations

A student may be permitted to write a supplemental examination in any class for which no less than 40% of the grade was determined by a compulsory final examination. The supplemental examination constitutes the same proportion of the final grade as did the final examination during the regular session. Normally a supplemental examination is permitted only where a student:

- (a) completed the class with a final grade of FM, and
- (b) attained the required cumulative GPA at the end of the academic year.

Only one (one full credit or 2 part credit), supplemental examination is permitted in one year, and no more than three (full credit or equivalent) supplemental examinations are permitted during a student's degree program. On successful completion of a supplemental examination in a professional class, a grade of C is entered on the student's record along with the notation that the grade was earned by supplemental examination. In the case of failure an F is entered. In all other classes, the grade achieved on the supplemental examination is recorded along with the notation that the grade was earned by supplemental examination. In all cases, the final grade recorded is used in computing grade point averages. However, the original grade remains on the transcript.

Supplemental examinations in A classes must be written in February, and in all other classes in August, immediately following the failure. Supplemental examinations may not be deferred.

Eligible students who wish to write a supplemental examination must submit to the Office of the Registrar a completed application form (which may be obtained from that office) and the required fee by July 10 for the August examination and January 25 for the February examination.

Students who fail to pass the supplemental examination can obtain credit for that class only by repeating it (see Faculty Regulation 8.4 and Arts and Science Regulation 19.9).

18. Application for Readmission

Students who have been required to withdraw from the School of Occupational Therapy may apply for readmission after being out of the School for a minimum of one year. Since enrolment in the program is strictly limited, students seeking readmission must convince the Admissions Committee that they merit a place of study in the School. Applicants seeking readmission to the School should follow procedures for application for admission previously outlined.

19. Voluntary Withdrawal

A student withdrawing from the University or intending to discontinue any class must have the approval of the Director of the School of Occupational Therapy and must also notify the Registrar. Students wishing to be readmitted to the program after having withdrawn voluntarily must apply for readmission through the Registrar's Office. Due to limited enrolment of the program, readmission cannot be guaranteed.

Course of Study

The prescribed first-year classes are listed in the section describing admission requirements.

Second Year: Anatomy 217R, Anatomy 210B, Physiology 2030R, Occupational Therapy 2200B, 2201B, 2207A, 2208A, 2210C, 2212B, 2215B, 2220C, 2221B and Statistics 1060A (if no previous credit in Statistics).

Third Year: Physiology 3110B, Occupational Therapy 3300R, 3301A, 3305A, 3306A, 3307C, 3308C, 3310A, 3320R, 3321B, and one 3 credit hour elective in a social science.

Fourth Year: Occupational Therapy 4420A/B, 4400A, 4405R, 4406A, 4407A, 4408A 4421R, 6 credit hours of electives in Occupational Therapy, 6 credit hours of electives chosen from Arts and Science, Administrative Studies, Health Professions, or Medicine.

All classes are completed during the normal academic year with the exception of Occupational Therapy 2221B, 3320R, 3321B, and 4420A/B which are completed during the summer months (see class descriptions).

Class Descriptions

Required Classes

Anatomy 217R Gross Anatomy: 6 credit hours. The gross structure of the human body is presented by anatomical regions through lectures, dissection, and laboratory study. The class, only open to occupational therapy students, includes practical sessions in surface and functional anatomy as well as lecture/demonstrations in radiological anatomy.

Anatomy 210B Neuroanatomy: 3 credit hours. Corequisite: Anatomy 217R. This class provides the student with an introduction to the organization and integration of the human nervous system.

Statistics 1060A Introductory Statistics for Science and Health Science: 3 credit hours. For class description, please refer to the Statistics section of this calendar.

Physiology 2030R Human Physiology: 6 credit hours. Prerequisites: Two classes from; Biology, Physics, Chemistry. Corequisite: Anatomy 217R. The function of organs and body systems is presented through lectures and laboratory work. Special emphasis is on the integration of function in the whole organism.

OT 2200B Pathology: 1 credit hour. Corequisites: Anatomy 217R, Physiology 2030R. An introduction to pathological processes of disease and injury is presented including reference to immunology, the inflammatory reaction, healing and repair, thrombosis and embolism, and neoplasms.

OT 2201B Introduction to Psychiatry: 2 credit hours. Prerequisites: Psychology 1000 or 1010, OT 2207A. This course provides an introductory overview of the field of psychiatry and psychiatric illness. Students learn about the history of psychiatry, about legal and ethical guidelines for psychiatric diagnosis and treatment, and about the classification, epidemiology, multiple causation and assessment of psychiatric disorders. The etiology, symptoms, behaviour, functional problems, treatment, management and prognosis of a selection of the most commonly diagnosed psychiatric disorders, including schizophrenic, paranoid, organic, personality and adjustment disorders, are reviewed.

OT 2207A Normal Growth and Development: 3 credit hours. Prerequisites: Psychology 1000 or 1010, Sociology 1000, 1100 or 1200. Theories and processes of physical, psychological and social development throughout the life cycle are presented and related to occupational development through the life span. Roles and developmental life tasks are analyzed and high risk stages of development are discussed with particular reference to facilitation of adaptive occupational function and prevention of occupational dysfunction. Cultural and social factors which influence one's reaction to physical and emotional disability, chronic illness, old age and death are considered along with their relevance to occupational therapy.

OT 2208A Occupational Therapy: Theory and Process: 3 credit hours. Prerequisites: Sociology 1000, 1100 or 1200, Psychology 1000 or 1010. The theoretical base of occupational therapy practice is addressed through the work of Mosey, Kleihofner and other theorists. Students gain an appreciation

of the relationship between theory and practice through case problem solving and experiential activities using a human occupation generic frame of reference.

OT 2210C Kinesiology: 2 credit hours. Corequisite: Anatomy 217R. The scientific approach to the analysis of human movement is introduced. Mechanical principles governing human motion and functional anatomy are discussed and inter-related to develop an understanding of the factors responsible for normal movement. Techniques of analysis of the physical components of activities using observation skills and motion analysis technology are also presented.

OT 2212B Activity — Analysis, Therapeutic Selection and Adaptation: 2 credit hours. Prerequisite: OT 2208A. Corequisites: OT 2210C, Anatomy 217R. The medium of occupational therapy intervention is activity, defined in its broadest concept. The role of activity in accomplishing life tasks, satisfying physical and emotional needs and restoring physical and mental health is explored. Through independent learning modules and directed laboratory experience, students analyze a range of activities including self-care, home management, community living skills, occupational skills (play, work, study) creative/self-expressive activities and leisure time activities. Analysis of the physical, cognitive, perceptual and psychosocial demands of an activity are related to the therapeutic use and adaptation of activity to meet defined goals.

OT 2215B Functional Measurement and Evaluation: 3 credit hours. Prerequisites: Stats 1060A, Psychology 1000 or 1010, OT 2208A. Corequisite: OT 2210C. Course material focuses on the functional measurement and evaluation of human occupation. Measurement theory concepts of standardization, usability, reliability and validity are examined as they apply to procedures currently used in occupational therapy as well as to the construction and validation of new procedures. Issues associated with the process of functional measurement and evaluation of human occupation are highlighted as they relate to information gathering, goal setting, test selection, planning, administration, scoring, analyzing and interpreting results, and communicating results appropriately and ethically. Students learn by using an introductory research format to apply concepts and issues to the analysis of a chosen procedure. The course is structured to facilitate self-directed learning with student analyses presented in both seminar and report format.

OT 2220C Introduction to Clinical Practice: 2 credit hours. Corequisites: OT 2207A, OT 2208A. The professional skills and ethics fundamental to the practice of occupational therapy are introduced by means of seminar and practical experience involving video recording and playback discussions. Both dyadic and group therapeutic interaction are examined with emphasis on dyadic interaction using communication skills in a variety of professional relationships. Other clinical practice skills such as role negotiation, interviewing, application of the occupational therapy clinical process in the clinical situations and professional behaviour are also taught. Brief field experiences in clinical occupational therapy programs augment didactic and experiential classroom instruction. These skills are applied during Fieldwork: Level 1.

OT 2221B Fieldwork — Level I: 0 credit hours. Corequisites: All other prescribed second year classes except Stats 1060A. Four weeks in the summer following second year are spent in a clinical occupational therapy program. This supervised learning experience provides opportunities for observing treatment programs and the skills of an occupational therapist. Students practise clinical skills with clients and carry out treatment procedures under the close supervision of a practising therapist.

Physiology 311B Neurophysiology: 3 credit hours. Prerequisites: Physiology 2030R, Anatomy 210B. The student is provided with the principles of neurophysiology. Current concepts of the organization and function of the mammalian nervous system are surveyed.

OT 3300R Medical and Surgical Conditions: 6 credit hours. Prerequisites: Anatomy 217R, 210B, Physiology 2030R, OT 2200A, OT 2210C. Corequisite: Physiology 3110B. Physicians and surgeons present the etiology, pathophysiology and medical management of medical and surgical conditions frequently encountered in practice by occupational therapists.

Musculoskeletal, neurological, rheumatic, respiratory, cardiac and general medical conditions are covered. Specific management strategies relevant to different age groups are presented. Rehabilitation management of residual dysfunction is discussed in relation to the team role of the occupational therapist.

OT 3301A Specialized Topics in Psychiatry: 3 credit hours. Prerequisite: OT 2201B. This course is a continuation of O.T. 2201B and addresses the etiology, systems, behaviour, functional problems, treatment, management and prognosis of the major psychiatric disorders not studied in O.T. 2201B. Students also study psychiatric disorders occurring specifically in children and the elderly. The management of psychiatric disorders in those with a mental handicap or those with chronic psychiatric disease is reviewed. Other management issues such as indications for individual or group, institutional or community treatment are considered.

OT 3305A Therapeutic Procedures — Biomechanical: 2 credit hours. Prerequisites: Anatomy 217R, Physiology 2030R, OT 2200A, OT 2207A, OT 2208A, OT 2210C, OT 2212B, OT 2215B, OT 2220C. Corequisite: OT 3300R. The principles and techniques of biomechanical analysis are applied to the development of joint protection programs and programs to increase joint mobility, muscle strength and endurance in conditions which result in musculoskeletal dysfunction. Mechanical principles are applied to the adaptation of equipment and procedures to achieve maximum restoration of function. Graduated work conditioning programs are discussed. Biofeedback is presented as an adjunct to therapeutic programs.

OT 3308A Therapeutic Procedures — Rehabilitative: 2 credit hours. Prerequisites: Anatomy 217R, Physiology 2030R, OT 2200A, OT 2201B, OT 2207A, OT 2208A, OT 2210C, OT 2212B, OT 2215B, OT 2220C. Corequisite: OT 3300R, OT 3301A. The theory and principles of rehabilitation are presented and applied to the management of temporary and permanent disability. Evaluation tools used include functional assessment, vocational and pre-vocational testing and environmental accessibility evaluation. The principle of adaptation applied to performance, equipment, and environment is integrated with the problem solving approach in planning programs to achieve maximum function at home, at work, at school, and in the community.

OT 3307C Therapeutic Procedures — Psychosocial: 4 credit hours. Prerequisites: OT 2201B, OT 2207A, OT 2208A, OT 2220C, OT 2212B, OT 2215B. Corequisite: OT 3301A. This course is organized into two major sections. In the first section, major psychosocial issues, such as change, loss of meaning, and feelings of incompetence, are discussed in relation to persons whose psychosocial dysfunction stems from psychiatric, developmental, or physical problems. In the second section, selected theoretical frames of reference are discussed. Evaluation tools and treatment strategies are analyzed and applied to persons whose dysfunction is primarily psychiatric in nature. Students will practice identifying problems and planning individual and group treatment programs which will be designed to restore optimum psychosocial functioning at home, at work, and in the community, for clients at various stages of the life cycle.

OT 3308C Therapeutic Procedures — Neurodevelopmental: 3 credit hours. Prerequisites: Anatomy 217R, 210B, Physiology 2030R, OT 2200A, OT 2207A, OT 2208A, OT 2220C, OT 2212B, OT 2215B. Corequisites: Physiology 3110B, OT 3300R. Current theories of the neurodevelopmental approach to the remediation of dysfunction resulting from neurological damage are presented. Theoretical constructs are applied to the development of occupational therapy programs for clients with congenital, neonatal and acquired neurological defects. Evaluation tools and treatment strategies appropriate for neurological dysfunction are presented and practiced. Among the current theorists discussed are Ayres, Bobath, Brunnstrom and Rood.

OT 3310A Rehabilitation Technology: 3 credit hours. Prerequisites: Anatomy 217R, Physiology 2030R, OT 2208A, OT 2220C, OT 2210C, OT 2212B, OT 2215B. Corequisite: OT 3300R, OT 3305A, OT 3308A. This class addresses primarily three areas of rehabilitation technology, namely orthotics, prosthetics and technical aids to rehabilitation. The principles and current theories of orthotic and prosthetic management of upper and lower

limb problems are presented along with laboratory experience in design and construction of static and dynamic orthoses. The use of external power in upper limb prosthetics and orthotics is reviewed. Strategies for training clients to use conventional and externally powered orthoses and prostheses are discussed. Technical aids to rehabilitation range from simple devices to electronic environmental controls and communication aids. Emphasis is on problem analysis and design of simple devices and evaluation and selection of electronic aids to solve rehabilitation problems.

OT 3320R Clinical Practice: 6 credit hours. Prerequisites: All second year classes. Corequisites: All third year classes except OT 3321B. Dyadic and group therapeutic interaction are analyzed in depth with emphasis on group interaction including family dynamics. Video recording and play back discussion are used to gain further understanding and skill in leadership, use of therapeutic milieu, and communication in complex clinical situations involving such issues as professional ethics, legal issues, peer review, public relations, time management and quality of care. A seven week supervised field experience in an accredited occupational therapy setting in the Atlantic Region is included in the second term. In this experience students continue to develop clinical practice skills including problem identification and begin to develop skills in program planning under the supervision of practicing therapists serving as clinical preceptors.

OT 3321B Fieldwork — Level II: 0 credit hours. Corequisites: All third year classes except elective. Eight weeks in the summer following third year are spent in a clinical occupational therapy program. Experience is obtained in applying therapeutic principles to clinical problems. Skills in evaluation and problem identification, treatment program planning and use of therapeutic procedures are developed under the direction of the supervising therapist. With supervision, students are expected to assume partial responsibility for a small caseload during this fieldwork experience.

OT 4420A/B Fieldwork — Level III: 0 credit hours. Prerequisite: OT 3321B. Eight weeks are spent in practice under professional direction. Students develop competence in applying theoretical knowledge and clinical skills to identification and definition of client problems, planning and conducting treatment programs and measuring goal attainment. Under supervision, students assume responsibility for a caseload of approximately 75% of that of an entry level therapist. Opportunities for involvement in community health care programs are included. This class would normally be completed in the summer preceding the fourth year.

OT 4400A Pharmacology. 1 credit hour. Prerequisites: Physiology 3110B, OT 3300R, OT 3301A. This class covers the effects, side effects, indications and contraindications of major classes of drugs used in selected medical and psychiatric conditions. The issue of compliance is discussed.

OT 4405R Therapeutic Program Design: 6 credit hours. Prerequisites: All third year classes. Therapeutic programs are designed within the framework of current theoretical models of occupational therapy practice. Case study methods are used to apply program design principles to program planning for clients at varying stages within the life cycle and with problems arising from biological or psychosocial causes. Development of evaluation methods to provide measures of progress and goal attainment is discussed. Topics of needs analysis and cost benefit analysis of programs are included.

OT 4406A Community Occupational Therapy: 3 credit hours. Prerequisites: All third year classes. The roles and functions of occupational therapists in schools, industry, community health care programs and social services agencies are explored. Consultant, program director, and direct service provider are community practice roles explored in relation to providing occupational therapy programs for populations at risk as well as for those with identified dysfunction. Strategies for effective communication with government and social service agencies are addressed.

OT 4407A Scientific Inquiry in Occupational Therapy: 3 credit hours. Prerequisites: Stats 1060A, OT 3321B. Basic research methodology and its application to occupational therapy practice are discussed. Emphasis is on treatment evaluation and clinical investigations based on scientific principles. Students learn to design clinical recording methods to facilitate analysis of treatment effects. Critical analysis and interpretation of research literature is included.

OT 4406A Supervision and Management: 3 credit hours. Prerequisite: OT 3321B. Supervision skills are taught in relation to supervision of auxiliary staff, students and volunteers. The organization and administration of occupational therapy services in institutions and community-based agencies are discussed. Management principles related to personnel, budgeting, record keeping, reporting and program development are presented. Accountability systems such as peer review and chart audit are studied and applied to occupational therapy services. Current federal, provincial and regional health care policies are reviewed to determine their effects on occupational therapy service development. Experience in planning student programs and inservice or continuing education programs is included.

OT 4421R Independent Study and Advanced Clinical Practice: 6 credit hours. Prerequisites: Stats 1060A, all third year classes. Corequisites: OT 4405R, OT 4408C, OT 4407A. Students complete a scientific study of an approved topic under the direction of an assigned tutor. Topics must be relevant to current occupational therapy practice. Seven weeks of fieldwork experience relevant to the topic of study are used to increase knowledge and experience in the area and allow collection of data pertinent to the study. A seminar presentation and typewritten report or journal article are required.

Electives

OT 4410B Dyadic and Group Interaction: 3 credit hours. Prerequisite: OT 3321B or permission of the instructor. Dyadic interaction and group structure are analyzed in depth. Techniques applicable in occupational therapy psychotherapeutic intervention are discussed. Experience in applying dyadic and group techniques in treatment is gained through laboratory practice and clinical tutoring.

OT 4411B Behaviour Therapy: 3 credit hours. Prerequisite: OT 3321B or permission of instructor. Students learn the principles of behaviour therapy and its application in achieving behaviour change. Operant conditioning, modelling, desensitization, aversion therapy, assertiveness training, and the token economy are some of the topics discussed.

OT 4412B Advanced Neurodevelopmental and Sensory Integration Therapy: 3 credit hours. Prerequisites: Anatomy 210B, Physiology 3110B, OT 3308C and OT 3321B. An in-depth analysis of advanced theories and techniques of neurodevelopmental and sensory integration therapy. Experience in applying these therapeutic procedures to clinical problems is gained in laboratory sessions and through individual clinical tutoring.

OT 4413B Independent Living Programs: 3 credit hours. Prerequisites: OT 3308C, OT 3321B or permission of instructor. Alternative needs of independent living for severely disabled persons are presented. The role of the occupational therapist in independent living programs is discussed in terms of preparing clients for independence, and program organization and coordination.

OT 4414B Theory Application in Occupational Therapy Practice: 3 credit hours. Prerequisite: OT 3321B or permission of instructor. The transition from theory to practice is explored within the context of current occupational therapy theories reported in the literature. Program models based on recent theories are developed.

OT 4415B Stress Management Through Activity: 3 credit hours. Prerequisites: OT 3301A, OT 3307C, OT 3321B. Current theories of stress as an etiological factor in disease and dysfunction are presented. The concept of stress reduction through lifestyle management is discussed within the context of occupational therapy theory. Strategies of goal setting, problem solving, and adaptation are applied through active participation in purposeful activity to reduce effects of physical and psychosocial stress and improve clients' function in social and vocational roles.

OT 4416B Vocational Rehabilitation: 3 credit hours. Prerequisites: OT 3305A, OT 3306A, OT 3321B. The role of the occupational therapist in vocational rehabilitation is explored. Job analyses, pre-vocational skills exploration and evaluation, job sample design and evaluation, situational assessment and work adjustment programs are major topics. Work related

aptitude testing and career counselling methods are discussed in relation to individuals experiencing physical, cognitive and emotional dysfunctions. The use of work information indexes and relevant community resources is emphasized.

OT 4425B/4426B/4427B Directed Study in Occupational Therapy: 3 credit hours. Prerequisite: Permission of Committee on Studies. In this course students may individually or in small groups explore a particular topic within occupational therapy under the direction of a faculty member. The topic and requirements for the class are jointly decided by the students and the professor involved. An outline of the objectives and evaluation methods for the class must be approved by the Committee on Studies before class work begins. A paper or presentation prepared for this class may not be submitted for credit in any other class.

OT 4417A/4418B/N 4900A/4901B/PH,HE,REC 4498A/4499B 4499R/PH 4900A/4901B/PT 4300A/4901B Interdisciplinary Approach to Gerontology: See N 4900A and N 4901B for description.

College of Pharmacy

Academic Staff, 1987-88

Robert S. Tonks, BPharm., PhD (Wales), FPS, FIBiol., Dean of the Faculty of Health Professions and Professor

David K. Yung, BA, BSP, MSc (Sask.), PhD (Alta.), Director and Professor

Professors

R. Frank Chandler, BSc Pharm, MSc (Alta.), PhD (Syd.)

J. Gordon Duff, BSP, MSc (Sask.), PhD (Fla.)

Kenneth M. James, BSP, MSc (Sask.), PhD (Alta.)

Michael Mezei, Dipl. Pharm. (Bud.), PhD (Oregon State)

Associate Professors

Patrick S. Farmer, BSP, MSc (Sask.), PhD (Portsmouth)

Mary E. MacCara, BSc (Pharm.), (Dal), Pharm.D. (Minn.)

Ingrida S. Sketris, BSc (Pharm.) (Tor.), Pharm. D. (Minn.)

Assistant Professors

Isaac Abraham, BPharm, MPharm (UST Ksi.), PhD (Neb.)

Dale W. Cochran, BA (Queen's), BSc (Pharm.) (Tor.), BSc (Pharm), Pharm.D. (SUNY Buffalo)

Pollen K.F. Yeung, BSc (Pharm.), MSc (Man.), PhD (Sask.)

Lecturers

Lillian Berry, BSc (Pharm.) (Dal) PhC

Rita K. Caldwell, BSc (Pharm.) (Dal) PhC

Richard A. Merrett, BSc (Pharm.) (Tor.), MSc (Tor.)

Beth Wilson, BSc (Pharm.) (Dal) PhC

Special Lecturers

Dawn M. Frail, BSc (Pharm.) (Dal), MSc (Dal)

Vincent Helgton, Pharm. Dip. BSc (Dal) PhC

Bonnie Salsman, BSc (Pharm.) (Dal)

Roy Steeves, BSc (Pharm.) (Dal), Pharm. D. (Fla.)

C. Brian Tuttle, BSc (Pharm.) (Dal), MSc (Tor.)

Preceptors (1987)

The pharmacist preceptors listed below gave their time and expertise to a structured practical training program. The program is administered by the College with the support of the Pharmacy Licensing Bodies in the Maritimes. It requires the third year students to demonstrate their knowledge and professional competency in actual practice situations in community and hospital pharmacy.

Community Pharmacists

Nova Scotia

Kim Ackles

Sandra Aylward

Peter Bakes

Eric Bannerman

Diane Bell

Lillian Berry

Stephen Brown

Anne Charlton

John Dudar

George Falm

Dominic Gniewek

Kimberlee Heisler

Ram Laushik

Catherine Longard

Susan Mansour

Mike Mercer

Bob MacDiarmid

Shelley MacDonnell

Rosemary MacDougall

Kevin MacKay

Eric McDonald

Sarah Nicholson

Roberta Pawlyshyn

Sandra Penny

Brian Petite

William Ross

Byron Sarson

David Scott

Dorothy Servant

Paul Tibbo

Lorraine Wallbank

Susan Wedlake

David Wilmshurst

New Brunswick

Fred Armstrong

Vincent Basque

Janice Chapman

Hugh Gorham

Ronald Greenfield

Peter Haines

Claire Hawkes

David Jamieson

Lisa Kennedy

Robert McInnis

Joyce McLean

Raymond Thibault

Sydney Varner

William Venolt

Anne Marie Whelan

Bonita Witt

P.E.I.

George Auld

Roy Cairns

Allan Greene

Nancy Lea-Cooke

Robert Matheson

Joseph McAskill

Ariene McKay

Wayne Rogerson

Royden Stetson

Gordon White

Hospital Pharmacists

Nova Scotia

Gina Burgess

John Burgess

Janice Carr

George Crosman

Donna Crowell

Brian Dillman

Catherine Druham

Dawn Fage

Patricia Galbraith

Karen Gallivan

Michael Gillis

G.M. Griffin

Joan Hannan

Rosemary Hayter

Pauline Hingston

John Hughes

Geraldine Kearns

Marjorie Keith

Shelley Lynde

Mary Maxner

Alexa Miller

Hugh McGinn

Brian O'Rourke

Michael Taylor

New Brunswick

Deborah Boudreau

Kathy Foster

Luice Gossein

Gordon Kane

Irene Kerr

Linda Knowles

Pamela McLean-Veysey

Darlene Smith

Roy Steeves

Molra Wilson

P.E.I.

Roy Boates

Anne Bourgeois

Karen Cameron

Kendra Day

The pharmacists listed below have given their time and expertise to the Clinical Clerkship during 1986-1987. During the Clerkship the fourth year students attend conferences and clinical drug rounds at participating hospitals and learn to apply clinical pharmacy principles.

Canadian Forces Hospital

Brian O'Rourke

Michael Taylor

Camp Hill Hospital
Margaret Ackman
Beverly Atkinson
John Burgess
Sarah Ferguson
Gerl Kaarna
Bonnie Salsman
Wendy Scott
Kathleen Spurr
Brian Tuttle

Halifax Infirmary
Joan Hannan
Pauline M. Hingston
Janice Meisner
Alexa Miller
Susan Scribner

Nova Scotia Hospital
Catherine Bennett
Brian Dillman
Nancy Harris

Izaak Walton Killam Hospital for Children
Rita Caldwell
Gina Burgess
Shelly Mann
Stephanie Oxenham
Ardeith Reardon

Victoria General Hospital
Anne Bishop
Sharon Johns
Carol Kenny
Judy McPhee
Richard Merrett
Larry Sereack
Emily Somers

Saint John Regional Hospital
Roy Steeves

Formal pharmacy education in the Maritime provinces began in 1908, with evening classes in pharmacy and chemistry conducted in the Nova Scotia Technical College. Success of these classes encouraged the Nova Scotia Pharmaceutical Society to establish the Nova Scotia College of Pharmacy in 1911. The College was affiliated with Dalhousie University in 1912.

The New Brunswick Pharmaceutical Society and the Prince Edward Island Pharmaceutical Association were admitted to affiliation with the College in 1917 and 1950, respectively. With the affiliation of the former society, the College was renamed the Maritime College of Pharmacy.

In 1961, the Maritime College of Pharmacy was admitted into Dalhousie University as the College of Pharmacy, a constituent part of the new Faculty of Health Professions. A four year program leading to the degree of Bachelor of Science in Pharmacy (BSc(Pharm.)) was introduced. The undergraduate program, which admits 66 students into the first year, has a patient-oriented curriculum in which clinical pharmacy is integrated with the pharmaceutical sciences.

In 1966, a Master's program was established, followed by a Doctor of Philosophy program in 1977. More information on the graduate program may be obtained from the Faculty of Graduate Studies Calendar.

In 1972, a twelve month pharmacy residency program was initiated by Camp Hill Hospital in cooperation with the College of Pharmacy. Programs were initiated at the Halifax Infirmary in 1974, at the Victoria General Hospital in 1981 and at the Saint John Regional Hospital in 1982. The programs orient the resident to various aspects of institutionalized health care with emphasis placed on drug therapy in patient care. They provide an opportunity for the residents to use professional judgement in evaluating drug information, drug therapy and in communicating with members of the health professions and with patients. A certificate is issued to candidates successfully completing the pharmacy residency program. Programs at the Camp Hill Hospital, the Halifax Infirmary, and the Saint John Regional Hospital are accredited with the Canadian Hospital Pharmacy Residency Board.

George A. Burbidge Pharmacy Building

In the fall of 1988, the College of Pharmacy moved into the George A. Burbidge Pharmacy Building. This building, the former Medical Sciences Building was renamed in honour of the first Dean of the College, in recognition of his contribution to pharmacy education in the Maritimes. Present facilities accommodate approximately 260 undergraduate and 12 graduate students.

The pharmacy library houses 6,584 bound volumes, 9,740 microforms and receives almost 280 subscriptions relating to pharmacy and allied sciences.

Adjacent to the library is an area established for the preservation of pharmaceutical archives. The archives include a collection of historical pharmaceutical implements, containers, records and preparations.

Career Opportunities

Pharmacy is a health science concerned with many aspects of the use of drugs for the health care of the patient. This includes the preparation of suitable materials for use as medicines from natural and synthetic sources, the compounding of drugs and the dispensing of suitable medication, the taking of medication histories, keeping patient drug profiles, counselling patients on their prescribed medication, educating patients on their self-medication habits, monitoring drug interactions, drug side-effects and the patient's compliance with their drug treatment and the provision of information on drugs to other health professionals.

Pharmacy graduates have a wide range of career opportunities. The majority enter community pharmacy practice. Hospital pharmacy also provides an interesting challenge for pharmacists, particularly in view of their expanding role within the clinical setting. The pharmaceutical industry provides opportunities for pharmacists in the fields of sales, production, research and quality control.

The increased role of federal and provincial governments in public health has provided opportunities for pharmacists in analytical laboratories and in administrative positions as government inspectors and health supplies officers. Opportunities may also be available in universities as teachers and researchers.

A Bachelor of Science in Pharmacy is necessary for those who wish to practice as pharmacists. For those who wish to enter research or teaching, a Master of Science degree or further postgraduate study is usually required.

Licence in Pharmacy

The College of Pharmacy, being purely educational, has no jurisdiction in matters relating to licencing or to registration as a Pharmaceutical Chemist (Pharmacist). These functions are entirely under the control of the provincial licencing body concerned. A period of practical training or apprenticeship is required before a graduate in pharmacy is licenced as a pharmacist. Information regarding licencing or registration in each province may be obtained from the respective provincial society: the Registrar of the New Brunswick Pharmaceutical Society, Place Heritage Court, Suite 204, 95 Foundry Street, Moncton, N.B., E1C 6H7; the Registrar of the Prince Edward Island Board of Pharmacy, PO Box 1084, Charlottetown, P.E.I., C1A 7M4; or the Registrar of the Nova Scotia Pharmaceutical Society, 1526 Dresden Row, PO Box 3363, Halifax South Postal Station, Halifax, N.S., B3J 3J1.

Pharmacy Examining Board of Canada (PEBC)

The Pharmacy Examining Board of Canada was created by Federal Statute on December 21, 1963, to establish qualifications for pharmacists acceptable to participating pharmacy licencing bodies. The Board provides for annual examinations and issues a certificate to the successful candidate which may be filed with a Canadian provincial licencing body in connection with an application for licence to practice pharmacy under the laws of that province. Baccalaureate graduates from the College of Pharmacy are eligible to write these examinations. Information relative to the dates of examinations, application forms, etc., may be obtained through the Director's Office, College of Pharmacy.

Student Pharmacy Society

The basic aims of the Student Pharmacy Society are to promote a closer liaison with the other societies on campus, to give the pharmacy students a strong position with regard to Student Council activities, to provide a means of communications between students and their respective licencing bodies in the Maritimes, and to provide an organizational body which plans and finances the various unique Pharmacy Society activities.

Membership in the Pharmacy Society includes membership in the Canadian Association of Pharmacy Students and Interns and representation in the Canadian Pharmaceutical Association.

Admission Requirements

The general requirements for admission to the Faculty of Health Professions are described in Arts and Science Regulation 5. Applicants should note that admission is on a competitive basis so that final selection of candidates usually is based upon higher than the minimum academic requirements. Students with advanced standing or degrees are not given preference for admission. Enrolment is limited by the number of laboratory places available.

Because this is the only College of Pharmacy for the Maritimes, preference is given to Maritime residents.

In order to be qualified for admission, students must have senior matriculation (or equivalent) standing in chemistry, English, mathematics, and either biology or physics plus one other subject.

Applicants must write the Pharmacy College Admission Test (PCAT). Information on test dates, testing centres and test format may be obtained by writing PCAT, Psychological Corp., 555 Academic Ct., San Antonio, Texas 78204. Applicants are required to write the test no later than the February sitting.

An academic screening is done and selected applicants are interviewed.

Application forms may be obtained from the Admissions Office of Dalhousie University. Information regarding credit for advanced classes may be obtained from the Registrar. Application forms must be submitted before the deadline indicated in the enclosed Almanac. A non-refundable application fee is required.

Deposit

Because of the large number of applicants, a deposit is required from accepted students to show proof of intent to register with the College of Pharmacy. A non-refundable deposit of \$100.00 (applicable to tuition fees) is payable within three weeks of notification of acceptance.

Services

University services and services to students are outlined in the General Information section of the Calendar.

Regulations

University Regulations

All students must observe the University Regulations as outlined in this Calendar.

Faculty of Health Professions Regulations

All students must observe the Faculty of Health Professions Regulations as outlined in this Calendar.

College of Pharmacy Regulations

There is, within the College of Pharmacy, a Committee on Studies.

When the work of a student becomes unsatisfactory or his/her attendance irregular, the student may be required to discontinue and be excluded from the class concerned.

If laboratory work or assignments are not completed in a satisfactory manner in any class or classes, credit for the class is withheld until all work has been satisfactorily completed.

In the case of failure in the laboratory portion of a pharmacy class, there is no supplemental privilege and the laboratory, together with the corresponding lecture portion of the class, must be repeated.

At the beginning of January, the results obtained by each student will be reviewed. Any student who has not shown reasonable proficiency in the Christmas examinations may be required to withdraw from the College of Pharmacy for the remainder of the session or to reduce the number of classes being taken.

As an academic requirement, students are assessed in each year on their aptitude and fitness for the profession of pharmacy. A student who, in the judgement of the faculty, fails to attain a satisfactory standard in the assessment may be retired from the College of Pharmacy.

A student withdrawing from the University or intending to discontinue any class or classes must have the approval of the Director of the College of Pharmacy and must also notify the Registrar.

Each student, before registration each year, must have program approval from the College of Pharmacy. In seeking this approval the student should have determined eligibility for the proposed classes by satisfying the prerequisites prescribed. In choosing elective classes in the final year, the student should note the intent that the electives should prepare the graduate for specified areas of practice.

Grading System

Grade Points

Grades are reported using a letter grading system set forth in Faculty

Regulation 10, and grade point averages are computed as provided for in the same regulation. It should be noted that the letter grades F, FM, W, INC and NP are counted as zero grade points. The yearly academic performance of all students is assessed by June 1st each year.

Credit Hours

A passing grade in a credit class must be achieved in order to accumulate credit hours.

For classes offered by the College of Pharmacy, one credit hour is defined as one hour of lecture per week per term, or three hours of laboratory per week per term.

Yearly Academic Requirements

In each year of studies, a student must obtain a minimum grade point average (GPA) of 2.00 and accumulate at least 18 credit hours. If enrolled as a part-time student, the number of credit hours registered, and accumulated must be the same.

At the end of the second and subsequent years, a student must also have a minimum cumulative GPA of 2.00.

Requirements for Professional Classes

A student must obtain a grade average of at least C in each professional class for that class to be counted as credit for the degree or as a prerequisite for another professional class. A student who earns a grade of less than C in a professional class but is still eligible to continue in the College of Pharmacy must repeat that class until a grade of C or better is obtained.

Requirements for Degree

To satisfy the requirements for the degree of Bachelor of Science in Pharmacy a student must:

accumulate at least 134 credit hours (or its equivalent for transfer students), with an overall (cumulative) GPA of at least 2.00 in the prescribed classes; and

accumulate at least 104 credit hours (or its equivalent for transfer students), with an overall (cumulative) GPA of at least 2.00 in the prescribed professional classes.

Note: For lists of prescribed and professional classes see the sections "Classes of Instruction" and "Prescribed Classes."

Duration of Studies

See Faculty Regulation 7.

Degree with Distinction, Dean's List, University Medal

See Faculty Regulations 22.1, 22.2 and 22.3.

Summer School Classes

The grade that a student receives in a summer school class is used in calculating the GPA of the next academic year.

Failure to Meet the Requirements

Students who fail to meet the yearly academic requirements may be allowed to proceed on probation for the next academic year, providing their yearly GPA is at least 1.80 (1.60 in first year) and they have accumulated at least 18 credit hours in their current year of study; otherwise they must withdraw from the College of Pharmacy. Students who fail to meet the cumulative GPA requirements must withdraw from the College of Pharmacy.

Students required to withdraw from the College of Pharmacy are not allowed to register in any Pharmacy classes unless they have been readmitted or approval to take the classes has been granted by the Faculty of the College.

Students who have been required to withdraw from the College of Pharmacy will not normally be considered for readmission until they have been away from the College for one year. Application forms for readmission must be submitted not later than July 7. If subsequently readmitted the student will be on probation and must maintain a minimum GPA of 2.00 or withdraw from the College.

Probation

A student whose marks fall to the probation level for the second time must withdraw from the College of Pharmacy. If subsequently readmitted the student must maintain a minimum GPA of 2.00 or withdraw from the College.

These decisions and conditions of probation would normally be made by the Committee on Studies. However, the Committee will consider any written appeal.

Supplemental Examinations

Supplemental examinations in classes not designated as professional classes may be permitted only when a student meets the requirements of the Faculty Regulation 8.4 and Arts and Science Regulation 19.9 and has a GPA of not less than 1.80 (1.80 in first year).

Failing a Class Twice

Any student failing a professional class for the second time must withdraw from the College of Pharmacy.

Remedial Examinations

A student who has met the yearly academic requirements but has a D in one professional class, and no failures, at the discretion of the Committee on Studies and the professors of the class, may be allowed to raise the grade to an acceptable level by doing remedial work recommended by the professors of the class and then writing the remedial examinations. Remedial examinations are subject to the following regulations.

Remedial examinations will be allowed for not more than six credit hours of class work in a student's program.

Remedial examinations will be written at a time specified by the department offering the examination. However, this must be before September 1 immediately following the class.

On successful completion of a remedial examination, a grade of C is entered on the student's record along with the notation that the C was earned by examination. In the case of a failure an F is entered. The final mark recorded will be used for grade point average calculations for the past academic year. However, the original grade of D also remains on the transcript.

Appeals

Students wishing to appeal a decision based on faculty regulations should request from the Director the appeal procedure.

Prescribed Classes

The program of prescribed classes results from a reorganization of the pharmacy curriculum first implemented in the academic year 1978-1979. All students entering the College of Pharmacy in that year or following years are required to complete this program.

All classes in this program are offered within the normal academic year with the exception of Pharmacy 3000B. Pharmacy 3000B includes a practical training program which the student must complete on a full-time basis in a pharmacy, normally during the month of May following the third year of study.

The following are descriptions of classes which are expected to be offered in the academic year 1988-89.

First Year: Pharmacy 1100, Pharmacy 1700B, Anatomy 101A, Chemistry 112, Mathematics 1080A, Mathematics 1000B and an elective.

Second Year: Pharmacy 2100, Pharmacy 2500B, Chemistry 240, Microbiology 3020 and Physiology 201.

Third Year: Pharmacy 3000B, Pharmacy 3100B, Pharmacy 3250A, Pharmacy 3300C, Pharmacy 3310A, Pharmacy 3500, Biochemistry 3100 and Pharmacology 3470 or 3480.

Fourth Year: Pharmacy 4100C, Pharmacy 4500, Pharmacy 4700A, Pharmacy 4710B, Pharmacy 4930B, Pharmacy elective and an approved elective designed to prepare the student for the fields of community practice, hospital pharmacy, industry or graduate studies.

Classes of Instruction

Professional Classes

Ph1100 Pharmaceutics I: B. Wilson, 9 credit hours, lecture: 4 hours first term and 3 hours second term; tutorial: 1 hour; lab: 3 hours. An introduction that includes a preliminary description of the functions of a pharmacist in practice and an introduction to communication techniques. The major lecture topics are pharmaceutical calculations, dosage forms, and basic compounding and dispensing techniques. A programmed text approach to medical terminology is also included. Laboratory work consists of compounding and dispensing representatives of the dosage forms discussed in class. Dispensing labs and communication skill seminars are compulsory parts of this class. Failure to complete the labs or the communications portion will result in a grade of incomplete on the transcript.

Ph 1700B Pharmacy Administration I: J.G. Duff, 3 credit hours, lecture 3 hours. An introduction to the history of Pharmacy, pharmacy organizations, law, and business management.

Ph 2100 Pharmaceutics II: staff, 10 credit hours, lecture 4 hours, lab 3 hours. Prerequisites: Pharmacy 1100, Chemistry 112 and Mathematics 1000B. A continuation of Pharmacy 1100 that includes a discussion of liquid dosage forms, dispersed systems, sterile preparations and biopharmaceutics. Lectures and labs stress the practical applications, the scientific principles, and calculations related to these topics. Labs and communication skill seminars are compulsory parts of this class, failure to complete either will result in a grade of incomplete on the transcript.

Ph 2500B Introduction to Therapeutics: L. Berry and M. Mezel, 2 credit hours, lecture 2 hours second term. An introduction to therapeutic and prophylactic use of prescription and over-the-counter (OTC) drugs. Patient counselling is emphasized along with knowledge of drug products and disease states.

Ph 3000B Practical Training Program: L. Berry, 5 weeks (175 hours). Prerequisite: completion of third year. A structured practical training program consisting of five consecutive weeks to be completed in May, after the third year academic program. This program (which is conducted in the presence of a practicing pharmacist preceptor in both community and hospital pharmacies) studies prescription compounding and dispensing, nonprescription drugs and prescription accessories, patient counselling and communications, laws and regulations, management and administration as well as everyday practical problem solving. Emphasis is on all aspects of pharmacy relating to general practice.

Ph 3100B Pharmaceutics III: K.M. James and L. Berry, 2 credit hours, lecture 1 hour second term, lab 3 hours second term. Prerequisite: completion of second year. This class is concerned with the proper compounding and dispensing of pharmaceutical products, and communication techniques used in recommending OTC drugs.

Ph3250A Pharmacokinetics: I. Abraham, 2 credit hours, lecture 2 hours first term. Prerequisite: Pharmacy 2100. A class designed to acquaint students with basic applied pharmacokinetics. Topics include general concepts of one and two compartment models, linear and non-linear pharmacokinetics, drug kinetics after intravenous, intramuscular or oral administration, practical methods of one compartment model utilizing urinary data, multiple dosing kinetics, effect of renal impairment on drug kinetics, approaches to dosage adjustment in renal failure, effect of hepatic impairment on drug kinetics, pharmacokinetic factors influencing drug therapy in the elderly, pharmacogenetics, relationship between drug concentration and response and kinetics of pharmacologic response.

Ph 3300C Medicinal Chemistry: D.K. Yung and P.S. Farmer, 5 credit hours, lecture 2 hours, lab 3 hours second term. Prerequisite: Chemistry 240. Applications of the content of areas of chemistry to organic medicinal agents, and the design, chemistry, therapeutics, and pharmacological action of organic compounds used in medicine and the correlation of physicochemical properties and physiological action. The laboratory work consists of qualitative analysis of certain classes of drugs.

Ph 3310A Pharmaceutical Analysis: D.K. Yung, 3 credit hours, lecture 2

hours first term, lab 3 hours first term. Prerequisite: Chemistry 240. An introduction to the principles and methodology of drug product quality assurance. Topics include gravimetric, volumetric, chromatographic, and spectrophotometric methods of analyses of drug products.

Ph 3500 Therapeutics I: staff, 9 credit hours, lecture 5 hours. Corequisites: Pharmacy 3100B, Pharmacology 3470, Microbiology 3020 and Pharmacy 3250A. Prerequisite: Pharmacy 2500B. Therapeutic and prophylactic use of prescription and OTC drugs are discussed. Patient interviewing and counselling are emphasized, along with knowledge of drug products and disease states.

Ph 4000 Pharmaceutical Investigation: 6 credit hours, a minimum of 6-8 hours per week. Prerequisite: Consent of the supervisor and approval by the Committee on Studies. The Committee on Studies must approve the project before the student registers in the class. Library, laboratory and/or field investigations related to an area in pharmacy, carried out by an individual or a small group of students under the supervision of one or more faculty members. Projects should be submitted to the Committee on Studies well before registration, preferably before the end of the previous academic term. Presentation of a seminar on the completed project is required. Where appropriate, a bound thesis is submitted. A paper or a presentation which is prepared for this class may not be submitted for credit in any other classes.

Ph 4010A, 4020B, 4030C Directed Study in Pharmacy: 3 credit hours. Prerequisite: Consent of the supervisor and approval by the Committee on Studies. The Committee on Studies must approve the project before the student registers in the class. For a description of these half classes, see the full class Pharmacy 4000.

Ph 4100C Pharmaceutics IV: staff, 5 credit hours. Prerequisites: Pharmacy 3100B, Pharmacy 3250A and Pharmacy 3500. This class deals with topics in clinical pharmacokinetics, radiopharmaceutics and drug interactions.

Ph 4220A, 4240B Dosage Formulation and Product Development: K.M. James, 3 credit hours, lecture 2 hours, lab, individual assignments, minimum students 4. Prerequisite: Pharmacy 2100 and consent of instructor. Application of physicochemical and technical knowledge in the development of pharmaceutical products.

Ph 4230A Dermopharmacy: M. Mezal, 3 credit hours. Prerequisite: Consent of instructor. Topics include skin diseases and topical therapy.

Ph 4320A or B Pharmaceutical Analysis and Control: D.K. Yung, 3 credit hours, lecture 2 hours, lab 3 hours. Prerequisite: Consent of instructor. A study of the theory and practice of quantitative analytical techniques used in the analysis and control of drugs and finished pharmaceutical dosage forms with emphasis on modern instrumental methods.

Ph 4330C Herbal Remedies: R.F. Chandler, 3 credit hours, lecture 2 hours first term, 1 hour second term. Prerequisite: Consent of instructor. Topics concerning natural products of plant origin of pharmaceutical and/or medicinal importance are discussed, including historical highlights, native and folklore usage, herbal "health foods," and poisonous plants of significance to our geographical area. In addition, an introduction to chemistry, biosynthesis and general extraction, purification, and identification techniques is presented for the carbohydrates, glycosides, lipids, volatile oils, alkaloids and some miscellaneous compounds.

Ph 4340C Drug Design: P.S. Farmer, 3 credit hours, lecture 2 hours first term, 1 hour second term. Prerequisite: Pharmacy 3300C or consent of instructor. The principles of drug design are studied. The increasing role of biochemical knowledge in lead generation is emphasized, followed by consideration of available lead exploitation methods. Case studies of drug discovery will be reviewed in some length. Extensive reading assignments will be given.

Ph 4500 Therapeutics II: staff, 13 credit hours, lecture, 7 hours first term and 5 hours second term, clerkship 80 hours, tutorial 2 hours. Prerequisites: Biochemistry 3100, Pharmacology 3470 or 3480, Therapeutics I and consent of instructor. A discussion of the application of pharmaceutical sciences to various diseases, therapeutic use of drugs and drug-induced disease is presented. Conferences and clinical drug rounds are conducted

at participating hospitals in conjunction with instruction in and application of clinical pharmacy principles.

Ph 4550B Pharmacy Home Health Care: W.A. Parker, 3 credit hours, lecture/laboratory exercise 3 hours. Prerequisite: Consent of instructor. This course consists of didactic lectures and readings, laboratory exercises in surgical appliances and orthotic fittings and the use of durable medical equipment, and a community pharmacy-based home health care clerkship rotation.

Ph 4700A Pharmacy Administration IIA: Patrick King, 3 credit hours. Prerequisite: Pharmacy 1700B. This course is intended to provide introductory business training to prepare the student to manage a retail or hospital pharmacy. Students will be exposed to financial analysis, capital budgeting, marketing, organizational behaviour and decision making.

Ph 4710B Pharmacy Administration IIB: K.M. James, 3 credit hours. Prerequisite: Pharmacy 4700A. Consideration of socioeconomic factors that affect the practice of Pharmacy. A review of ethics, standards of practice and pharmacy legislation, followed by student presentations on current socioeconomic topics. Each presentation is evaluated by a panel of students and practicing pharmacists.

Ph 4800 Hospital Pharmacy: M.E. MacCara and R.A. Merrett, 6 credit hours, lecture 2 hours, lab as assigned. Prerequisite: Consent of instructor. A study of the purposes, functions, and responsibilities of the pharmacy department in the hospital. Current concepts in hospital pharmacy, such as, unit dose drug distribution, clinical pharmacy services, intravenous (IV) admixture services, total parenteral nutrition, quality assurance programs and drug information services will be discussed. Tours of hospital facilities may be organized. Laboratory work gives practical experience using aseptic technique in the compounding of IV admixtures and total parenteral nutrition preparations.

Ph 4900B Studies in Drug Information: M.E. MacCara and I.S. Sketria, 3 credit hours, lecture 3 hours, minimum students 4. Prerequisite: Consent of instructors. A study through lectures, seminars and reading assignments of the essentials of drug information services. Study and application of common principles of drug literature retrieval, evaluation and communication result from confrontation with actual questions regarding drugs and drug products based on clinical practice. Laboratory sessions at the Provincial Drug Information Service will be organized.

Ph 4910B Drug Metabolism: 3 credit hours, lecture 2 hours/week for 14 weeks, open to 4th year pharmacy students and graduate students. Prerequisite: Consent of instructor. The biotransformation of drugs and other foreign compounds in humans and animals is examined. The isolation and characterization of metabolites and the biochemical mechanisms of drug metabolism at subcellular or molecular levels are discussed. Emphasis is on the relationship between drug biotransformation and the therapeutic and/or toxic effects of drugs.

Ph 4920B General Toxicology: 3 credit hours, 2 hours/week for 14 weeks, open to 4th year pharmacy students and graduate students. Prerequisite: Consent of instructor. The various disciplines of toxicology and the fundamental principles governing the interaction of toxic chemicals and biological systems are covered. The toxic effects and the biochemical mechanisms underlying the toxic manifestations of various chemicals such as drugs, carcinogens, teratogens, heavy metals, insecticides, pesticides, and industrial solvents, will be discussed in detail.

Ph 4930B Introductory Drug Metabolism and Toxicology: P. Yeung, 2 credit hours, lecture 2 hours second term. Prerequisites: Biochemistry 3100, Pharmacology 3470 or 3480 and Therapeutics I. An introduction to drug metabolism and general and clinical toxicology.

Ph 4950B/N 4800B/HE 2250B/PT 3090B Interdisciplinary Course in Human Nutrition: 3 credit hours, normally spring term, E. Lamble. Prerequisite: Biology 1000 or at the discretion of the professor. For description, see N4800B.

Ph 4960A, 4970B/N 4900A, N 4910B/OT 4417A, OT 4418B/PE, HE, REC 4498A; PE, HE, REC 4499B/PT 4300A, PT 4901B An

Interdisciplinary Approach to Gerontology: Two separate classes, dealing with social and health perspectives, respectively. See N 4900A and N 4910B for description.

Biochemistry 3100: D.W. Russell, 6 credit hours, lecture 3 hours, L.C. Stewart, lab 3 hours. Prerequisites: Chemistry 240. A study of the chemistry of living organisms. Topics include the organic and physical chemistry of macromolecules, with special reference to proteins, the catalytic activities of enzymes, the energy-yielding pathways of metabolism, bio-synthesis of nucleic acids and proteins; the control of metabolism. Emphasis is on an understanding of the concepts and methods of biochemistry, and on the evidence for accepted conclusions. The laboratory class includes experiments designed to consolidate the students' knowledge of pH and buffers, experiments with selected enzymes, some metabolic experiments with radioactive glucose, an investigation of the properties of deoxyribonucleic acid, assay of a vitamin, and an antigen-antibody test for pregnancy.

Anatomy 101A: P. Jackson, 3 credit hours, lecture 4 hours. Taught by the Department of Anatomy and designed exclusively for students in the Health Professions and Dental Hygiene.

Physiology 201: staff, 6 credit hours, lecture 3 hours, tutorial 1 hour. Prerequisite: Anatomy 101A or permission of the Committee on Studies. Text: E.E. Selkurt, *Basic Physiology for the Health Sciences*, Little, Brown and Co., 1975. Taught by the Department of Physiology, dealing with functions of various systems of the body, with special reference to the human. While the primary aim is to acquaint the student with normal mechanisms, frequent references are made to diseased functions.

Microbiology 3020 General Microbiology: For class listing see under Microbiology in the Arts & Science section of this calendar.

Pharmacology 3470 The Influence of Chemical Agents on Living Organisms: staff, 6 credit hours, lecture 3 hours. An introduction to the actions of drugs on physiological and biochemical functions of man and lower animals. The basic mechanisms of actions and structure-activity relationships of various groups of pharmacological agents are stressed and wherever possible, discussed at the molecular and macro-molecular level of cell organization. Factors influencing the absorption, distribution, biotransformation, and excretion of drugs are discussed, as are potential uses.

Pharmacology 3480 The Influence of Chemical Agents on Living Organisms: staff, 6 credit hours, lecture 3 hours, lab Wed. 2:30-5:00 p.m. Prerequisite: Consent of course coordinator. The lecture class (Pharmacology 3470) is augmented by a practical laboratory class designed for student participation in the demonstration of basic principles of pharmacology.

Other Prescribed Classes

Note: For class descriptions of the following classes, see under the respective departmental sections of the Arts & Science segment of this calendar.

Chemistry 112 General Chemistry

Chemistry 240 Introductory Organic Chemistry

Mathematics 1000A Introductory Statistics for non-Mathematicians

Mathematics 1000B Differential and Integral Calculus

Electives

The first year elective may be any approved credit class. The student should discuss the available electives with his or her faculty counsellor. Electives for the fourth year of study must be approved by the Committee on Studies.

College of Pharmacy Scholarships, Awards, Bursaries, Prizes and Loans

In determining the recipients of scholarships and medals, the total of each letter grade (A+, A, A-, etc.) will be used, as well as the grade point average. Details of scholarships, awards, bursaries, prizes, and loans are found in the university publication, Scholarships, Prizes, and Financial Aid, available on request from the awards office.

School of Physiotherapy

Academic Staff, 1985-86

Robert S. Tonks, B Pharm, PhD (Wales), FPS, FI Biol., Dean of the Faculty of Health Professions

Joan M. Walker, Certs. Phys. Ther. (N.Z.), Dip TP, BPT (Man.), MA (Man.), PhD. (McM), Director and Professor

Professor

David A. Egan, MCSP, Dip TP, MSc (UWO)

Associate Professors

Kenneth C.W. Hill, MCSP, Dip TP, MSc (Dal)

James C. Wall, BSc (Lond.), MSc (Surrey), MEd (Tor.), PhD (Lond.)

Lydia Makrides, MCSP, BPT (Sask.), MSc (Ottawa)

G.I. Turnbull, MCSP, Dip TP, BPT (Man.), MA (Dal)

Assistant Professor

Cheryl L. Kozey, BPE (UNB) MSc (Waterloo)

Faculty Honorary Appointments To Clinical Facilities

Cheryl L. Kozey, BPE (UNB), MSc (Waterloo), (*Nova Scotia Sports Medicine Clinic*)

Honorary Appointments

R.A. Fox, MD, FRCP (C), Professor, Department of Medicine

B.R. MacKenzie, MD, FRCP (C) Associate Professor, Department of Medicine

J.J. Murray, MD, FRCP (C) Professor, Department of Medicine

W.D. Stanish, MD, FRCS (C), Assistant Professor, Department of Surgery

J.F.L. Woodbury, MD, FRCP (C), FACP, Professor, Department of Medicine

Cross Appointments

J.M. Walker, Certs. Phys. Ther. (N.Z.), Dip. TP, BPT (Man.), MA (Man.), PhD (McM), Associate Professor, Department of Anatomy, Faculty of Medicine

Provincial Clinical Coordinators

J. O'Dea, BSc (PT) (McGill) *Newfoundland*

N. McKay, BSc (PT) (Dal) *New Brunswick*

Overseas Clinical Coordinators

I. Glencross, Queen's College, Glasgow

M. Robertson, Queen Margaret College, Edinburgh

Clinical Research Associates

J.W. Kozey, MSc (Waterloo)

Dr. R. Stalker, MD (Dal)

Clinical Associates

Nova Scotia

J.G. Brachaniec, MCSP — Camp Hill Hospital, Halifax

M.C. Merlin, BPT (McGill) — Halifax Infirmary, Halifax

S.E. Quackenbush, Dip. Phys. Ther. (Dal) — IWK Hospital, Halifax

J.L. Schaffner, BSc PT (McGill) — N.S. Rehabilitation Centre, Halifax

V.I. Zwerling, Dip. Phys. Ther. (Dal) — Victoria General Hospital, Halifax

B. Lynch, Dip. Phys. Ther. (Alta.) — Dartmouth General Hospital, Dartmouth

N. Raison — Camp Hill Hospital, Halifax

S. Berryman — IWK Hospital, Halifax

J. Wright — IWK Hospital, Halifax

Y. Munn — Victoria General Hospital, Halifax

S. Cogswell, BSc (Phys.) (Dal) — Halifax Infirmary, Halifax

J. Venot, BSc (Phys.) (Dal) — N.S. Rehabilitation Centre, Halifax

L. Langley, BSc (PT) (Dal) — Physiotherapy Atlantic, Halifax

J. Everett-Abraham, BSc (PT) (McGill) — Northwood Centre, Halifax

M. Fogarty, Dip. Phys. Ther. (Dal) — St. Rita's Hospital, Sydney
 K. Works, BSc (Phys.) (Dal) — Colchester Hospital, Truro
 W. Krawchuk, Dip. Phys. Ther. (Dal) — Sydney City Hospital, Sydney
 S. Liengme, Dip. (MCSP) — St. Martha's Hospital, Antigonish
 A. Waterbury, Dip. Phys. (Dal) — Valley Health Services, Kentville
 J. Cameron, BSc (PT) (Dal) — Aberdeen Hospital, New Glasgow

New Brunswick

P. Greechan, Dip. (MCSP) — Chalmers Hospital, Fredericton
 M. Thomson, Dip. (MCSP) — St. John Regional Hospital, St. John
 S. Bosca, BSc (Phys.) (Dal) — Chaleur General Hospital, Bathurst
 J. Hughes, Dip. Phys. Ther. (Dal) — Moncton City Hospital, Moncton

Newfoundland

M. Mulholland, Dip. (MCSP) — St. Clare's, St. John's
 G. Barrowman, Dip. (MCSP) — Salvation Army Grace General Hospital, St. John's
 G. Brown, BA, BEd, Dip. (MCSP) — Dr. Charles A. Janeway Child-Centre, St. John's
 L. Croable, BPT (Queen's) — Children's Rehabilitation Centre, St. John's
 K. Ambler, Dip. (MCSP) — Western Memorial Hospital, Corner Brook

Prince Edward Island

J. Rogers — Queen Elizabeth Hospital, Charlottetown

Part II — Additional Clinical Placements

Nova Scotia

L. Burke, Dip. (Phys.) (Dal) — Northside Harbour View Hospital, North Sydney
 N. Frank, Dip. (PT) (Dal) — Soldiers Memorial Hospital, Middleton
 K. Goodspeed, BSc (PT) (Dal) — Glace Bay General Hospital, Glace Bay
 P. McKenna, BSc (Phys.) (Dal) — Glace Bay Community Hospital, Glace Bay

New Brunswick

S. Banks — Carleton Memorial Hospital, Woodstock
 B. Cormier, BSc (Phys.) (Dal) — Sussex Health Centre, Sussex
 C. Dumont — Campbellton Regional Hospital, Campbellton
 E. Jones — St. Joseph's Hospital, Saint John
 M. Lavolette — Dr. George Dumont Hospital, Moncton
 E. Morrison — Miramichi Hospital, Newcastle
 S. Paquin — Hotel Dieu Hospital, Chatham
 C. Pelletier — Edmundston Regional Hospital, Edmundston
 B. Roberts — Worker's Rehabilitation Centre, Saint John

Newfoundland

L. Goulding — Central Newfoundland Regional Health Centre, Grand Falls
 M. Hitchens — General Hospital, Health Sciences Centre, St. John's
 I. Hutchinson — James Paton Memorial Hospital, Gander
 C. Wright, BSc (Phys.) (Dal) — Carbonear General Hospital, Carbonear
 L. Vardy, Dip. Phys. (Dal) — Nova Physiotherapy, St. John's
 A. Kavanagh, Dip. Phys. (Dal)
 S. Garvin
 B. Ellis
 L. Hardman, Dip. Phys. (Dal)
 G. Russell
 S. McSeffrey

Prince Edward Island

V. Handren, Dip. Phys. (Dal) — Island Physiotherapy, Charlottetown

The School of Physiotherapy was established in 1963. A two-year program leading to a Diploma in Physiotherapy was offered by Dalhousie, the course of study being followed by a compulsory five-month internship period prior to eligibility for licence to practise physiotherapy. This Diploma program was terminated at the end of the 1976-77 academic year. In 1975 the Senate of Dalhousie approved the implementation of a four-year program leading to a Bachelor's Degree. The BSc (Physiotherapy) degree which replaced the Diploma program comprises a general Arts and Science first year with required subjects followed by three professional years of study as outlined. During this course of study clinical training is undertaken. Whilst primarily

concerned with a commitment to graduate academically and clinically highly qualified physiotherapists, the school also offers non-credit workshops and seminars as part of a continuing education program for graduates in Physiotherapy.

The School also offers a post-diploma program which enables Diploma holders to obtain a BSc (Physiotherapy) degree.

Affiliated Institutions

At present clinical instruction and practice during the course of study is undertaken with the guidance of clinical instructors in the following centres: Camp Hill Hospital, Grace Maternity Hospital, The Halifax Infirmary, The Isaac Walton Killam Hospital for Children, The Nova Scotia Rehabilitation Centre, The Dartmouth General Hospital, The Victoria General Hospital and a variety of other placements including clinics in Newfoundland and New Brunswick.

Field Experience

Throughout the course of study students learn to apply their academic knowledge in a variety of situations. During the summer following the second year of study a brief period of orientation is undertaken to familiarize the students with the clinical environment in preparation for the clinical experience which follows in the third and fourth years. During these last two years, students are engaged in clinical practice under the guidance of clinical instructors. During these clinical placements the student's performance is evaluated by the staff of the Physiotherapy Department in which they are practising and students must maintain a satisfactory level of performance together with demonstrated suitability to pursue a career in Physiotherapy. A compulsory period of clinical practice between the third and fourth years offers the student the opportunity to obtain experience across Canada and in Britain. The students choose specific placements from amongst clinical facilities associated with Dalhousie's School of Physiotherapy.

Career Opportunities

The profession of Physiotherapy (or Physical Therapy) offers a varied, interesting and worthwhile career to both men and women in a variety of settings. Upon graduation most Physiotherapists work in hospital-based departments rotating through various areas of interest prior to becoming more deeply involved in any specific area. Opportunities are available in rehabilitation centres, extended care units, special schools, or with local government agencies, industrial health units, sports clubs and private clinics. Alternatively, experienced physiotherapists may operate a private practice. Interested persons can pursue careers leading to Graduate Degrees in related areas proceeding to teaching and/or research. A limited number of graduate programs in Physiotherapy are available at universities in Canada.

Licence to Practise Physiotherapy

Physiotherapists practising in Canada must be licensed with the appropriate Provincial Licensing Body. The school itself has no jurisdiction in matters related to licensing, and Dalhousie University cannot accept responsibility for changes in licensing regulations which may occur from time to time.

The Canadian Physiotherapy Association (CPA), the national professional organization, recommends minimum academic and clinical curriculum content for membership. The degree course at Dalhousie University is designed to fulfill the present requirements by the time the students graduate. Membership or eligibility for membership in the CPA entitles the Physiotherapist to apply for Provincial licensing through the appropriate provincial body. At present an examination for registration is not necessary for graduates of Canadian Physiotherapy Schools.

Students' Society

The Physiotherapy Students' Society gives incentive to the students to participate in school, campus and community activities and to participate in both local and national professional activities.

Regulations

(See also Faculty Regulations)

1. All students are required to observe the University regulations and the Faculty regulations as described in this Calendar.

2. Regular and punctual attendance at classes is required of all students. When the work of a student becomes unsatisfactory or if attendance is irregular, the student may be required to withdraw from the School.
3. Promotion each year is contingent upon satisfactory academic and clinical performance.
4. Students whose clinical performance is repeatedly unsatisfactory may be required to withdraw from the School.
5. Except in special circumstances students may not carry a course load in excess of the normal load as set down in the calendar of the School of Physiotherapy. A full course load in each of the three professional years is normally 36 credit hours. The minimum full course load is 36, 30 and 30 credit hours in Years II, III and IV respectively.
6. Students are normally required to complete the requirements for their degree within six years of initial registration in the School of Physiotherapy, (see Faculty Regulation 7)

Supplemental Privileges (see Faculty Regulation 8.4 and Arts and Science 19.9)

In addition to meeting the normal requirements of this Faculty, supplemental privileges may be granted provided the student has met the minimum required Grade Point Average (GPA) for the year, and provided the student has attained a marginal fail grade (F/M) in that class for which this privilege is to be granted.

A maximum of one supplemental can be permitted in any one year, and a maximum of three can be permitted throughout the whole course of study. Students who fail their year may be required to repeat the whole year or withdraw from the School of Physiotherapy.

Students who fail a class on two occasions are not permitted to repeat the class and thus must withdraw from the School of Physiotherapy.

Failed Year

The student is considered to have failed the year under the following conditions:

1. If the student has failed to meet the required GPA for that year.
2. If more than one supplemental is required.

Students who fail their year may be required to withdraw from the School or to repeat their full year of study. Supplemental privileges are not granted in a repeated year.

Credit Hours

Each full class is assigned a value of six credit hours, and each half class is assigned a value of three credit hours.

Grading System

The passing grade is D except in PT 4080R clinical practice. See Faculty Regulation 10.

Grade Point Average Requirements

A student must obtain a minimum yearly GPA of 2.0 and a cumulative GPA of 2.0 or higher in the School of Physiotherapy (see Faculty Regulation 10). To satisfy the requirements for the Degree of Bachelor of Science in Physiotherapy, a student must accumulate at least 138 credit hours (or its equivalent for transfer students).

Withdrawal

Students who voluntarily withdraw, having satisfactorily completed courses toward the BSc (Physiotherapy) degree, with the intention of returning at a later date are advised that re-acceptance is contingent upon there being an available place.

Appeal

A student wishing to appeal a decision based on School regulations should in the first instance attempt to resolve the issue with the instructor(s) concerned, before proceeding as per Health Professions Regulation 20.

Degree with Distinction

See Faculty of Health Professions Regulation 21.2.

Association Membership

Information regarding membership in the various Physiotherapy Associations can be obtained from the following sources: The Canadian Physiotherapy Association (44 Eglinton Ave. W., Suite 201, Toronto, Ontario, M4R 1A1); The Chartered Society of Physiotherapy (14 Bedford Row, London, WC1R 4ED, England); The American Physical Therapy Association (1111 North Fairfax St., Alexandria, Virginia, 22314, U.S.A.); The World Confederation of Physical Therapy, Secretary General (16/19 Eastcastle Street, London, W1N 7PA, England); The Canadian University Service Overseas, (CUSO) (151 Slater Street, Ottawa, Ontario, K1P 5H5).

Scholarships, Bursaries and Prizes

Details of scholarships, prizes, bursaries, and loans may be found in the Dalhousie Awards Office Publication "Scholarships, Prizes, and Financial Aid."

Degree Programs

BSc (Physiotherapy) Degree Program

The program for the BSc (Physiotherapy) Degree is composed of a minimum of four years of study at University.

Application for Admission

The minimum academic requirement for entry into the first Professional Year of the BSc (Physiotherapy) program is successful completion of first year in the Faculty of Arts and Science at Dalhousie University or the equivalent at another University (see Academic Requirements). Previous elective academic work transferred to the BSc (Physiotherapy) program must be not more than 10 years old at the time of graduation from the program. Prospective candidates are strongly advised not to include classes of similar description and content as those offered in the second, third and fourth (professional) years. Students seeking exemption from classes are assessed on an individual basis. A limited number of places may be made available for students who already possess a degree and whose course work may not include the prerequisite courses as described below, and who in the opinion of the Admissions Committee have demonstrated that they may be considered suitable candidates to pursue a career in Physiotherapy. Such candidates are evaluated on an individual basis.

The deadline for receipt of applications for admission to the School of Physiotherapy is stated in the enclosed almanac. Selected applicants will be asked to attend an interview. In addition, all applicants must undergo a medical examination to assess their fitness for the study and practice of Physiotherapy. Since the demand for admission exceeds the resources available, candidates are judged on a competitive basis. The decision of the admissions committee is final. Applicants are required to make arrangements to have an official copy of their final transcript for the current year sent as soon as it becomes available. We stress that it is the applicant's responsibility to see that all necessary documents are received by the School of Physiotherapy as soon as possible. Applicants with incomplete files will not be considered. At present, owing to the limited enrollment and the large number of applicants, only residents of the Atlantic provinces can be considered for admission to the School of Physiotherapy.

Quota System

The School of Physiotherapy at Dalhousie University is the only School serving Atlantic Canada. Due to the serious shortage of physiotherapists in some of the Atlantic provinces, a provincial quota system has been implemented. The provincial quota system means that a specified number of places will be allocated to each Atlantic province. Approximately 16 positions have been allocated to Nova Scotia, 12 to New Brunswick and Newfoundland, and 2 to Prince Edward Island for a total of 42 positions.

Deposit

Because of the large number of applicants, a non-refundable deposit of \$100.00 (applicable to tuition fees) is required from accepted students as proof of intent to register with the School of Physiotherapy. The \$100 is payable within three weeks of notification of acceptance.

Transfer Students (See also Undergraduate Regulations)

Students who wish to transfer to the School of Physiotherapy from another University course in Physiotherapy must submit a written request for transfer to the Chairman of the Admissions Committee of the School of

Physiotherapy and enclose official transcripts from all colleges and universities attended as well as the calendar descriptions of all courses taken. Such requests are assessed on an individual basis. Admission is subject to the availability of a place. In order to obtain the BSc (Physiotherapy) degree from Dalhousie University, any transfer student admitted into the School must conform with Faculty Regulations.

Academic Requirements

First Year

During this year students are registered in the Faculty of Arts and Science at Dalhousie or in an equivalent course of study at another University. Applicants are advised that a minimum C standing in each class (Dalhousie or equivalent) is required for consideration for admission into the School of Physiotherapy. An overall average of at least 70% is required. Possession of the minimum standing does not, however, guarantee admission owing to the competition for the limited number of places in the program.

Faculty of Arts and Science

The required course of study includes five full classes comprising two science classes (Chemistry, Physics or Biology), one social science class (Psychology, Sociology and Social Anthropology), and two electives. All prerequisite courses must be completed by the end of the normal academic year preceding the year of anticipated admission to the School of Physiotherapy. It should be noted that in order to fulfill the science requirement the two classes must be in different areas of science, i.e. both cannot be concentrated in one area. Applicants with prerequisite courses that are over 10 years old are advised to take all prerequisite courses in order to qualify for admission consideration. Applicants with prerequisite courses that are between 6 and 10 years old are advised to take a prerequisite course in order to qualify for admission consideration.

Year 1: The classes in the *recommended* program at Dalhousie are as follows: Two classes from: Chemistry 1100, 1110, 1120, or 1200, Physics 1000 or 1100 or 1300, Biology 1000 or 2000 level and one class from: Psychology 1000 or 1010, Sociology and Social Anthropology 1200 and two Arts and Science electives.

Second, Third and Fourth Years: Students must obtain a minimum GPA of 2.0 in each of the final three years of study and an overall final GPA of at least 2.0. Additionally, promotion to the fourth year of study is contingent upon a satisfactory clinical report (passing grade "C" required) with regard to the summer clinical placement between the third and fourth years of study (PT 3500B).

Faculty of Health Professions

Required Classes

Year II: Physiology 2030R, Physiotherapy PT 2021A, PT2041B; PT 2051B, PT 2081C, PT 2070A, PT 2080B, PT 2100B, PT 2180A. Four week summer clinical orientation.

Year III: Physiotherapy PT 3000A, PT 3010A, PT 3020B, PT 3030B, PT 3050A, PT 3061A, PT 3062B, PT 3110B, PT 3120A, Psychology 2120A, Elective, PT 3500B.

Year IV: Physiotherapy PT 4010B, PT 4021A, PT 4022B, PT 4030B, PT4060R, PT 4050B, Option PT 4110-4140A/B, Option PT 4210-4240A/B, PT 4280A, Statistics, Elective.

Electives

All electives must be approved by the School of Physiotherapy. A fourth-year elective is expected to be beyond the 1000 level. Admitted students who have four full years of university study may be allowed credit up to a maximum of two classes. Students with three full years of university study may be allowed one class credit.

Students who have successfully completed, prior to admission, classes equivalent to the required classes in the program of study may apply for exemption by submitting the course outline to the School office (see Arts and Science Regulation 14, "Advanced Placement"). If granted, the student will be required to replace all such classes with those approved by the School.

Clinical Practicum

After the second year, students engage in a four week clinical orientation (May/June). Throughout the third and fourth years, students engage in clinical practice under the guidance of clinical instructors. A compulsory full-time period of clinical practice is undertaken for approximately eighteen weeks between the third and fourth years (PT 3500B). Students must have settled all financial obligations to the University prior to undertaking any period of clinical practice.

Post-Diploma Program

In 1977, the Senate at Dalhousie University approved the implementation of a course of study which enables Diploma holders in Physiotherapy to obtain the BSc (Physiotherapy) degree.

Application for Admission

Application for admission is made through the office of the Registrar and the deadline for receipt of applications is published in the enclosed almanac. The enrollment is strictly limited, however, the School may consider late applications if appropriate resources prove available.

Students who apply must possess the normal admission requirements to Dalhousie University and *Either* (a) A Diploma in Physiotherapy from Dalhousie University *Or* (b) A Diploma in Physiotherapy from a recognized institution whose curriculum in the opinion of the Committee on Studies, is at least equivalent to years 2 and 3 of the current BSc (Physiotherapy) program at Dalhousie University and which rendered the graduate eligible for membership in the professional association/society of his/her country of training. Three references are required.

Course of Study

The total number of credit hours required in the existing BSc (Physiotherapy) degree is 136. Students with a Diploma in Physiotherapy are allowed a total of 78 credit hours, and must therefore take 60 credit hours to complete the requirements for the degree. The course of study is normally completed within 5 years from the date of initial enrollment. A break in registration is permitted but does not extend the five-year limit (see Faculty Regulation 7). A minimum overall "C" average (cumulative GPA 2.0) must be achieved.

Required Classes	Credit Hours
Elective	3
PT 4010B Human Locomotion	3
PT 4021A Research Methods	3
PT 4022B Research Methods	3
PT 4030A Physiotherapy Management and Professional Issues	3
PT 4150/4110/4130/B Option	3
PT 4210/4140/4120/A Option	3
PT 3120A Exercise Physiology	3
PT 3110B Neurophysiology	3
A Statistics	3
R Elective	6
Sub total	36
Plus 4 approved Electives	24
Total	60

All students must obtain approval of their total proposed course of study from the School. Students who possess university classes in addition to their Diploma may apply for transfer credit. A minimum of six full classes must be taken at Dalhousie University. No work overload (more than 6 full courses) is permitted during an academic year. The School cannot guarantee that credits taken at another University will be equivalent to Dalhousie course offerings and therefore accepted as part of the degree requirements. See Faculty Regulation 2, Arts and Science Regulation 5 and School regulations—Application for Admission.

Required Classes

Physiology 2030R: 6 credit hours. A full class in Physiology offered by the Department of Physiology, comprised of a lecture and laboratory series, which will be closely integrated with Anatomy 217R.

PT 2021A Clinical Physiotherapy I: 3 credit hours. Co-requisites: PT 2061C, PT 2062R, Anatomy 217R. A class in physiotherapy closely integrated with PT 2061C/PT 2062R emphasizing observation and surface anatomy in the evaluation of functional disability and the subsequent design of appropriate progressive activity.

PT 2041B Clinical Physiotherapy II: 3 credit hours. Co-requisites: PT 2061C, Anatomy 217R. Pre-requisite: PT 2021A. A continuation of PT 2021A with increasing emphasis being placed on the design of progressive activity in order to solve stated clinical problems involving strength, mobility, endurance and coordination.

PT 2051B Kinesiology: 3 credit hours. Co-requisites: PT 2061C, Anatomy 217R. The scientific basis underlying methods of evaluation, principles of progression of activity and techniques used for developing mobility, strength, endurance and coordination are considered.

PT 2061C Functional Anatomy: 3 credit hours. Knowledge of gross anatomy of the human body and associated surface anatomy is used to appreciate the relationship of anatomical structures during functional activities.

Anatomy 217R Gross Anatomy: 9 credit hours. The gross structure of the human body is studied region by region through the use of lectures, dissection and demonstrations in Radiological Anatomy.

PT 2070A Microbiology: 3 credit hours. Co-requisites: Physiology 2030R, PT 2061C, Anatomy 217R. An introductory class in Microbiology offered by the Department of Microbiology within the Faculty of Medicine.

PT 2080B Pathology: 1 credit hour. An introductory class in Pathology offered by the Department of Pathology within the Faculty of Medicine.

PT 2100B Neuroanatomy: 3 credit hours. Pre-requisite: PT 2160A. Co-requisites: PT 2061C, Anatomy 217R. A class in Neuroanatomy offered by the Department of Anatomy.

PT 2160A Human Histology: 3 credit hours. A histology class for physiotherapy students covering cells, tissues, and selected organs.

Summer clinical orientation: 4 weeks, 0 credit hours.

PT 3500A Assessment: 3 credit hours. Pre-requisites: PT 2021A, PT 2051B, PT 2041B. The course presents both theory and practice in the physiotherapeutic aspects of the clinical assessment of musculoskeletal disorders.

PT 3010A Clinical Therapeutics I — Orthopaedic Condition: 3 credit hours. Prerequisites: PT 2070A, PT 2080B, PT 2021A, PT 2030R, PT 2041B, PT 2051B, PT 2061C, Anatomy 217R, PT 2100B, PT 2160A, and four weeks clinical orientation.

PT 3020B Clinical Therapeutics III — Rheumatology/Amputees: 3 credit hours. Prerequisites: PT 2070A, PT 2080B, PT 2021A, PT 2030R, PT 2041B, PT 2051B, PT 2061C, Anatomy 217R, PT 2100B, PT 2160A, and four weeks clinical orientation.

PT 3030B Clinical Therapeutics IV — Neurological Conditions: 3 credit hours. Pre-requisites: PT 2070A, PT 2080B, PT 2021A, PT 2030R, PT 2041B, PT 2051B, PT 2061C, Anatomy 217R, PT 2100B, PT 2160A, and four week clinical orientation.

PT 3050A Clinical Therapeutics II —Cardiorespiratory/Obstetrics: 3 credit hours. Prerequisites: PT 2070A, PT 2080B, PT 2021A, PT 2030R, PT 2041B, PT 2051B, PT 2061C, Anatomy 217R, PT 2100B, PT 2160A, and four weeks clinical orientation.

Classes designated as Clinical Therapeutics I, II, III, IV, include lectures from the teaching staff of the Departments of Medicine, Surgery, Paediatrics, Neurosurgery, Obstetrics and Gynecology of the Faculty of Medicine, and these are integrated with the Physiotherapeutic procedures taught by the Faculty of the School. The topics covered include conditions commonly

encountered in orthopaedics, rheumatology, spinal cord injury and disease, central and peripheral nervous system lesions, medical and surgical chest conditions, vascular diseases, ante- and post-natal care together with the prevention and treatment of post-surgical complications.

PT 3061A Electrical Energy In Physiotherapy Part I: 4 credit hours. Prerequisites: Physiology 2030R, PT 2061C, Anatomy 217R. The course presents both theory and practice. The physiotherapeutic application and control of various forms of electrical energy. The physiological effects on the normal are related to the therapeutic effects used for injury and disease and are specifically applied to a selected number of pathological conditions. Use of modalities and tests that may be applied to sensory and motor systems will be considered.

PT 3062B Electrical Energy In Physiotherapy Part II: 4 credit hours. Prerequisite PT 3061A. Continuation of PT 3061A with emphasis on thermal modalities and therapeutic radiations.

PT 3110B Neurophysiology: 3 credit hours. Prerequisite: Physiology 2030R. The principles of neurophysiology and survey of current concepts of the organization and function of the mammalian nervous system are provided.

PT 3120A Exercise Physiology: 3 credit hours. Prerequisite: Physiology 2030R. The student is given a thorough understanding of skeletal muscle physiology and insight into the short and long term response to work. The material is related to normal and pathological conditions.

PT 3500B Clinical Practicum: 0 credit hours. Summer clinical practicum, Year III/IV (passing grade C required). In addition, students must take *Psychology 2120B (Clinical Psychology)* during the third year of study.

PT 4010B Human Locomotion: 3 credit hours. Prerequisites: PT 2061C and Anatomy 217R or equivalent. The course introduces students to human gait analysis with emphasis on observational methodology. Various types of locomotion, quadrupedal, wheelchair, bipedal, with and without aids, will be considered in terms of functional anatomy and analysis.

PT 4021A Research Methods: 3 credit hours. Prerequisite or corequisite: An approved course in statistics. The course is designed to familiarize students with the research process.

PT 4022B Research Methods: 3 credit hours. Prerequisite: PT 4021A. The course familiarizes students with the research process through the undertaking of a research project.

PT 4030A Physiotherapy Management and Professional Issues: 3 credit hours. Presentations by faculty, other resource persons and students are given on issues related to the health care delivery system and administration in Physiotherapy.

PT 4110-4150A/B Option: 3 credit hours.

PT 4210-4240A/B Option: 3 credit hours. Each student takes one option class in each term. These classes are related to detailed study of specific areas in Physiotherapy or related fields, some of which offer the opportunity to develop advanced clinical skills. Final details of options are available to the students at the beginning of each academic year.

PT 4280A Paediatric Development and Assessment: 3 credit hours. Examination of prenatal and postnatal development with emphasis on the infant and child and assessment procedures appropriate to age.

PT 4050B Psychiatry: 3 credit hours. Prerequisite: Clinical Psychology 2120B. An understanding of common psychiatric disorders that students will meet in clinical practice is developed. The class is given by members of the Department of Psychiatry in the Faculty of Medicine.

PT 4060R Clinical Practice: 6 credit hours. Prerequisite: PT 3500B. All students must undertake up to 15 hours per week in the practice of Physiotherapy in an approved setting. Satisfactory clinical performance is mandatory prior to graduation (passing grade C required). In addition,

students are required to take Math 1060A (Statistics) during the fourth year of study.

Elective Classes

PT 3070A/3080B Directed Study: 3 credit hours each. Under the guidance of a member of Faculty of the School of Physiotherapy a student may undertake a detailed study related to the theory or practice of Physiotherapy or associated topics. A variety of subjects ranging from detailed literature surveys to more clinically oriented areas are available to the students and evaluation is based upon the collection and presentation of the material.

PT 3090B/N4800B/Ph4950B/HE2250B Interdisciplinary Course in Human Nutrition: 3 credit hours, normally spring term, E. Lambie. Prerequisite: Biology 1000 or at the discretion of the professor. For class description, see N4800B.

PT 4300A/4301B/N4900A/4910B/OT4417A/4418B/PE, HE, REC 4498A/ 4499B/PH4960A/4970B An Interdisciplinary Approach to Gerontology: See N 4900A and N 4910B for description.

School of Recreation, Physical & Health Education

Academic Staff

Robert S. Tonks, BPharm, PhD (Wales), FPS, FI Biol *Dean of the Faculty of Health Professions*

T.L. Maloney, BPE, BEd (University of Alberta), MA (University of Western Ontario) PhD (University of Alberta), *Director and Associate Professor.*

Professors

E.G. Belzer Jr., BS (West Chester State College), MS (University of Maryland), PhD (University of Illinois) *Head of the Health Education Division*
A. Bonen, BA (University of Western Ontario), MS, PhD (University of Illinois)
L.E. Holt, BS, MS (Springfield College) PhD (University of Southern Illinois)
J.C. Pooley, Teach. Cert. (Bede College, England), Dip. PE (Carnegie School of Physical Education, England), MS, PhD (University of Wisconsin)
A.J. Young, BS (West Chester State College), MS, PhD (University of Maryland)

Associate Professors

R.P. Beazley, BA, BEd (Acadia University), BPE (McMaster University), MPE (Dalhousie University), EdD (University of Tennessee)
G.C.B. Elder, Dip.Ed.Adv. (St. Mary's College, University of London), MEd (Georgia Southern University), PhD (McMaster University)
R.J. Hoyle, BA, MA (Cambridge University), MSc (Dalhousie University)
N.H. Kemp, DLC (Loughborough College, England), BS (PE), MS (University of Oregon)
J.F. McCabe, BPE, BA (University of New Brunswick), MSc, EdD (University of Tennessee) *Head of the Physical Education and Kinesiology Division*
J. Prsala, MA, PhD (Charles University, Czechoslovakia)
A. Richards, Dip. PE (Trent Park College), MSc (Dalhousie University), EdD (University of Colorado)
J.F. Singleton, BA (University of Waterloo), MS (Pennsylvania State University), PhD (University of Maryland)

Assistant Professors

H.C. Ballem, BPE (University of New Brunswick), MSc (Dalhousie University)
L.J. Barnes, BPE, MSc (Dalhousie University)
P.D. Campagna, BPHE (University of Windsor), BEd (Queen's University), MEd (State University of New York), PhD (University of Alberta)
N.M. Ipson, BA, MS (Brigham Young University)
R.F. Lyons, BA (Dalhousie University), MEd (Xavier University), PhD (University of Oregon), *Graduate Coordinator of the Leisure Studies Division*
D.P. McGuire, BA (Wright State University), MA (University of Cincinnati)
W.R. Mitic, BA (University of Western Ontario), MHK (University of Windsor), EdD (State University of New York)
C.A. Putnam, BPE (University of Manitoba), MS (University of Washington), PhD (University of Iowa)
P.D. Richards, Teach. Cert. (Trent Park College), Laban Arts of Movement Centre Certificate (England), MA (University of Colorado) *Head of the Leisure Studies Division*
S.M. Shaw, Cert. Ed. (Institute of Education, University of London), BPE, MSc (Dalhousie University), PhD (Carleton University)
C.A. Savoy, BPE (University of New Brunswick), EdM (Boston University)
J.A. Scott, BPE (University of Calgary), MS (University of Oregon)
L.J. Verabli, BA BPHE (Queen's University), MS (University of Michigan), PhD (Ohio State University), *Supervisor of Teaching Internship Program*
A.D. Yarr, BPE, MPE (University of British Columbia)

Lecturer

L.A. MacGregor, BPE (Dalhousie University), MS (University of Illinois)

Special Lecturers

Catano, J.W. BSc (Drexel Institute of Technology), MSc (Dalhousie University)
R.L. Kirby, MD (Dalhousie University), FRCP(C)
J.F. MacDougall, BA, BEd (St. Francis Xavier University), Dip. Physical and Health Education (Dalhousie University), MEd (Ontario Institute for Studies in Education)
B. Neumann, BA (University of Toronto), MA (York University)
H.A. Nobel, BSc (Springfield College), AIE (University of London), DPE (Acadia University), LLD (Dalhousie University)
R.E. Stalker, MD (Dalhousie University), *Dalhousie University Health Services*

Sessional Lecturer

N.W.P. Munro, BSc (UNB), MA (Carleton)

Purposes of the School

Since its inception in 1966 the School of Recreation, Physical and Health Education has been assigned responsibilities for undergraduate studies in the Divisions of Health Education, Physical Education and Kinesiology, Leisure Studies, and for the conduct of graduate education and research.

Information about the graduate programs available in Kinesiology, Health Education and Leisure Studies is available in the Calendar of the Faculty of Graduate Studies.

Regulations

1. All students must observe the University and Faculty regulations described in this Calendar.

2. All Students must attend the classes of their prescribed course regularly and punctually. When the work of a student becomes unsatisfactory or attendance is irregular, the student may be required to discontinue the class concerned.

3. Undergraduate Grade Point Average Standards

A student must obtain a minimum grade point average (GPA) of 1.8 in the first normal academic year of university study. In the case of transfer students from Dalhousie the first year of study will include those courses completed prior to admission to the School and being used for degree purposes.

Thereafter the student must maintain a minimum GPA of 2.0 in any work completed in an academic year (September — April). A minimum

cumulative GPA of 2.0 over the entire undergraduate course of study must be achieved in order to be awarded the BPE, BRec, BSc (Health Education) or BSc (Kinesiology) Degree.

Failure to meet these standards will result in the student being placed on probation (see Regulation 6.) or being required to withdraw from the School.

A normal yearly workload in each of the undergraduate degree programs is considered to be 30 credit hours.

Students expecting to receive a BSc (Kinesiology) degree with honours are required to maintain a GPA of 3.0 or better over the last 3 years and all grades counting toward an honours degree must be C or better.

4. Computation of Grade Point Average

The point value of letter grades and their use in GPA calculation are explained in Faculty Regulation 10.

Notes:

A "W" (withdrawal failure), "INC" (incomplete) and "NP" (no paper) will be counted as an "F" for computation purposes.

A grade of "FM" continues to be counted as zero grade points in computing the GPA unless a supplemental examination is written and passed, in which case a value of 1.0 is assigned.

A grade of "ILL" may only be awarded if a medical certificate has been submitted. A class so graded must be completed at the earliest possible opportunity. A grade of "ILL" does not enter into the GPA computations.

5. 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 within four weeks of the required date for submission of grades in that class to the Registrar's Office.

Exceptions to this rule will normally be extended only to classes which require field work after completion of the Spring term. At present these are Health Education 1295, Leisure Studies 4498, Physical Education 3398 and Physical Education 3402.

6. Retirement from the School

Any student who has been declared as not having met the GPA standards for the first time is allowed a probationary period until August 30. During this probationary period Summer School classes may be taken at Dalhousie and if the grades achieved in such courses raise the GPA to the minimum required level, the student is readmitted. In cases where the GPA is too low to be raised by taking a normal Summer session workload the student is retired from the School with no probationary period.

If the grades achieved in Summer School are not sufficient to raise the GPA, the student is retired from the School for a period of at least one academic year. Application may be made to be readmitted for the following academic year (i.e. one year after retirement from the School). The application is processed through normal procedures only if the student's GPA has been raised to the minimal level. Readmission at this time is contingent upon one of two things: (1) the remainder of the student's program can be completed in the period specified for degree completion in Faculty Regulation 7 or (2) the Committees on Studies of the School and the Faculty of Health Professions find justification for extending the period for degree completion.

7. Failure to Attain GPA Standards

Any student who fails to meet the yearly GPA standards as defined in Regulation 3 above must withdraw from the School. Provisions for being readmitted are provided in Regulation 5 above. However, a student who has been declared as having failed the year on any two occasions is not eligible to return to the School.

8. Academic Appeals Procedures

8.1 Appeals to Division Committee on Studies: In each of the divisions in the School of Recreation, Physical and Health Education (Health Education, Physical Education and Kinesiology, Leisure Studies) a Committee on Studies exists for the purpose of hearing initial student appeals of academic decisions.

The student appellant is responsible for the preparation of all documentation in support of his/her appeal.

The student must submit the appeal to the appropriate division head who will convene a meeting of the Committee on Studies.

The student has the right to appear before the Committee on Studies and he/she should notify the division head of his/her desire to do so. The student also has the right to be represented by an advocate of his/her choice.

The decision of the divisional Committee on Studies shall be conveyed to the student, in writing, by the division head immediately after the conclusion of the appeal. This notification should include information about procedures to appeal to the School's Committee on Studies.

If the student's appeal is denied, the student may appeal to the School's Committee on Studies by the procedures identified below. This appeal must be presented to the School's Director within 30 days of notification from the division head of the result of the appeal at the division level.

If the student's appeal is upheld two things may happen:

In the case of division regulations, the matter need go no further and implementation is carried out by the division head.

In the case of the School/Faculty regulations, the division head is responsible for presenting the case to the Committee on Studies of the School of Recreation, Physical and Health Education.

8.2 Appeals to the Committee on Studies of the School of Recreation, Physical and Health Education: As noted above it is the responsibility of the student to forward the necessary documentation to the School's Committee on Studies when the appeal is initiated by the student. Otherwise, it is the responsibility of the division head.

As the Chairman of the School's Committee on Studies, the Director will inform the student of his/her right to appear before the Committee. The student will also be informed of his/her right to be represented by an advocate of his/her choice.

The decision of the School's Committee on Studies shall be conveyed in writing to the student by the Director immediately after the conclusion of the appeal. If the student's appeal is denied this notification shall include information about procedures to appeal to the Committee on Studies of the Faculty of Health Professions. It should be noted that this appeal to the Faculty of Health Professions Committee on Studies must be presented within 30 days of notification from the School of the disputed academic decision.

If the student's appeal is supported, two things may happen:

In the case of School regulations, the matter need go no further and implementation is carried out by the Director of the School.

In the case of Faculty of Health Professions regulations, the Director of the School is responsible for presenting the case to the Committee on Studies of the Faculty of Health Professions.

9. Degree with Distinction

The Degree of Bachelor of Physical Education, Bachelor of Recreation or Bachelor of Science (Health Education) with Distinction is awarded under circumstances of Faculty Regulation 222.

10. Student Advisory Programs

Although many courses are compulsory in the School's program, considerable latitude exists for the development and extension of individual interests. To help in planning a total personal program each student is assigned an adviser from the teaching staff. Advisers can help students to select courses, avoid common pitfalls, choose activities, interpret regulations and solve various types of problems. Although students are responsible for their own programs and for maintaining high academic standards, they should consult their adviser regularly and whenever problems may occur.

11: Student Exchange Program

A reciprocal exchange program operates between the School and several colleges of physical education, leisure studies and recreation in England and the United States. Students of good academic ability may apply to participate in this study opportunity in their second or third year.

Course of Study for Bachelor of Science (Health Education)

Overview

The Bachelor of Science in Health Education is a four year degree program

offered by the Health Education Division. The goal of health education is to promote, maintain or improve individual, family and community health through educational processes. Health educators foster personal and collective responsibility for achieving an optimal level of health, for preventing diseases and debilitating conditions from occurring, and for minimizing the impact of such diseases and conditions upon individuals who have been affected. Health educators provide a setting in which change, based on informed decisions about health matters, is promoted through education.

The responsibilities of health educators include: assessing health education needs; planning, conducting and evaluating health education programs; coordinating health education activities and resources; promoting health education throughout the community; professional development.

The BSc (HE) program guides students in attaining:

1. knowledge, attitudes and practices conducive to a healthy lifestyle,
2. professional preparation for a career in school or community health education, and
3. academic preparation for advanced study and research in health education or health-related fields.

Employment and Further Study

Graduates of the BSc (HE) program are qualified for employment with government departments, health agencies, health and fitness centres, health promotion businesses, industries, medical care centres, professional organizations, schools, senior citizens' centres, and more.

Some graduates qualify to pursue further study in fields such as business administration, education, health administration, health education, health promotion, medicine, nursing, and public relations.

Admission Requirements

Applicants should have completed Nova Scotia Grade XII (or equivalent) with an average of 70% in five university preparatory subjects, including English and biology or chemistry. While Grade 12 Mathematics is not required for admission, Mathematics 441 will be essential if students are required or elect to take mathematics, science or computing science courses in their programs.

Students already engaged in university programs can transfer into the Health Education program, and experienced persons in the workplace can be admitted as mature students. Inquiries about admission to this program should be directed to the Head of the Health Education Division.

Description of the Program

The BSc in Health Education is made up of 120 credit hours of classes in four faculties — Health Professions, Arts and Science, Medicine, and Management Studies. Students must complete the following courses: Basic Human Anatomy and Physiology, Principles of General Biology, Introductory Psychology or Sociology, Microbiology, Educational Psychology, Fundamentals of Health Education, Mental Health, Human Growth and Development, Nutrition, Drug Use in Society, Safety Education & First Aid, Communicable or Chronic Degenerative Diseases, Health Education Planning and an Internship. In addition, students complete health education electives from courses such as Consumer and Environmental Studies, Human Sexuality, Group Dynamics, Research Interpretation, Statistics and Experimental Design, Gerontology, Directed Studies in Health Education, Exercise Physiology, Physical Fitness Assessment, Sociology of the Family, Medicine and Health Across Cultures, Medical Ethics, and Methods and Materials for School Health Education.

Beyond these classes, students choose courses more specific to school or community health education. Those who prefer school health education take courses which qualify them for a Nova Scotia Teacher's Certificate (level 5), such as: History, Philosophy and Sociology of Education; Special Education; Teaching Methods; Field Placement. Ontario and Quebec recognize a Nova Scotia Teacher's Certificate and negotiations are in progress toward reciprocal licensing arrangements with Alberta and New Brunswick. These students prepare for teaching in either elementary or secondary schools. On the other hand, students who prefer community health education select one of the following two study concentrations. *Administration and Evaluation* includes courses such as Introduction to Public Administration, Accounting, Organizational Theory and Behaviour, Health Care Policy in Canada, Computer Science, Research Methods, Health Economics, and Personnel Function. *Lifestyles Education* includes

courses such as Psychological Aspects of Social Issues, Exercise Physiology, Fitness Assessment, Applied Anatomy and Kinesiology, Outdoor Education, Leisure and Disabled Persons, and Interpersonal Communications.

Health Education Courses Offered

HE 1163 Biostatistics and Epidemiology: lecture 3 credit hours. Enrolment restricted to students of the School of Nursing's Diploma in Outpost and Community Health Nursing program. This course provides an understanding of epidemiology, the basic science of preventive medicine and public health. The student is introduced to such concepts as the "epidemiological method" and its application to the study of the distribution and dynamics of disease in a population. By means of a problem solving approach, the class helps to provide some of the basic tools necessary to study the occurrence of disease in order to determine such issues as the severity of an outbreak, agents of the disease, and risk factors and causation.

HE 1295R Fundamentals of Health Education: lecture/discussion 6 credit hours. Enrolment restricted to BSc (HE) students. This course is divided into five phases: three in the classroom, two in the field. In the first phase, students improve skills in library research, scholarly writing, information storage and retrieval, and public speaking. At the same time, they develop a fund of knowledge, understandings, attitudes and appreciations related to health and professional health education. In the second phase, through readings, presentations and discussions, students learn about the three aspects of the school health program: health services, the healthful environment and school health instruction. During the third phase, students become familiar with basic principles of community health education and with the role of a community health educator. Topics include needs assessment, program planning and evaluation. The final two phases are internships, each lasting two weeks. One is in a community health agency, the other in a school. These internships follow the spring examination period.

HE 2204 Consumer and Environmental Studies: lecture/discussion 3 credit hours. This class introduces students to factors which cause changes in the environment and consequently affect health. The concepts of ecology and consumerism are examined and students are expected to apply these in their personal environments. The consumer's role and responsibilities in relation to personal health status are pursued.

KIN-1230 Human Growth and Development: lecture 3 credit hours For class description, please consult the BPE program section of this calendar.

HE 2250/N4800B/PH 4950B/PT 309B Interdisciplinary Course in Human Nutrition: 3 credit hours. Prerequisite: Biology 1000 or at the discretion of the professor. For class description, see Nursing 4800B.

HE 2350 Drug Use in Society: lecture 3 credit hours. International, national and regional issues of promotion, prevention, treatment and legislation of drug use are examined. Special emphasis is given to the public as drug consumer, the problematic drug user, the "Drug Industry" and teaching about drugs.

HE 3225 Mental Health: seminar 3 credit hours. Concepts and issues of mental health are explored. Instructor and guest lecturers present related theories, research and practices. This includes information about the major mental illnesses and their treatment. Experimental techniques are used to demonstrate the function of self-awareness and interpersonal communications in personal mental health.

HE 3351 Safety Education and First Aid: lecture/discussion/simulated practical experiences 3 credit hours. Students are introduced to the causes and effects of accidents and to strategies for reducing accidents through safety education. Upon successful completion of the first aid segments of the course students are certified in first aid and cardiopulmonary resuscitation.

HE 3395 Community Health Education Planning: seminar 3 credit hours. Issues and methods involved in the process of community health education

planning are studied. Community analysis, goal and objective setting, developing education strategies and program management techniques constitute the components of planning covered in this course.

LST 3480 Introduction to Statistics: 3 credit hours. For class description please consult the Leisure Studies section of this calendar.

HE 4401 Communicable Diseases: lecture/discussion 3 credit hours. Prerequisite Microbiology 1100A or Biology 1000R. Interactions among people, their environment, and the causal agents of communicable diseases are explored. Specific communicable diseases are examined in order to discuss the role of health education in treatment and prevention.

HE 4402 Chronic Degenerative Diseases: lecture/discussion 3 credit hours. The causes, effects and prevention of significant degenerative diseases and chronic conditions are pursued. Attention is paid to the health needs of people with these conditions. The role of teachers and community workers is emphasized.

HE 4412 Human Sexuality: lecture/discussion 3 credit hours. This class is concerned with basic knowledge and understandings regarding biomedical, psychological, historical, legal, religious, semantic and comparative cultural aspects of human sexuality from conception to senility. Consideration is given to adjustment needs and problems of children and adults in contemporary Canadian society and to educational efforts to help with them.

HE 4425 Group Dynamics: seminar 3 credit hours. Group dynamics, including: leadership, decision making, group goals, communication, controversy, creativity, conflict, use of power, cohesion, group norms and problem solving, comprise the content of this course. The approach to learning is experiential. The potential of students will be utilized and each one is expected to function as a teacher and helper, as well as a learner.

KIN 4440A Seminar — Research Interpretation and Undergraduate Paper: lecture/discussion with lab to be arranged 3 credit hours. For class description please refer to the BSc Program section of this calendar.

HE 4493 Field Placement: 9 credit hours. During the first 10 weeks of the course, students will intern in school settings on a full-time basis. During the concluding three weeks of the term, seminars will be conducted on campus and in community settings. They provide a forum for presenting information, sharing ideas and concerns, evaluating internships and preparing to find a job.

HE 4494 School Health Education Planning: lecture/discussion 3 credit hours. Planning curricula for school health education is the focus of this course. Such planning includes: clarifying one's point of view about school health education, assessing content needs, structuring needed content, organizing the health instruction program, stating goals and objectives, developing learning opportunities, assembling resources and selecting evaluation techniques.

HE 4495 Health Education Internship: field placements, seminar 15 credit hours. *Internship* — During the first 10 weeks of the course, students will intern in school or community health education settings on a full-time basis. Details about the internships are contained in the Internship Program Handbook. *Seminars* — During the concluding three weeks of the term, seminars will be conducted on campus and in community settings. They provide a forum for presenting information, sharing ideas and concerns, evaluating internships and preparing to find a job.

HE 4498S Methods and Materials for Elementary School Health Education: seminar 3 credit hours. If demand warrants, will be offered in the first Summer School session in alternate years with HE 4497S. Students examine and develop various health education materials designed for the elementary grades. Resource material and teaching strategies are discussed in connection with drug education, diseases, mental health, consumer health, dental health, family living, safety education, personal hygiene or other emerging topics. Emphasis is on identifying local resources.

HE 4497S Methods and Materials for Junior High School Health Education: seminar 3 credit hours. If demand warrants, will be offered in the first Summer School session in alternate years with HE 4498S. Students become acquainted with a range of teaching methods and procedures used in junior high school health education. Resource material is discussed and developed in topic areas such as drug education, communicable and chronic diseases, aging, mental health, consumer and environmental health, family living and human sexuality, health counselling and guidance. Emphasis is on the use of local resources and materials.

HE 4498/4499 An Interdisciplinary Approach to Gerontology: see N 4800A/4910B for description.

HE 4800C Directed Studies in Health Education: 3 credit hours. Prerequisites: Fourth year status; a G.P.A. of at least 2.8; a "B" grade in an earlier class in the area of study (where appropriate); consent of advisor; consent of teacher. The purpose of this class is to allow students to develop an area of specialization with library, laboratory or survey research under the direction of an appropriate faculty member.

Program of Study for a Bachelor of Science (Kinesiology)

The BSc program in Kinesiology is designed to provide students with an opportunity for the scientific study of human movement. Emphasis therefore is placed on course work in exercise physiology, biomechanics and motor performance. In addition, the students have an opportunity to supplement their kinesiology courses with appropriate in-depth courses in the selected areas of science such as biology, psychology, mathematics, chemistry or physics. For example, a student can complete a BSc program in Kinesiology with an emphasis in exercise physiology and biology, as these are complementary areas of study. Other complementary areas are motor performance and psychology, biomechanics and mathematics/physics. Other combinations of kinesiology and science may also be possible.

Both a general and honours kinesiology program are offered. There are some differences in course requirements. Within the first three years it is relatively easy to switch between the general and honours programs. However, those intending to switch from the general to the honours program will have to choose electives carefully. To remain in the general program the School's normal academic GPA criteria apply. However, there are special GPA criteria for students in the honours program. Please refer to Regulation 3. In this section of the calendar. Students receiving an honours degree must also complete an honours seminar and thesis in the fourth year.

Admission Requirements for BSc (Kinesiology) Degree

All students must observe the University and Faculty regulations described in this calendar. Generally admission from high school requires an average of 65% or better in five grade XII subjects including:

- English 441;
- a minimum of two of biology, chemistry, mathematics and physics; *Note:* Mathematics 441 is a pre-requisite for many courses at Dalhousie University.
- The remaining classes may be from those listed above or from Economics, French, Geography, Geology, German, History, Latin, Law, Modern World Problems, Music, Political Science, Sociology, Spanish.

In order to be admitted to the program, students transferring from other university programs are expected to have a minimum GPA of 2.0 (using the Faculty of Health Professions formula to calculate the GPA.)

Four Year Bachelor of Science (Kinesiology) General Program

First Year	Credit Hours
Anatomy 102	3
Physiology 102	3
KIN 1104	3
KIN 1230	3
Open Elective ¹	6

2 Electives only from the following:	12
Biology 1000	
Chemistry 1100 or 1430	
Mathematics 1000/1010	
Physics 1100 or 1300	
Psychology 1000	
Total	30

Second Year	Credit Hours
KIN 2310	3
KIN 2320	3
KIN 2330	3
KIN 2465	3
Arts & Science Electives	12
Open Elective ¹	6
Total	30

Third and Fourth Years² Credit Hours	
(select 30 credit hours each year)	
4 Courses from List A	12
2 Courses from List B	6
Arts & Science Electives	12
Open Electives ¹	21
KIN/PE Electives	9
Total	60

¹Electives may be chosen from the Faculties of Arts and Science, Health Professions, Management Studies and Medicine. Biology 1000 is strongly recommended.

²Third and Fourth Year curricula are listed together to permit flexibility in scheduling courses available in alternate years.

List A (Select 4)	List B (Select 2)
KIN 3414	PE 2220
KIN 3419	PE 4410
KIN 4440	PE 4497
KIN 4476	LST 2110
KIN 4800 (if GPA is more than 3.0)	LST 3157
LST 3480	LST 4420
	LST 4490
	LST 4494
	LST 4498
	LST 4499

Four Year Bachelor of Science (Kinesiology) Honours Program

First Year	Credit Hours
Anatomy 102	3
Physiology 102	3
KIN 1104	3
KIN 1230	3
Mathematics 1000/1010	6
2 Electives only from the following:	12
Biology 1000	
Chemistry 1100 or 1430	
Physics 1100 or 1300	
Psychology 1000	
Total	30

Second Year	Credit Hours
KIN 2310	3
KIN 2320	3
KIN 2330	3
KIN 2465	3
Science Electives	12
Open Electives ¹	6
Total	30

Third and Fourth Years² Credit Hours	
(select 30 credits each year)	
KIN 3414	3
KIN 4440	3
KIN 4466	3
KIN 4476	3
KIN 4800	3
Computer Science 1400	6
Science Electives ³	12
Open Electives	27
Total	60

KIN 4800 Honours Research and Thesis

¹Electives may be chosen from the Faculties of Arts and Science, Health Professions, Management Studies and Medicine. Biology 1000 is strongly recommended.

²Third and Fourth Year curricula are listed together to permit flexibility in scheduling courses available in alternate years.

³Science electives must be at the 200/2000 level or above.

Courses of Instruction - BSc (Kinesiology) Program

Anatomy 102C Basic Human Anatomy: lecture and lab 3 credit hours, Fall and Spring terms. Taught within the Department of Anatomy in the Faculty of Medicine with emphasis on gross anatomy. Scope and sequence are coordinated with Physiology 102C, which is taken concurrently.

Physiology 102C Basic Human Physiology: lecture and lab 3 credit hours, Fall and Spring terms. Taught within the Department of Physiology in the Faculty of Medicine and integrated with Anatomy 102C. Examinations in Physiology 102C are written with those in Anatomy 102C. Separate grades are awarded.

KIN 1104 Foundations of Physical Activity: lecture 3 credit hours. The course is designed to acquaint the student with the scientific foundations of physical activity.

KIN 1230 Human Growth & Development: lecture and lab 3 credit hours. A study of factors influencing human growth and development from birth to maturity, as revealed by observational and experimental studies.

KIN 2310 Physiology of Exercise: lecture and lab 3 credit hours. Prerequisite: Anatomy 102C and Physiology 102C. This is an introductory course for students with a basic knowledge of anatomy and physiology. It concentrates on the respiratory, cardiovascular and neuromuscular systems in terms of their involvement during exercise, their adaptation to different types of training and how they limit performance during exercise in different environmental conditions.

KIN 2320 Applied Anatomy and Kinesiology: lecture and lab 3 credit hours. Prerequisite: Anatomy 102C and Physiology 102C. Emphasis is on application of anatomical and kinesiological information to teaching and coaching experiences. The first half semester involves those bodily systems which produce movement, with emphasis on neuroanatomy. The second half semester consists of application of kinesiological principles so that activities can be interpreted effectively.

KIN 2330 Motor Control & Learning: lecture and lab 3 credit hours. Prerequisite: Psychology 1000. This course deals with efficiency in completing movements to achieve a desired goal. It involves systematic changes in perception of the environment, decisions about what movements to make, as well as changes in how these movements are carried out. This class covers what is known about these processes as well as how this information can be applied.

KIN 2465 Biomechanical Analysis: lecture and lab 3 credit hours. The focus of this course is on qualitative analyses of human movement from a mechanical perspective. The course is well suited to practitioners, and at

the same time the course will provide a solid base for those students wishing to pursue the study of biomechanics in greater depth.

KIN 3414 Physical Fitness Assessment & Program Design: lecture and lab 3 credit hours. Prerequisite: KIN 2310. Evaluation of various methods of physical fitness assessment, designing fitness programs for diverse populations and identifying motivational techniques with emphasis on the areas of cardiovascular fitness, weight reduction, pre- and post-natal programs and the elderly. In addition, laboratory work teaches the techniques of administering various fitness test.

KIN 3419 Physiological Bases of Sport: lecture and lab 3 credit hours. Prerequisite: KIN 2310. Human physiological adaptations to varying levels of exercise are studied. The conceptualization of the physiologic principles operating as the body's oxygen transport system adapts to meet metabolic demands of the working muscles provides the major emphasis. Attention is given to the metabolic, circulatory and pulmonary adjustments to the working state with a section devoted to the problems of acid-base homeostasis during exercise.

KIN 4440 Seminar - Research Interpretation and Undergraduate Paper: lecture/discussion with lab to be arranged, 3 credit hours. For those who plan to pursue graduate studies, the application of the processes of science to the field are discussed in a series of lectures to introduce the student to the language and methods of science in general. The assignments lead to the proposing and conducting of a small investigation appropriate to student interests which is written in the format of a journal appropriate to the question addressed. Selected studies are presented to the class.

KIN 4466 Advanced Biomechanics: lecture and lab 3 credit hours. Prerequisite: KIN 2465. This course takes a quantitative approach to understanding human movement, muscle function and the structure of biological tissue from a mechanical perspective. Concepts presented in the course will be illustrated with examples taken from the areas of sport, exercise, sports medicine and rehabilitation. Students will be introduced to several techniques used in biomechanics research.

KIN 4476 Skilled Performance: lecture 3 credit hours. Prerequisite: KIN 2330. This course is primarily concerned with examining the main concepts of skilled performance; that is, those factors which appear to be related to the effective and efficient acquisition of pre-determined goals on a regular basis. For the most part this class uses an information processing focus to study motor skills and the potential influences on their performance. However, one consequence of the material should be the recognition that any attempts to isolate skilled behaviour into separate perceptual, cognitive and motor skills can occur only at a superficial level. In addition, an attempt is made to use appropriate examples from sport, industrial and clinical settings to illustrate particular concepts.

KIN 4800 A, B, C, R, S or T Directed Studies in Kinesiology: 3 or 6 credit hours, Fall and/or Spring terms, Summer Schools. Prerequisites: Fourth year status, a GPA of at least 3.0, a "B" grade in an earlier class in the area (e.g. biomechanics, exercise physiology, motor behaviour) in which the project will be conducted (where appropriate), consent of advisor, consent of faculty. Senior undergraduate students develop an area of specialization under the direction of a faculty member by completing a library, survey, laboratory experiment or other research study.

KIN 4800 Honours Research & Thesis. At the conclusion of an honours program a student's record must show a grade which is additional to those for the required classes. This grade may be obtained through a comprehensive examination, the presentation of a research paper (which may be an extension of one of the classes) or such other method as may be determined by the School. The method by which this additional grade is obtained is referred to as the Honours Qualifying Examination. A pass/fail grading system will be used.

Program of Study for a Bachelor of Physical Education/Bachelor of Education

The combined BPE/BEEd program prepares students for a teaching career.

The base of the BPE/BEEd degree therefore consists of both theory courses and pedagogical courses.

Studies in the general education area occupy about one-third of the total curriculum and have three overlapping purposes. The first is to contribute to a liberal education. The second is to provide background studies of specific importance to Physical Education. The third is to provide for deeper study in another academic discipline. This choice will depend upon the student's interest, although, if a general school teaching qualification is desired, the student must choose a subject being taught in the school system in which he/she plans to teach. Students must complete at least 4 full credits in the minor subject, 3 of which must be beyond the 1000 level.

The theory courses are intended to provide a foundation for understanding the administrative, historical, measurable, philosophical and scientific aspects of Physical Education.

Admission Requirements for BPE/BEEd Degrees

The requirements for entrance into the BPE/BEEd program are generally the same as those outlined for other Health Professions. Generally, admission from high school requires an average of 65% or better in five grade XII subjects including:

- (a) English 441;
- (b) a minimum of two of biology, chemistry, mathematics and physics; Note: Mathematics 441 is a required pre-requisite for many courses in mathematics, science and computing science at Dalhousie University.
- (c) The remaining classes may be from those listed above or from Economics, Geography, Geology, Law, Modern World Problems, Music, Political Science, Sociology, Spanish, French, Latin, German, History. In addition, a senior class in physical education may be considered for admission to the BPE/BEEd program.

Admission with Advanced Standing

Students may be admitted to the undergraduate program with advanced standing if they have completed arts and science classes at Dalhousie or at a recognized university. However, all graduation requirements of the School ultimately must be met.

Students who have completed the three year Associate of the Nova Scotia Teachers' College, Truro, may be admitted with advanced standing, provided they satisfy the usual admission requirements for the Bachelor's Degrees in Physical Education and Education at Dalhousie. The decision on granting credit depends on whether an acceptable level of accomplishment has already been demonstrated in a comparable course.

Five Year Combined Bachelor of Physical Education/Bachelor of Education Degree

Students must not only meet the admission requirements and maintain academic eligibility in the School, but also for the BEEd program as described in the Department of Education section of this calendar. Students should also consult the School for details.

Students are expected to choose a minor in a teachable subject, e.g., English, French or other language, history, mathematics, biology, chemistry, physics, economics, health education. They must complete 24 credit hours in the minor subject, 18 credit hours beyond the 100/1000 level.

An activity program (8 hours per week) is required of all students in the combined BPE/BEEd program. In this program students will be given the opportunity to integrate teaching theory with teaching practice in an applied setting. Students should note that the activity program is scheduled on Tuesday and Thursday mornings from 0830 to 1130. They should not schedule any other classes during those periods.

Year I	Credit Hours	Year II	Credit Hours
Physical Education/Kinesiology Courses		Physical Education/Kinesiology Course	
PE 1195	3	PE 2220	3
KIN 1104	3	PE 2296	3
KIN 1230	3	PE 2384	3
Leisure Studies 2110	3	KIN 2310	3
Anatomy 102	3	Education Courses	
Physiology 102	3	Foundations: Sociology/History/Philosophy	3
Psychology 1000 or 1010	6	Educational Psychology 4311A or 4312B	3
Electives ¹	6	Electives ¹	12
Total	30	Total	30

Year III Elementary Credit Hours	Year III Secondary Credit Hours
<i>Physical Education/Kinesiology Courses</i>	<i>Physical Education/Kinesiology Courses</i>
KIN 2320	3
KIN 2330	3
KIN 2465	3
PE 3402 ²	6
<i>Education Courses</i>	<i>Education Courses</i>
Creative Arts — Art	3
Creative Arts — Drama	3
Reading/Language Arts	6
Educational Psychology	3
Total	30

Year IV Elementary Credit Hours	Year IV Secondary Credit Hours
<i>Physical Education/Kinesiology Courses</i>	<i>Physical Education/Kinesiology Courses</i>
PE 4250	3
PE 4395	3
Leisure Studies 2392	3
<i>Education Courses</i>	<i>Education Courses</i>
Foundations: Sociology/History/Philosophy	3
Mathematics Methods	3
Science/Social Studies Methods	3
ED 4901R ²	6
Electives ¹	6
Total	30

Year V Elementary Credit Hours	Year V Secondary Credit Hours
<i>Physical Education/Kinesiology Courses</i>	<i>Physical Education/Kinesiology Courses</i>
PE 4495 ³	12
PE 4497 or LST 4490	3
PE/KIN Elective	9
<i>Education Courses</i>	<i>Education Courses</i>
Foundations: Sociology/History/Philosophy	3
ED 4902A ⁴	3
Total	30

¹Electives may be chosen from the Faculties of Arts and Science, Health Professions (excluding Physical Education, Kinesiology and Leisure Studies courses), Management Studies and Medicine.

²Includes three weeks of teaching Internship in the Halifax Metro area at the end of the Spring term.

³PE 4495 students are assigned full-time to schools in the Metro area as of September 1 or whenever school begins, until November 30. No other classes may be scheduled during this period.

⁴Includes student teaching in chosen major.

Field Experiences

A compulsory program of field experience is offered in each of the last four years of the combined BPE/BEEd program. These experiences will include observation and involvement in school or community programs. Students who intend to gain teacher certification must complete the practice teaching experience successfully.

Students must provide their own transportation for their field work.

Health Education Minor (24 Credit Hours)

The Health Education Division of the School of Recreation, Physical and Health Education offers a minor program in Health Education for students whose major area of study is Physical Education. Consult the School for details of the Health Education minor.

Students taking a minor in Health Education do part of their practice teaching in Health Education if such school programs are available.

Special Considerations

If a student is interested in special programs such as remedial Physical

Education or outdoor education, every effort will be made to provide a relevant field experience.

Courses of Instruction - BPE/BEEd Program

Anatomy 102C Basic Human Anatomy: lecture and lab, 3 credit hours, Fall and Spring terms. Taught within the Department of Anatomy in the Faculty of Medicine with emphasis on gross anatomy. Scope and sequence are coordinated with Physiology 102C, which is taken concurrently.

Physiology 102C Basic Human Physiology: lecture and lab 3 credit hours, Fall and Spring terms. Taught within the Faculty of Medicine's Department of Physiology and integrated with Anatomy 102C. Examinations in Physiology 102C are written with those in Anatomy 102C. Separate grades are awarded.

PE 1195 Introduction to Teaching: lecture 3 credit hours. Examines the profession of teaching with emphasis on the area of Physical Education. Purposes of education, teacher roles and a brief introduction to the teaching process are included.

PE 2220 Measurement & Evaluation in Physical Education: lecture and lab 3 credit hours. An introduction to the fundamentals involved in measurement and evaluation, including writing objectives, designing and administering tests, organizing and analyzing test results. Tests used to measure physical fitness, specific motor skills and health knowledge are investigated.

PE 2295 Instructional Techniques in Physical Education: lecture and field work 3 credit hours. Prerequisite: PE 1195. A continuation of work begun in PE 1195 with emphasis on instructional techniques. Class management and planning will be areas of major concentration. The course includes theoretical content as well as appropriate field work related to teaching.

PE 2384 Physical Activity for Disabled Persons: lecture 3 credit hours. An introductory overview of current practices, philosophies and issues related to physical activity for the disabled. The class emphasizes knowledge and understanding of various disabling conditions in relation to physical activity.

PE 3398 Practical Studies Secondary: lecture/lab/field work 6 credit hours. Prerequisite: PE 2295. This course is designed for students who wish to specialize in secondary physical education. Students completing the course will have practiced basic skills for teaching team, individual, dual and fitness activities. Analysis of teacher behavior and practice in using a variety of teaching styles receive emphasis. Visits to schools are included during the term. Three weeks of full-time student teaching are included at the end of the spring term.

PE 3402 Elementary Physical Education: lecture/lab 6 credit hours. Prerequisite: PE 2295. This course is designed for students who wish to specialize in elementary physical education. Special projects with young children are developed by the class. Course includes field trips to innovative school, preschool and community organization programs.

PE 4250 Organization & Administration of Physical Education & Recreation: lecture 3 credit hours. This course focuses on the administrative and planning processes involved in the development and implementation of recreation and leisure programs in both community and public school settings. Students will have the opportunity to apply and test programming principles through practical experience in organizing a recreation program in settings internal or external to the University.

PE 4395 Curriculum Planning and Development: lecture 3 credit hours. Prerequisites: PE 3398 or PE 3402 or permission of the instructor. An introduction to basic curriculum theory and program development principles. Developing a curriculum philosophy, objectives, course and unit plan and program evaluation are covered. Appropriate field work is included.

PE 4410 Care and Prevention of Athletic Injuries: lecture/lab 3 credit hours. The course offers a fundamental understanding of the maintenance

of health (personal hygiene, nutrition, prevention of common ailments and injuries). More specifically it will deal with first aid, sports injuries, their prevention and treatment. Students will acquire practical skills in taping techniques and cardio-pulmonary-resuscitation.

PE 4495 Teaching Practicum In Physical Education: seminar and field work 9 credit hours, normally fall term. Prerequisite: PE 3398 or PE 3402. During the fall term students are placed in schools for full-time student teaching. Students are expected to obtain experience in applying basic teaching skills as well as becoming familiar with how schools are organized and administered. Being able to analyze teacher behaviour to provide assistance to fellow students is also expected. Seminars will be scheduled to provide opportunities to share student teaching experiences and to discuss topics of relevant interest.

PE 4497 Philosophy for Physical Educators: lecture 3 credit hours. Prerequisites in philosophy are not essential. An introduction to "thinking with concepts" provides a foundation for choice analysis in a seminar presentation. An introduction to existentialism is presented, with emphasis on choice, freedom and responsibility.

PE 4498A/PE 4498B An Interdisciplinary Approach to Gerontology: See N 4900A/4910B for description.

PE 4800 A, B, C, R, S or T Directed Studies In Physical Education: lecture 3 or 6 credit hours, Fall and/or Spring terms, Summer Schools. Prerequisites: Fourth year status, a GPA of at least 3.0, a 'B' grade in an earlier class in the area in which the project will be conducted (where appropriate), consent of advisor, consent of faculty. Senior undergraduate students develop an area of specialization under the direction of a faculty member by completing a library, survey, laboratory experiment or other research study.

Program of Study for Bachelor of Recreation

Program Description

The focus of the Bachelor of Recreation degree is recreation administration. The objectives of the program are as follows:

1. to provide the student with a broad educational exposure to various social science and humanities disciplines (e.g., psychology, sociology, economics, political science, anthropology, history);
2. to familiarize students with current social science-based research in leisure studies, including an understanding of research methods and statistics;
3. to provide the necessary background to enable students to pursue graduate work in leisure studies, management studies or the social sciences and humanities;
4. to provide the student with the necessary skills and knowledge for entry into the roles of leadership, advocacy, consultancy and education in leisure services;
5. to provide the student with the opportunity to design a specific interest area within recreation administration. These specializations will be based on student interest, market demand and availability of appropriate courses. Examples include: leisure and disabled persons, experiential education, arts administration, sport administration, commercial recreation, tourism, municipal administration and leisure counselling. The program of studies is developed in consultation with the student's advisor.

Admission Requirements and Regulations

1. All students must observe the University and Faculty regulations described in this calendar.
2. The requirements for entrance into the Bachelor of Recreation program are as follows:

At least five senior level university preparatory courses with a minimum average of 65%, including:

- (a) English,

- (b) a minimum of one of biology, chemistry, mathematics, physics,

- (c) a minimum of one of economics, French, German, history, political science, Latin.

- (d) The remaining classes may be taken from those listed above or from: geography, geology, law, modern world problems, physical education, sociology, Spanish.

The admission requirements outlined represent the minimum standard and final selection rests with the School. Students applying for admission from high school must complete the Experience Background Questionnaire and forward it to the Head of the Leisure Studies Division at the School. Transfer and mature students must submit an up-to-date resume to the Head of the Division. Three letters of reference indicating personal and academic suitability must also be forwarded directly to the Head of the Division.

Upon acceptance to the program each student will be urged to attend an orientation camp immediately prior to registration. This is a five-day program conducted at a residential camp, which is designed to orient new students to university life and develop fellowship among the Freshman class through experiential learning. There will be a charge for this program of about \$125.00.

Four Year Bachelor of Recreation Program

First Year	Credit Hours
LST 1126	6
Psychology 1000R	6
Sociology 1000 or 1200	6
Political Science 1100 or Economics 1100	6
Electives ^{1 2}	6
Total	30

Second Year	Credit Hours
LST 2110	3
LST 2127	3
LST 2128	3
LST 2328	3
LST 2361	3
LST 2382	3
LST 2384	3
Electives ^{1 2}	9
Total	30

Third Year	Credit Hours
LST 3296	3
LST 3360	3
LST 3420	3
LST 3450	3
LST 3480	3
Electives ^{1 2}	15
Total	30

Fourth Year	Credit Hours
LST 4362	3
LST 4495	3
LST 4498	6
Two of the following:	6
LST 4361	
LST 4363	
LST 4428	
LST 4482	
LST 4490	
Electives ^{1 2}	12
Total	30

¹A minimum of 24 credit hours of electives must be taken outside of the School of Recreation, Physical and Health Education. 12 credit hours of these must be beyond the introductory level.

²A minimum of 12 credit hours of electives must be taken within the School of Recreation, Physical and Health Education.

Courses of Instruction - BRec Program

A. Recreation Theory Courses

LST 1126 Introduction to Leisure Studies: 6 credit hours. An understanding of the place and potential of leisure in Canadian life is essential if we are to move beyond the conviction that only labour is to be valued. This foundation course introduces leisure forms and concepts including play, sport, culture and social leisure. It provides an overview of leisure service delivery and issues related to access to meaningful leisure opportunities. Opportunities for increasing writing skills, library utilization, verbal expression and computer skills are provided. A practicum is included.

LST 2110 History of Leisure: 3 credit hours. Prerequisite: LST 1126 or consent of the instructor. This course aims to make students familiar with the historical roots of the leisure pursuits of human kind. Sport, dance and recreation in ancient and primitive societies are explained and critically analyzed as are activities in early civilizations.

LST 2127 Psycho-Social Theory and Leisure: 3 credit hours. Prerequisites: SSA 1000 or 1200 and Psychology 1000. This course will provide an introductory analysis of leisure in modern society from sociological and social psychological perspectives. The role of leisure in the everyday life of individuals will be discussed in terms of social relationships, social interaction and theories of attitude and motivation, etc. In addition, since the role and function of leisure is affected by political, economic and cultural systems, a main-level perspective on leisure will also be provided by focusing on topics such as the influence of modern technology, the commercialization of leisure, the influence of social institutions and of the mass media.

LST 2128 Socio-Cultural Bases of Physical Activity: 3 credit hours. A variety of attitudes, values and interests, with respect to sport, exist in many cultures of the world. These will be reviewed and provide a backdrop for the study of the place of sport and physical activity in the recreational lives of Canadians. Topics will include: physical activity patterns in contemporary Canada, stratification and discrimination in sport and physical activity, physical activity in schools and theories of physical activity. Practica will be included.

LST 2326 Leisure and the Arts: 3 credit hours. The purpose of this course is to provide students with a perspective on the variety of artistic and cultural activities enjoyed by participants and spectators, including theatre, music, dance, arts and crafts, photography and mass media. The course will address theoretical and applied questions related to the arts and leisure, including value access, patterns of participation and the pursuit of excellence. A practicum will be included.

LST 2361 Administration of Leisure Services: 3 credit hours. Prerequisite: LST 1126. Administrative techniques relevant to leisure services are presented. Roles of administrators and problem solving methodologies which relate to human communications, personnel development, marketing and advertising, procedures, standards and financial management are discussed.

LST 2362 Education 4642 Adventure-Based Experiential Education: 3 credit hours. Outdoor education in one form or another is included as an integral part of most recreational programs. However, there are values of outdoor adventure activities which go beyond the usual rationale for recreation programs. These include personal development, citizenship training, leadership development and community service. This course will explore some of the educational philosophies which rely on an experiential base. Included will be an opportunity for hands-on experiences in developing, planning and evaluating an adventure-based program which has potential beyond the traditional recreation outcomes. A practicum will be included.

LST 2384 Leisure and Special Populations: 3 credit hours. An introduction of current philosophy, issues and practices relating to leisure opportunities for persons who, due to physical, mental and social conditions, have difficulty gaining access to community services. An analysis of leisure behaviours, barriers and needs will be provided through the classroom and a practicum.

LST 3157/Music 3361 History of Dance: 3 credit hours. This course traces the development of dance in Western Civilization from primitive times to the present day. The changing role of dance in society will be discussed, as will its relationship to the other arts. Sample dances from the different periods of history will be taught to illustrate the changing styles and patterns of dance.

LST 3296 Leadership and Community Development: 3 credit hours. Prerequisite: LST 1126 or consent of the instructor. The process of communications and social change are applied to the relationship of the recreation professional to individuals and groups in the community. An in-depth analysis of community development strategy and situational leadership theory are provided. A practicum will be included.

LST 3360 Analysis of Leisure Delivery: 3 credit hours. Prerequisites: LST 1126 and LST 2361 or consent of the instructor. The organization and delivery of leisure services in Nova Scotia and Canada are examined with emphasis on critical analysis of decision making processes, social impact and alternative planning methodologies.

LST 3420 Introduction to Research Methods: 3 credit hours. The purpose of this course is to give students a basic understanding of the logic and goals of social science research. The course will focus on factors that need to be taken into account in designing or evaluating research studies. Both qualitative and quantitative methods will be discussed with an emphasis on interview and survey research and on evaluation research.

LST 3450 Facility Design and Management: 3 credit hours. Offered alternate years beginning 1986-87. Prerequisites: LST 1126 and LST 2361 or consent of instructor. The increase in the number of sports, cultural and multi-use facilities requires the professional recreator to understand the relationships among resources, programs, use and demand. This course will develop design and management skills for the development and use of a recreation and leisure facility.

LST 3480 Introduction to Statistics: 3 credit hours. This course will provide an introduction to basic statistical concepts through the use of practical examples and hands-on experience. An introduction to the use of computer terminals and social science computer programs (SPSS) will be given. Both descriptive and inferential statistics will be reviewed, with emphasis on the analysis and interpretation of cross-tabulation tables, correlations and simple regression.

LST 3491 Sociology of Leisure: 3 credit hours. Offered alternate years beginning 1986-87. Prerequisite: LST 2127 or at least two Sociology/Social Anthropology courses. This will be an advanced undergraduate course on societal influences on leisure. Building on some of the material covered in *Psycho-Social Theory and Leisure*, the course will discuss various concepts and approaches which provide a framework for understanding the changing role of leisure in Canadian society. Students will be exposed to some of the current theoretical and methodological debates in the field of leisure research.

LST 4361 Sport Administration: 3 credit hours. Offered alternate years beginning 1987-88. Prerequisite: LST 2128 or consent of the instructor. Case studies highlighting a variety of administrative styles will be used in the introductory part of the course. The administration of sport at national, provincial, institutional, community and clubs levels will be examined. The efficacy of one type of administration over another will be discussed. The role of the volunteer in administrative positions will be juxtaposed with the professional in the same organization. International sport organizations will be analysed. A practicum is included.

LST 4362 Park Management & Natural Resource Development: 3 credit hours. Offered alternate years beginning 1985-86. Prerequisites: LST 1126 and 2361 or consent of the instructor. Basic issues in park management and natural resource development are examined with a focus on planning, design, development and maintenance of the outdoor environment for leisure activity.

LST 4363 Arts Administration: 3 credit hours. Prerequisite: LST 2326 or consent of the instructor. Styles of management of theatres, arts and cultural

centres, museums will be presented along with issues related to opportunities for participation in the arts and cultural activities. Features such as the study of cultural events, communication with performers and establishment of cultural facilities will be discussed. A practicum is included.

LST 4426 Leisure Enhancement: Ill and Disabled Persons: 3 credit hours. Offered alternate years beginning 1986-87. Prerequisite: LST 2384 or consent of the instructor. This course provides students with an understanding of disabling conditions and their leisure implications. It provides instruction in leisure facilitation techniques such as assessment procedures, task analysis, activity analysis and other program enhancement strategies through classroom lectures and a practicum.

LST 4482 An Experiential Approach to Youth Development: 3 credit hours. Offered alternate years beginning 1986-87. Prerequisite: LST 2382 or consent of the instructor. Youth as a sector of society and as a stage in human development is of great significance in the study of leisure. Particularly relevant is the issue of unemployment and underemployment which has created a number of problems such as low self-worth, alcohol abuse, teenage suicide, etc. There are programs being developed to address these problems, many of which are experientially based, e.g., Outward Bound, study service, service learning and national service. This course will study the phenomenon of youth development in the light of experiential educational approaches. During the course there will be an expectation that the students will meet and interact with a variety of youth. Practicum included.

LST 4490 Sociology of Sport: 3 credit hours. Offered alternate years beginning 1985-86. Prerequisite: SSA 1000 or 1200, LST 2128 or consent of the instructor. A survey course which views the interrelationships among sport, culture and society from a sociological perspective. The course provides the student with a broad overview of selected sociocultural factors which help to explain the incidence, form and regulation of sport and specified recreational elements in contemporary society.

LST 4492 Leisure Counselling & Education: 3 credit hours. Offered alternate years beginning 1984-85. Prerequisite: LST 1128 and LST 2127 or consent of the instructor. Simply defined, leisure counselling is a helping process which facilitates interpretive, affective and/or behavioural changes in others toward the attainment of their leisure wellbeing. This course will provide students with a basic introduction to leisure counselling and education. It will include an historical perspective, definitions, philosophies, models, issues and an exposure to the education and counselling techniques.

LST 4494 Canadian Sport History: 3 credit hours. Offered alternate years beginning 1986-87. Prerequisite: LST 2110 or consent of the instructor. This course analyzes the historical antecedents of sport in Canadian life. Sports such as football, basketball and track and field are discussed, as well as sport heroes and issues including the historical role of women and minority groups in sport.

LST 4495 Leisure Issues Seminar: 3 credit hours. Prerequisites: LST 3420 and LST 3480 or consent of the instructor. This senior level course covers a broad range of issues facing leisure studies and professional practice. Students have the opportunity of gaining in-depth knowledge through dialogue about and investigation of selected issues and strategies, and operationalize the techniques learned in the statistics and research methods courses.

LST 4496 Internship in Recreation Administration: 6 credit hours. This is a supervised student placement in an approved community agency for approximately twelve weeks, normally undertaken during the Summer between third and fourth years. The field experience plus an indepth report which includes the student's activities and agency analysis, are required.

B. Required Arts and Science Courses

Sociology 1200 Introduction to Sociology: lecture 6 credit hours. For class description please refer to the Sociology and Social Anthropology Department entry in this calendar.

Psychology 1000 Introduction to Psychology: 6 credit hours. For class description please refer to the Psychology Department entry in this calendar.

Political Science 1100 Introduction to Political Science: 6 credit hours. For class description please refer to the Political Science Department entry in this calendar.

Economics 1100 Introduction to Economics: 6 credit hours. For class description please refer to the Economics Department entry in this calendar.

Electives/Course Descriptions

Courses may be taken as electives across divisions with permission from the student's advisor. Course are described under the program in which they are designated, i.e., Health Education (HE), Kinesiology (KN), Leisure Studies (LST) and Physical Education (PE).

Awards and Prizes

For details of awards and prizes in the School of Recreation, Physical and Health Education, please consult the Awards Office publication "Scholarships, Prizes, and Financial Aid."

The Maritime School Of Social Work

Academic Staff 1987-88

Robert S. Tonks, BPharm, PhD (Wales), FPS, FIBiol, Dean of the Faculty of Health Professions
D.W. O'Brien, BComm, MSW (SMU), Adv. Dip. SW (Penn.), DSW (Penn.), Professor and Director

Professors

R.W. Carlson, BA, MSW (Penn.) PhD (Chicago)
R.A. Craig, BA (UNB), MSW (MA)
J.E. Cummings, BA (Dal), MSW (St FX), DSW (Tor.)
D.P. Kerans, BA (Loyola), MA (St. Louis), STL (Innsbruck), DRS (Strasbourg)
F.C. Wlen, BA (Queen's), MA, PhD (Cornell)

Associate Professors

M.L. Courtney, BA (Dal), MSW (SMU)
G. Fitzgerald, BA (Dal), MSW (King's)
J. Gilroy, BA (Dal), MSW (King's), MA (Tor.)
D. Moore, Dip. Social Studies (London), BA, MA (Dal), PhD (Boston U)
R. O'Day, BA (UBC), MA, PhD (Michigan)
D. Williams, AB (Chico), MSW (U.C. Berkeley), PhD (Brandeis)
R. Williams, BA (Acadia), MA (Tor.)

Assistant Professors

M. Deveau, BA (Ste-Anne), MSW (Dal), (Resident faculty member, Church Point)
J.B. Duplissa, BA, MSW (MA)
J.R. Harbison, BA, BSS (Dublin, Trinity College), Grad. Dip. SW (Edinburgh)
E. Macdonald, BA (St. Dunstan's), BSW, MSW (Ottawa) (Resident faculty member, Charlottetown)
M.J. MacDonald, BA (UNB), MSW (Dal) (Resident faculty member, Sydney)
B.K. Richard, BA (MA), MSW (Dal)
A. Sexton, BA (Honours), MSW (Dal)
E. Whitmore, BA, MA (Boston)

Lecturers

J.M. Pace, BSW (Dal), MSW (Wilfred Laurier)

Instructor

A. Smith, BA (Leeds)

Sessional Lecturers 1986-87

W. Bernard, BA (MSVU), MSW (DAL)

M. Burge, BA, BEd (UPEI), MSW (Guelph)

C. Campbell, BSc (Kings), BEd (Acadia), MSW (Carleton)

E. Harris, BA (Acadia), MSW (Dal)

C. Irwin, BA (Man.), PhD (Syracuse)

E. Jacobsen, BA (UNB), BSW (Dal), MSW (U of T)

K. O'Neill, BA (St. FX), MSW (Tor.)

F. Tester, BSc (West. Ont.), ME Des, MSW (Calgary), DPhil (Waikato, New Zealand)

J. Williams, BSc (Alberta), MSW, LLB (Dal)

E.A. Young, BSW, MSW (Tor.) (Resident Faculty Member, Saint John)

Field Instructors 1986-87

Aitken, Janis

Aucoin, Sr. Anne

Bagnell, Ron

Barter, Ken

Beals, Harold

Beck, Nancy

Belanger, Ken

Bernard, Wanda

Beaudoin, Paul

Brackley, Jane

Bremner, Jean

Britton, Bob

Bulger, Sr. Susan

Burchell, Mimi

Burton, Barbara

Campbell, John

Cleary, Tom

Comeau, Phil

Conrad, Patricia

Cook, David

Doucette, Carl

Ezeard, Ken

Fay, Jeanne

Fricotte, Carroll Anne

Forrestall, Pat

Frazer, James

Friday, Jim

Grant, Angus

Green, Mary Liz

Gregg, Valerie

Griffin, Roy

Harley, Donna

Hail, Karl

Hinea, Shirley

Jessemmie, Carmel

Johnson, Michael

Kaetz, Debbie

Kelly, Andrea

Khamisa, Laura

Lalo, Cesar

Lucas-White, Lydia

MacAulay, Frank

MacDonald, Marilyn

MacDonald, Maureen

MacInnis, Irene

MacIntyre, Hugh

MacKay, Gordon

MacKenzie, Clark

MacPherson, Ian

MacPherson, Sherril

Marchand, Verle

Maynard, Jean

Morris, Ruth

Mullaly, Robert

Napier, Corinne

O'Connor, Dan

Osborne, Tom

Paul, Elizabeth

Picketts, John

Proffit, Norma

Ramey-Bergman, Shirley

Roberts, Peter

Roma, Michael

Sears, Patti

Smith, Ada

Smith, Brian

Wilson, Darrell

Young, Art

School. Five students may serve on the BSW Committee. Students are invited to contact the Chairperson or notify the student representative of the Committee(s) on which they are interested in serving.

Bachelor of Social Work Degree

The Bachelor of Social Work program requires a minimum of two successive years of full-time study for persons with a previous undergraduate degree (attained at a B-average or better) to a maximum of four years of full-time study for mature persons who have no previous university credits. See Admission Requirements.

While the focus of study is on the people, the communities and the service network of the Maritime region, graduates are qualified to practice social work throughout Canada and elsewhere. Enrollment is limited to a specified number of places that are offered once a year to the best qualified candidates, who are selected by the admissions process.

Program Objectives

The BSW degree has been developed as a generalist degree, designed to provide the student with a basic range of skills and theoretical perspectives that are adaptable to a variety of job settings.

The principal educational goal of the program is the interaction of theory with practice.

Graduates of the program are expected to demonstrate competence in beginning general practice, with particular reference to the demands of the Maritime region, through development of:

Ability to assess their own learning needs, together with willingness to draw wider implications from their practice and life experience.

Understanding and appreciation of a wide range of social work roles and interventive methods.

Understanding of both the psychological and socio-economic forces which impinge on clients' lives.

Critical, well-founded awareness of the probable impact of various interventions on clients.

Ability to implement, or cause to implement, a variety of interventive skills.

Ability to judge which interventive methods are appropriate in each concrete situation.

Ability to understand and deal with the policies and administrative structures which affect the delivery of social services.

Graduates of the baccalaureate program will be prepared to integrate values, theory and practice skills with a developed and critical perspective on society.

Library

The Maritime School of Social Work has a professional library containing over 20,000 books and bound periodicals. In addition to serving students, faculty and staff, the library is a valuable resource for other universities, the social work community and the general public.

Relationship to the MSW Program

Admission to the MSW program normally necessitates that the candidate have a BSW degree and two years of postbaccalaureate social work experience in the area of preferred graduate study concentration.

For exceptions to this regulation see MSW Graduate Program admission regulations.

Full-time Studies

A full-time program of study, which normally consists of 30 credit hours during the Fall/Winter session, is available on the Halifax campus.

Part-time Studies

Part-time study may consist of 1/2 to 3 credits during the Fall/Winter session, according to the student's preference at the time of registration.

Off-Campus Programs

Decentralized BSW degree programs are presently underway on a part-time

The Maritime School of Social Work

The Maritime School of Social Work was incorporated in 1941 to meet a need for trained social workers in Atlantic Canada. The educational goals of the School were united with an interest in adapting established models of practice to the special realities and social problems characteristic of the Maritime provinces, and in developing the quality of social service delivery in the region. The School was incorporated by Dalhousie University in 1969, and in recent years it has become one of seven professional schools within the Faculty of Health Professions. Courses of study are available both at the undergraduate (BSW) and graduate (MSW) levels.

The Bachelor of Social Work degree program, introduced in 1978, is accredited by the Canadian Association of Schools of Social Work (CASSW). Instruction is conducted according to adult education principles, allowing students active involvement in decisions about their education. The students in Halifax have organized a Student Council to provide representation for students on the various standing committees of the

basis in Charlottetown (in cooperation with the University of Prince Edward Island); in Sydney (in cooperation with the University College of Cape Breton); and in Church Point (in cooperation with Université Ste.-Anne). A Micmac BSW program designed for the needs of the native community is also in progress, with class sessions alternating between Halifax and Sydney. The decision to admit new students to each of the decentralized programs is made on an annual basis. Students in these locations should contact the Admissions Office of the School for current information. The Micmac program is closed to new admissions.

Special "No Degree" Students and Students In Other Degree Programs

Students may be admitted on a non degree basis to off-campus BSW classes, for a maximum total of two full credits. special students are admitted in Halifax only in exceptional cases and with the permission of the BSW Chairperson.

Students in other Dalhousie degree programs seeking electives may take BSW classes other than the practice related courses Social Work 1000R, 3020R, 3030R, 4010R and 4030R only by permission of the Social Work course instructor. Such students should first check the regulations of their Faculty, School or College.

Additional information on any of the above programs may be obtained by contacting the School's Co-ordinator of Admissions.

Summer Sessions

A limited number of summer session classes are offered in Halifax and at the off-campus centres. These are announced during the Spring term.

New BSW students are required to begin their classes in the Fall session.

Audit by Agency Field Instructors

The MSSW permits Agency Field Instructors to audit social work courses. Prior permission of the individual faculty person(s) concerned is required.

If the field instructor wishes this audit to show on a Dalhousie University transcript then he/she must abide by the University audit regulation and fee as outlined in the current Dalhousie University Undergraduate/Graduate Calendar.

Admission Requirements

(a) Admission of Regular Students

To be eligible for admission to the BSW program, regular candidates who have completed Nova Scotia Grade XII (or equivalent) are required:

- (i) to have completed at least one year of undergraduate study at a recognized university following Senior Matriculation;
- (ii) to have a minimum academic average of B- or 65%;
- (iii) to show evidence of personal maturity and suitability for social work.

(b) Admission of Mature Students

Persons who do not meet the above requirements may apply as mature candidates provided that they are at least 25 years of age at the date of application and are able:

- (i) to provide evidence of their potential for achievement at the university level; and
- (ii) to show evidence of their aptitude and suitability for social work.

(c) Information for University and High School Students

Obtaining professional training in social work requires a well-developed interest and a willingness to engage in long-range planning. Because enrollment is limited to the most qualified candidates, younger applicants are best able to compete successfully for admission to the BSW degree program if they have already completed another undergraduate degree at a B+ (75%) average or better.

Students who complete an initial undergraduate degree before applying to Social Work would normally have 10 social work credits (i.e. two years of full-time study) to complete for the BSW degree.

Work experience in summer or part-time jobs, particularly ones related to

the provision of social or human services, and/or volunteer experience in similar areas can be important assets.

Students are also advised to consider work or voluntary activities in which there is a direct personal contact, preferably with some training and on-going supervision.

Students are also reminded that a year or more of social services related work experience following receipt of their initial degree will substantially enhance their application for admission.

Course Selection

Although the selection of courses in the first years of university study need not be restricted to any specific subjects or degree programs in order to be acceptable to the Maritime School as a basis of admission (provided that the minimum B- average has been attained), subject areas that are particularly helpful in providing background preparation for Social Work include Psychology, Sociology and Political Science. The other Social Sciences and Humanities are also well suited for developing a foundation for the study of Social Work.

(d) Information for Persons Over 25 Years of Age

Individual qualifications beyond the basic admissions requirements determine which applicants are successful in being offered a place in the program. Demonstrated ability for study at the university level, together with demonstrated ability for social work practice are helpful assets for the candidate to possess. Each applicant is considered in relation to other applicants who qualify for similar admission priority, on the basis of the following qualifications:

Academic Experience

For persons lacking the regular admission prerequisites, academic ability may be demonstrated by the successful completion of at least one full university credit prior to application for the BSW program.

Work Experience

Demonstrated ability for social work usually involves current or previous work experience in social services or responsible related human services, with a supporting work reference. Equivalent experience in the community environment is similarly helpful as a qualification. Service delivery experience in the human services (for example, as a personal care worker) is an asset but, because many candidates possess this type of background, other qualifications often determine the outcome of the individual's application.

Volunteer Experience

Volunteer experience in the human/social services field is of assistance in developing the individual's interest in social work but, since candidates would normally be expected to possess this type of experience, it is often not as important for demonstrating social work skills as related work experience. For some individuals, however, it is one means whereby evidence of personal suitability and understanding of social work may be provided.

Personal Statement

The personal statement required as part of the BSW application provides an opportunity to explain the nature of the applicant's interest in a career in social work. It is also of value in communicating the depth of the candidate's previous social work related experience in either giving or receiving help, and the candidate's motivation and readiness for social work training.

Application Procedure

Enrollment is limited to a specified number of places that are offered once a year to those candidates selected by the admissions process.

Applications are grouped into 3 categories, as follows:

Group A: Working Adults—persons currently employed in the social/human services.

Group B: Adult Applicants—persons 25 years of age or over not currently employed in the social/human services.

Group C: University Students—persons under 25 years of age not currently employed in the social/human services but with current or recent university experience (minimum of 5 credits).

Those candidates with the best qualifications within each category are offered a place in the program. Interviews are not generally required, but in certain instances the Admissions Committee may require an interview and personal evaluation as part of the selection procedure.

The School has an affirmative action policy designed to increase the number of qualified social workers who belong to the Acadian, Black and Native minority groups of the Maritime region.

Application packages may be obtained from the Registrar's Office, Dalhousie University in late November. Application forms, official transcripts, and supporting documents must be received in the Registrar's Office no later than March 1.

Applicants who are attending university at the time of application should ensure that their first-term transcripts are submitted prior to the March 1 deadline date and also that their final transcripts are forwarded immediately following completion of the regular session in April.

Admission Credits

The first five credits of the 20 credits required for the BSW degree are referred to as 'admission credits.' These courses may be completed either before or after acceptance into the BSW program, strictly in accordance with the basis of admission as stated in the Admission Requirements section above.

For all applicants/students, admission credits must meet the following criteria:

- (i) They must be offered by a recognized university or equivalent institution of higher learning, or by certain other institutions for which the work is considered appropriate to an academic program in social work;
- (ii) They must be comprised of general university-level course content in any subject area *other than* social work, and equivalent to the first year of any undergraduate degree at Dalhousie;
- (iii) They must be completed at an average of B- (85%) or better.

Regular Students: Are required to complete the first five non-social work admission credits prior to entry to the program.

Mature Students: May complete some or all of the five non-social work credits after admission to the BSW program. Mature candidates are, however, encouraged to complete at least one, and preferably all of these credits prior to application.

Advanced Standing

It should be noted that persons possessing a Bachelor's degree must take a minimum of 6 credits under Dalhousie instruction, and persons without a Bachelor's degree must take a minimum of 7 ½ credits under Dalhousie instruction. This regulation sets the absolute limit of credit from all sources which any individual student shall receive.

Transfer Credits

Transfer credits are applied only to the 15 social work credits of the BSW curriculum, and not to the 5 general non-social work admission credits. With respect to the latter, the first five acceptable university credits completed at the B^U- level and taken prior to entry to the BSW program are allowed on a credit-for-credit taken basis. (See Admission Credits and BSW Curriculum).

Transfer credit is considered (a) in relation to university courses in an initial undergraduate degree program taken after the fifth acceptable credit and/or (b) in relation to certain other qualifications. Transfer credit is not granted on a credit-for-credit basis; rather it is pro-rated, normally on the basis of 1 credit for each of 2 acceptable academic credits previously taken within the limits outlined below. Transfer credits towards the BSW are granted subject to Faculty of Health Professions Regulation 2 and the following conditions:

- (i) Credits accepted for transfer must have been completed within the 10 years preceding the student's projected completion date of the BSW degree program. An extension of this 10-year rule may be granted by the Faculty Committee on Studies to accepted students who apply to the Chairperson of the School's Committee on Studies. (See Faculty of Health Professions Regulation 7.)

(ii) Transfer credit is considered only in relation to acceptable credits previously completed at an average of B-(85%) or better.

(iii) The total amount of transfer credit that may be applied to the BSW degree is standardized by the School for certain specific qualifications, such as a previous undergraduate degree with a B- average or better, a registered nursing diploma, a social services diploma, etc. For example, accepted candidates who have completed a Bachelor of Arts degree, with the required B-(85%) average, are eligible for a *block transfer credit* of 5 credits, in addition to the 5 admission credits also allowed. (See Admission Credits above.)

(iv) The maximum amount of transfer credit to be recommended is the decision of the transfer co-ordinator. Persons with the qualifications for more than one block of credit are normally limited to one block only.

Assessment for transfer credit on an individual basis is also provided as follows:

- (a) Accepted students who have extra credits beyond the minimum required 5 non-social work admission credits (with the required B-average), and who have not completed a degree or diploma will be assessed for transfer credit in relation to their extra credits by the transfer credit coordinator.
- (b) Accepted students who have completed a previous undergraduate degree with the required B- average), and who have also completed further undergraduate or graduate credits or degrees will be considered for possible transfer credit in relation to these additional credits by the transfer credit coordinator.
- (c) Mature students accepted who possess university credits or degrees which do *not* meet the required B- (85%) average will be considered for possible admission credits and for transfer credit by the transfer credit coordinator.
- (d) Mature students who have not yet completed the 5 non-social work admission credits, and who possess one of the specific qualifications appropriate for transfer credit, such as a registered nursing diploma, are eligible for the amount of transfer credit permitted for that qualification.

It is the student's responsibility to provide course outlines and other documentation required by the School to determine eligibility for transfer credit. All recommendations for transfer credit must be approved by the University Registrar, who may or may not award the number recommended. In accordance with University regulations. Students who are eligible for transfer credit will receive a letter from the Registrar, usually during the first term, stating the number of transfer credits that have been approved.

Competency Credit

Credit for competency allows the new student to receive credit for learning from various types of previous experience provided that he/she is able to demonstrate its relevancy to the content of the BSW program.

A maximum of two credits may be applied for by those students who have had at least 24 consecutive months of full-time paid or unpaid employment in the human services, or equivalent, prior to acceptance. The number of competency credits for which the student may apply is, however, limited by the amount of transfer credit for which he/she is eligible; e.g., a student with a previous degree is normally limited to 1 competency credit (2 half-credits).

Accepted candidates must apply for competency credit by September 30th of the year of their acceptance to the BSW program, and are encouraged to apply as soon as admitted. To be eligible, candidates must also register in the Fall session of the year of their acceptance *either* for a Dalhousie full-credit course or for a Dalhousie half-credit course beginning in September.

A fee equal to half the regular course fee is charged for each half-credit for competency, and is payable upon registration for competency credit assessment.

Competency credits earned are assigned on an individual basis to classes selected from the 15 social work credits of the curriculum, thus reducing the number of social work credits subsequently required for completion. (See BSW Curriculum below.)

New Student Advising Sessions

New students are assisted in planning their classes by curriculum advisors from the School who meet with each student during the initial stage of the scheduled Fall registration sessions. Decisions about which social work classes will be covered by transfer credit are usually made at this time. The possible assignment to particular social work classes of competency credits to be earned in the coming months is also discussed during this session.

Faculty Advisors

Each student is also assigned a faculty advisor for ongoing consultation concerning any issues or concerns that may arise throughout the year. In the off-campus centres the resident faculty member acts as advisor.

Regulations

Maritime School of Social Work Regulations

All students are required to observe the University and Faculty of Health Professions regulations as described in this calendar.

Grading Requirements

(a) Grade Point Average (G.P.A.)

The Maritime School of Social Work uses the grade point average system (G.P.A.) which is described in Faculty Regulation 10. In each year of study in the MSSW a student must maintain a minimum grade point average of 2.00 and a cumulative grade point average of at least 2.00. The G.P.A. is calculated at the end of each year. For part-time students the G.P.A. is calculated at the School when 30 credit hours of study are completed. All courses to be used in the attainment of a BSW degree are included in this calculation of the G.P.A. This includes courses taken at other institutions by Letter of Permission from other universities (see Regulation 15).

(b) Grade Requirements for Social Work Courses

A student must obtain a grade of at least a C in each social work course for that course to be counted as a credit for the degree. A student who earns a grade of less than C in a social work course but is otherwise still eligible to continue in the School of Social Work must repeat the course until a grade of at least C is attained. Social work courses are all courses taken under BSW study which are not otherwise designated as admission credits.

(c) Requirements of Field Instruction Courses

Field Practice courses SW3020 and SW4020/4030R are graded on a pass/fail system. A student must obtain a passing grade in each Field Practice course in order to be eligible to proceed in the program. Field courses are not included in the calculation of G.P.A.

Required Withdrawal from the Program

A student who fails to meet the yearly G.P.A. standards as defined in Regulation 25(a) (above) must withdraw from the School. As well a student who fails a repeated course (academic or field work) normally must withdraw from the School.

Probation

A student with a cumulative G.P.A. of 1.8 - 2.0 may be granted probationary status at the discretion of the BSW Program Committee. A student granted probationary status must achieve a cumulative G.P.A. of 2.0 for the next year (or following the completion of 30 credit hours of instruction in the case of a part-time student) or be required to withdraw from the program. A student whose grades fall within the probationary level a second time will be required to withdraw from the program.

Readmission After Required Withdrawal

Students who have been required to withdraw from the School of Social Work may apply for readmission after being out of the School for a minimum of one year. Since enrolment in the program is limited, students seeking readmission must understand that readmission is not automatic.

Readmission After Voluntary Withdrawal

Students who wish to withdraw from the BSW program should notify the BSW Chairperson of their intention in writing, stating the reasons for their decision.

Students who have withdrawn from the program for more than one year and who wish to be reinstated are required to submit a new application form, to be returned with a letter to the Chairperson, BSW Committee, requesting re-entry, and explaining the reasons for the interruption in their program, and for the decision to resume their BSW degree studies.

Because of the relation of the BSW program to the attainment of professional qualifications, each application is evaluated separately by the BSW Committee.

Appeals

A student wishing to appeal a decision based on School regulations, should consult with the Chairperson of the Academic Appeals Committee for advice on appeal procedures (see Faculty Regulation 20).

Duration of Undergraduate Study

Students must normally complete undergraduate studies within 10 years of their first registration. This rule also applies to transfer credit to be used in completing a degree. (see Arts and Science Regulation 17)

Workload Regular Academic Year (Fall-Spring)

(5) full-credit classes per academic year (except in the first year where 5 ½ credits are permitted) shall be regarded as constituting a normal workload for a full-time student, and may not be exceeded without written permission from the School's Committee on Studies of the Maritime School of Social Work. Written permission is also required if the planned workload in any term would amount to six half-credit classes (i.e. 3 full credits).

Maximum Workload — Summer School

See Faculty of Health Professions Regulation 18.4.

Limits on Credits — Summer School and Correspondence Classes

See Faculty of Health Professions Regulation 18.1 and 18.2.

Credits from other Universities under Concurrent Registration

Bachelor of Social Work students who wish to take classes at other institutions, whether in the academic year or in summer session, must obtain approval *in advance* on a Letter of Permission form obtained from the School or Registrar's Office six weeks in advance of the starting date of the class requested. A copy of the Letter of Permission will be provided by the Registrar if approval for the classes is given. The workload at the other institution must conform to the workload limitations at Dalhousie. Not more than half of the work of any three or four year degree program may be by Letter of Permission.

See Faculty of Health Professions Regulation 19.

Discipline

See University Regulations - Discipline.

Plagiarism

See University Regulations - Academic Offences.

Sexual Harassment

Dalhousie University has adopted procedures to deal with sexual harassment on campus. Using the definition of sexual harassment as being "any sexually-oriented behaviour of a deliberate or negligent nature which adversely affects the working or learning environment," the Presidential Advisory Committee on Sexual Harassment deals with such disputes through an informal type of mediation process, and if this is not successful, by a formal hearing procedure. The Committee is composed of a male and female appointee of administration, faculty, staff, undergraduate and graduate students. Copies of the procedures and a brochure giving names of committee contacts may be obtained from the Student Council or from the School Office.

BSW Curriculum

The BSW degree is awarded upon successful completion of 20 credits as outlined below:

- (I) Five admission credits as defined in section 19. above.
- (II) Five and one half compulsory credits in Social Work as follows:
 - 1000R Introduction to Social Work (1 ½ credits)
 - 3020R Field Instruction I (1 credit)
 - 4010R Advanced Social Work Practice (1 credit)
 - 4030R Field Instruction II (2 credits)
- (III) Nine and one half credits as follows: (For many students some of the following credits will be covered by either transfer and/or competency credits.)
 - 3010R Perspectives on Social Welfare Policy (1 credit)
 - 3030R Foundations of Social Work Practice (1 credit)
 - 3040R People-In Society (1 credit)
 - 3050A/B Social History of Atlantic Canada (UPEI equivalent: Pol. Sci. 242) (½ credit)
 - 3070A/B Social Service Delivery Analysis (½ credit)
 - 3080R Science and Testing of Practice (1 credit)
 - 3090A/B Social Statistics (UPEI equivalents: Soc. 321, Math 2210, Ed. 481, Psych. 271) (½ credit)
 - 3100A/B Political Economy of Social Welfare in Canada (UPEI equivalent: Pol. Sci. 201) (½ credit)
 - 3220A/B Cross-Cultural Issues and Social Work Practice (½ credit)

Social Work in a Special Field of Practice Elective: (½ credit) (Usually an elective offered by the School to provide in-depth study of unmet needs, and emerging social work roles in a field of practice selected by the student.)

Social Problem Electives: (1 credit or 2 x ½ credits) (May be social work electives, or electives offered by other Departments or Schools, to provide in-depth study of contemporary social problem issues. Examples of social problem electives are: Child Welfare, Deviancy, Women's Issues.)

Free Electives (1 ½ credits or 3 x ½ credits). (Free electives may be chosen from any subject area, including social work.)

In Charlottetown, Sydney and Church Point the social problem electives and the free electives are to be taken at UPEI, UCCB and U. Sts. Anne.

Sequencing of Course Credits

Students commencing with the 20-credit BSW curriculum are strongly advised to complete their five admission credits at the beginning of their program or, if this is not feasible, as early in their program as possible.

All students accepted into the program are expected to commence their social work credits during the regular academic session which begins in September.

It is the policy of the BSW Committee that:

- (I) SW 1000R — Introduction to Social Work be completed prior to the commencement of SW 4010R — Advanced Social Work Practice, and that
- (II) SW 3020 — Field Instruction I, be completed prior to the commencement of SW 4030 — Field Instruction II.

The sequencing of course work is otherwise determined by the student and is largely dependent on each student's needs within the following guidelines:

- (I) 1000R — Introduction to Social Work should be taken at the beginning of a student's program,
- (II) Students are advised to take 4010R — Advanced Social Work Practice after 3030R — Foundations of Social Work Practice.

(III) 4030R — Field Instruction II should be taken at the end of a student's program. Students may not register for 4030R unless they have completed their 5 non-social work admission credits.

Equipment and Insurance

All students should supply themselves with a battery operated cassette recorder for use with library cassettes, and for use in field instruction. Many field agencies expect the student to have the use of a car in order to do his/her field placement.

Full time students (3 credits and above) are covered for Accident Liability Insurance during Field I and Field II through payment of their Student Union Fees. (\$99.00)

On-campus Students carrying less than 3 credits pay \$10.00 per ½ credit course and \$20.00 per full credit course to the Student Union. However, this does not give them Health Benefit and Insurance coverage. In such instances, if the student wishes Accident Insurance coverage during placements, he/she would need to pay the Student Union the difference between what they have paid through course registration and the \$99.00.

BSW Social Work Class Descriptions

1000R Introduction to Social Work: (compulsory). This course is a basic introduction in the student's study of the field and the practice of Social Work. It is primarily a practice class with intensive laboratory-style components, with focus on the ongoing development of communication and interventive skills. An assessment of the students' learning needs and strengths is also carried out. This class is organized in four modules of unequal value: (1) orientation to the field of social work and social welfare (4 weeks), 10% of overall course value; (2) learning needs assessment (4 weeks), 20% of overall course value; (3) introductory communication and relationship skills (5 weeks); 20% of overall course value; and (4) introductory interventive skills (13 weeks); 50% of overall course value.

3010R Perspectives on Social Welfare Policy: This course provides a survey of the history of social welfare in Canada, with a focus on historical debates which shed light on present-day issues; a survey of a variety of perspectives on social problems and social policy issues, with a focus on the various definitions of human needs; and an initial survey of the spectrum of social welfare programs available in the Maritimes. Each student will be asked to undertake an analysis of the policies informing a program of his/her choice.

3030R Foundations of Social Work Practice: Topics relate to the principles and processes of giving and receiving help in one-to-one and in mutual aid interpersonal exchanges, facilitated by a purposeful helper; and the principles and skills of analysis of developmental and problematic interpersonal, organizational and community change situations.

3040R People In Society: An overall theoretical perspective on the personal, organizational and societal problems facing people today is provided regarding (a) the individual, (b) society and its functioning and (c) the interplay between these two. Emphasis is on extrapolating major conceptual elements of each of these theories in order to develop an integrated diagnostic scheme relevant to the wide range of situations typically encountered in social work practice and fundamental to the theoretical base required by a "generalist" social work practitioner. 3010 Perspectives on Social Welfare Policy is a complementary class supplying historical and contemporary data, while 3040 provides a preliminary diagnostic framework.

3050A/B Social History of Atlantic Canada: An analysis of the peoples who settled the region, the problems they have faced and their reactions to them are presented, with a focus that gives historical perspective to contemporary social problems.

3070A/B Social Service Delivery Analysis: An appreciation of the social worker's role and responsibility in planning and delivery of social services; an understanding of the ability to apply selected theoretical models of service delivery; proficiency in analyzing and influencing service delivery systems in which social workers participate; and familiarity with some of the recent service delivery innovations in various provinces of Canada are developed.

3080R Science and The Testing of Practice: This is the basic research course in the BSW program. It is a full credit course and is ordinarily offered over two semesters. In the first section, the emphasis is on providing students with a knowledge of the scientific method, a conceptual understanding of the primary terminology of science and the interrelationships between theory, research and practice. In the second section the focus switches to the more pragmatic consideration of evaluating practice.

3090A/B Social Statistics: The aim of this course is to develop an understanding of major basic statistical tools which facilitate interpretation of data derived from social work-related data bases or research. The ability to apply basic forms of analysis to the description of samples, and the ability to draw inferences from samples to populations are provided. Applications rather than mathematical derivations are examined in exploring the practical significance and limitations of statistics. Concepts explicated are: prediction, models, level of measurement, probability, inference, and quantification. Statistics developed include: measures of central location, dispersion, regression, association, confidence intervals, and selected tests of significance with emphasis on multivariate applications.

3100A/B Political Economy of Social Welfare in Canada: The structure of government and the nature of bureaucracy; the nature of federal, provincial, municipal relations; the historical development of social policy within a context of federal taxation and provincial initiatives; and aspects of parliamentary forms as related to social policy development are covered. A critical analysis of the welfare state and its functions vis-a-vis social development on the one hand, and social control and economic planning on the other, are central concerns in this course.

3220A/B Cross-Cultural Issues and Social Work Practice: This course provides students an opportunity to: critically examine theoretical frameworks for viewing minority racial, ethnic and cultural groups in society; examine personal values as they relate to the above groups; develop skills in working effectively with minority groups and understand social policies as they relate to minority groups.

4010R Advanced Social Work Practice (compulsory): Selected theories of personal and social change are critically examined from the perspective of social work practice for the development of analytical and practical skills in preparation for professional practice.

Field Instruction

All part-time and full-time students are required to make arrangements to undertake the two field placements (SW3020 and 4030R) during regular working hours. The field component of the program is controlled and supervised by the Maritime School of Social Work faculty. There is provision for seminars, workshops, consultations, etc., in order to assist the students with testing content from academic classes. Content not taught in the classroom but necessary to a specific field of practice is introduced as required, including such topics as law and social work, housing policy, and employment policy and practice.

3020R Field Instruction I (compulsory): This initial field placement provides an opportunity for beginning social work practice under supervision of agency personnel in liaison with School faculty. The student develops beginning competencies in direct practice situations, working with individuals and small groups. Use of agency and community resources, policies and services are studied. Approximate length 200 hours. Students must indicate their intent to the Field Co-ordinator by *October 1* if they plan to register for Field I in January of their first year, by *January 1* if they plan to register for Field I in the Spring/Summer terms and by *March 1* if they plan to register for Field I in September or January of their second or subsequent year(s).

Field I should be completed early in the student's program

4030 Field Instruction II (compulsory): The major field placement offers a faculty-supervised opportunity for the development of counselling, social change and community action skills sufficient for responsible entry into practice upon graduation. The student becomes increasingly proficient in service situations requiring counselling, and can recognize the need for

influencing policy, program or process within the place of field practice in order to carry out professional responsibilities in the community.

The student must develop a proposal to be submitted to the School and to be approved by the Field Coordinator prior to beginning the practicum. The proposal must be submitted by *March 1* in order for students to be able to register for Field II during any period of the following academic year. *January 1* is the deadline for submitting proposals if students intend to register for Field II in the Spring/Inter-session term. Field placements requested in the Spring/Summer sessions are dependent upon the availability of faculty field instructors.

Students who are working in non-social work positions must make arrangements early in their program to be able to complete their 200 hour Field I placement and their 500 hour Field II placement. The student would normally be expected to request leaves of absence from his/her regular non-social work position. A manual is available to aid the student in its preparation, as well as outlining the expectations for satisfactory completion of the practicum. The Field II practicum is done at or near the end of a student's program. Minimum of 500 hours. Proposals should be sent to: Field-II Coordinator, Maritime School of Social Work, Dalhousie University, Halifax, N.S. B3H 3J5.

BSW Credits for Competency

2500A Learning Through General Work Experience (½ credit)

2510B Self Analysis and Personal Development (½ credit)

2520C Specific Social Work Skills (½ credit)

2530D Non-credit Structured Learning Experiences (½ credit)

2540E Knowledge of Special Field of Practice (½ credit)

A student may not apply for more than three (3) of A, B, C and D. Thus maximum credits allowable are two: — one and a half (1 ½) for three of A, B, C and D; and ½ credit for E.

BSW Elective Classes

The number of elective classes offered each year is limited. The following is a list of classes that have been offered at the School; they are not, however, offered each year.

13170A/B Feminist Counselling

3180A/B Family Counselling

3200A/B Law and Social Work

3210A/B Social Work in the Medical Field

3230A/B Women and Social Change

3240A/B Community Work Approaches to Social Work Practice

3250A/B Social Work in Corrections

3260A/B Social Work in Industry

3270A/B Social Work in Addictions

3280A/B Social Planning: Theory and Applications

3290A/B Counselling in Social Work Practice

3300A/B Independent Study

3310A/B Rural Social Work

3320A/B Social Work and the Aging

3340A/B Social Work with Exceptional Children

3350A/B Social Work with Groups

3370A/B Child Welfare

4400A/B Family and the Law

Scholarships, Bursaries and Financial Aid

For information on all prizes, bursaries, scholarships and loans, consult the booklet "Scholarships, Prizes, and Financial Aid," issued by the Dalhousie Awards Office. Further information may be obtained from: Director of Awards, Office of the Registrar, Dalhousie University, Halifax, B3H 4H6, Telephone: 1-(902) 424-2450.

University Scholarships

Full-time students in the Bachelor of Social Work program are automatically considered for Dalhousie University Scholarships which are funded from general scholarship funds. A limited number of scholarships are also available for part-time students.

University Bursaries

The Awards Office receives completed applications up to the designated deadlines. Applications will then be *batched* and *assessed on a competitive basis* for funds available. Applicants will be notified of the decision later. Applicants who are unsuccessful in the initial assessment period may file an application for the subsequent period(s).

It should be noted that Canada Student Loans (with or without bursaries) are expected by provincial authorities to meet the financial deficiencies of the student and that the bursaries subsequently awarded by the University must be reported and are liable to deduction (in part or in whole) from the amounts originally allocated under the Canada Student Loan Plan or provincial aid program.

The University has at its disposal some funds which are selectively awarded as bursaries, on an emergency basis, to students who may unexpectedly find themselves in urgent need of financial assistance. While these bursaries are awarded primarily on the basis of demonstrable need, satisfactory academic standing is also expected. Except under exceptional circumstances, bursaries will not be awarded to students who have not availed themselves of assistance under the federal/provincial student aid programs. (Students must register for and maintain full-time status during the academic year for which assistance is sought.)

Registered Dalhousie University students who are seeking bursary assistance, must complete an Application for Financial Aid form, which is available from the Awards Office, Room 125, Arts & Administration Building. On-campus students are also required to arrange for an interview. In the event that the applicant may be eligible for a restricted bursary, he/she should draw this to the attention of the interviewing officer at the time.

Further information may be obtained from the Awards Office.

School of Social Work Scholarships

The Prince Scholarship: A small scholarship is available to a returning student upon recommendation of the Bachelor of Social Work Committee.

School of Social Work Bursaries

Hannah G. Matheson Bursaries: These bursaries were provided for in the will of the late Caroline E. Carmichael (LLD, Dal), to perpetuate the name and memory of her niece, Miss Hannah G. Matheson, who had devoted her life to social work. They will be made available to students in their second, third, or fourth year of Arts who intend to continue their studies at a School of Social Work, and to graduate students in Sociology or Psychology who wish to continue their work in the field of Social Work. These bursaries are open to students enrolled in full-time studies in the Maritime School of Social Work.

Lloyd MacInnis Memorial Bursary: The Lloyd Y. MacInnis Memorial Award Fund was established to provide an annual bursary to a qualifying student who is continuing his or her studies at the School in the baccalaureate program beyond first year.

Jane Wisdom Memorial Bursary: When Jane Wisdom began her caring work in Halifax shortly before the Great Explosion of 1917, she was truly a pioneer in what has come to be known as Social Work. It is in recognition of her distinguished service that anonymous donors in 1977 established an endowment fund whereby one or more annual bursaries would be granted to students in the baccalaureate program of the Maritime School of Social Work at Dalhousie University.

Faculty of Management Studies

The Faculty of Management Studies offers two undergraduate programs, one in Commerce (BComm), administered by the School of Business Administration, and the other in Public Administration (CPA), administered by the School of Public Administration. Students wishing to enroll in programs offered by the Faculty should address themselves directly to the Schools concerned for further information or for help in planning courses of study.

Faculty Officers

Roy E. George, Dean, Kilam Library, Telephone 424-2582

Mary E. Dykstra, Director, School of Library and Information Studies, 3621 Kilam Library, Telephone 424-3656

A. Paul Pross, Director, School of Public Administration, 1229 Le Marchant Street, Telephone 424-3742

Ronald G. Storey, Director, School of Business Administration, 6152 Coburg Road, Telephone 424-7080

School of Business Administration

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. The undergraduate program includes studies in the humanities and social sciences as well as in the functional areas of business. Recognition is given to the growing emphasis on quantitative and behavioural analysis.

Academic Staff 1987/88

Director of the School
Ronald G. Storey

Director, Centre for International Business Studies
Phillip J. Rosson

Coordinator, MBA Program
M. Eileen MacDougall

Coordinator, BComm Program
M. Arne Hicks

Emeritus Professor
C.R. Brookbank, BA, MA, PhD (Toronto)

Professors

G.R. Chesley, BComm (McM), MA, PhD (Ohio), CA

M.A.H. Dempster, BA (Toronto), MS, PhD (Carnegie-Mellon), MA (Oxford), (Roy A. Jodrey Chair)

C.R. Dipchand, BComm, (Queen's), MBA (Sask.), PhD (Western)

R.E. George, BSc (London), MA (Bristol), PhD (London), (Wm. A. Black Chair)

M.J.C. Martin, BSc, (Nottingham), PhD (Sheffield)

J.R.E. Parker, BComm (Dal), MBA (Wash.), C Phil (Mich.), CA
G.S. Roberts, AB (Oberlin), MA, PhD (Boston College)
R.G. Storey, BBA (UNB), MBA (Queen's), PhD (Mich. State)

Associate Professors

B.C. Archibald, BA (Queen's), MSc (Stanford), PhD (Waterloo)

M.R. Brooka, BOT (McGill), MBA (Dal), PhD (Wales)

D.C. Cherry, BComm (Dal), MBA (McM), CMA

C.J. Dirksen, MBA (Oregon), BS (Santa Clara), PhD (Oregon)

J.F. Duffy, BS, MS, PhD (Iowa)

R.A. Ellison, BSc (UNB), MBA (McM), PhD (Tennessee)

I. Fooladi, BS (Iran), MA (Tehran), MS, PhD (Oregon)

R.H.R. Glube, BSc (Dal), MBA (Chicago), PhD (Cranfield)

R.E. Klapstein, BSc (Calg.), BA (Alta.), MBA, LLB (Dal), LLM (Osg. H.), CMA

S.O. Larsson, BSc (SGW), MSc (Alta.), PhD (UBC)

L.C. MacLean, BA, BEd (St FX), MA, PhD (Dal)

R.N. Maddox, BA, MBA, PhD (Ohio)

L.W. Mealea, AB, MBA (Rutgers), PhD (Mass.)

A. Oppong, BSc (Ghana), MBA (Chicago), PhD (Iowa), CGA

D.J. Patton, BA (UNB), MA (Toronto), DBA (Indiana)

A.C. Peacock, BA, MA, PhD (Western)

P.J. Rosson, Dip MS (Salford), MA (Lancaster), PhD (Bath)

R.S. Sandhu, BSc, BCL, LLM (Delhi), LLM (Yale), MBA (Dal)

Y. Sanker, BA (McG), MA (Tor.), PhD (Johns Hopkins)

D.A. Schellinck, BSc, MBA (Dal), PhD (Illinois)

E.W. Scott, BComm (Dal), MBA (Col.), CA, CMA

Y. Sharaf, BSc, MPA (Tehran), MBA, PhD (Mich. State)

D.P.J. Sheridan, CD, BA, BEd, MEd (Admin) (Sask.), PhD (Alta.)

R.A. Street, BComm, LLB (Dal), MBA (Western), LLM (Dal)

G.E.R. Zinck, BComm (Dal), BEd (MSV), CA

Assistant Professors

R. Carroll, BBA, BEd (St. FX), MBA (Dal), CGA

F.G. Crane, BA (Acad), DPA, MPA (Dal), PAdm (ICSAC), PhD (Bradford)

H.I. Gasman, Vordiplom (Stuttgart), MS (Oregon), PhD (UBC)

J.K. Grude, BA (Alta.), MSc, PhD (London)

M.A. Hicks, BSc (Carleton), MBA (Dal), CA

P.C. Lam, BComm (Dal), MBA (McGill), PhD (Manchester)

B.W. MacLean, BComm, MBA (Dal), CA

P.C. Secord, BComm, MBA (Dal), CIA, MPA (Dal), CMA

Visiting Assistant Professor

A. Verbeke, BBA (Antwerp), MFM (Flem Inst Mgt), MBA/MPA (Sint-Ignatius), PhD (Antwerp)

Part-time Faculty

M.E. MacDougall, BSc, MBA (Dal)

D. Moulton-Barrett, BA (Dal)

E. Pease, BA, BEd (Dal), MEd (MSV)

Bachelor of Commerce

In all classes the main effort is directed towards drawing out the principles which govern traditional and contemporary practice. The principles are related to current developments in business, government and society at large, and special discussion meetings are arranged in which recognized authorities participate.

The students may follow a general program of study or choose a measure of concentration in one of nine special areas: Accounting, Economics, Finance, Management, Marketing, Public Sector Management, Quantitative Methods, Computing Science in Commerce, and Small Business Management.

Courseware Development Project

The School of Business Administration has undertaken a multi-million dollar project to introduce computers into all aspects of the School. Prime objectives of the project include the integration of information technology into the curriculum and the development of sophisticated decision support systems for practicing managers through research carried out by faculty members in cooperation with industry.

Currently, all faculty members and support staff have their own personal computers and students have access to a computer laboratory with 45

personal computers and 20 terminals. All personal computers and terminals are connected through a data switch to the School's three MicroVAXes and artificial intelligence computer, and are networked with other computer systems on campus providing gateways to international data networks.

The generosity of several Canadian corporations as well as the support of the Capital Campaign for Dalhousie has enabled the School of Business Administration to become a recognized world leader in the development of this project.

1. Admission Requirements

Applications are available at the Registrar's Office, Arts and Administration Building, Dalhousie University, Halifax, Nova Scotia, B3H 4H6.

1.1 Students from Nova Scotia High Schools

At least five senior level university preparatory classes should be taken in the grade XII year as follows:

- (a) English.
- (b) Mathematics 441 or 442.
- (c) At least one of Biology, Chemistry, French, German, History, Latin and Physics.
- (d) The remaining classes may be from those listed above or from Economics, Geography, Geology, Law, Modern World Problems, Music, Political Science, Sociology, Spanish, Accounting.

Any special or experimental classes must have been previously approved by Dalhousie if acceptance for credit for admission is to be assured.

A passing grade of at least 50% is required in each class, with an average of at least 65%. A grade of at least 65% is required in both English and Mathematics (either 441 or 442).

The University does not apply criteria rigidly. Students who do not meet the above requirements, particularly those with high standing, are invited to apply and will be given consideration as special cases.

1.2 Admission from Outside Nova Scotia Students are accepted from other provinces and countries at levels as shown below, which are considered equivalent for the purpose of admission to Nova Scotia Grade XII:

New Brunswick, Newfoundland, Labrador, Prince Edward Island, Manitoba, Saskatchewan, Alberta, British Columbia: Grade XII, with subject distribution as for Nova Scotia.

Quebec: Two years at CEGEP. In special cases, one year CEGEP (high standing in a strong program required).

Ontario: Grade XIII or very high standing in Grade XII.

U.S.A.: Outstanding students may be admitted from U.S.A. Grade XII on the basis of advanced placement work or high SAT or CEEB scores; transfer credits will be considered for such outstanding students if they have completed a full year of study with good standing (minimum: 30 semester hours) at a recognized university. Other students from the U.S.A. can normally be admitted only after completing a first year at a recognized university or junior college (minimum: 30 semester hours). Credit, if any, for that year's work is determined on an individual basis.

The United Kingdom, West Indies, West Africa: General Certificate of Education (GCE) with pass standing in at least five subjects, of which one must be English and at least two must be at Advanced Level.

Hong Kong: GCE as for Great Britain, or University of Hong Kong Matriculation Certificate under same conditions as for GCE.

Bangladesh, India, Pakistan: Bachelor's degree with first or second-class standing from a recognized university; or in certain circumstances, first-class standing in the Intermediate examinations in Arts and Science, provided the candidate has passed at the university level in English, Mathematics, and a language other than English. Note: This standing is not sufficient for admission to the sequential BEd program at Dalhousie.

Countries not mentioned above: Write to the Admissions Office, Dalhousie University, Halifax, N.S. B3H 4H6, for further information.

1.3 Transfers from Colleges and other Universities

Students who have begun their post-secondary studies elsewhere, and who are in good standing, may be considered for admission. Credit for work completed may be granted, subject to the conditions given in section 13, page 28.

1.4 Mature Students

Students who do not meet the usual admission requirements may be considered under the *mature student* category provided that

1. they are at least 23 years old, and
2. they have been absent from full-time high school study for at least four years

Prospective students should submit to the Admissions Committee an application form together with a letter outlining their work experience and other activities. Normally, high school transcripts are required and interviews may be required.

Under exceptional circumstances, the Admissions Committee may agree to admit the student directly to a degree program if the student's background is deemed sufficient preparation for such admission. Otherwise, the Admissions Committee may admit mature students initially to the *no-degree* category until they have achieved grades of C or better in at least three full-year classes (or equivalent) taken. At that time, they are eligible to apply for admission as regular undergraduate students.

Mature students are advised to contact Henson College at 424-2526 for pre- and post-admission counselling (see page 22).

1.5 January Admissions

Admission to Dalhousie is normally for classes beginning in September, and the University does not admit full-time, first year students in January. Part-time students and transfer students, however, may be admitted for classes beginning in January. The deadline for application for January 1989 admission is November 15.

1.6 Proficiency in English

Applicants for admission whose native language is not English must give evidence that they are proficient in spoken and written English. Evidence may be provided by the English Language Test of the University of Michigan, or the Test of English as a Foreign Language (TOEFL) (normally with a score of at least 580). Both of these tests are administered in various centres throughout the world. Information may be obtained by writing to the English Language Institute, Testing and Certification Service, Ann Arbor, Michigan 48104, U.S.A. or TOEFL Box 899, Princeton, New Jersey 08540, U.S.A.

Certified copies of original documents, or relevant sections of documents (e.g. calendar pages) are acceptable in lieu of originals. Certificates in languages other than English or French must be accompanied by certified translation into English or French.

2. Student Aid, Scholarships and Other Awards

A separate booklet, *Scholarships, Prizes and Financial Aid*, is available, on request, from the Director of Awards and Student Aid, Dalhousie University.

3. Admission to Classes

3.1 Academic Advice

At Dalhousie all students are offered academic advice prior to registration. First-year students may wish to consult with the Director of Admissions or Registrar, or with the Summer Faculty Advisor. After the first year, students can consult the Commerce Coordinator for program advice. Each student must complete a *Class Approval Form*, obtainable from academic departments or the Office of the Registrar. This form must be completed before registering.

Students can be registered only after the Class Approval Form is completed and submitted.

NOTE THAT THE COMPLETION AND SUBMISSION OF A CLASS APPROVAL FORM DOES NOT CONSTITUTE REGISTRATION.

Registration is complete only after the registration form, which will be provided to each eligible student, is submitted to the Office of the Registrar and financial arrangements have been made with the Student Accounts Office.

3.2 Numbering of Classes

Classes are numbered to indicate their general level. Those in the 1000 series are introductory and can normally be taken by fully matriculated students without any previous classes at Dalhousie, while classes in the 2000, 3000, and 4000 series are usually first available to students in the second, third, and fourth years, respectively. Often these classes have prerequisites.

The letter following a class number indicates the session in which the class is offered. The letters A and B denote classes given in the first and second terms respectively. The letters C and R denote classes spread over both terms, i.e., given for the full academic year. An R class carries one full credit or more, and a C class less than one full credit. For summer sessions, A denotes a class given in the first three weeks, B a class given in the second three weeks, and R and C classes continuing for six weeks. Students should consult the timetable to determine which classes are offered in a given year.

4. Registration

Registration material and detailed information will be sent to all eligible students except those admitted late, in which cases documentation must be completed in person. After the Class Approval Form has been completed (see above) students may register, either in person or by mail. Late registration requires approval of the Dean.

A STUDENT IS REGISTERED ONLY AFTER FINANCIAL ARRANGEMENTS HAVE BEEN MADE AT THE ACCOUNTS OFFICE.

5. ID Card

Upon registration, a receipt which is also a requisition for an ID Card will be issued by the accounts office. An ID Card which gives the student access to many campus services and activities may then be obtained at the ID Unit. The Unit is open during special registration periods, of which all students are notified, and at other times as posted by the Unit, which is located in the basement of the Arts and Administration Building.

NOTE: It is University Policy that all students requesting the release of funds from the Awards Office *must* present a *current valid Dalhousie University Student Identification Card.*

6. Withdrawal and Change of Registration

6.1 Responsibility of Registered Students

Students who have registered are responsible for fees. Those who withdraw from the University may be entitled to refunds of fees. Withdrawals are not effective until notification is received at the Office of the Registrar.

NON-ATTENDANCE DOES NOT, IN ITSELF, CONSTITUTE WITHDRAWAL.

6.2 Class Changes

It is recognized that some students may wish to make changes in programs

already arranged. Class changes will normally be completed during the second week after the beginning of the class. No change is effective until a change form, available at the Office of the Registrar, is received by that office.

See the almanac for deadlines for adding and dropping classes, and the Dalhousie University Fees Handbook for the schedule of refunds.

7. Degree Requirements

7.1 General Program (Without Honours)

Four years of study are required comprising the equivalent of 20 full credits. Not more than the equivalent of 8 full credits may be at the 1000 level.

The classes in the program are divided into four categories as follows:

(Note that all classes are half-credits except those designated as "R" which are full credits.)

Required Core Area Classes: Commerce 1101, 1102, 1501, 2201, 2301, 2401, 2501, 2502, 2801, 3302, 3501, 4350R; Economics 1100R, 2200 or 2201 or 2220 or 2221; Mathematics 1000 and 1010, or 1110 and 1120*.

*Note: Mathematics 1110 and 1120 are specifically designed for the Commerce program, but are not normally accepted as the prerequisites for upper level mathematics or computing science classes.

Core Area Electives: the equivalent of 3 full credits to be selected from offerings in the core areas of Commerce, Economics and Mathematics (Including Computing Science).

Non-Commerce Electives: the equivalent of 5 full credits chosen, subject to the approval of the School of Business Administration, from all classes offered in the University, except those designated as Commerce classes. A total of 2 credits must be follow-up classes, i.e., be classes which provide further development of the subject matter introduced in lower level classes (these will most frequently be classes at the 2000 level and above). Classes which do not have a lower level prerequisite are not considered follow-up classes.

Due to the growing awareness of the importance of ethics in the education of business managers, the School highly recommends that students take Philosophy 2080R (Ethics in the World of Business) as part of their Commerce program. This class would qualify as a Non-Commerce elective follow-up if the student has taken any class in Philosophy at the 1000 level, even though there are no formal prerequisites listed for Philosophy 2080.

Free Electives: the equivalent of 3 full credits chosen, subject to the approval of the School of Business Administration, from all classes offered in the University.

Students are expected to ensure that the classes taken comply with the above requirements.

7.2 First Year Program

Students entering the Bachelor of Commerce program from high school will normally take the following courses: Commerce 1101A, 1102B, 1501A, Mathematics 1110B or 1000B, and two Non-Commerce electives.

Students transferring from other universities or programs should consult the Commerce Coordinator for assistance in planning a first year in Commerce at Dalhousie.

7.3 Honours Programs

Honours programs may be designed with an area of concentration in Accounting, Finance, Management, Marketing, and Quantitative Methods, or without an area of concentration. The Honours program of each student must be approved by the Director of the School of Business Administration or his appointee, usually the Commerce Coordinator.

7.3.1 Requirements of Honours Program

The requirements of the honours program are those of the BComm

program with the following changes:

- the student must attain an average grade of at least B- in all classes beyond the first year,
- one of the full class equivalents within the core area electives must be a class designated as an Honours Seminar,
- the student must obtain a grade of at least B- in the designated Honours Seminar, (or in the case of unconcentrated Honours, where two MBA classes are taken in lieu of the Honours Seminar, a grade of B must be obtained in each of them), and
- to obtain First Class Honours students must, in addition to the above requirements, attain an average of A- both (1) for all classes in the core area of Commerce, Economics and Mathematics, and (2) for all twenty classes.

7.3.2 Admission to Honours Program

Students are normally admitted to the Honours program after completion of three years of the regular program. Students must meet the following admission requirements:

- an average grade of B- in all classes taken in the second and third years of the BComm program, and
- an average grade of at least B+ in the group of prerequisite classes to the relevant Honours seminar.

Students failing to meet the foregoing standards for admission to an Honours program may be given permission in special circumstances to take an Honours seminar as an elective. Such special admission to the Honours seminar does not constitute admission to an Honours program.

Students wishing to follow an Honours program without an area of concentration should consult the Co-ordinator concerning the requirement for unconcentrated honours.

7.4 Competency In the English Language

All students entering the Commerce program must satisfy the School as to their competency in the English language. This competence is normally demonstrated by satisfactory performance in a written examination (not for credit) administered by the School of Business Administration or by a grade of C or better in English 100. This examination must be written in the student's first year in the program. The examination is held three times each year — normally in the first week of each term (September and January) and in the week following the Spring examination period (April). Students who fail the English examination must attend special English workshops until they are able to show evidence that they have attained a level of proficiency equivalent to that required to pass the English examination. Students normally are not permitted to enter the second year of the Commerce program until they have passed the English test, satisfied the standards of the English proficiency workshop, or have obtained the required mark in English 100. A student who fails to satisfy the school as to competency in the English language cannot be recommended to Senate for the awarding of a degree.

8. Merit Points

Merit points are awarded for each class as follows:

Grade	Points
A+, A, A-	3
B+, B, B-	2
C+, C, C-	1
D	0

One merit point is awarded for each class transferred from another institution.

Note that although D is a passing grade, no merit points are awarded. For fractional credit classes, corresponding fractional merit points are awarded (e.g. in a half-credit class, a B would yield one point).

9. Required Standing

In order to qualify for the degree, candidates must have obtained a minimum of sixteen merit points in the twenty classes required. This minimum is adjusted in proportion to the number of Dalhousie credits received relative to the total number of credits required.

For the minimum acceptable standing for Honours see Honours Program (above).

10. Required Withdrawal

Students who have not passed at least half of the classes for which they are registered after the final date of withdrawal without penalty, will be considered to have failed the year, and will be required to withdraw from their programs.

11. Readmission After a Failed Year

Students who have failed their year on the first occasion in Management Studies may apply to the Faculty for re-admission consideration. Students will not normally be considered for reinstatement until they have been out of the program for at least one year. A student who has twice failed a year or who has been required to withdraw twice will be ineligible for readmission to the Faculty as either a full-time or a part-time student. Ordinarily an appeal is allowed only if illness has seriously interrupted the student's studies and this is established by submission to the Registrar of a medical certificate from the physician attending the student at the time of illness.

12. Counting of Classes Towards Two Undergraduate Degrees

A student who holds a BA or BSc and who wishes to gain a BComm must fulfill the requirements of the BComm and meet the following stipulations:

- only classes that are applicable to the BComm may be counted for credit.
- each class carried forward must bear a grade of "C" or higher.
- a minimum of eleven new classes must be taken of which eight must be in the core area.

13 Transfer Credit

13.1 Classes Taken at Other Universities While Not Registered at Dalhousie

- Students from another college or university who are not eligible for readmission to that college or university will not be admitted to Dalhousie.
- No credit will be given for any work used as the basis for admission.
- No transfer credit will be granted for any class in which a final mark of less than C (or the equivalent in Dalhousie terms) was obtained, or for any class in which a final mark was granted conditionally.
- To obtain a Bachelor of Commerce, at least one half of the degree credits, including at least one half in core areas of Commerce, Economics, Mathematics must be taken at Dalhousie.
- Students in Management Studies who wish to complete honours programs must attend Dalhousie for the Honours seminar or equivalent classes.
- Transfer credits may be granted only for classes which are offered by a recognized university or equivalent institution of higher learning and which are judged to be of comparable standard to classes offered at Dalhousie and to be appropriate to an academic program of the faculty.
- Transfer credits for classes that lie within the scope of other Dalhousie departments are subject to approval by those departments.
- Transfer credits are not normally granted for classes that are not within the scope of any Dalhousie department. Students may, however, apply to the School of Business for credit for such classes but they must justify the inclusion of such classes in their proposed program.

(i) No credit will be given for any classes taken at another university while a student is inadmissible at Dalhousie. Students who have been permitted to reregister, after having been declared ineligible at Dalhousie, cannot take classes at another institution for Dalhousie credit until they have taken further Dalhousie classes.

(j) No grades are recorded for transfer credits awarded on admission to Dalhousie. However, for classes taken on Letters of Permission while a student is registered at Dalhousie, grades are recorded.

13.2 Classes Taken at Other Universities Under Concurrent Registration at Dalhousie

(a) Credit for such classes falls under the limitations and regulations described in the preceding section on transfer credits.

(b) A student who wishes to take classes at other institutions while registered at Dalhousie, whether in the academic year or in summer sessions or by correspondence, must obtain approval in advance on a form available in the office of the Registrar. A letter of permission will be provided if approval for the classes is given. The workload at the other institution must be acceptable to the School of Business.

(c) Permission to take a class at another university will not be granted if the student is living in the area and could reasonably be expected to take the class at Dalhousie.

(d) The class fee will be paid by Dalhousie if:

- (1) the student is registered and has paid fees as a full-time student at Dalhousie.
- (2) the classes are approved as part of the student's program, and
- (3) the class is not part of a summer school program.

14. Summer School

There are no limitations on the number of credits taken at summer school at Dalhousie (subject to normal workload limitations) that may be counted toward the Bachelor of Commerce degree.

15. On-campus Classes

Students must take on-campus at Dalhousie a minimum of five credit equivalents from the core area courses. No more than 15 credits may be obtained from courses taken at other universities and from Dalhousie by correspondence.

16. Advanced Placement

Students possessing advanced knowledge of a subject which was acquired other than at a university will be encouraged to begin their studies in that subject at a level appropriate to their knowledge, as determined by the department concerned, and will be exempted from any classes which are normally prerequisites for the one to which they are admitted. However, such students must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e. they must complete at Dalhousie the full number of credits required for the particular credential being sought).

17. Part-Time Study

The School is committed to providing students with the opportunity to obtain a degree through part-time as well as full-time study. To this end, the School endeavours to offer at least one evening section of all required Commerce classes each year, as well as a selection of electives. In addition, several first and second year required classes are available by correspondence through cooperation of the School of Business and Advanced Management Centre, Henson College. Part-time students are reminded of University policy that limits programs of study to ten years from the date of initial registration. Note also, the regulation below concerning the number of classes that must be completed on campus at Dalhousie.

For information on correspondence courses in the Bachelor of Commerce program, contact The Advanced Management Centre, Henson College, 1261 Seymour Street, Halifax, N.S., B3H 3J5.

Part-time students are encouraged to consult with the Dean of Henson College for advice on their academic programs and other matters.

18. Audit of Classes

Students who have been admitted to the faculty are permitted to audit many of the classes offered. For those who are not full-time students, fees are payable as indicated in the Dalhousie University Fees Handbook. A class may not be changed from credit to audit or from audit to credit status after the last date for dropping classes without penalty (see the almanac, page 4). In order to change from audit to credit prior to the deadline an additional fee is required. Permitted changes require that the procedures as given in section 10.2 on page 26 be followed.

19. Duration of Undergraduate Studies

Students are normally required to complete their undergraduate studies within ten years of their first registration, and to comply with the regulations in force at the time of that registration. This is also the normal limit for transfer credits. However, the Commerce Coordinator may grant permission to continue studies for a reasonable further period, subject to such conditions as the Coordinator deems appropriate and with the stipulation that the student must meet the degree requirements in force when the extension is granted.

20. Assessment

20.1 Method

Examinations may be oral, written (closed or open book) under supervision, or take-home. To gain credit toward a degree, students must appear at all examinations, prepare such essays, exercises, reports, etc., as may be prescribed, attend the classes of their prescribed course to the satisfaction of the instructors.

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 including information on the availability of a supplemental examination and the proportion of the grade to which such an examination would apply; within four weeks after the beginning of each term the department chairperson must report to the Dean the method of evaluation to be used by each instructor in each class.

20.2 Examinations and Tests

Periods of approximately two weeks in the spring and one and one-half weeks in December are set aside for the scheduling of formal written examinations by the Registrar. Instructors wishing to have examinations scheduled by the Registrar for their classes must so inform the Registrar at the beginning of the third week of classes in the fall and spring terms. Instructors may also arrange their own examinations at times and places of their choosing during the formal examination periods, with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority. No tests or examinations covering the work of a whole term shall be held during the last two weeks of classes in the term. No tests may be held between the end of classes and the beginning of the official examination period.

20.3 Grades

A letter-grade system is used to evaluate performance. Grades in the A range represent excellent performance, grades in the B range represent very good performance, and those in the C range represent satisfactory performance. A grade of D represents marginally acceptable performance. F and FM indicate failure, marginal in the case of FM.

Grades in the ranges of A, B, C, D and P are passing grades. Other grades, including W, NP, ILL, INC, F and FM, are non-passing grades.

20.4 Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar, such grades to be based on the instructor's evaluation of the academic performance of the students in the class in question.

20.5 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 within four weeks of the required date for submission of grades in that class to the Registrar's Office.

20.6 Correction of Errors in Recorded Grades

Correction of errors in the recording of a grade may be made at any time. Otherwise changes will only be made as in Regulation 20.7 below.

Students are not entitled to appeal for any grade change more than six months after the grades are sent from the Registrar's Office.

20.7 Reassessment of a Grade

On payment of a fee, a student may appeal to the Registrar for reassessment of a grade in a class. The Registrar will direct the request to the head of the academic unit concerned, who will ensure that the reassessment is carried out and reported to the Registrar. Written applications for reassessment must be made to the Registrar within two months of the date the grade is sent from the Registrar's Office. Students have a right to view their marked examination papers by appointment for a period of two months from the date the grades are sent to students from the Registrar's Office.

20.8 Special Examinations

Special examinations may be granted to students in the case of illness supported by a medical certificate, or in other exceptional circumstances. Medical certificates must be submitted to the Office of the Registrar at the time of the illness and will not normally be accepted after a lapse of one week from the date of the examination. Arrangements for special examinations should be made with the instructor concerned and the Registrar at the time the illness or other exceptional circumstance arises, or as soon thereafter as possible.

20.9 Supplemental Examinations

One full-credit supplemental examination (or two half-credit supplemental examinations) may be written by any student on the work of any one year, provided that:

- the student has obtained a final grade of FM in that class,
- the student has satisfied the requirements for the class,
- a single compulsory final examination or test in the class in question accounted for more than fifty per cent of the final grade (the supplemental examination should — at the discretion of the department — constitute the same proportion of the final grade as did the final examination during the regular session), and
- the student has not been required to withdraw from the Faculty.

Apart from the case of "A" classes (given in the fall term), the supplemental examinations must be written in the following September. For "A" classes, supplemental examinations must be written in February immediately following the failure. Supplemental examinations may not be deferred.

An eligible student who wishes to write a supplemental examination must submit to the office of the Registrar a completed application form (which may be obtained from that office) and the required fee by July 10 for the September examination, and January 25 for the February examination.

A student who fails to pass the supplemental examination can obtain credit for that class only by repeating it.

A student may not write both a supplemental examination and an examination at the end of Summer School in the same class in the same year. No supplemental examinations are allowed for classes taken at Summer School. No more than seven credits obtained as a result of supplemental examinations may be counted toward a degree.

21. Repeating Classes for Which a Passing Grade has been Awarded

With the permission of the department concerned and the endorsement of the Commerce Coordinator, a student may repeat any class for which a passing grade has previously been awarded. The original passing grade will nevertheless remain on the transcript and a second entry will be recorded with the new grade and the notation "repeated class." No additional credit will be given for such a repeated class, but the higher grade, or point count

appropriate to it, will be used for degree purposes. Note that both grades are used in calculating the merit point total when a degree with distinction is awarded.

22. Workload

Five full credits per academic year shall be regarded as constituting a normal workload for a student in the regular year.

Students may not normally take more than one full credit in any summer session, nor may the workload in any one week exceed one sixth of a credit. This may be increased to a maximum of 2.5 credits in summer school in any one year with a maximum of 1.5 credits in any one summer session.

Students who wish to exceed the normal workload must apply for permission to the Commerce Coordinator, School of Business Administration. Such permission will not normally be granted to any student who is in his first year of study or who, in the preceding academic year, has failed a class, or who had an average of less than B- (B for Summer School) in a normal workload.

23. Graduation

In order to be graduated students must submit a Request to Graduate to the Registrar's office by the deadlines indicated below:

Graduation Month	Application Deadline
February	December 1
May	February 15
October	August 15

In cases where requests can be accommodated after the deadline, a \$50.00 fee will be charged.

24. Appeals

Any student suffering undue hardship from the application of any of the regulations of the Faculty may appeal for relief to the Coordinator of the program and/or the Academic Appeals and Grievances Committee. Normally the request for relief should be made to the Coordinator who will make a decision which may be appealed to the Committee.

25. Almanac

The almanac is given on page 4. All concerned should note dates of registration, examinations, convocations, permitted withdrawals, etc.

26. Fees

Information about fees is given in the Dalhousie University Fees Handbook.

27. Changes in Regulations

In general, any change which affects a currently registered student adversely will not apply to that student. Any student suffering undue hardship from application of any of the regulations may appeal for relief as outlined in the Appeals section.

28. Senate Regulations

In addition to the above Faculty Regulations, students are reminded that they must also comply with the University Regulations printed at the front of this calendar pages 17 and 18. Particular attention is drawn to the University Regulation which refers to plagiarism, on page 18.

The School has developed the following suggested programs for the guidance of students.

(Note that all classes are half-credits except those designated as "R" which are full credits.)

Without An Area of Concentration

Year 1: Commerce 1101, 1102, 1501; Economics 1100R; Mathematics 1110 or 1000; two non-Commerce electives.

Year 2: Commerce 2201, 2301, 2401, 2501, 2502, Economics 2200 or 2220 or 2201 or 2221, Math 1120 or 1010, one half core area elective and one non-Commerce elective.

Year 3: Commerce 2601, 3302, 3501; one and one half core area electives; one non-commerce elective; one free elective.

Year 4: Commerce 4350R; one core area elective; one non-Commerce elective; two free electives.

With An Area of Concentration Accounting

Year 1: As for those without an area of concentration.

Year 2: Required core area classes: Commerce 2201, 2301, 2401, 2501, 2502; Economics 2200 or 2201 or 2220 or 2221; Math 1120 or 1010; Core area electives: Commerce 2110, 2111, 3112.

Year 3: Required core area classes: Commerce 2601, 3302, 3501; Core area electives: Commerce 3113, 3114, 3120; one non-Commerce elective; Free electives: Commerce 3201 and one half class chosen from those listed for the fourth year.

Year 4: Required core area classes: Commerce 4350R; two non-Commerce electives; Free electives: Commerce 4101, 4102, 4113, and one of 2602, 3202, 3203, 4114, 4120 or 4150.

The professional accounting bodies allow certain exemptions in respect of classes taken in the School of Business Administration. These differ from province to province. Particulars can be obtained from the provincial offices of: The Institute of Chartered Accountants, The Association of Certified General Accountants, The Society of Management Accountants, The Chartered Institute of Secretaries.

Economics

Year 1: As for those without an area of concentration.

Year 2, Year 3 and Year 4: As for those without an area of concentration except for the electives listed below in the program choices. To ensure that the prerequisite requirements of the 3000 level and 4000 level Economics classes are met, students must postpone one or more of the 2000 level Commerce classes to the third or fourth years. The School of Business Administration should be consulted in regard to the class(es) to be postponed. The Economics Department offers a number of program choices. Business Administration students may choose to do from 4 ½ to 6 classes in Economics in any of these program areas in conjunction with the requirements and electives outlined above. Further information on these program choices is available from the Economics Department brochure.

Canadian Development Studies: Economics 2232R and 2250R plus 2 ½ to 4 classes from Economics 2220, 3326, 3326R, 3330, 3336.

Economic Analysis and Policy: Economics 2220 or 2221 and 4 to 5 ½ classes from: Economics 2231, 3324R, 3326, 3326R, 3330, 3336, 3432R, 4426, 4431.

Economics and Government: Economics 2220 or 2221, 3324R, 3326, 4426, and 2 to 3 ½ classes from Economics 2232R, 3326R, 3330, 3331, 3336, 4431, 4433.

Labour and Society: Economics 2220 or 2221; Commerce 3303 and 3304; and 3 to 4 ½ classes from Economics 2231, 2232R, 2241, 2250R, 3324R, 3336, 3432R.

Regional and Urban Economics: Economics 2220 or 2221, 3324R, 3432R, and 2 to 3 ½ classes from: Economics 3330, 3332, 3336, 4433.

Other program choices offered which might interest Business Administration students include: Economic Development in Historical Perspective, International Development Studies, Mathematical Economics and Econometric Models, Resources and Environment.

Finance

Year 1: As for those without an area of concentration.

Year 2: Required core area classes: Commerce 2201, 2401, 2501, 2502B; Math 1120; Economics 2201 or 2221. Core area electives: Commerce 2111 or 3100; Economics 2200 or 2220. One non-Commerce elective.

Year 3: Required core area classes: Commerce 2301, 3302, 2601, 3501. Core area electives: Commerce 3112 or 3101, 3201; one full credit chosen from those listed for the fourth year. One non-Commerce elective.

Year 4: Required core area class: Commerce 4350R. One non-Commerce elective. Recommended free electives totalling three CADM1:B

full credits: Commerce 2602, 3113, 3202, 3203, 4120, 4200R (for Honours students), 4201; Economics 3324R, 3326.

Actuary Science in Commerce

The nine required core area classes listed under the general program including: Mathematics 1000, 1010. Core Area electives: Mathematics 2000R, 2600; Computing Science 1400, 1410, 2270, 2350; Commerce 3201; MBA 6206. At least one of Commerce 3202 or 3203; Five non-commerce electives; One-half free elective.

Management

Year 1: As for those without an area of concentration. Suggested non-Commerce electives: Psychology 1000R or 1010R, Sociology 1200R.

Year 2: Required core area classes: Commerce 2201, 2301, 2401, 2501, 2502; Economics 2200 or 2220 or 2201 or 2221; Math 1120. One and one half non-Commerce electives.

Year 3: Required core area classes: Commerce 2601, 3302, 3501. Core area electives: Commerce 3303, 3304, 3305. One non-Commerce elective. One free elective.

Year 4: Required core area class: Commerce 4350R. Core area electives: Commerce 3308 plus one other credit; one half credit non-Commerce elective and two free electives (Honours students must take Commerce 4300R).

Marketing

Year 1: Required core area classes: as for those without an area of concentration; Two non-Commerce electives one of which should be from the following: Psychology 1000 or 1010, Sociology 1200, Philosophy 1000, 1010 or 1020.

Year 2: Required core area classes: Commerce 2201, 2301, 2401, 2501, 2502; Math 1120 or 1010. Core area electives: Commerce 3401, 3101 and 2403 or 3408. One half non-Commerce elective.

Year 3: Required core area classes: Commerce 2601, 3302, 3501; Economics 2200 or 2220 or 2201 or 2221. Core area electives: Commerce 3404; and two of Commerce 2403, 3402, 3403, 3405, 3406, 3407, 3408, 3409. One and a half non-Commerce electives.

Year 4: Required core area class: Commerce 4350R. One non-Commerce elective. Three free electives, including Commerce 4401 and at least one of the marketing electives listed in year 3. (Honours students must take Commerce 4413 and 4450).

To do a concentration in marketing with a Transportation/Distribution subspecialty, the above program applies with the following changes: Commerce 2403 should be taken in year 2; Commerce 3407 and 3408 should be taken in year 3; Commerce 3404 is not required.

Public Sector Management

Common to all Public Sector Management Concentrations

- (a) The nine required core area classes listed under the general program.
- (b) Four credits in political science including: Political Science 2200, 4240.
- (c) Two and one half credits in Economics including: Economics 2200 or

2220 or 2201 or 2221 (whichever was not taken to satisfy the core area class requirement), Economics 3324.

Functional Concentrations

I Accounting and Financial Management: Four and one-half credits including: Commerce 2110, 2111, 3112, 3113, 3201, 3203, 4120.

II Computer Systems: Four and one-half credits including: Commerce 2110, 2111, 3112, 3113, 3114, Mathematics 2270, Computing Science 2450.

III Finance: Four and one-half credits including: Commerce 3100, 3101, 3201, 3202, 3203; Economics 3338.

IV Governmental Marketing: Commerce 3401, 3404, 4401, 3303, 3304, Psychology 1000R or 1010R.

V Management: Four and one-half credits including: Commerce 3303, 3304, 3305; Psychology 1000R or 1010R, 2120, 2080.

VI Quantitative Methods: Four and one-half credits including: Commerce 3100, 3101, 4501, 4537, 4538; Economics 3338 and one class in Mathematics above the 1000 level.

Quantitative Methods

Year 1: As for those without an area of concentration. Students planning to take further Mathematics or Computer Science courses should take Mathematics 1000A and 1010B.

Year II, Year III and Year IV: As for those without an area of concentration except that suggested Commerce electives are as follows: Commerce 4501, 4537, 4538, 4542.

Students wishing to concentrate in the Quantitative Methods area are advised to consult the calendar listing of the Department of Mathematics for additional class offerings of interest. For all the prerequisite requirements of the higher level Mathematics classes to be met, students may have to postpone one or more of the 2000 level Commerce core classes to the third or fourth year. The School of Business Administration should be consulted in regard to the class(es) to be postponed.

Computing Science in Commerce

If the student wishes to achieve the equivalent of a minor in Computing Science, the following program is recommended:

Year 1: Commerce 1101, 1102; Economics 1100R; Mathematics 1000 and 1010, Computing Science 1400 and 1410; one non-Commerce elective.

Year 2: Commerce 2201, 2401, 2501, 2502, 3112; Economics 2200 or 2201 or 2220 or 2221; Computing Science 2450, 2810; one non-Commerce elective.

Year 3: Commerce 2301, 3302, 2601, 2110, 3501, and 2111 (for an Accounting orientation) or 3201 (for a Quantitative Methods orientation); Computing Science 2350; One non-Commerce elective; one half free elective.

Year 4: Commerce 4350R and 3113, 3114, 4111 (for an Accounting orientation) or 4501, 4538 (for a Quantitative Methods orientation); Computing Science 3250; One non-Commerce elective. One free elective.

A student wishing to earn the equivalent of a major in Computing Science should take Math 2070 and 2080 in place of Commerce 2501 and 2502 in the second year; Computing Science 3890 and another half-class in Computing Science (see list below) as electives in the third year; Computing Science 3700 and another half class in Computing Science as electives in the fourth year. The elective classes in Computing Science can be drawn from 3090, 3810, 4140, or any other classes listed in the calendar under Computing Science. Other classes which might be taken as electives to develop more of a concentration in Accounting or Quantitative Methods can be found in the preceding sections of this program guide.

Small Business Administration

Year 1: As for those without an area of concentration.

Year 2: Required core area classes: Commerce 2201, 2301, 2401, 2501, 2502, Math 1120. Core area electives: two of Commerce 2110, 2401, 2402, 3100, 3101, 3303 or 3304. One non-Commerce elective.

Year 3: Required core area classes: Commerce 2801, 3302, 3501, and one of Economics 2200, 2201, 2220, or 2221. Core area electives: Commerce 3307 and three of Commerce 2602, 3201, 3306, 3401, 3402, 3406, 4120, 4534 or 4541, or core area electives listed above but not yet taken. One non-Commerce elective.

Year 4: Required core area class: Commerce 4350R. Three full credit equivalents from the core area electives listed in years II and III as yet untaken or non-Commerce electives. One non-Commerce elective.

Classes Offered

The School has adopted a four digit numbering system. The former numbers used prior to the 1981-82 academic year, are shown in brackets. Note: Each of the following A/B classes may be offered only as A or B. Check the current timetable to determine in which term the class is offered. If no prerequisite is given for a class, none is required. It may not be possible to offer all the electives listed below in every year. Students should bear this in mind when planning their program for the following year.

1101A/B (101) Introductory Accounting I: An introduction to the principles and practices used by accountants in processing and communicating data both within and outside the entity. Emphasis is on financial statement accounting and reporting with the following objectives: (1) To introduce the theoretical framework upon which financial statement accounting is based, and examine its major underlying principles. (2) To examine basic financial accounting methodology, and develop the analytical and procedural skills related thereto. (3) To develop an understanding of the information content of conventional financial statements, and an appreciation of the inherent limitations of accounting information.

1102A/B (103) Introductory Accounting II: Prerequisite: Commerce 1101. Emphasis will be placed upon managerial accounting, with the following specific objectives: (1) To introduce managerial accounting methodology, and develop the analytical and procedural skills related thereto. (2) To develop an understanding of the uses of accounting information by managers in various functional areas of business. (3) To introduce various accounting reports which are useful for management planning and control. (4) To develop an awareness of the limitations of accounting information for managerial decision-making purposes.

1501A/B (108) Introduction to Computers in Business Management: lecture 3 hours. The goal of this course is to produce a person who will be immediately productive within an information processing system. Successful completion of this course will provide the student with a clear understanding of computers and how they may be incorporated into a business environment, as well as a proficiency with word processing, spreadsheet, database and a fourth generation language. The course combines traditional lectures with a completely self-paced computer-managed instructional environment including tutorials, quizzes and electronic mail. It is strongly recommended that students complete this class in their first year of study.

2110A/B (455) Data Processing Systems: lecture 3 hours. Prerequisites: Commerce 1102 and 1501. This class begins an in-depth study of the elements of data processing, data representation and organization, hardware alternatives, software alternatives, systems analysis and design, internal control and actual applications to data processing situations. Material builds upon the basis in Introductory Accounting and Introduction to Computers in Business Management.

2111A/B (Part of 310) Financial Accounting Procedures: lecture 3 hours. Prerequisites: Commerce 1101, 1102 with at least a B- average or permission of instructor. This class conducts an in-depth study of financial accounting procedures such as accounting for income tax, leases, share

capital, earnings per share, accounting changes, the Statement of Changes in Financial Position, and cash flows. The emphasis is on the application of generally accepted accounting principles, financial statement presentation and disclosure requirements.

2201A/B (207) Introduction to Managerial Finance: lecture 3 hours. Prerequisites: Commerce 1102 and Economics 1100. An introduction to the problems business managers face in the acquisition and effective use of the firm's financial resources and analytical concepts for evaluating financial decisions. How the firm can achieve successful interaction with its external environment and make an appropriate contribution to the operation of the economy is considered. Essential background knowledge: An understanding of economic principles and environment in which a business operates and sufficient knowledge of accounting processes and principles to enable the student to use financial data intelligently. Topics covered: Time value of money; Present value; Financial ratio analysis; Working Capital Management; Long-term Financial Decisions.

2301A/B (215) Organizational Behaviour: lecture 3 hours. Insight into human behaviour in organizations and capacity for objective analysis is developed. Research and text material drawn from the fields of sociology, anthropology and psychology are used in the development of understanding and objectivity. Case material and substantive data from the behavioural sciences are considered.

2401A/B (108) Introduction to Marketing: lecture 3 hours. Prerequisite: Commerce 1102 or permission of instructor. The student receives a basic understanding of the character and scope of marketing and its role in business operations with focus upon the concepts and techniques a business must employ to anticipate and satisfy consumer needs. Emphasis is placed on the tools available for the marketing manager, the problems to be confronted, and the development of understanding and analytical ability in the following: the role of the consumer; product-line development; channels of distribution; pricing systems; selling and promotional activities. Case materials and problem sets are used to give insight into the analytical tools used in problem analysis and decision-making. Prior to 1988/89 this class was numbered Commerce 1401. Credit will be given for only one of Commerce 1401 (taken prior to 1988/89) and Commerce 2401 (taken after 1987/88).

2403A/B (219) Channels of Distribution: lecture 3 hours. Prerequisites: Commerce 1102, 2401. Co-requisite: Commerce 2201, 2301, 3101. Few companies deal with their customers directly, most relying on a network of distribution channel intermediaries to get their product to market. This requires that producers carefully design, select and manage their distribution channel operations to achieve the desired level of performance. This course reviews theory and practice in the field of management, employing case analysis and projects to enhance student learning. Prior to 1988/89 this class was numbered Commerce 2401. Credit will be given for only one of Commerce 2401 (taken prior to 1988/89) and Commerce 2403 (taken after 1987/88).

2501A/B (204) Statistics for Economics and Business I: lecture 3 hours. Prerequisite: Mathematics 1000 level, or consent of instructor. (Commerce students must register for Commerce 2501 and 2502. Credit will be given for only one of Commerce 2501, Mathematics 1080 or 2070, Economics 2222.) An introduction to the principles and applications of statistics relevant to business and economics, with emphasis on making inferences based on observed data. Topics covered include descriptive statistics, probability, random variables, estimation, hypothesis testing.

2502A/B (205) Statistics for Economics and Business II: lecture 3 hours. Prerequisite: Commerce 2501, Mathematics 2070, Economics 2222 or a grade of C or higher in Mathematics 1080. (Credit will be given for only one of Commerce 2602, Mathematics 1070 or 2080, Economics 2223.) A continuation of Commerce 2501. Topics covered include decision theory, regression and correlation, time series, index numbers, an introduction to the use of statistical packages on the computer, and management uses of statistical data.

2601A/B (213) Legal Aspects of Business — Contracts: lecture 3 hours. An appreciation of some of the legal problems that might be faced by the Business Community. The meaning and sources of law, machinery of justice, the law of torts, formation of contracts, capacity to contract, legality of object, mistake, misrepresentation, statute of frauds, privity of contracts, interpretation, breach and discharge of contracts, and the law of agency. Students must make extensive use of the law library in writing reports on a series of cases.

2602A/B (214) Commercial Transactions: lecture 3 hours. Prerequisite: Commerce 2601. This follow-up to Commerce 2601 examines the law relating to the sale of goods, bailment, contracts of employment, negotiable instruments, real property, tenant and landlord, mortgages; partnerships, corporations, devices for securing credit and the rights of creditors. Students must make extensive use of the law library in writing reports on a series of cases.

2701A/B Business Communication: lecture 3 hours. Prerequisite: English Competency Exam. The goal of this class is to teach students how to properly prepare both written and oral business communications. The stress will be on written communication, specifically business memos, letters and reports although communication theories and the role of communication in business will be discussed. As well, one oral presentation per student will be required.

3100A (212) Financial Accounting and Investigation: lecture 3 hours. Prerequisite: Commerce 1102. Credit for this class will be removed from the admissible classes for a BComm degree if Commerce 2111 is also taken. This class is intended for non-accounting students. This class investigates areas introduced in Introductory Accounting to provide a more detailed understanding of topics such as cash flow, working capital flow, valuation, generally accepted accounting principles, leases, pensions, and consolidations. Emphasis is placed on investigating the financial position and prospects of organizations using various data sources in addition to those conveyed in financial statements.

3101B (312) Managerial Accounting: lecture 3 hours. Prerequisite: Commerce 2201. Credit for this class will be removed from the admissible classes for a BComm degree if Commerce 3112 is also taken. This class is intended for non-accounting students. An exploration of the use of accounting information, especially cost analysis, by management in planning and controlling organizations. Topics include budgeting, cost systems, reports and information. This class demonstrates the information base for managers with financial management, marketing management, operations management and personnel management.

3112A/B (301) Cost Accounting: lecture 3 hours. Prerequisites: Commerce 1101 and 1102 with a B- average or permission of instructor. Cost Accounting practices and concepts help manufacturing, service, not-for-profit and most other types of organizations in their planning, analysis and control functions. Topics such as cost accumulation, standards, budgeting and allocation are studied in depth. Prior to 1987/88, this class was numbered 2112. Credit will be given for only one of Commerce 2112 (taken prior to 1987/88) and Commerce 3112 (taken after 1986/87).

3113A/B (Part of 310) Financial Accounting Theory: lecture 3 hours. Prerequisite: Commerce 2111 or permission of instructor. The concepts underlying external reporting constitute the material for this course. Principles of asset and liability valuation, revenue and expense recognition, and income definition are examined in depth. Difficulties with present practices and proposed alternatives are explored.

3114A/B Public Auditing: lecture 3 hours. Prerequisites: Commerce 2110, 2111, 3112, or permission of the instructor. Recommended: Commerce 3120. The responsibilities of the public auditor and the procedures used to fulfill these responsibilities are examined in detail, to provide an understanding of the audit process and the degree of reliance one can place on audited financial statements. Prior to 1987/88, this class was numbered 4111. Credit will be given for only one of Commerce 4111 (taken prior to 1987/88) and Commerce 3114 (taken after 1986/87).

3120A/B Information for Organizational Control: lecture 3 hours.

Prerequisites: Commerce 3112, 2301 or permission of instructor. Financial systems for organizational control in both the public and private sectors are analyzed in detail to evaluate and develop such control systems. Case analysis is used extensively to look at structures such as investment centres, profit centres and cost centres.

3201A/B (307) Intermediate Finance: lecture 3 hours. **Prerequisites:**

Commerce 2201 and one of 2111, 3112, 3100 or 3101. A more intensive study of capital budgeting, cost of capital and valuation theory than that of Commerce 2201. Emphasis is on principles of capital budgeting, long term capital, and the bargain for funds vital in financing the business enterprise. Case analysis is used extensively.

3202A/B (331) Security Analysis: lecture 3 hours. **Prerequisites:**

Commerce 2201, 2502 and Economics 2201 or 2221. Introduces the theory and philosophies of investment, and concentrates on investment analysis using computers, machine-readable data and other tools available to the institutional investor. The focus is on common stocks, bonds, and investment trusts. Case material is primarily Canadian and covers stocks, bonds, options and mutual funds. Reading assignments and case analysis provide opportunities to handle investment analysis and portfolio management on a problem-solving basis.

3203A/B (332) Canadian Capital Markets: lecture 3 hours. **Prerequisites:**

Economics 2201 or 2221, Commerce 2201. The latter may be waived with the consent of the instructor. Canada's capital markets and the flow of funds within them. Main sectors in the capital markets are identified and their historical development and function within the total structure is emphasized. Other areas include term structure and risk structure of interest rates, the risk-return relationship on financial assets and the efficiency of Canada's capital markets. Reading assignments, case analysis, evaluation of available research results and classroom discussion comprise the class.

3210A/B Insurance and Risk Management in the Corporate Setting:

Prerequisites: Commerce 1102, 2201, 3302, 2502, Economics 2200 or 2201 or 2220 or 2221. Basic concepts of insurance, insurance market organizations, types of insurance and the development of programs for corporate risk management. Problems of implementation and administration are also considered.

3302B (216) Organizational Theory: lecture 3 hours. **Prerequisite:**

Commerce 2301. (This class cannot be taken until the 3rd year of the Commerce program.) It surveys both theory and research pertaining to complex organizations with emphasis on design, structure and administrative practices in the environmental setting and how the interaction of these variables relates to organizational performance. Concomitant with this exposure to theory and research, students have the opportunity to apply this knowledge to case studies relevant to complex organizations. Emphasis is on the analysis of case studies and the formulation of general solutions and decisions for action. Prior to 1988-89, this class was numbered Commerce 2302. Credit will be given for only one of Commerce 2302 (taken prior to 1988-89), and Commerce 3302 (taken after 1987-88).

3303A/B (323) The Personnel Function: lecture 3 hours. **Prerequisites:**

Commerce 2301 and 3302. Covers the major aspects of the personnel function: job analysis, human resource planning, selection, training, performance appraisal, compensation, labour relations, safety and health knowledge, leadership and justice with respect to employees. Knowledge of the processes is supplemented by the development of analytical skill in coping with various personnel problems and in the integration of the processes with the many other functions required in the organization. This "system and process" analysis builds upon the skill and knowledge acquired in the class on Organizational Behaviour. Cases simulate work environments. The role of personnel management and administration of the personnel function are analyzed.

3304A/B (324) Labour Management Relations: lecture 3 hours.

Prerequisites: Commerce 2301, 3302 or permission of instructor. Introduces students to some practical and theoretical aspects of labour-management relations in Canada. Examines historical, legal, behavioural, economic and political background of our system. Emphasis is on the key processes of

industrial relations as they impinge on the activities of managers. Cases used are drawn mainly from Canadian sources.

3305A/B (325) Individual And Organizational Change: lecture 3 hours.

Prerequisites: Commerce 2301 and 3302, or permission of instructor. Current concepts and methods of individual and organizational change. The primary objective: to develop the student's skills as a change agent and improve performance as a manager, using lectures, exercises and case studies. The opportunity to fine tune those analytical and decision-making skills necessary for the effective introduction of change into complex organizations, enabling the student to 1) identify those situations where change is appropriate, 2) develop effective change strategies, 3) implement planned change and 4) effectively monitor the change process.

3306A/B (322) Interpersonal Dynamics: lecture 3 hours. **Prerequisites:**

Commerce 2301 and 3302 or permission of instructor. A more intensive study of the processes and possible problems associated with the dynamic interaction between individuals. Building upon Commerce 3302 and employing such techniques as sensitivity training, structured exercises in interpersonal relations, and case studies.

3307A/B (305) Small Business Management: lecture 3 hours.

Prerequisites: Commerce 1102, 2201, 2401, or permission of instructor. Written and oral cases used to adapt and apply business principles to small-business situations. Students must strengthen their knowledge of basic business functions, use information sources, and organize these into workable recommendations for managing a variety of small businesses.

3308A/B (308) Survey of Business Processes and Retail Management:

lecture 3 hours. A survey for non-Commerce students who wish to have an overview of the management problems facing the operator of a retail or service business. Primarily designed for Pharmacy students, but open to Arts and Science students without previous Commerce classes. Commerce 3307 is the class for Commerce students who are interested in this topic. Students may count for credit only one of Commerce 3307 and 3308.

3401A/B (313) Buyer Behaviour: lecture 3 hours. **Prerequisite:** Commerce

2401. In view of the very competitive situation in Western business, the firm that is successful designs and sells products that meet the desires of specific consumer segments. Thus, analysis and prediction of consumer behaviour are increasing in importance and sophistication. An extensive body of research evidence from Marketing and the Behavioural Sciences is explored and evaluated to access the marketing implications of elements of consumer behaviour. The emphasis of the class is empirical research on an outside project. The theoretical background must do a considerable amount of background reading from the text and outside sources. Some Mathematical modeling of the consumer processes is accomplished.

3402A/B (315) Marketing Communications: lecture 3 hours. **Prerequisites:**

Commerce 3401. The communication tools of Advertising, Sales Promotion, and Public Relations are presented as part of the overall Marketing Mix. Positioning, segmentation, and other marketing concerns will be studied as they relate to the firm's communications situation. Problems of the promotion manager will be presented to help students appreciate those factors which affect promotional decisions. The Promotion Plan will be used as the integrating force for the material presented.

3403A/B (317) Special Topics in Marketing: lecture 3 hours.

Prerequisites: Commerce 2401, 3401. A special interest seminar for senior level marketing students. The particular topics to be discussed are at the discretion of the instructor. Interested students should consult the School.

3404A/B (318) Marketing Research: lecture 3 hours. **Prerequisites:**

Commerce, 2502, 3401. The scientific method in solving marketing problems. Emphasis on planning and formulating research problems, research design, application of sampling methods, statistical design of experiments, and analysis of data collected. A real-life research project is required, its nature to be determined considering student interest and background.

3405A/B (321) Export Marketing: lecture 3 hours. **Prerequisites:**

Commerce 1102, 3401 and Economics 1100. (Commerce 3701 is strongly

recommended). Stresses the knowledge required by those involved in exporting. Topics dealt with include trade barriers, agencies which assist Canadian exporters, and international marketing strategies possible to penetrate these markets.

3408A/B Retailing: lecture 3 hours. Prerequisites: Commerce 2201, 2403, 3401. Retailing is designed to provide an understanding of the functions, problems and practices of retail management. It provides an exposure to location planning, layout, organizational structure, retail personnel management, buying, pricing, retail accounting and control mechanisms.

3407A/B Physical Distribution Management: lecture 3 hours. Prerequisites: Commerce 2403, 3501, or permission of the instructor. An introduction to the decision problems faced by the manager of a physical distribution system: to achieve co-ordination of the channels of distribution, the transportation and storage of products, and the communications and data processing system; to minimize the total cost of these activities and satisfy the marketing requirements of the firm. Topics include customer service, order processing, traffic management and transportation, packaging, inventory management, distribution centres, physical distribution organization and systems controls.

3405A/B Transportation Modes and Policy: lecture and seminar 3 hours. Prerequisite: Commerce 2403. This course examines the development and operation of the various transportation modes and national transportation policy in Canada. Topics include characteristics, cost structures and pricing decisions of the various modes (air, pipeline, rail, road and water); the National Transportation Act and other relevant legislation; the structure of the industry and government agencies; regulation; subsidies; current and emerging freight and passenger issues (with particular reference to the role of transportation in the Atlantic Region).

3409A/B (223) Sales Management: lecture 3 hours. Prerequisite: Commerce 2401. Co-requisite: Commerce 2201, 2301, 3101. Sales Management is designed to provide an understanding of the tasks and problems facing today's sales manager and to familiarize one with current sales force management practice. Specifically, this class provides 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 is made of the case method and classroom discussion is used to extend the basic text material and examine other points of view.

3501A/B (341) Production/Operations Management: lecture 3 hours. Prerequisites: Commerce 2201, 2301, and 2501. "Production" is one of the basic functions of any organization whether it provides either goods or services. Consequently, all managers, whatever their specialist interests, should have an understanding of some of the key concerns in managing operations, particularly if they aspire towards senior/general management positions. The purpose of this course is to provide such an understanding. It begins at a basic level by examining various types of production processes and continues by considering key aspects of scheduling, control, materials management and quality assurance. It concludes by examining production planning and strategy.

3601A/B (335) The Law of Business Associations: lecture 3 hours. Prerequisite: Commerce 2601 and 2602. Modern business operating through various forms of associations, in particular the corporation, raises complex problems: (a) the choice of the form of business enterprise, (b) the nature of the corporate personality; (c) the dual system of incorporation; (d) the corporate constitution; (e) the contracts between the corporation and outsiders; (f) the control and management of a corporation, (g) the capital structure of a corporation in the raising and maintenance of capital; (h) the securities legislation, and (i) the organic changes in a corporation through mergers, amalgamations, sale of assets, take-overs, reorganization, receivership and winding up. Improved understanding of the complexities of the field while providing indispensable minimal skills essential in reaching well-formulated decisions is the objective.

3602A/B (336) The Consumer and the Regulation of Business: lecture 3 hours. Prerequisite: Commerce 2601 and 2602. Complexities in the relationships between the consumer, business and government continue to increase. A rapidly expanding body of law designed to regulate these relationships in an effort to promote freedom of contract has developed. Of particular concern are problems relating to quality and safety of goods and services, warranties and guarantees, misleading advertising, unfair trade practices, the regulation of consumer credit, and legal remedies. Some of the more critical problems, the legal remedies available, and the role of administrative tribunals, their jurisdiction, and their procedures and policies are examined.

3701A/B (410) The Firm in the International Environment: Prerequisite: Commerce 1102, 2201, and Economics 2200 or 2220 or 2201 or 2221. The effects of the major focus in the international environment on the nature and form of international business arrangements. Topics include theories of private direct foreign investment, controls of cross-border trade and financial flows, international business negotiations and effects on business of changes in national economic policies.

4101A Advanced Topics in Accounting I: lecture 3 hours. Prerequisite: Commerce 2111, 3112. Advanced procedural and conceptual topics in financial and managerial accounting are studied. A host of topics introduced in earlier classes are examined in depth, as well as a number of topics in accounting not previously studied.

4102B Advanced Topics in Accounting II: lecture 3 hours. Prerequisite: Commerce 4101. This class continues from Advanced Topics in Accounting I. Part of this class is devoted to an extensive study of consolidations. Investigation procedures for specific financial problems faced by various types of organizations are used.

4105A/B (455) Accounting for Medical Care Organizations: Prerequisites: Commerce 3113, 3120. Medical care accounting is studied to ascertain the peculiarities of information requirements and accounting practices in this area.

4106A/B (456) Accounting for Governmental Organizations: Prerequisite: Commerce 3113, 3120. Accounting practices and possibilities for both internal and external reporting are studied at various levels of government.

4107A/B (457) International Accounting: Prerequisite: Commerce 3113, 3120. Comparable accounting practices in various countries are studied for both internal and external accounting and reporting problems. Foreign currency translation methods are also reviewed.

4113 A Contemporary Issues in Accounting: lecture 3 hours. Prerequisite: Commerce 3113. Current issues in accounting and recent accounting literature are examined to provide a familiarity with the direction of accounting developments, and a basis for future study of accounting problems and practices. This class is required for, but not restricted to, Honours students in Accounting.

4114B Computer Auditing: lecture 3 hours. Prerequisite: Commerce 3114. The first part of the course includes: internal control guidelines for computer based systems; responsibilities of management, users and systems personnel; segregation of duties; computer security; applications controls; and controls for advanced systems. The second part of the course will cover auditing of computer based systems including computer assisted auditing, general purpose audit software and auditing of advanced systems.

4120A/B (320) Taxation: lecture 3 hours. Prerequisite: Commerce 1102 and Economics 1100. An introduction to the taxation system in Canada, with special reference to the provisions of the Income Tax Act and their effect on business decisions. Essential background knowledge and technical skill: knowledge of economic principles and the economic environment in which a business operates and the ability to work with accounting information.

4121A/B Advanced Taxation: lecture 3 hours. Prerequisite: Commerce 4120. A more detailed examination of the corporate taxation system in

Canada; now tax planning for both individuals and corporations can be a significant element in the regular business decision-making process, especially for the private corporation.

4150B Research In Accounting: seminar 3 hours. Prerequisite: Commerce 4113. An average grade of at least B+ in Commerce 3113, one of Commerce 2111 or 3112, one of Commerce 2110 or 2201 or 3201, one of Commerce 3302 or 2802, and Commerce 2502. This class provides the opportunity for students to undertake both directed and independent study of selected topics in accounting. A major research paper is required. This class is open to Honours students only.

4200 (480) Seminar In Finance: Prerequisites: Either Commerce 3202 or 3203 and an average of B+ in Commerce 2201, 2502, 3201, Economics 2200, or 2220 or 2201 or 2221. Special seminar restricted to Honours students in Finance. Students are exposed to aspects of financial theory not covered in other classes. Each student prepares an original honours thesis.

4201A/B (411) International Financial Management: Prerequisite: Commerce 1102, 2201, 2502 3701 and Economics 2200 or 2220 or 2201 or 2221. The factors that affect the financial function when a firm engages in international trade and investment. Topics include the international monetary system, sources of international financing, remitting of funds from foreign subsidiaries, accounting for operations abroad and the foreign exchange market.

4300R (470) Seminar In Management: Prerequisites: Commerce 3305 or ½ credit in Psychology at the 2000 level and a B+ average in Commerce 2301, 2502, 3302, 3303, 3304, Economics 2200 or 2201 or 2220 or 2221. Special seminar restricted to Honours students in Management.

4350R (311) Planning for Profit and Social Responsibility: lecture 3 hours. Prerequisites: Commerce 1102, 2401, 1501, 2201, 2301 and 3302. The role business plays in our society; the economic, social, legal and political environment in which firms operate; the effect of these environmental constraints and opportunities on business decisions; the way in which business decisions are made and implemented; management practices.

4401A/B (319) Marketing Strategy: lecture 3 hours. Prerequisites: Commerce 2401, 3401, 3404 (or 3406 if a transportation major) and one other marketing course (preferably 2403). This course is designed to integrate the learning that has taken place in previous specialist marketing courses offered in the Commerce program as well as reinforcing the links between marketing, business policy, finance and management functions. The course is case study based, requiring students to develop complete marketing strategies for companies in a variety of situations. Student presentations of their case analyses will form an important part of the course.

4402A/B Independent Study in Marketing: Prerequisites: Commerce 2401, 3404 and two other half classes in Marketing. The content of this class is negotiated with an individual instructor. The class offers the student the opportunity to explore in greater detail any particular area of interest in Marketing.

4413A Advanced Topics In Marketing: Prerequisites: Commerce 2401, 3401, 3404, at least ½ other class in Marketing at the 2000 or 3000 level. This class carries students beyond the basic tools of Marketing, developing an understanding and appreciation of the value of theory in Marketing. (This is a required class for Honours Marketing students).

4450B Honours Thesis In Marketing: Prerequisites: Commerce 4413A; Commerce 4401B must be taken concurrently with this class. An average grade of B+ in all Marketing classes beyond Commerce 2401. Students write an Honours thesis demonstrating their ability to gather, analyze, and synthesize data leading to new knowledge useful in understanding Marketing. Special seminar restricted to Honours students in Marketing.

4500R (471) Seminar In Quantitative Methods: Prerequisites: B+ average in Math at the 1000-level, Commerce 2501, 2502, 3501. Commerce 4501

must be taken concurrently with this class. Special seminar restricted to Honours students in Quantitative Methods.

4501A/B (328) Operations Research: lecture 3 hours. Prerequisites: Mathematics 1000-level, Commerce 1501, 2502, or consent of the instructor. Formulating management problems in mathematical terms and discussing methods of solving such problems with the computer. Topics include transportation problems, network analysis, non-linear programming and waiting lines, with emphasis on applications rather than theory.

4534A/B (434) Managing Technological Entrepreneurship: Prerequisites: All required core area classes, except Commerce 4350, or consent of instructor. High technology based industries face unique management problems imposed by the rapid rate of technological change and the often uncertain environmental impacts of technological innovations. This class examines some of the techniques that have recently been developed to improve management effectiveness in high technology organizations and their responsiveness to environmental concerns.

4537A/B (437) Case Applications of Operations Research: Prerequisite: Commerce 4501 or consent of instructor. A seminar in which case teaching methods are used to explore how OR and statistical techniques are applied to "real-life" management problem situations. The class analyzes a series of management problem situations developing appropriate OR models to evaluate alternative management actions.

4538A/B (438) Applied Multivariate Analysis: Prerequisites: Mathematics 1000-level, Commerce 1501 and 2502 or consent of instructor. The convenience of packaged statistical programs (e.g. SPSS) has opened the area of data analysis to researchers with a wide variety of backgrounds. Since it is possible to operate "canned" programs without understanding advanced mathematics, there is a need for a class designed around a packaged statistical program, (SPSS) which introduces the user to the basic concepts underlying the techniques. An introductory class in multivariate analysis for students in business and economics. Students use and interpret statistical programs with data sets from such business areas as marketing, finance and organizational behaviour.

4541A/B (441) Operations Management In Service Industries: Prerequisite: Commerce 3501. A sequel to Commerce 3501 examines the applications of Operations Management concepts and techniques to service industries. It is management problem/case oriented and based upon material specifically developed for such a class.

4542A/B (442) Intermediate Production: lecture 2 hours. Prerequisite: Commerce 3501. A sequel to Commerce 3501 examines selected topics in greater depth than is possible in an introductory class. As part of the requirements, each student prepares a major report on a subject agreeable to the student and the instructor.

School of Public Administration

The School of Public Administration prepares students for careers in government agencies, public corporations, social service agencies, and para-public organizations. It imparts a knowledge of the substance and processes of public policy and of the machinery of government. It provides an appreciation of, and training in, the techniques of political and economic analysis and evaluation. It develops a capacity for financial and personnel management. It fosters professional attitudes appropriate to public service.

The School's aim in each respect is to promote effective, efficient and accountable management — management of government and management in government. Public managers today must grapple with both new and traditional problems. The public demands economy, effectiveness, efficiency and accountability from the public service. To meet these demands, public managers require an appreciation of and broad professional training in the most up-to-date administrative practices and methods.

These needs are addressed through two graduate programs — the MPA and the DPA — and the undergraduate Certificate in Public Administration, which is available intramurally and through distance education. All three programs are interdisciplinary in nature and are built around the principle that though administration is a general, or generic process, the environment of the public sector is so distinct that public administration should be treated as a field worthy of study in its own right.

Academic Staff

Director of the School

A. Paul Pross, BA, MA (Queen's), PhD (Tor.)

Professors

Kel Antoft, BA, MA (Dal)

Peter Aucoin, BA (SMU), MA (Dal), PhD (Queen's)

David M. Cameron, BA (Queen's), MA, PhilM, PhD (Tor.), (on sabbatical)

A. Paul Pross, BA, MA (Queen's), PhD (Tor.), (Director)

Associate Professors

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William J. Coffey, AB (Dart.), MA, PhD (UWO), (on leave)

Dale H. Pool, BA, (Calvin), MA (W Mich.), PhD (Iowa)

Assistant Professors

Marguerite Cassin, BA (U. of Manitoba), MA (UBC) (Associate Director & Graduate Coordinator)

Barbara Jamieson, BA, MA (UBC), PhD (Tor.), (on sabbatical)

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Adjunct Professors

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Thomas W. Kent, MA (Oxon.)

Lecturers

Roy S. Gunn, BCom (Dal), CA

Robert P. Moody, BCom (SMU), MPA (Dal)

Terry Vey, CMA

John Young, BA (U. of Guelph)

The Certificate in Public Administration (CPA Program)

The CPA is intended primarily for public servants who do not have a degree. The program consists of undergraduate classes designed to provide a

general introduction to the structure and organization of government and the principles of public administration.

Students taking the CPA through distance education take five credits, as follows:

PA 2201C Canadian Political Institutions: A Public Administration Perspective

PA 2202C Politics and Public Policy-making in Canada

PA 2249C Organization Theory for Public Administration

PA 2250C Introduction to Public Sector Management

Comm 1101C: Accounting

Comm 2301C: Organizational Behaviour

Comm 2302B: Organizational Theory (not available through distance education at this time)

and an elective credit class selected from those offered intramurally or through distance education and approved by the School.

Students wishing to take the CPA on campus take the corresponding intramural classes as follows:

Pol. Sci. 2200R for PA 2201C and PA 2202C

Comm 1101A and B for Accounting 1101C

Comm 2301A for Organizational Behaviour 2301C

Comm 2302B Organizational Theory

PA 2249A and PA 2250B

(Pol. Sci. 2200R; Comm 1101A and B and Comm 2301A and B are described elsewhere in this calendar)

Classes Offered

PA 2201C (Distance Ed.) Canadian Political Institutions: A Public Administration Perspective: Canadians govern themselves through two types of institutions. Formal institutions — Parliament, legislatures, local government councils, the judiciary, the office of the Governor General — are assigned functions and structures by our constitution. However, these bodies create and enforce the laws through the interaction of informal institutions — political parties, intergovernmental meetings, interest groups, and so on. The course examines the structure, role and interactions of both sets of institutions and discusses their relationship with Canadian society at large. This overview of the Canadian political system, however, is conducted from the special perspective of the public administrator. Consequently, it pays special attention to the relationships between public services and elected bodies. It also examines the part that a permanent non-partisan civil service plays in securing the continuity of the institutions of government.

PA 2202C (Distance Ed.) Politics and Public Policy-making in Canada: This course is concerned with the dynamics of the Canadian political system, particularly its impact on the policy process. It first discusses the context of the policy process, showing how our social, cultural and ideological environment determines public attitudes towards policy questions. It then examines the formal roles assigned to law-making and law-implementing institutions and shows how they interact in the political system to create and enforce public policies. Like PA 2201C, the course pays special attention to the role of public administrators, discussing the significance of their work in informing elected officials about policy issues and defining the role they play in giving policy advice.

PA2249C and 2249A Organization Theory for Public Administration: This course introduces students to the study and practice of public administration by way of an examination of the structure, design and behaviour of the complex organizational systems through and within which public administration is practiced. It outlines the principal theoretical issues inherent in public administration insofar as the administration of public affairs relates to the ways in which governments are organized and organize themselves to perform their multiple and varied functions. The course focuses on public administration but it also draws upon literature which encompasses both private and public administration with relevant comparisons and differences considered where appropriate. In so doing it acknowledges not only the degree to which organizational theories themselves are generic to all forms of administration but also the phenomena of non-profit organizations in the private sector and commercial enterprises in the public sector. The example, illustrations and cases used

for the consideration of actual organization structure, design and behaviour are drawn primarily from the Canadian experience of public administration, at all three levels of government.

PA 2250B and PA 2250C Introduction to Public Sector Management: This class is designed for undergraduate students in Public Administration, Commerce, Political Science and the Health Professions who require an introduction to the principles and methods used in the operation of government organizations. The class introduces the student to the structure of Canadian government organizations at the federal, provincial and municipal levels. The operations of a particular department are discussed and students are shown how managers in the department work within a framework of government-wide policies of personnel and financial management. It concludes with a brief discussion of the impact of the policy-making process on the management and delivery of government programs.

Comm 1101C (Distance Ed.) Accounting: An Introduction to the principles and practices used by accountants in processing and communicating data both within and outside the organization. Emphasis on financial statement accounting and reporting with the following objectives: to introduce financial accounting methodology and the related problem-solving skills, to introduce the theoretical framework upon which financial statement accounting is based, to develop an understanding of the information content of conventional financial statements and the inherent limitations of accounting information.

The Balance Sheet, Income Statement and Retained Earnings Statement
 Recognizing, Classifying and Recording Transactions
 The Accounting Cycle: Specialized Journals and Subsidiary Ledgers
 Internal Control, Current Assets and Current Liabilities
 Inventories and Cost of Goods Sold
 Property, Plant and Equipment, and Intangible Assets
 Inter-Corporate Investments
 Corporations: Long-Term Liabilities: A Review of Accounting Principles and Concepts
 Financial Statement Analysis

Comm 2301C (Distance Ed.) Organizational Behaviour: Insight into human behaviour in organizations and capacity for objective analysis is developed. Research and text material drawn from the fields of sociology, anthropology and psychology are used in the development of understanding and objectivity. Case materials and substantive data from the behavioural sciences are considered.

Introduction to Organizational Behaviour
 Learning and Decision Making
 Individual Differences: Values, Attitudes and Personality
 Perception and Communication
 Motivation: Content Approach
 Motivation: Process Approach
 Behaviour in Groups
 Intergroup Relations
 Leadership
 Organization Structure and Change

Application Procedure

Application forms are available from the Admission Office of Dalhousie University. Applications to the intramural program should be submitted as early as possible, and not later than August 1 in the academic year in which studies are to commence. Applicants to the correspondence program should consult Henson College and submit their applications by the deadline set by the college.

Further information on the Certificate or other programs of the School of Public Administration may be obtained from: Administrative Secretary, School of Public Administration, Dalhousie University, Halifax, Nova Scotia, B3H 3J5. (902-424-3742).

Part-time Study

Students may complete the Certificate through part-time study at the rate of

not more than two and one-half credits during the academic year. One further credit can be taken in each summer session.

Credits

Normally, four of the five credits in the program must be taken at Dalhousie University and at least three of the five credits after the student has registered in the program.

Classes taken for the Certificate may be credited toward a Bachelor's degree, but a student must complete at least five of the subjects required for the degree after the awarding of the Certificate.

The Special Certificate Program

The Special Certificate program is a course of studies which give students who do not satisfy the general requirements for admission to the Faculty of Graduate Studies an opportunity to qualify for admission to the DPA and MPA degrees. Individuals with a minimum of ten years work experience in an administrative position who have (1) completed a full year of university study or (2) achieved a professional designation (e.g. the Certificate in Municipal Administration from Henson College) can be considered.

Successful completion of the Certificate with an average grade of B+ and with no grade below B-, would constitute a basis for a recommendation from the School for admission to the Faculty of Graduate Studies.

Individuals interested in enrolling in the Special Certificate Program should consult the School before filing applications and should include with their applications a resume and a statement of their reasons for wishing to undertake the program.

Admission Requirements

The program leading to the Certificate in Public Administration is available to persons who meet the undergraduate admission requirements of Dalhousie University and who are not enrolled in a program leading to a first degree. Those not meeting the formal admission requirements may apply for admission under the "mature student" category. Details of admission requirements are described below.

Mature Students

Students who do not meet the usual admission requirements may be considered under the mature student category provided that

1. they are at least 23 years old and
2. they have been absent from full-time high school study for at least four years

Prospective students should submit to the Admissions Committee an application form together with a letter outlining their work experience and other activities. Normally, high school transcripts are required and interviews may be required.

Under exceptional circumstances, the Admissions Committee may agree to admit the student directly to a degree program if the student's background is deemed sufficient preparation for such admission. Otherwise, the Admissions Committee may admit mature students initially to the no-degree category until they have achieved grades of C- or better in at least three full-year classes (or equivalent) taken. At that time, they are eligible to apply for admission as regular undergraduate students.

Mature students are advised to contact Henson College at 424-2526 for pre- and post-admission counselling.

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Your enquiries are invited



Dalhousie University

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