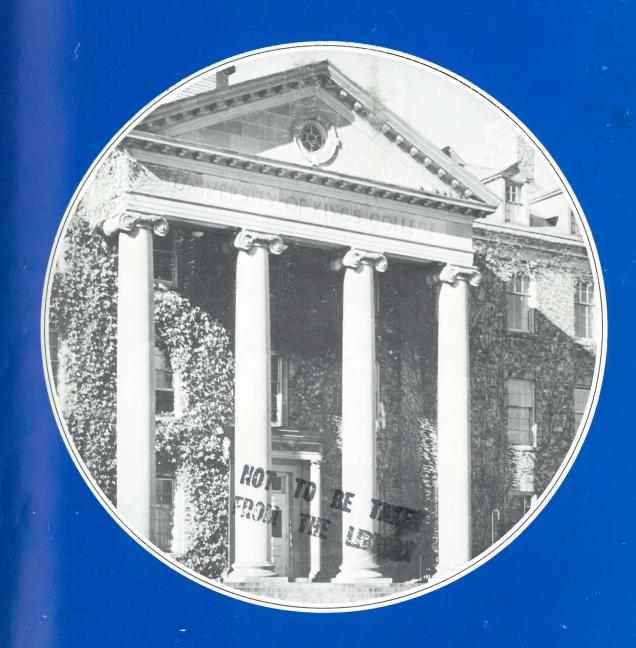
# Calendar 1972 - 1973



University of King's College

June 26, 1975

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## CALENDAR 1972-1973

## University of King's College

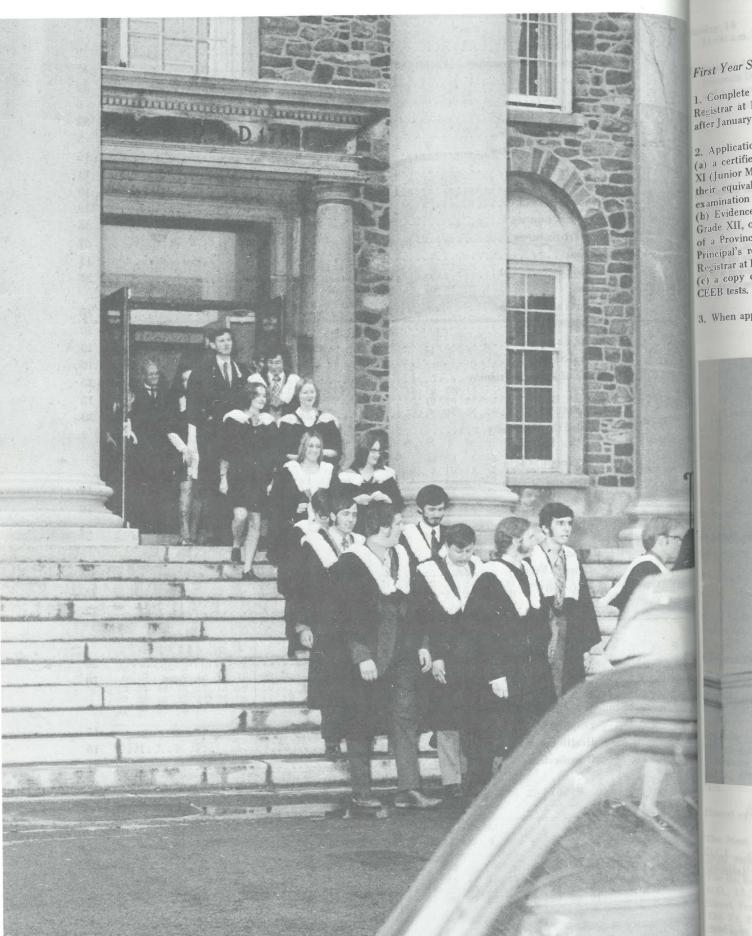
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HALIFAX, NOVA SCOTIA
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## **Application Procedure**

First Year Students

1. Complete application forms and send to the Registrar at King's College as soon as possible after January 1.

2. Application should be supported by: (a) a certified transcript of Nova Scotia Grade (a) a colonial Grade (XI (Junior Matriculation) high school marks or their equivalent, or the Grade XI Provincial examination certificate.

(h) Evidence of completion of Nova Scotia Grade XII, or its equivalent, in the form either of a Provincial examination certificate, or of a Principal's report. This should be sent to the Registrar at King's College by August 15. (c) a copy of scores obtained in the SACU or Second, Third and Fourth Year Students

form will be sent for completion and return to the Registrar, King's College. (King's students will receive the notice of acceptance from Dalhousie University and other forms to be completed and returned to the Registrar of that institution.)

4. During the appropriate registration period specified in the Almanac, King's Arts and Science students will go first to Dalhousie and then to the Registrar's office at King's to:

(a) submit approved selection of classes.

(b) pay fees. (Resident students will be assigned rooms.)

1. Provisional residence application and regis-3. When application is approved, a registration tration forms for the 1972-73 term must be

completed at the Registrar's Office before 15 May, 1972, and the required fee paid. Students who are required to withdraw from residence during the summer must do so before 15 August, 1972 or forfeit the deposit. The deposit will be credited to the year's account for those who return.

2. King's students will also be required to complete forms for the Registrar, Dalhousie University. These will be sent during the summer months.

3. During the appropriate registration period specified in the Almanac, King's Arts and Science students will go first to Dalhousie and then to the Registrar's office at King's to:

(a) submit approved selection of classes.

(b) pay fees. (Resident students will be assigned rooms.)



The Haliburton Room

## **General University Almanac 1972-73**

July, 1972

Saturday, 1

Last day for receiving applications for admission to Faculty of Arts and Science, students transferring from other Universities and Colleges. Last day for receiving applications from students who do not meet the P-Z normal admission requirements to the Faculty of Arts and Science.

Friday, 14

Last day for receiving applications for supplemental examinations in Arts and Science. Fee must accompany application for examination. If a late application is accepted, an additional fee of \$2.00 per day (maximum \$5.00) must be paid. The late fee applies between July 14 and 31. No applications will be considered after July 31, and no refund of fee will be paid after this date.

August, 1972

Supplemental examinations begin in Arts and Science.

Tuesday, 15

Last day for receiving applications for admission to full-time study in the Faculty of Arts and Science.

September, 1972

Friday, 1

Last day for receiving applications for part-time study, Faculty of Arts and Science.

Monday, 11

Registration and payment of fees, for NEW FULL TIME students in Arts and Science.

Surnames

8:30 a.m.-12:00 noon A-E F-L 1:00 p.m.-5:00 p.m.

Tuesday, 12

Registration and payment of fees for NEW FULL TIME students in Arts and Science.

Surnames:

M-O 8:30 a.m.-12:00 noon 1:00 p.m.-5:00 p.m. P-Z

Wednesday, 13

Registration in School of Theology.

Registration and payment of fees, for RETURNING and PART TIME students in Arts and Science.

Surnames:

A-E F-L

8:30 a.m.-12:00 noon 1:00 p.m.- 5:00 p.m.

Registration and payment of fees, for returning PART TIME and FULL TIME Tuesday, 2 students in Arts and Science.

Surnames:

8:30 a.m.-12:00 noon 1:00 p.m.- 5:00 p.m.

Saturday, 16

8:30 a.m.-12:00 noon, Registration and payment of fees continues for PART TIME and SPECIAL students in Arts and Science. All students who wish to study part-time (one or two classes) in the Faculty of Arts and Science, must have been registered at Dalhousie previously, or must have completed an application for admission to the University. Late registration fee payable after this date for students in Arts and Science.

Sunday, 17

University Church Service with Academic Procession - Chapel,

8:30 a.m. Classes begin in Arts and Science.

Monday, 25

First day for change of course or class in Arts and Science.

Friday, 29

Last day for withdrawing from courses in March, 1973 the School of Theology,

October, 1972

Monday, 9

Thanksgiving Day. No classes.

Last day for adding full-term classes and classes that terminate at Christmas. Last day for dropping classes that terminate at Christmas - Faculty of Arts and Science.

November, 1972

Remembrance Day. No classes.

Wednesday, 20

Last day of classes in Divinity.

December, 1972

Last day of classes in Arts and Science.

Friday, 8

Examinations begin in Arts and Science.

12:30 p.m. Christmas vacation begins.

January, 1973

Classes resume in Arts and Science.

Thursday, 4

Classes resume in Divinity.

Last day for withdrawing from courses; the School of Theology.

Last day for adding, or dropping, classes in Arts and Science. After this date all classe in which a student remains registered will } counted towards a student's programme for the academic year.

February, 1973

Friday, 2

Munro Day. No classes.

Saturday, 3

Dalhousie Winter Carnival, No classes.

Wednesday, 7

Meeting of Convocation 8:00 p.m.

Monday, 26

Study break.

be announced.

Monday, 5

Classes resume in Arts and Science.

April, 1973

Last day of lectures for students in Arts and Chancellor

Last day of classes for Divinity students, la day of term.

Tuesday, 17

Examinations begin for Arts and Science.

Friday, 20

Good Friday. No classes.

May, 1973

Monday, 1

Last day for receiving applications fro students other than Canadian and American - Faculty of Arts and Science.

Wednesday, 2

11:00 a.m. Baccalaureate Service.

Encaenia Day – King's Convocation – Arts Friday, 18 and Science and Divinity.

Thursday, 17 Dalhousie University Convocation.

Regular session ends.

Office Hours

Week days (Monday-Friday), 9:00a.m.-5:00

June, July, August (Monday-Friday), 9:00 a.m.4:30 p.m.

Officers of the University: 1972-73

Patron

Study break for Divinity students. Dates to The Most Reverend the Lord Archbishop of Canterbury and Primate of All England.

Visitor

The Most Reverend the Lord Archbishop of Nova Scotia and Metropolitan of the Ecclesiastical Province of Canada.

Norman H. Gosse, M.D., C.M. (Dal.), D.Sc. (Laval), D.C.L.(K), LL.D. (Dal.), F.A.C.S., F.R.C.S.(C), 1488 Birchdale Ave., Halifax, N.S.

President and Vice-Chancellor

J. Graham Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.), 6360 Coburg Rd., Halifax,

Board of Governors

The Most Rev. W. W. Davis, B.A., B.D., D.D., D.C.L., (Chairman), 5732 College Street, Halifax, N.S. The Rt. Rev. H. L. Nutter, B.A. B.S.Litt., M.A., D.D., LL.D., (Vice-Chairman), 791 Brunswick

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N.B. (1973). The Rev. Canon W. E. Hart, B.A., L.Th., R.R. No. 1, Bloomfield Station, N.B. (1973).

The Ven. Raymond H. Murphy, B.Th., 426 King Ave., Bathurst, N.B. (1975).

Diocese of Nova Scotia

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E. W. Balcom, D.C.L., Port Dufferin, N.S.

Dr. J. Graham Morgan, B.A., M.A., D.Phil., Harold Vincent, B.C.L. (1974), 5651 Ogilvie St., Halifax, N.S.

The Venerable L. F. Hatfield, M.A., D.D., St. John's Rectory, P.O. Box 83, Truro, N.S.

Rev. W. A. Trueman, B.A., B.S.Litt., Charlottetown, P.E.I. (1973).

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Professor Innis Christie, B.A., LL.B., LL.M., 21 Bayview Road, Halifax, N.S. (1974).

Robert J. Cram, B.A., Rum Point, Garden Lots, Lunenburg Co., N.S. (1974). John W. Fisher, LL.B., 170 Bay Street, Suite

203, Toronto 1, Ontario. (1974). The Rt. Rev. J. S. Wetmore, B.A., B.S.Litt., D.D., 7 Fox Meadow Road, Scarsdale, N.Y.,

10583, (1974). Arthur J. Andrew, B.A., M.A., D.C.L., 1 MacKay Court, 215 MacKay Street, Ottawa,

Ontario, K1M 2B6, (1973). Mrs. I. E. Cochran, B.A., B.Ed., 26 Oakhill Drive, Sherwood Park, Halifax, N.S. (1973). Rev. E. G. Harris, B.A., B.S.Litt., B.D., 21

Lynn Drive, Dartmouth, N.S. (1973). R. V. Swetnam, Esq., 6897 Tupper Grove, Halifax, N.S. (1973).

Faculty Representatives

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Professor J. P. Atherton, M.A., 277 Purcell's Cove Rd., Boulderwood, Halifax, N.S. (1972). The Rev. Dr. J. B. Hibbitts, M.A., B.S.Litt., D.Phil., D.D., STM., 1625 Preston St., Halifax, N.S. (1973).

#### Student Union Representatives

Mr. Raymond Oake, Mr. Wayne MacQueen, Mr. Roderick MacLean, Mr. James Jardine.

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The Rev. Thomas Cox, 1804-1805. Rev. Dr. Charles Porter, 1805-1836

The Rev. Dr. George McCawley, 1836-1875. Faculty of Divinity (1972-73) The Rev. Dr. John Dart, 1875-1885.

The Rev. Dr. Isaac Brock, 1885-1889. The Rev. Dr. Charles Willets, 1889-1904. Dr. Ian Hannah, 1905-

The Rev. Dr. C. J. Boulden, 1905-1909. The Rev. Dr. T. M. Powell, 1909-1914.

The Rev. Dr. T. S. Boyle, 1916-1924.

The Rev. Dr. A. H. Moore, 1924-1937.

The Rev. Dr. A. Stanley Walker, 1937-1953. The Rev. Dr. H. L. Puxley, 1954-1963.

Dr. H. D. Smith, 1963-1969. Dr. F. Hilton Page, (Acting), 1969-1970. Dr. J. Graham Morgan, 1970

(Epis. Theol. Sch.),

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Yesus, H. G., B.A. (Haile Selassie), M.A. (Illinois et Brandeis)

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Associates in Supervised Pastoral **Education (1972-73)** 

The Rev. Canon F. M. French, B.A. (Vind.), M.A. (Dal.), LL.D. (St. Marv's), Rector of the Parish of St. Mark's, Halifax, N.S.

The Rev. L. Avery Kempton, B.A., B.D. S.T.M., Chaplain at the Victoria General Hospital, Halifax, N.S. and certified Chaplain Supervisor. Halifax, N.S.

The Rev. E. T. McKnight, B.A., B.D., (Acadia), Chaplain at the Nova Scotia Hospital, Dartmouth, N.S. and certified Chaplain Supervisor,

The Rev. Professor C. J. Taylor, B.A., B.D. (Acadia), S.T.M. (Andover Newton), D.D. (Vind.),

Professor of Clinical Pastoral Education of Acadia University, Wolfville, N.S. and certified Chaplain Supervisor.

The Rev. H. H. Taylor, B.A., B.D. (Acadia), The Institute of Pastoral Training, King's College, Halifax, N.S. and certified Chaplain Supervisor.

The Rev. K. H. Tufts, B.A., L.Th. (Vind.), Chaplain at the Victoria General Hospital,

## **Historical Sketch**

The history of higher education in Canada began in 1789 with the founding at Windsor. Nova Scotia, of the University of King's College. At the time of its establishment it was with the exception of the fifteenth-century King's College in Cambridge and in Aberdeen, the only foundation of that name in existence. Although there had been a King's College, New York, chartered by George 11 in 1754, it did not survive the end of the colonial period in America and its re-organization in 1784 under the name of Columbia College was undertaken on an entirely different plan. The Loyalist political and religious principles upon which the New York seminary had been founded migrated, along with the Loyalists themselves, to Eastern Canada, and in 1802 a Royal Charter was granted by George 111 proclaiming King's College, Windsor, "The Mother of an University for the education and instruction of youth and students in Arts, to continue forever and to be called King's College."

Since that time, King's has maintained in Canada certain of the Oxford traditions, In 1920, when the original buildings were destroyed by fire, the University moved to Halifax, where, with the assistance of the Carnegie Corporation, new buildings were eventually erected on the campus of Dalhousie University. In 1930 it entered into partnership with Dalhousie which, with a Royal Charter dating from 1820, is the third of Canada's senior universities. This novel arrangement, by which the English and Scottish University traditions were united, is upheld by a special agreement under which the two have maintained joint faculties of Arts and Science, so that undergraduates of King's read for the B.A. and B.Sc. of Dalhousie, King's has left her own degree-granting powers in abeyance in these faculties and now gives degrees in theology by examination, together with honorary degrees in Divinity and Laws.

In May 1941, the King's College buildings were taken over by the Royal Canadian Navy as an Officer's Training Establishment, and during the next four years, until May 1945, nearly 3100 officers were trained for sea duty with the R.C.N. The students and academic staff of King's carried on during this period through the kindness of Dalhousie University and Pine Hill Divinity Hall.

King's College is residential, on the Oxford and Cambridge pattern, and, in addition to the day students who live out, 125 men and 100 women can be accommodated in residence. Dinner in Commons Hall is formal with Latin grace; the wearing of academic dress is required of all members of the College in statu pupillari and the emphasis is everywhere upon the corporate life. The inestimable benefits of life in a small residential college are, in England at least, an accepted part of the "Oxbridge" tradition, but this is certainly not so in North America, where universities have in general

followed either the German policy of having no residential facilities at all, or the English provincial plan of housing a proportion of the student body in "halls of residence" entirely separated from the university itself. The corporate life in King's thus emerges as something rare on the North American continent, since it is designed to educate "the whole man" and not simply to train him for specific examin-

In addition to its athletic activities, the College runs a Debating Society, known as the "Quintilian", and a Dramatic Society which stages two plays each year. Daily services are held in the Chapel for those who wish to participate. Although the College is an Anglican foundation and incorporates facilities for the training of Anglican clergy, there is no denominational bar aimed at the exclusion of non-Anglicans from membership of the College, either as lecturers or students. Members of Faculty may themselves be resident and function in the traditional manner as "dons" for the staircase (i.e. The University of King's College having enter "bays"). The bays are named Chapel Bay, an association with Dalhousie University, Middle Bay, Radical Bay, North Pole Bay, Cochran Bay, and The Angel's Roost, Alexandra Hall is the residence for women.

Now that there are many large overcrowded universities which find it difficult if not impossible to concentrate upon anything not strictly connected with a student's graduation at the earliest possible time, there is all the more reason for the encouragement of the small residential university wherein the future leaders of society may be educated towards the acceptance of social and moral responsibility. The education of such people must be conducted on an individual, not a mass, basis.

King's tries to be a miniature of the Christian ideal of the larger community. It is this, rather than any of the more superficial observances, which links King's with the older universities of Britain and makes it unusual in Canada.

#### Constitution

The Board of Governors is the Supreme Governing Body of the University. It consists of the Bishops of the Diocese of Nova Scotia and Fredericton, the President of the University, the Vice-President, the Treasurer, two members elected by each Faculty, together with eight members elected by the Alumni Association, Exemptions Granted to King's College by four members by the Student Union, six by each of the Synods of Nova Scotia and Fredericton, and not more than eight co-opted members. The Governors have the management of the funds and property of the College, and the power of appointment of the President, professors and officials. The Board appoints an Executive Committee.

Convocation consists of the Chancellor and the Vice-Chancellor, together with all Bachelors of

Divinity and Masters and Doctors of University; Members of the Board of Govern and of the Faculty of Arts and Science hold the degree of Master or Doctor from recognized University; members of the Facult of Divinity; Fellows of the University Bachelors of the University of five ye standing who are recognized by the Clerk Convocation. All degrees are conferred Convocation.

The Faculties consist of the members of teaching staff on the King's Foundation in Faculty of Arts and Science under the Agr ment of Association with Dalhousie University and the members of the teaching staff Divinity.

#### Faculties

#### Faculty of Arts and Science

students registered in Arts and Science atten classes jointly with Dalhousie students. The classes are given by Dalhousie professors or l on the course taken. The students of be institutions follow the same curriculum, to the same examinations, and must attain same academic standard. The University Kings College Foundation Year Programm with the University of Kings College.

#### Faculty of Divinity

The School of Theology is under the survei responsible to the Board of Governors, bu much of its work is done in the Atlantic School of Theology under the direction of the Boar of Governors and the Senate of that school, both of which bodies the University of King College has substantial representation, Degree and diplomas in Theology are awarded candidates fulfilling the necessary academi requirements, regardless of religious denomi ation or sex. Students are also prepared to mee Rules governing residence life are contained in of Canada. The Course of Study for thes candidates is subject to the Bishops in the Dioceses of Nova Scotia and Fredericton.

Other Institutions

The University of Oxford exempts from Responsions an undergraduate in Arts of thi University who has passed in the subjects of the second or a higher year. A Bachelor of Art with Honours is further exempted from for terms of residence. The Trustees of Rhode Scholarships exempt from the qualifying exam ination candidates who are exempt from Re sponsions by the University of Oxford.

### Chapel

Regular worship is an integral part of the facilities afforded by the University. All students are invited to attend the services in the College Chapel.

### Sunday Service:

The times of these services are announced at the beginning of each session.

The service on Wednesday evening is a College Corporate Communion.

While the Book of Common Prayer is used in the services in the Chapel, students of all denominations are welcome and encouraged to

The Rev. D.F. L. Trivett, Campus Chaplain, is available to all students and conducts discussion groups for students and faculty.

### General Discipline

The maintenance of discipline is in the hands of the College Board which is composed of the President, the Dean of Residence, the Dean of Women, three students: President of the Students' Union, Chairman of the Men's Residence Council, Women's House President, two proprofessors on the King's Foundation, depending fessors on the King's Foundation chosen annually by the Faculty, one member of the Faculty of Divinity chosen annually by the Faculty. The students exercise a large measure of self-government in maintaining good order and discipline in the residences. Students however, is available only to students registere conducting themselves in an unbecoming manner, within the precincts of the college, may be fined, suspended or expelled. When a student is expelled from residence there is no return of fees.

lance of the Divinity School Council which. In keeping with the traditions of the College, students are expected to wear gowns when attending chapel, when seated for formal meals, and when calling upon the President of the University. Gowns may be obtained from the Dean of Women.

> Students are expected to attend lectures and laboratories regularly and punctually and to perform all exercises assigned by the Faculty.

ordination requirements in the Anglican Churcon the "Regulations" handbook. Students will be

expected to sign a statement acknowledging receipt of the "Regulations" of the University and a statement of their acceptance of these "Regulations".

Dons in the Bays, the Dean of Men, the Dean of Women, the Registrar, the Bursar, the Faculty, and the President are willing to help, counsel, and advise any student at any time, and will act as much as is within their power in the best interest of the students and the College.

### King's College Library

King's College Library was founded in 1789. Just after the Royal Charter was granted to the College in 1802, Bishop Inglis sent his son to England with £250 to begin the purchase of books. The library grew steadily during the 19th century and was probably one of the best libraries in English-speaking Canada of the time. There were various benefactors over the years, chief of whom was Thomas Beamish Akins. From Mr. Akins the library received most of its rare collection of some 40 incunabula (books printed before 1500, that is, during the first fifty years since the invention of printing with movable type). This is a remarkable number of these very rare books to be found in such a

King's Library is very rich in the field of English literature. Much of the credit for the development in this field must go to the late Professor Burns Martin. The Professor Burns Martin Memorial Fund continues to aid the library's growth in this area.

With the help of the William Inglis Morse Endowment for Canadiana, this important area of study is growing steadily as more and more works are being published about our country.

The largest proportion of books, however, is found in the field of Theology. This collection is large and comprehensive and constantly kept up to date. The John Haskell Laing Memorial Bequest helps with the purchase of books in

Book purchases in the general field are aided by memorial funds to the following persons: the Hon, William Johnston Almon, Frances Hannah Haskell, James Stuart Martell, and Thomas Henry Hunt (Alumni Memorial).

The library is open Monday to Friday from 9.00 a.m. to 5.00 p.m., and 7.00 p.m. to 10.45 p.m. On Saturdays the hours are 9.00 a.m. to 12.00 noon. On Sundays 2-5 p.m. For part of the session the reading room will be open on Saturday from 2.00 to 5.00 p.m.

The student loan period for all books except those on reserve is one week.

Fines will be charged for overdue books at the rate of twenty-five cents a day for seven day

Students are given the privilege of borrowing books for the summer.

### **Degrees and Courses**

The degrees of Doctor of Divinity and Doctor of Civil Law, may be conferred honoris causa in recognition of eminent literary, scientific, professional or public service.

The dignity and honour of Fellow may be conferred by the vote of Convocation upon any friend of the University for noteworthy services rendered on its behalf.

Convocation confers the degrees in sourse of Doctor of Divinity and Bachelor of Divinity and Associate of Theology (on recommendation of the Board of Examiners of the General Synod of the Anglican Church of Canada), Master of Divinity, Master of Sacred Theology, and Bachelor of Theology. Courses are prescribed for the diplomas: Licentiate in Theology, Testamur, Associate of King's College, (Nova Scotia).

Pre-professional work in Arts and Science by students intending to enter one of the Dalhousie professional schools may be taken as a student of King's College.

#### Other Courses

#### Master of Arts and Master of Science

In accordance with the Terms of Association, a graduate cannot take a Master's degree in Arts and Science while enrolled at King's, but the attention of undergraduates is especially drawn to the standing and conditions needed in their courses before being admitted to work for a Master's degree.

## King's College Residence 1972-73

Dean of Residence

Mr. David Jones

Dean of Women

Mrs. Ena Gwen Jones

Dons

Mr. Mark DeWolf Professor John F. Godfrey Mr. Wayne Hankey Mr. George Sheppard Mr. Hagos Yesus

Residence life at the University is encouraged for all students because the community life there enjoyed forms an essential part of the student's education. Exceptions will be made in the case of a student wishing to reside in a home or lodging outside the university.

Male students live in the men's bays (Chapel, Middle, Radical, North Pole and Cochran), each housing 22-26 men, under the supervision of the Dean of Residence. Female students live in Alexandra Hall, a residence accommodating 100 women, under the supervision of the Dean

All rooms are furnished with bed, dresser, desk, and chairs. Students are required to provide their own bedding and towels, and to attend to

their own laundry arrangements. Coin-operated washing and drying equipment is provided in both men's and women's residences.

Single and double rooms are available to both men and women, priority for single rooms being given to students in their senior year.

The residences have been designed to provide for the comfort and convenience of the students, and to facilitate study. In the men's residence, two students occupy a suite of two rooms (bedroom and study). The men's common room and lounge is open to residents of all bays, as is the Haliburton Room, a gathering place for all students and the site of many student activities.

The women's residence was built in 1962 and is modern in every respect. It contains, besides the rooms in which female students live, a library, reading rooms, lounges, a service elevator and ample storage space.

Both residences are designed so that it is not necessary to go outside for meals and extracurricular activities.

Meals are prepared and served to all resident students in Prince Memorial Hall, erected in

Students accepted in residence by the Deans are expected to remain for the whole session, or, in the case of withdrawal during the session, must obtain substitutes satisfactory to the Dean, residents will be charged with room for complete session and will be liable for t charge unless or until a substitute has assume obligation to the University for the balance, student may withdraw from the resident Resident Students without notice to the Dean.

The residence will be open for new stude from the evening of September 10, 1972. for returning students September 12, 19 until December 20, 1972, and from the ever of January 1, 1973, to the morning of May 1973. (Students not in their graduating will be expected to vacate the residence hours following their last examination). sident students in faculties whose terms exc these periods may reside in the College permission of the Dean on payment of reand, when Prince Hall is open, meals may b eaten by arrangement with the Steward.

made until the student has been accepted ] the University for the coming session and \$50.00 residence deposit has been received the Business Office. Deposits for all applitions made prior to July 15th must be receive by that date. Applications for residence according modation made after July 15th must accompanied by the \$50.00 deposit. Cancel tion of application received by the Regist prior to August 15th will entitle the student a refund of the \$50.00 deposit.

## **Expenses**

A Payment must be made in Canadian funds by cash or negotiable cheque. Please make cheques nayable to the University of King's College for the required amount.

A complete session is defined for students registered in the faculty of Arts and Science and for students registered for the Atlantic School of Theology as being from the first day of regular registration (including Sunday, September 10) until the day following the last regularly scheduled examination in the Faculty of Arts and Science (for students in this Faculty) and in the Atlantic School of Theology (for students in this School). The annual charges for these periods for board, light, meals, etc. are as follows:

		Double	Single
Men's Residence	\$	950.00	\$1025.00
Women's Residence		950.00	1025.00
Women's Residence (S	Suite	e)	1100.00

Confirmation of accommodation will not h A graduating resident student may stay in residence without charge after these periods up to and including the last day of Encaenia activities, but will be expected to pay for meals, during this time.

> In exceptional circumstances a student may seek permission of the Dean of Residence to occupy a room at times other than those specified above. For charges and conditions students should consult with the Dean of Residence.

> Students in residence must make a deposit of \$500.00 at commencement of the first term, the balance of the bill to be paid in January. New students are expected to deposit \$50.00 when pre-registering and returning students \$20.00 before April 15, increasing this deposit to \$50.00 by August 15.

Resident students as well as non-resident, must pay the following at commencement of the first term: Student Body Fees \$40.00, Gown \$15.00, and any tuition fees payable to the University of King's College. (Gowns for nonresident students are optional.)

#### Surcharges

If deposit is not paid within 21 days of registration day a surcharge of 3% will be charged and a further 2% for each additional complete month until paid. The same applies to charges payable by non-resident students.

Second Term residence fees are due in January and surcharges as above will be levied after January 30th.

### Fee For Student Organizations

At the request of the King's student body, a fee of \$40.00 is collected on enrolment from each student who takes more than one class. This fee entitles the student to the privileges of the various students' organizations and clubs, and a copy of the King's College RECORD.

#### **Caution Deposit**

On enrolment each resident student is required to make a deposit of \$25,00 as caution money to cover damage done to furniture, etc. This amount, less deductions, will remain a credit on the books until the student graduates or leaves, when the balance will be returned by cheque, usually during June. No refund in whole or in part will be made before that month. All students in residence are held responsible for the care of furnishings within their respective rooms. Losses or damages incurred during the session will be charged to the caution deposit.

Each year a student, on returning, is expected to settle for the previous year's deductions so that his credit may be maintained at \$25.00.

The items above, together with a key deposit of \$5.00 are payable at King's Business Office.

#### **Tuition Fees**

Payment of tuition fees for Arts and Science students is to be made to Dalhousie University Business Office. Please note that cheques are to be made payable to Dalhousie University, A charge of \$5.00 is made for any cheque returned by the bank and penalties, as shown below, for unpaid accounts may be added. Post-dated cheques cannot be accepted.

#### **Full-Time Students**

Students registered for more than two credits.

#### Pre-Registration by Mail

Returning students who wish to preregister must pay the first instalment of fees by mail before August 15, by money order or negotiable cheque. If fees are to be paid by a government or other sponsoring agency, a signed confirmation by the sponsoring agency must be enclosed.

#### Payment at Regular Registration Period

Fees are payable in full on registration or in two instalments. The first instalment is \$445.00 including incidental expenses. The second instalment, \$240.00 is due by January 26th.

A carrying charge of \$5.00 is added if fees are not completely paid at registration. Registration is not complete until the first instalment is

Bills for fees will not be issued. The receipt issued at registration will shown the balance, if any, which is outstanding.

Students planning to pay the first instalment of fees from a Canada Student Loan should apply to their Province as early as possible so that funds will be available at registration.

#### Penalties for Late Payment

for fees may register conditionally. A penalty of \$5.00 per day, to a maximum of \$20.00, commencing on the first business day following the regular registration day, will be charged. To accounts outstanding after October 1, an additional charge of 8% interest from October 2

Penalty and interest charges will be waived for students paying accounts from provincial loans who pay by October 31 and give evidence of having received the loan from the province. Students who produce evidence that their application for a provincial loan had been rejected and pay accounts by October 31 will also have penalty and interest charges waived. Students who receive payment or notification of rejection of application from the province after October 31 and pay accounts within seven days may have the penalty charges waived, but interest will be charged from October 1, Proof must be provided to the Awards Officer that an application for a provincial loan was made prior to August 15 and that payment or notification of rejection of application had not been received by October 31.

Interest at 8% will be charged on second instalments outstanding after January 26. No examination results will be released, nor will the student be permitted to register for another session until all accounts are paid in full. The names of graduating students whose accounts are not completely paid by April 27 will not be included in graduation lists.

PART-TIME STUDENTS — Students registered for two credit classes or less.

AUDIT STUDENTS - Students auditing a lecture class for interest only with no credit to

Total fee must be paid at registration by both Part-time and Audit students.

SCHOLARSHIPS awarded by King's College will normally be applied to charges at King's. If a student has a larger scholarship than his obligation to King's, the balance may be paid by King's to Dalhousie University for tuition fees. The student should enquire at the Bursar's Office to ascertain if the Dalhousie Business Office has been informed of the arrangement,

The Dalhousie Business Office does not issue bills for tuition fees; the receipt issued at registration will show the balance, if any, which is outstanding.

#### Residence Deposits

King's College requires a deposit of \$50.00 by August 15th for each new student requesting residence, and a \$20 deposit from returning students by April 15, increasing this deposit to \$50.00 by August 15. The room deposit will be Students unable to pay the first instalment due refunded only when notice of cancellation of accommodation has been received by the Deans or the Registrar before August 15.

#### CHARGES

Full time students registered for more than 2

#### Faculty of Arts and Science

King's Students \$680.00

The above charge includes class fees, laboratory fees, library fees, examination, diploma and registration fees, instrument rental charges, and hospital clinics where applicable.

Incidental Fees are collected for the Students' Union. Students' Union Fee \$40.00

Part time students (These charges include incidental fees of registration and library only): Students registering for 1 or 2 classes in all Faculties for University credit, per class \$150.00

Students registering for one-half credit class \$ 75.00

1/3 credit class \$50.00

Audit students (This charge does not entitle students to any privileges other than attendance at class);

Students not candidates for University credit who wish to take one University lecture class because of their interest in it. No credit or official transcript will be issued to such a student.

1 full credit class \$75.00 1/2 or 1/3 credit class \$37.50

(A student enrolled at King's is required to pay the King's Council of Students' fee of \$40.00, but not the Dalhousie Council of Students' fee, or the Rink and Athletic Field fee. However, any King's student who wishes to participate in the Dalhousie Council of Students' activities must pay both of the above Dalhousie fees. Dalhousie students resident at King's College must pay King's College Council of Students' fee of \$40.00)

Library Fee Divinity students who are not registered for any Arts courses must pay a

Library fee of \$5.00 to King's College Business Office

#### Faculty of Theology

Full-time students, basic course ....\$350.00 Full-time students, M.S.T. . . . . . . . . . \$575.00 Part-time students for each semester course below Master's level .....\$40.00 Part-time students for each semester course at Master's level ......\$60.00 Arts and Science courses, when necessary .....\$150.00 A.K.C. Registration . . . on application \$10.00 A.K.C. Examinations: per paper to be paid by the preceding December 1, and nonrefundable .....\$ 5.00

#### Examinations

An application for examination must be accompanied by the proper fee: Supplemental and Special (per examination) .....\$15.00 At an outside centre (each - extra) \$10.00 For re-marking of a paper .....\$ 3.00 (Application for re-marking must be made in writing to the Registrar within three months of

the date of the examination). If application for refund of supplemental examination fee is not made on or before July 31, the fee will be forfeited.

Diploma Fees are payable at registration in the

final year of the course,	
A.K.C., Testamur\$	12.00
M.Div., M.S.T., B.Th	20.00
B.D., A.Th	40.00
Additional fee for any degree in absentia	at the
Spring Convocation	10.00

A student may receive only an unofficial transcript. An application for a transcript must be accompanied by the proper fee. First transcript, no charge; additional copies, each original, \$1; extra copies, \$.50 each. No transcript will be issued until all charges owing to the university have been paid in full.

#### Student Photograph

At time of first registration at King's each student will be required to supply two picture. These should be approximately one inch by or and one-half inches.

#### **Laboratory Charge**

No laboratory deposit is charged. Individstudents will be charged for careless or wilfi

#### Parking on the Campus

license number, for a charge of \$10.00.

them in designated areas only.

#### Refund of Fees

A student who has completed registration wishes to withdraw must obtain written a proval from the Registrar.

the date of commencement of classes will & King's. debited in full for the incidental fees and m receive a refund of the balance on a prop<sub>0</sub> No student shall be admitted to a degree in a tional basis, calculated in monthly units: a f charge will be made for the month in which t withdrawal is approved, including the month December. A student withdrawing in Janua will be charged the full first instalment of fee A student changing before February 1 from full-time to part-time status, with the approve of the Registrar, will be eligible for adjustment in fees for the remainder of t session.

for any reason will not be entitled to a refun class or taking any examination. of fees, either academic or residence.

after the approval of the proper authority he have been paid. been obtained, N.B. - King's College studer must report AS WELL to the Registrar at Withdrawal Bursar, King's College.

## **University Regulations**

All students are required to report their local address while attending the University, to the Office of the Registrar, on or before October 13. Subsequent changes must be reported promptly.

Place of Residence of Students:

For the purpose of admission to the University Each student who has a car on campus ma the place of residence of a student is the place obtain a parking permit from the Gener where he is domiciled. This is normally pre-Office upon the presentation of insurance an sumed to be the place (country, province, etc.) where the home of his parents or guardian is located. That place remains as his place of Students with motorbicycles may obtain residence throughout his attendance at the parking permits under the same conditions for University unless he takes steps that satisfy the charge of \$2.50, and will be required to pai Registrar that he has established a place of residence elsewhere.

Admission Ad Eundem Statum: Students from other universities desiring to study at Dalhousie-Kings's University may, on producing satisfactory certificates, be admitted with advanced standing and given credit for classes A student withdrawing after two weeks from equivalent to those offered by Dalhousie-

> course in this university unless he has attended and passed in at least one year's work in the Faculty in question, and that essentially the last year of the degree course. In the Faculty of Arts and Science one year's work is interpreted to mean at least five classes of university grade.

### Registration

All registered students are required to agree to obey all the regulations of the University already made or to be made, and to pay the A student who is dismissed from the Universit required fees and deposits before entering any

Under no circumstances may a student register Applications for a refund or adjustment shoul unless all previous accounts, including fees, be made to the Business Office at Dalhous library fines, and other fines, to the university

See the individual faculty regulations.

### Late Registration

Late registration in the Faculty of Arts and Science requires the approval of the Registrar. All students who register late must pay an extra fee not to exceed \$5.00 per day, to a maximum of \$20.00.

#### Discipline

If a student is required by a Faculty to discontinue attendance in the Faculty solely because he has failed to maintain the required academic standing, he is not regarded as dismissed on grounds of general discipline and his right to be considered for admission to another faculty is unaffected.

When the work of a student is unsatisfactory, or his attendance is irregular without sufficient reason, he may be dismissed from one or more classes, or from the University.

No return of fees will be made to any student dismissed from classes or from residence, or from the University.

#### Non-Academic Student Activities

Students representing the College in non academic activities must be in good standing. Those who are ineligible for such representation are as follows:

(a) Students on probation in any Faculty.

(b) Students registered for fewer than ten lectures per week, a period of two laboratory hours being regarded for this purpose as equivalent to one lecture.

(c) Students who have more than two failures in college subjects.

These regulations do not apply to the Dramatic Society.

#### Dalhousie Libraries

King's students enjoy the same privileges in the Dalhousie Libraries as Dalhousie Students. For regulations and hours see the current Dalhousie calendar.

#### Other Libraries

Arrangements can be made for King's students to use the Halifax Public Library, the Nova Scotia Technical College Library, Pine Hill Library and the Provincial Legislative Library.

#### Conferring of Degrees

Successful candidates for degrees are ordinarily required to appear at Convocation in the proper academic costume to have the degree conferred upon them. However, any student may elect to have his degree conferred in absentia by giving formal notice to the Registrar (Dalhousie) before May 5.

#### Student Employment

The Department of Manpower and Immigration. Manpower Division, in co-operation with the University, maintains a year-round Canada Manpower Centre on campus.(Student Union Building, Dalhousie). This is done to assist students in obtaining employment.

All students wishing assistance in obtaining part-time and summer work, or graduates seeking permanent employment, are urged to contact the Canada Manpower Centre early in the academic year.

There are opportunities for students to earn part of their college expenses by working in the Library, Gymnasium and Dining Hall.

#### Student Counselling Service

Students worried or anxious about any matter, whether a personal or learning problem, are invited to visit the Student Counselling Services Centre at Dalhousie, fourth floor of the Student Union Building, Counsellors with broad experience in solving personal problems offer a free confidential service to students.

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The student body has an academic committee which arranges tutorial services for students.

#### University Health Service

The university operates a health service and a small in-patient infirmary.

Further specialist services in a fully accredited medical centre are available when indicated.

#### Medical Care — Hospital Insurance

Students must be able to provide proof that they are properly enrolled in any Hospital-Medicare scheme in their home province in order to qualify for service. This applies particularly to residents of any province requiring a premium for Medicare Insurance.

Canadian students remaining in Nova Scotia less than twelve months have their hospitalization paid by their home province. For residents of Saskatchewan and Ontario (and any other provinces with similar regulations) this requires that the student's premium for hospitalization Medicare be paid.

Non-Canadian students who have resided in Nova Scotia for more than three months and show intention of remaining more than twelve months are regarded as residents of Nova Scotia and hence qualify for hospitalization and treatment by a doctor of their choice under Medical Services Insurance,

#### Registration Requirements

1. All students registering for the first time at the University are required to submit a certificate of health. This requires a physical examination by the student's personal physician and his completion of a Student History form provided by the University Health Service to each applicant.

2. All returning students are required to complete an annual medical questionnaire at the time of registration. Those who have been out for a year or more for any reason are required to submit a medical questionnaire, as above.

3. Other examinations may be required of all students who are found on admission to be in low medical category, and also of students participating in major sports.

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.

#### **Tuberculin Tests**

The tuberculin tests and reading is a requirement for registration for all students attending Dalhousie-Kings for the first time and all students returning to the university after an absence of one or more years.

Those who do not complete this requirement will not be fully registered and will be required to pay the fee for late registration.

The effectiveness of such precautionary measures is reduced very considerably unless every student included in the testing programme is tested. The co-operation of students in this simple and harmless test is vital to the welfare of the entire student body.

#### **Emergency Treatment**

In the event of a medical emergency students should telephone the University Health Service. 424-2171.

#### Other Services

Further services or requirements may be announced at the time of registration.

The University Health Service does not provide the following:

- (a) Medical or Surgical care other than that provided by, or arranged through, the University Health Service.
- (b) X-ray or Laboratory service, except as authorized by the University Health Service.
- (c) Medications. (Prescriptions, drugs etc.)
- (d) Dental treatment.

(e) Treatment for illness attributable to mis-

(f) Eveglasses and examinations for same.

The University Health Service will not pay accounts for hospital or medical service, including x-ray, laboratory service, rendered off-campus except in emergency cases or where prior approval was received.

#### Prescriptions

Medications prescribed by Health Service physicians or consultants to whom the student is referred by the Health Service are paid by a prepaid drug plan operated by the Student Union. All other prescriptions are at the student's expense.

#### Health and Physical Education

All students in their first year of attendance at the University are encouraged to participate in some form of physical activity. Activities offered include field hockey, basketball, fencing, soccer, badminton, volleyball, swimming and hockey.

#### Chaplaincy Service

Chaplains, representing Anglican, Baptist, United, Lutheran, Presbyterian, Roman Catholic and Jewish faiths, are on the campus. The office is located in the Dalhousie Student Union Building. All chaplains are available by phone 24 hours a day.

#### Canadian Armed Forces

#### **Subsidization Plans**

The Regular Officer Training Plan (ROTP),

Medical Officer Training Plan (MOTP) and the Dental Officer Training Plan (DOTP) are conpletely subsidized university plans coveris tuition, books, medical services, monthly b and summer employment for up to four ve of undergraduate study. Successful applicar serve as commissioned officers in the Canadia Armed Forces for varying compulsory perio after graduation.

For further information on above plans, dents should inquire at the

Canadian Forces Recruiting and Selection I Sir John Thompson Building, 1256 Barrington St., Halifax, N.S.

Phone: 422-5956 or 423-6945.

#### Primary Reserve

Reserve Officer University Training undergraduates to prepare themselves for promotion to commissioned rank in the Resen required with your application. The Officer Cadets enrolled receive pay 16 weeks during the summer.

For further information contact the Comma ing Officer of your nearest Reserve unit,

## Children of War Dead (Education

able to military service. Enquiries should directed to the nearest District office of th (2) You must be in, or have completed, your Department of Veterans' Affairs.

## **Admissions and Programmes:**

## Faculty of Arts and Science

Admission from Canadian High Schools

If you wish to be admitted to the Faculty of Arts and Science you must arrange to send a completed application form (available either from your high School or from the Registrar's Office) as soon as possible after January 1. You should also ask your school Principal or Guidance Counsellor to send a High School Record Transcript, showing academic standing.

You must ensure that copies of the following documents are sent to the Registrar's Office:

(1) A certified transcript of Nova Scotia Grade XI high school marks or their equivalent, or the (ROUTP) provides an opportunity for selecte Grade XI Provincial examination certificate; one or the other of these documents are

Component of the Canadian Armed Force (2) Evidence of your completion of Nova Scotia Grade XII, or its equivalent, in the form training of up to 15 days during the year an either of a Provincial examination certificate, or of a Principal's report. (This should be sent to the Registrar's Office by Aug. 15th.); and

(3) A copy of your scores in either the SACU or the CEEB test.

#### **Admission Requirements**

(1) Completion of final Provincial, or local high school, examinations in the University Children of War Dead (Education Assistant Preparatory Programme for Nova Scotia Grade Act) provides fees and monthly allowances fe XI, or its equivalent, with a mark of at least children of veterans whose death was attribu 50% in each of five subjects including English;

> Senior Matriculation year (Nova Scotia University Preparatory Programme in Grade XII or its equivalent). For equivalents see below under Equivalent Certificates of Matriculation.

> You can then be admitted under any one of the following provisions:

> a) if after your mid-year examinations you have an average of 70%, with no failures, in five

> b) if after your Easter examinations, you have an average of 70%, with no failures, in five subjects; or

> c) if after you have completed your final Grade XII high school examinations, or their equivalent, in June, you have an average of 60%, with no failures, in five subjects; or

> d) if after you have completed Province of Nova Scotia Grade XII examinations, or their equivalent, you have an average of 60%, with no failures, in five subjects; or

> e) if having completed Province of Nova Scotia Grade XII examinations, or their equivalent, you can show that you are eligible for a total of seven (7) points calculated on the following

Mathematics, English, and any one other recognized language - 2 points each; any other recognized subject (at present biology, chemistry, economics, geography, geology, history, physics, and any additional recognized language) - 1 point each. A grade of at least 50% is required for point allocation, with an average of at least 60% in the subjects offered.

If you are admitted under either of the provisions, (a) or (b) above, you must have completed your Senior Matriculation year before you may enter the University.

#### Special Cases

The University will consider for admission students who are lacking the normal high school preparation, provided that the applicant can show (by his record, in interviews, perhaps by additional tests) that his qualifications in other respects are acceptable.

#### **Recommended Preparation for Admission**

The *minimum* entrance requirements for admission to the Faculty have been stated above. However, you will have a wider choice of university programme as your interests develop if, in Grade XI and XII, you choose Mathematics, English and at least one other language. If you lack preparation in any of these three subjects, you may find yourself cut off from certain programmes at Dalhousie-King's, unless you take extra time to make up your deficiencies. In this connection, you should pay particular attention to the detailed suggestions to be found in those sections of the Calendar which describe the course offered by individual departments.

If you are in any doubt about the suitability of your high school programme as a preparation for the work which you plan to do at Dalhousie-King's, you are advised to consult with your Guidance Counsellor or with the Admissions Officer.

#### Admission of Students Educated Outside Canada

If you wish to be admitted to the Faculty of Arts and Science and your native language is not English, you must take the English Language test of the University of Michigan. These tests are administered locally throughout the world. You can arrange for the test to be given to you by writing to the English Language Institute, Testing and Certification, University of Michigan, Ann Arbor, Michigan, U.S.A.

#### Admission requirements

If you have academic qualifications which are accepted as equivalent to the Nova Scotia Matriculation, you may be admitted to the first year of a degree programme in the Faculty of Arts and Science. For equivalents see below.

Equivalent Certificates of Matriculation and Records of Marks

For purposes of consideration for admission, official certificates and records of marks at the completion of the following levels are considered as Senior Matriculation:

### Atlantic Provinces of Canada

Nova Scotia Grade XII

#### New Brunswick

The former Grade XIII; or first year of a university or Junior College, which admits students from New Brunswick, Grade XII (but

#### New foundland

First year Memorial University

#### Prince Edward Island

First year the University of Prince Edward Island (but see below).

Although the Grade XII certificates from New Brunswick and Prince Edward Island are classified as equivalent to Nova Scotia Grade XI, students from these Provinces with consistent averages above 80% may be considered for admission provided they have passes in five subjects including English.

#### Other Canadian Provinces

McGill Senior Matriculation; or Senior High School Leaving Certificate; or C.E.G.E.P. Diplôme d'études Collégiales,

Grade XIII (Secondary School Honour Graduation Diploma)

Manitoba; Alberta; Saskatchewan Grade XII

#### British Columbia

The former grade XIII; or first year of a university or Junior College which admits students from the British Columbia Grade XII.

#### United States

First year university standing (minimum of 30 semester hours) from accredited institutions of higher learning; standing in Mathematics and English will be important considerations for admission. A United States high school graduation diploma alone will not admit a candidate to any course, but consideration may be given to exceptionally well-qualified students on the basis of high CEEB scores or advanced place-

#### UK: West Indies: West Africa

G.C.E. with standing in at least five subjects, of which at least two must be passed at Advanced level; or four subjects, of which three must be at least at Ordinary level.

#### Hong Kong

G.C.E. as above or University of Hong Kong Matriculation Certificate on the same basis as G.C.E.

#### India and Pakistan

Bachelor's degree with first or second class standing from an approved university or, in certain circumstances, first class standing in the Intermediate examinations in Arts and Science; provided that the Candidate has passes at the university in English, mathematics and a language other than English. (It should be noted that this is the requirement for entry to the first-year course in Arts and Science and will not qualify for admission to the sequential B.Ed. year.)

#### Admission and Transfer from Other Colleges or Universities

If you have attended a recognized Junior College and can present satisfactory certificates, you may be granted Senior Matriculation standing for the work of the appropriate grade. For work beyond this level you may receive credit on admission for a maximum of five equivalent classes. This means that you can complete the requirement for a general degree in two years or an honours degree in three years. This recognition is regularly offered to the Convent of the Sacred Heart in Halifax, to the Nova Scotia Teacher's College in Truro, and to the Nova Scotia Agricultural College.

If you were admitted to another recognized university from the Iunior Matriculation level and are in good standing at that university, you may present *five* appropriate university credits in lieu of Senior Matriculation subjects in order to meet the entrance requirements for admission to the first year of study. If you have more than five university credits, you may surrender five for matriculation purposes and retain credit for other appropriate classes in accordance with regulations set out below.

If you were admitted to another recognized Note: Students from the United Kingdom and university from the Senior Matriculation level

passed at Advanced level. English is imperative and are in good standing, you may be admitted to Dalhousie-King's and may retain credit for appropriate classes in accordance with regulations below.

#### Regulations

- 1. If you have attended another university you will not be admitted if, on academic grounds, you are ineligible for re-admission to that university.
- 2. No transfer credit will be given for any class for which you obtained a grade less than C or for any class which was not credited to you unconditionally.
- 3. You must undertake all or most of the advanced work of your course at Dalhousie-King's. This must include at least five classes, of which at least three are in your area of specialization (classes which are normally taken in the second and subsequent years of study).
- 4. If you are enrolled in an honours programme you must attend Dalhousie-King's as a full-time student in your last two years unless the Committee on Studies gives you special permission for this requirement to be waived.
- 5. No class taken elsewhere shall be counted toward fulfilling the concentration requirement of the general bachelor's degree or the principle subject requirement of an honours programme without approval from the individual Dalhousie departments concerned.
- 6. You may receive transfer credit only for classes equivalent to those offered at Dalhousie-King's and only in subjects normally recognized as having standing in a faculty of arts and

Application Procedure for Transfer Students and for Students Educated Outside Canada

Deadlines for Receipt of Applications For admission from Canada and from the

For admission from all other countries: May 1.

the West Indies who write qualifying G.C.E.

examinations in June may request delaw consideration if they can ensure that the examination results can be made available the Admissions Office by August 21; otherw the May 1 deadline must apply.

For transfer credit: July 1.

Documents to be Submitted

- 1. a completed application form; the form  $_{\rm W}$  King's offers 4 Programmes of Study leading to be sent to you by the Admissions Office degrees in Arts and Science.
- 2. a completed high school principal's repo B.A. (Honours) four years form, (or our high school record-transcr which will be sent to you on request by Admissions Office.)
- 3. official academic transcripts (or certification) copies) from all colleges and universities
- 4. a copy of the calendar of all colleges a universities attended, in which each of classes you have taken has been clearly marke
- 5. SACU or CEEB scores. (See below).

Records of other tests, as well as letters personal and academic reference, can also helpful in the consideration of application from students educated abroad.

Note: if an original certificate is in a language other than English or French, a translation is one of these languages should accompany

Objective Tests (SACU and CEEB)

SACU scores are normally required from tests from all other applicants.

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## **Programmes of Study**

B.Sc. (General) three years B.Sc. (Honours) four years

King's provides an alternative to the ordinary B.A. first year programme which is identical for general and honours students.

The ordinary first year programme consists of 5 classes and students are required to choose one from each of three of the groups A, B, C, D.

The King's alternative first year programme, The Foundation Year Programme, which is a first year B.A. Programme for both general and honours students, consists of the Foundation Year Course together with one other introduc-

Further specification of the degree programmes is to be found on pages 10-12.

## **Foundation Year Programme**

#### Introduction

Canadian applicants for admission, and resul The University of King's College, in association from SACU, CEEB, or equivalent objects with Dalhousie University, will offer a special Foundation Year programme beginning in the academic session 1972/73. This programme is No one who meets the admission requirement designed for entering first year students who described in the foregoing will be refuse are interested in pursuing studies in the admission because his or her SACU or CEB Humanities and Social Sciences leading to the scores are low. On the other hand, if your he B.A. degree, but without disciplinary or subject

FACULTY OF ARTS AND

B.A. (General) three years

SCIENCE

scores, taken together with your high scholled programme of studies focusing attention on the development of institutions and ideas in the Western world which have been crucial for the development of the present day world views prevailing in western societies. It is intended that students will derive from the course a general but comprehensive picture of the events and movements leading up to the present day, such that they are better able to understand their own heritages and positions.

> The instructors in the programme are specialists in a wide variety of university subjects. All take the view, however, that first year study at university can profitably be devoted to attempts to integrate knowledge and understanding rather than to premature specialization in particular subjects. On the basis of the integrated view which a student can develop in

the Foundation Programme, choice of greater specialization for subsequent years at university may be more reasonably made.

Admission Requirements to the Foundation Year Programme

The admission requirements are those pertaining in the Faculty of Arts and Science in

#### **Teaching Staff**

J. P. Atherton, M.A. (Oxon). Associate Professor of Classics. R. D. Crouse, B.A. (Vind.), S.T.B. (Harvard), M.Th. (Trinity), Ph.D. (Harvard), Associate Professor of Classics. H. V. Gamberg, B.A. (Brandeis), Ph.D. (Prince-

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Associate Professor of History. D. H. Steffen, Ph.D. (Goettingen). Associate Professor of German.

J. Stolzman, B.A. (Oregon), M.S. (Florida), Ph.D. (Oregon). Assistant Professor of Sociology.

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In addition occasional lectures will be given by invited speakers. Most seminars and discussion groups will be led by junior fellows of the University.

Programme Teaching, Grading and Credit

The programme is to be regarded as a complete unit. It will not be possible for students to enrol in only part of the course. Evaluation of students' performances will be by means of continuous evaluation through the course of essays and other devices, the final grade to be given being a composite of all evaluations. Final grading will be the result of discussion among all those teachers who have had grading at least at Ordinary level.

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G.C.E. as above or University of Hong Kong Matriculation Certificate on the same basis as  $G \subset E$ 

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## Foundation Year Programme

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SCIENCE

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In addition occasional lectures will be given by invited speakers. Most seminars and discussion groups will be led by junior fellows of the University.

Programme Teaching, Grading and Credit

The programme is to be regarded as a complete unit. It will not be possible for students to enrol in only part of the course. Evaluation of students' performances will be by means of continuous evaluation through the course of essays and other devices, the final grade to be given being a composite of all evaluations. Final grading will be the result of discussion among all those teachers who have had grading of Arts and Science.

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responsibilities throughout the year. There will be no examinations. Grading will be done in terms of the letter grade system of the Faculty

The programme will be conducted in such a way that students will spend approximately equal amounts of time in lecture sessions and seminar/tutorial sessions. Lecture hours will be M.W.F. at 9:30 a.m. and T.Th. at 10:30 a.m. The times of the seminar/tutorial sessions will be arranged.

Successful completion of the Programme will result in the student attaining four credits towards the degree for which he is enrolled.

In addition to enrolment in the Foundation Year Programme the student will enrol in one introductory level course drawn from those listed in the departments of the Faculty of Arts

Upon successful completion of the Programme the normal departmental requirement of passing an introductory course in the discipline concerned is waived by the following depart-

Classics (except in the case of courses in the classical languages)

English Language and Literature

German (except in the case of courses in language)

History

Political Science

Sociology (except for courses in Anthropology)

In addition the following departmental provisions have been established:

#### Economics:

Programme is regarded as adequate prerequisite for upper year courses in Economics for which Economics 100 is not a prerequisite

(b) students intending to enrol in Economics courses for which Economics 100 is a prerequisite must have passed Economics 100A, (the requirement of Economics 100B being waived)

German: successful completion of the Foundation Programme may be regarded as a substitute for

#### German 221. Philosophy:

successful completion of the Foundation Programme may be regarded as a substitute for Philosophy 230.

For general regulations relating to degrees and courses other than those specifically related to the Foundation Year Programme see the relevant sections of this Calendar.

Outline of the Foundation Year Pro-

The course is to be seen as an integrated rather than interdisciplinary one. The attempt to achieve integration is made in two major respects: by the fact that it treats matters in a historically developmental fashion, and by the consideration of similar institutions, ideas and movements in each of the historical periods.

The following are the "teaching units" of the

- 1. The Ancient World: The origin of the primary institutions and beliefs of the western world in Greece, Rome and Israel, Coordinator: Mr. Atherton,
- (a) successful completion of the Foundation 2. The Medieval World: the formation of

Christendom and the modern European tra tion. Co-ordinator: Mr. Hankey.

Unit 1

- 3. The Reformation and Renaissance: he nings of the modern world and the emerge of the nations, Co-ordinator: Mr. Hankey.
- 4. The Age of Reason: the enlightenm romanticism and revolution. Co-ordinator:
- 5. The Triumph of the Bourgeoisie: Bourge culture from Marx to the collapse in World I. Co-ordinator: Mr. Morgan.
- 6. The Contemporary World: from the dec of the European order to contemporary inc trial culture. Co-ordinator: Mr. Gamberg.

The following are the recurring general to which are discussed in each of the "units' outlined above.

- a) Outline of historical events.
- b) Political institutions and the modes
- c) Predominant theological and philosoph
- d) Scientific thinking and the age.
- e) Economic institutions.
- f) The structure of society.
- g) Literary, musical and artistic expression the age.

Gramophone recitals and film showings will an integral feature of the course to demonstr changes in musical and artistic expression,

There follows a synopsis of the course show the relation of the above general topics and

Literature

and Music

and Art

be Historical ge Outline	From the Iliad to the beginnings of Christianity	From the "Dark Ages" to "the Waning of the Middle Ages:" circa 1500 A.D.	From the end of the Middle Ages to circa 1650	The "Age of Reason" from c. 1650 to 1815	From French Revolution to the First World War	From the First World War to the present
Political Political Institutions  d la ecli	The City State, Democracy, The Roman Empire: Religion and the State	Marauding imperialism, The Holy Roman Empire; feudal kingdoms, Decline of the Papacy	Rise of centralized territorial states. Absolute Monarchies	Absolute Monarchy, enlightened despotism, The English parliament, French Revolution	Revolutions, liberalism, con- servatism, demo- cracy. National- ism.	The problem of democracy Fascism, Socialism. Welfare States, Left and Right.
Philosophy and Theology	The rise of "reason"; The Gods and Society.  Monotheism.	Theology "queen of the sciences." Reason and Faith: Aquinas Realism and Nominalism.	Secularism; mysticism; Chris- tian humanism The Reforma- tion and Pro- testantism. The Counter Refor- mation.	Revealed religion criticized; Deism. Empiric- ism and rational- ism; idealism.	Revival of religion; Sectarianism. Reactions to rationalism. Positivism. Materialism. Evolutionary thought.	The secular age ? Existentialism; individualism. Freudianism.
Scientific Thinking n a	The emergence of the scientific world view.	Abstract Speculation and deductive logic; "qualitative" physics. Alchemy.	Modern conception of science begins: Cartesianism; astronomy. Mathematics and Science.	The public acceptance of Science. The growth of the natural sciences.	Scientific advance and technology. The social "sciences", evolution. Advances on all fronts.	New directions in Physics: the atomic age. Sci- ence and social structure.
owin Economic d # Institutions	Slavery, Imperial Economy	The rise of cities, merchants, guilds. The feudal system: manorial system, fiefdoms.	The growth of capitalism: trade and industry. Decay of feudalism.	Contests for commerce and colonies; the bourgeois revolu- tion. Beginnings of Industrialism.	Industrialism, Capitalism, im- perialism.	Monopoly and Corporate Capitalism Neo- Colonialism; Modernization and The Third World
Structure of Society	Forms in Greek Roman and Jewish Societies.	Feudalism: peas- ants and nobles. The beginnings	Monarchism; the mercantile society and its	Criticism of divine right; republicanism;	Parliamentary democracy; the entrenchment of	Class Societies, and Socialist Societies, Pro-

structure, De-

cline of mon-

archical system.

The Renaissance

and its products:

Baroque art and

speare and Eliza-

music; Shake-

bethan poetry

and drama.

Class societies.

The "neo-

phases of

classical" era.

Baroque, Early

Rococo and

Romanticism.

the bourgeoisie.

Social classes.

Romanticism

ism in art.

Naturalism.

realism; national-

blems of race.

Bureaucracy.

"Alienation"

and the Arts:

and frag-

The Waste Land

Experimentation

mentation. The

inward look and

the prying eye. The Cinema Subjectivity.

of the "middle

Church and Soc-

classes". The

Romanesque:

beginning of

ture; Dante,

Chaucer.

Humanism.

Polyphony. The

"modern" litera-

Gothic.

iety.

Tragic drama

history; social changes and the

writing of

rise of Art

forms.

and society. The

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## **General Faculty Regulations**

Students are subject to changes in regulations and courses made after their first registration unless specifically excused by the Faculty. All enquiries about the regulations hereunder should be made to the Registrar. Enquiries about honours courses should be made to the head of the department concerned.

#### Credits

- 1. Degrees are normally earned by credit given for studies in classes of the Faculty of Arts and Science of Dalhousie University during the regular (September to May) academic year; by exception, credit may be obtained for university-level studies-
- a) during a summer session;
- b) by extension courses:
- c) at other universities attended by the student proir to entrance;
- d) in other Faculties of the University. A student taking classes in another Faculty as part of an affiliated course must conform to the regulations of that Faculty with respect to these classes.
- e) at other institutions while still registered at King's-Dalhousie with special permission of the Committee on Studies, Ordinarily, no student may register at King's-Dalhousie in the same session in which he is taking work in another educational institution. In exceptional circumstances the Committee on Studies may permit deviations from this regulation. Details of the regulations governing credits earned in these ways are given below.

#### Late Registration

Students who do not register on the proper day are warned that they may not be able to obtain places in some classes.

#### Classes in the Faculty of Arts and Science

#### Admission to Classes

2. No student shall be admitted to a class until he has satisfied the regulations regarding entrance and complied with the General University Regulations.

#### Duration of Undergraduate Studies

3. A student is normally required to complete his undergraduate studies within ten years of his first registration. In special circumstances, for each individual case, the Committee on Studies may grant permission to continue studies beyond this period subject to conditions specified by the Committee.

4. Five classes shall be regarded as constituting a normal year's work for a student, and may not be exceeded without written permission from the Committee on Studies. Such permission will not normally be granted to any

student who is in his first year of study or to any student who, in the preceding academic year, has failed any class or had an average less

- 5. A full-time student registered in this University may, with the permission of the instructor concerned, audit any class in the Faculty of Arts and Science, provided that it is clearly understood that he will not be eligible to write examinations in the class and will not, under any circumstances, be granted credit for it.
- 6. A student possessing advanced knowledge of a subject, which he has acquired otherwise than at a university, will be encouraged to begin his studies in that subject at a level appropriate to his knowledge, as determined by the department concerned, and will be exempted from any classes which are normally prerequisites for the one to which he is admitted. However, the student must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e. he must complete at the University the full number of classes required for a general or an honours

- 7. In order that his class work may be recognized as qualifying for a degree or diploma, a student must meet the regulations for the degree or diploma concerned, and conform to the following requirements:
- a) he must appear at all examinations, prepare Failed Year such essays, exercises, reports, etc. as may be prescribed and, in a class involving field or laboratory work, complete such work satis-
- b) he must have settled all obligations to the University with respect to tuition and residence fees, bookstore debts, library fines, etc. (not later than April 30 for Spring Convocations).
- 8. When the work of a student becomes unsatifactory his case will be discussed by the Committee on Studies which may require him to withdraw from the class or classes concerned and to be excluded from the relevant examina-
- 9. In determining pass lists, the standings attained in prescribed class exercises, in field or laboratory work, and in various examinations, are taken into consideration. A student who fails to abtain a pass mark on the work of the session in any class shall lose credit for attendance in that class and can gain credit only by repeating it.

#### Sessional and Class Examinations

10. a) In all classes, covering two terms, examinations are conducted or other forms of assessment are made; at the end of the first term before the December vacation; and the Spring, after the close of lectures in the Spring Other examinations, etc. in any class may held at dates appointed by the instructor. papers set at the Spring examination in subject cover the work of the whole session that subject, and not merely the work of second term, and approximately 25% of questions will be set on the work covers before December examinations.

- b) Within four weeks after the beginning each term the departmental Chairman m report to the Registrar the method of evaltion to be used by each Instructor in each class The system of grading is A+, A, A-, B+, B, R C, D, F/M, F.
- assessment are made at the end of the term work of any one year. either before the December vacation for fin term half-classes or after the close of lectures i 21. The supplemental examination may, at the the Spring for second-term half-classes.
- proficiency in the first term may be advised t withdraw from the University for the remainde of the session or to reduce the number of classes he is taking.
- 13. Application for re-marking of examination 23. No supplemental examinations are allowed must be made to the Registrar within the for classes taken at the Summer School. months of the date of the examination.

- 14. A student is considered to have failed gistered, unless:
- a) the year is the first he has spent at an university, when passes in only two classes
- b) he is a part-time student, when he must pas one week from the date of the examination. at least one half-class.

passed or failed his year.

- first occasion is required to reapply to the must apply by July 10th. Faculty for consideration for readmission.
- 16. A student who fails a year on two Summer School and Extension Classes occasions will be ineligible to return to t University as either a full-time or a part-time 27. Up to five credits from Summer School other very exceptional circumstances.

considered if a medical certificate from physician attending the student is submitted ! the Registrar at the time of illness.

Supplemental and Special Examinations

- 17. A student may be permitted to write a supplemental examination in one class in which he failed if:
- ne lanco...
  a) he has otherwise fulfilled the requirements for class work (see above);
- b) he has obtained a mark of not less than 40% (or F/M grade) in the final examination in that
- c) he has not failed his year (see above).
- 18. The supplemental examination must be written in the August immediately following the failure. It may not be deferred.
- 19 A student who fails to pass the supplemental examination can obtain credit for that class only by repeating it.
- 11. In half-classes occupying one term, exam 20. No more than one supplemental examinainations are conducted or other forms a tion may be written by any student on the
- discretion of the department concerned, constitute the same proportion of the final mark as 12. Any student who has not shown reasonable did the Spring examination in the original class.
  - 22. No student may write both a supplemental examination and an examination at the end of the Summer School in the same class in the same year.

  - 24. No more than five passes obtained as a result of supplemental examinations may be counted towards a degree.
- year if he passes fewer that three of the full (a 25. Special examinations may be granted to their equivalent) classes for which he is restudents in case of genuine illness, supported by medical certificate, or in other unusual or exceptional circumstances. Medical certificates must be submitted at the time of the illness and will normally not be accepted after a lapse of
- 26. A student wishing to appear as a candidate The results reported in the pass lists of the at a supplemental or special examination shall academic year determine whether a student ha be required to give notice of his intention to the Registrar's Office at Dalhousie on or before July 10, the fee to be remitted with the notice. 15. A student who has failed his year for the Students wishing to write at outside centres

student. An appeal against the application of and correspondence classes may be accepted this rule may be addressed to the Committee of towards the requirements for a degree, not Studies but will be allowed only if illness he more than two of them by correspondence. seriously interrupted the student's studies, or Such classes must have been passed at an adequate level and can be accepted only if they are closely equivalent in content to classes An appeal on the grounds of illness will only in normally given at Dalhousie-King's.

28. No student may take classes totalling more Degrees than one full credit in any one Summer School session. Not more than two full credits can be obtained at Summer School in any one academic year.

Exceptions will normally be granted by the Committee on Studies only in respect of attendance at a university which operates a trimester system or its equivalent.

In all cases, permission must be obtained in advance, following the procedure detailed

- 29. A student wishing to take, at a university other than Dalhousie, a Summer School class to be counted for credit towards a Dalhousie degree must:
- a) obtain an application form from the Office of the Registrar at Dalhousie University;
- b) obtain from the university he proposes to attend a full description of the Summer School classes (or alternative classes) he wishes to take; usually the Summer School Calendar will
- c) make application to the Registrar of Dalhousie University and submit the class description of the class he wishes to take (alternatives should be indicated where possible).

When a decision has been reached, the student will be notified directly by the Registrar. If the decision is favourable, the receiving university will be so advised by the Registrar's Office.

Similar regulations relate to correspondence classes and, at the present time, only the correspondence classes offered by Queen's University, Kingston, Ontario will be con-

Students should make application for Summer School as early as possible in order that they may make necessary arrangements and obtain a list of the text-books required.

#### Transfer Credits

- 30. Upon receipt of an application for admission to this University, and an official transcript students will be advised of the number of credits which may be transferred from another university. However, provisional assessment can be made on interim transcripts.
- 31. A student transferring from another university to a programme leading to a general degree at Dalhousie must take the equivalent of at least five full classes at Dalhousie of which at least three are classes at the 200 level or

A student enrolled in an honours programme must attend Dalhousie as a full-time student in his final two years unless the Committee on Studies gives special permission for this requirement to be waived.

Minimum Standing for a General Degree

32. In order to qualify for the award of a general degree, candidates must have obtained no more than four credits with a D grade in the fifteen classes required.

Minimum Standing for an Honours Degree

33. Students in honours courses are expected to maintain a performance satisfactory to the Department involved in each year of study and, if they fail to do so, may be required by the Committee on Studies to transfer to a general

Counting of classes toward two undergraduate

- 34. A student who holds one undergraduate degree (B.A., B.Sc., or B.Com.) and who wishes to gain a second undergraduate degree must fulfill the requirements of the second degree and the following:
- a) only classes that are applicable to the course for the second degree may be counted for
- b) each class carried forward must bear a grade of C or higher;
- c) a minimum of six new classes must be taken. Of these, four must be taken in the area of concentration.

#### Change of Registration

Changing a Course or Class

35. Class changes will not be permitted during the first week after commencement of classes in

- 36. The last date, for adding a class is one month from the commencement of the term in which that class is given. Students must complete the appropriate registration change form which must be approved by the instructors of the class concerned and by the
- 37. The last date for withdrawing from a class is one month from the commencement of the term in which that class is given. Students must complete the appropriate registration change form which must be approved by the instructors of the class concerned and by the
- 38. A registered student who wishes to withdraw from the University, or one who wishes to change from full-time to part-time status, must write to the Registrar explaining his circumstances. In either case, the student should not discontinue attendance at any class until his application has been approved. A student proposing withdrawal will normally be invited to discuss his situation with the Dean or the Assistant Dean of Student Services.

## **Faculty of Divinity**

#### Requirements for Entrance to Divinity Courses

The basic Divinity degree course is normally a post-graduate programme regulated by the Senate of the Atlantic School of Theology. Students may take Divinity classes without being committed to ordination, either on the part of themselves or the Faculty.

Non-graduates who have university matriculation may, on the recommendation of a Bishop, be admitted to the basic Divinity course. Before embarking on the course they will be required to complete a probationary programme of one or two years depending on their standard of matriculation, provided always that five university credits or their equivalents be completed. On satisfactory completion of the basic programme in Divinity they will be granted the Bachelor of Theology (B.Th.). This provision is intended for older men. Only in exceptional circumstances will it be allowed to enrol under the age of twenty-five.

#### Master of Divinity (M.Div.)

This degree is awarded to those who already hold a bachelor's degree on entering the Divinity School. The course consists of the basic programme of the Divinity School, (the choice of electives being approved by the Divinity Faculty), passed with an overall average of at least 65%, which must be maintained each year.

#### Master of Sacred Theology (M.S.T.)

In conjunction with the Institute of Pastoral Training, the University of King's College now offers the degree of Master of Sacred Theology in the field of pastoral care. Particulars concerning regulations for this degree may be obtained from the Executive Director of the Institute of Pastoral Training at the University of King's College. A degree in Divinity is a prerequisite.

A student who has passed not fewer than two-thirds of the required courses of the basic programme may be awarded the Testamur.

#### Diploma of Associate of King's College (Nova Scotia) (A.K.C. (N.S.))

The University of King's College has established the diploma of Associate of King's College (Nova Scotia), A.K.C., (N.S.), to encourage further study for those persons who are not eligible for the B.D. It combines extramural and intramural work, and now includes Pastoralia. Particulars concerning regulations for this diploma may be had upon application to the

#### Bachelor of Divinity (B.D.)

Students who have received the M.Div. B.S. Litt., or B.S.T., and graduate students who have qualified for the L.Th. may proceed to the final examination for the extramural degree of B.D. under the General Synod Board of Examiners, By agreement among all Anglican Theological Colleges in Canada, the Degree of Bachelor of Divinity is now awarded only by examination by the Board of Examiners of General Synod. Particulars concerning regulations for this Degree may be had upon application to the Registrar.

#### Associate in Theology (A.Th.)

By arrangement among all Anglican Theological Colleges in Canada, the Title of Associate in Theology is now awarded only by examination by the Board of Examiners of General Synod. Particulars (concerning regulations for this Title) may be had upon application to the Registrar.

#### Medical Examination

For all candidates for ordination a medical examination by the General Synod physician is required during their first year in Divinity. It is the responsibility of the student to make the necessary arrangements with the Diocesan Office at the earliest opportunity.

### **Supplemental Examinations**

No student may write more than three supple-

mental examinations in one year, the records pass mark for which is 50%.

### The Divinity Curriculum

In association with the Atlantic School Theology, the curriculum of the Divini School is carefully designed to cover essential tenets of the Christian Faith. origins and history, and its application in life of the twentieth-century.

In most cases, the curriculum followed by individual student will be mapped out a result of consultation between that student a King's Divinity Faculty. It will draw as an propriate on the resources of the Atlanti-School of Theology, supplementing these and if required for specific goals of the student for example full-time ministry, ordained otherwise, in the Anglican Church of Canada Such supplementary studies or training normally be recognized for credit by ments of the School.

Details of the basic course requirements offerings of the Atlantic School of Theolog Correctional Center, Springhill. are given in a bulletin published separately, a available from the School or from King Registrar on request.

### PARISH TRAINING

All students who are candidates for ordinat are expected to undertake some Sunday sponsibilities, and may participate in the annu-"Parish Training School" arranged by Pastoral Committee of the Diocese of No Scotia as a help for students going to summe of Pastoralia shares in the overall direction this Parish Training Programme which is grade ship with other helping professions. to the student's capabilities and is not onero The School takes place between the end Spring Examinations and graduation week.

University of King's College Atlantic School of Theology Acadia Divinity College Medical Faculty of Dalhousie University

The organization of the Institute in collaboration with Pine Hill Divinity Hall, the Divinity School of Acadia University, Presbyterian College, Montreal, Medical Faculty of Dal housie University, pioneered this modern development in Theological education on the Canadian scene. It is the objective of the Institute to bring pastors and theological students face to face with human misery as it exists both in and out of institutions, through courses in Clinical Pastoral Education in both general and mental hospitals, reformatories and invenile courts, homes for the aged, alcoholism treatment centers, and other social agencies. In this connection, the Institute now sponsors six-week courses in Clinical Pastoral Education. usually commencing mid May, at the Nova Atlantic School of Theology and not constitut Scotia Hospital, Dartmouth (mental), the Nova an additional burden on top of the requir Scotia Sanatorium, Kentville, the Victoria General Hospital, Halifax, the New Brunswick Provincial Hospital in Lancaster, King's County an Hospital, Waterville, and Springhill Medium

While the above mentioned courses aim primarily at increasing the pastoral competence of the parish minister or church worker, students of particular aptitude and interest can be guided in further theological training to become qualified teachers of these subjects in theological courses, directors of Clinical Training Courses, and institutional chaplains; also, in certain cases, to become experts in particular specified fields, such as ministering to work in rural or mission parishes. The Profess the mentally ill or alcoholics, where the church may have a significant role to play in partner-

### **Institute of Pastoral Training**

A recent development in this field was the formal constitution in December 1965 of "The Canadian Council for Supervised Pastoral Education", which seeks to co-ordinate training across Canada, establishing and maintaining high standards, accrediting training courses, and certifying supervisors. The Institute of Pastoral Training has links with the Council, its Executive Director served as President of the Council and as a member of the Board of Directors, and two members of its Executive serving on the Council's Committee on Accreditation and Certification, Professor R. J. R. Stokoe of King's College, who has directed the six-weeks course at the Nova Scotia Hospital, Dartmouth, and now directs courses at the V.G. Hospital, has been certified as a Chaplain Supervisor, by the Canadian Council and also by the Association for Clinical Pastoral Education in the United States.

Other goals of the Institute include the production of teaching materials, the promotion of workshops, and the establishment of a first class library and reference center at the Institute office.

A number of one-day and four-day workshops have already been held in various localities in the Maritimes, and information as to what is involved in setting one of these up may be obtained from the Secretary of the Institute.

All enquiries concerning courses offered should be addressed direct to the Secretary of the Institute, the Reverend Howard H. Taylor, University of King's College, Halifax, N.S. Board and lodging can usually be arranged, and some bursary assistance is forthcoming, Academic credit is given by certain Canadian and American colleges, including the Atlantic School of Theology, for satisfactory completion of any of the courses offered. Applications to attend the courses from bona fide enquirers belonging to other professions are -welcomed, and receive equal consideration.

## **Extension Department**

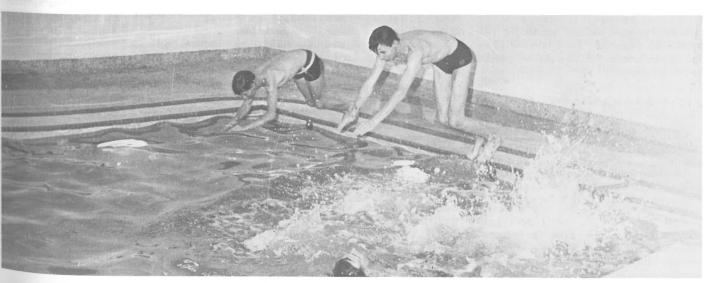
Extension courses are given in the evenings at the University of King's College and cover subject material in Public Relations and Journalism. The Public Relations course is offered annually, and Journalism is given every other year. Both of these are full term courses, but they are not for credit as academic requirements are waived, making the study programmes available for citizens in the community as well as for registered students. Courses commence in October of each year.

#### 1972-73 Courses

## PUBLIC RELATIONS (A Survey of the Entire

These lectures attempt a practical application of the theory of communications. Subjects discussed include: History and Philosophy of Public Relations, communications research (persuasion and public opinion), interpretation of problems, planning and action evaluation, improving PR standards, image, language of public relations, the publics (shareholders, employees, customers, the community), PR for business and industry, utilities, welfare agencies, churches, schools, government; technique of communications (mass media, printed and spoken word, films, speeches, displays, advertising), case histories, Seminar discussions include letter writing, human conflicts and

JOURNALISM (A Survey of the Entire Field) These lectures attempt a practical application of journalistic theory and mechanics. Subjects discussed include: Canons of journalistic practice, newspaper organization, ethical standards, physical aspects of a newspaper, beginnings of journalism, editorial policies, new mechanical devices, nature of news (what people read), gathering news, reporting techniques, art of news writing in various categories (civic, social, labor, accidents, science, education, crime, business and industry, sports, etc.), editing the



## Scholarships, Prizes and Bursaries

Any scholarship winner who can afford to do so is invited to give up all or part of the money awarded. He will still be styled the winner of the Scholarship during its tenure, This arrangement increases the values of the Scholarships Funds, as it enables other students of scholarly attainments to attend the University.

All Scholarships, Prizes and Bursaries, except awards to Graduating Students, will be credited to the student's account and not paid in cash.

Application for scholarship and bursaries should be made to the Registrar.

In order to retain scholarships tenable for more than one year, an average of 65% must be made each year, with no failing mark in any subject.

#### Arts and Science

#### A. Entrance Scholarships

Dr. W. Bruce Almon Scholarship - \$1500 a year. Established by the will of Susanna Weston Arrow Almon, this scholarship is open to a student entering the University of King's College and proceeding to the degree of Doctor of Medicine at Dalhousie University. It is renewable yearly provided that the student maintains a first class average, and lives in residence each year until the regulations of Dalhousie Medical School require otherwise.

By the terms of the will preference is given to a descendant of Dr. William Johnstone Almon.

Susanna Almon Scholarships - \$750 a year. Established by the University from the legacy of Susanna Weston Arrow Almon, these scholarships are tenable for four years from Grade XII.

Chancellors' Scholarships - \$500 a year. Established originally through the generosity of the Hon, Ray Lawson, O.B.E., LL.D., D.C.L., former Chancellor of the University, and continued by succeeding Chancellors, these scholarships are open to students of the Atlantic Provinces, and are tenable for four vears from Grade XII. The holders of Chancellors Scholarships will normally be required to live in residence.

King's Foundation Scholarships - \$350 a year. Established by the Board of Governors, these scholarships are tenable for four years from Grade XII.

Halifax-Dartmouth Scholarships - \$300. An entrance scholarship for students entering the University from the Halifax-Dartmouth area.

King's College Bursaries - \$100. The University offers a limited number of bursaries of \$100 to entering students of satisfactory academic standing and in need of financial assistance.

Alumni "Annual Giving" Scholarships - \$600. Established by the Alumni Association, these scholarships are intended for entering students. but consideration will be given to applications from students who are already members of the College and who are in good academic standing. The holders of Alumni "Annual Giving" Scholarships will normally be required to live in

Margaret and Wallace Towers Bursary - \$600 a Year, Established by Dr. Donald R. Towers, an alumnus of King's, in memory of his mother and father. This bursary, tenable for four years from Grade XII, is open to a student of high academic standing entering the University to study Arts and Science and who is a resident, or a descendant of residents, of Charlotte County, New Brunswick, or of Washington County, Maine. Failing any qualified applicants from these counties in any one year, the bursary for that year only will become available to a student resident anywhere outside the Maritime Provinces of Canada.

Winfield Memorial Entrance Scholarship -\$200. Established by Mrs. W. A. Winfield in memory of her husband.

The Alumni Scholarships - \$300. The Alumni Association has established two scholarships of \$300 each: one restricted to students of King's College School, Rothesay Collegiate, Edgehill, Netherwood or Halifax Ladies College; and one unrestricted.

Keating Trust Scholarships - \$125. Awarded from a bequest to the College from the Rev. I. Lloyd Keating to students entering College with outstanding marks in Science, these scholarships, according to the will of the donor, are intended to encourage students, and preferably Divinity students, in the study of chemistry and physics, and scholars will be required to take at least one class in physics or chemistry during the year in which they hold the scholarship.

Nova Scotia Light & Power Co. Ltd. Scholarship - \$300 a year. The Nova Scotia Light & Power Co. Ltd. offers an entrance scholarship of \$300.00 a year, tenable for three or four years, providing the student maintains an average of 65% and has no failure in any

Nova Scotia Teachers College Bursary - \$500. Awarded on the recommendation of the Principal to a graduate of Nova Scotia Teachers College who registers as a full time student in the Faculty of Arts and Science.

The Halifax Rifles Centenary Scholarship \$200. Established by the Halifax Rifles as an entrance scholarship. For particulars apply to the Registrar.

King's College Naval Bursary – \$300 a year. In order to commemorate the unique and valuable relationship between the University of King's

College and the Royal Canadian Navy during the Second World War, ships and establishme of the Atlantic Command have set up a Buren to enable a student to attend King's.

Applicants must be children of officers men either serving in the Royal Canadian N or retired from the R.C.N. on pension. Acad mic achievement and promise will be the consideration in selecting a candidate. Purpos industry, and character are to be careful weighed, together with the likelihood that the candidate will make good use of higher educ tion to benefit not only himself but also

The Bursary is awarded annually but intended to be tenable by the same students the completion of his course at King's Colle College for any reason.

needy students of suitable standing, residen the town of Bridgewater, or within six miles

Walter Lawson Muir Bursary - \$175. To | student preferred. awarded at the discretion of the Scholars Committee either to a student entering collegfor the first time or to a student returning college who won high scholastic standing in t previous year, Endowed by Mrs. W. L. Muir.

The United States Scholarship - \$500. Aw ed annually by Friends of New York S Corporation, to a student resident in the Un States, who in the judgment of the Directors The scholarship holder will be required to live the Corporation best exemplifies an appreci in residence. tion of the importance of good relationship between the people of the United States and Applications should be made to the Registrar

among two or more students.

Imperial Oil Higher Education Award. Imped Saint John University Women's Club Scholarapply to the Registrar.

I.O.D.E. Bursaries - \$100 to \$200. Provincial Chapter of Nova Scotia, I.O.D. Registrar, before March 1. will award a limited number of bursaries from \$100 to \$200 to university students satisfactory academic standing in need financial assistance. First-year student will given preference. For particulars apply to Provincial Educational Secretary, I.O.D. year. 5677 Victoria Road, Halifax, Nova Scotia Dr. M. A. B. Smith Prize — \$25. Established by

B. Scholarships, Bursaries and Prizes Awarded in Course

The President's Scholarship - \$250. Three scholarships of \$250 will be awarded to the students who make the highest average at the end of the first, second and third year examinations and hold no other scholarship.

The Stevenson Scholarship - \$120. Founded by the Rev. J. Stevenson, M.A., (sometime Professor of Mathematics), of the value of \$120 a year tenable for two years, this scholarship will be awarded to a student who makes the highest aggregate in the first year examinations.

The Scholarship will be credited in half-yearly instalments, provided always that the scholastic standard is maintained.

Alexandra Society Scholarship - \$300. An annual award offered by the Alexandra Society provided that he makes acceptable progres of King's College to a woman student who, The Bursary will be withdrawn in the event stands highest in the second or third year academic failure or withdrawal from King examinations, provided that she live in residence. If the student who stands highest is otherwise ineligible, the award shall be left to Deihl Bridgewater Bursary - \$250. To assi the discretion of the Scholarship Committee.

The Claire Strickland Vair Scholarship - \$300. the town. Bequeathed by the late Lena Rul An annual award to be offered a student beyond the first year who displays excellence in English, an English Major or English Honours

> April Fund Scholarship - \$600. A scholarship of \$600.00 has been established by the Trustees of the April Fund to be awarded to a student of outstanding academic distinction entering his or her graduating year. Any student may apply for this scholarship whether or not he has previously studied at the University of King's

not later than May 15th. An applicant who is not already a King's student must submit his In any year the scholarship may be divide transcript and the names of two professors who can supply references.

Oil Limited offers annually free tuition a ship - \$100 (Undergraduate). The Saint John other compulsory fees to all children or war University Women's Club awards a scholarship of employees and annuitants who proceed of \$100 each year to a woman student entering higher education courses. The award is tenal her senior year in a Maritime University. The for a maximum of four years. For particula award is made to a student from the City or County of Saint John, with consideration being given to both academic attainment and financial need. For particulars apply to the

> The Lawson Prize - \$100. Established by The Hon. Ray Lawson, former Chancellor of the University, for the student who shows the greatest progress between the first and second

a bequest of \$500 from the late Dr. M. A. B. Smith. Awarded to the student with the highest marks at the end of his second year with ten classes. In case of a tie preference will be given to a Divinity student.

Bishop Binney Prize - \$20. This prize, which was founded by Mrs. Binney in memory of her husband, the late Bishop Binney, is given to the undergraduate with the best examination results at the end of the second year with ten This scholarship is intended to aid students who

The Akins Historical Prize - \$100. Founded by T. B. Akins, Esq., D.C.L., Barrister-at Law and Commissioner of Public Records.

The award is made for the best original study in Canadian History submitted in competition.

Essays must be handed in, under a nom de plume, with the writer's name in an attached envelope, on or before the 1st day of April of the year concerned. Essays become the property of King's College.

The Beatrice E. Fry Memorial - \$50. Established by the Diocesan Board of the W.A. of the Diocese of Nova Scotia, in memory of Miss Beatrice E. Fry. To be awarded to the woman student (Anglican) of the College obtaining the highest mark of the year in English 100. provided that mark exceeds 65%.

The Henry deBlois English Prize - \$15. The late Rev. D. deBlois, D.C.L., a graduate of King's College, left the sum of \$200 to the Governors of the College to establish a prize in English. Awarded to the student of the 3rd or 4th year in Arts or Science who submits the best essay on some subject relating to English

For conditions, apply to the Registrar. All essays must be in the hands of the Registrar of King's College by February 15.

The Almon-Welsford Testimonial - \$30. The Honourable William J. Almon, Esq., M.D. (1816-1901) and his family endowed a prize to commemorate the gallant and loval deeds of Major Augustus Frederick Welsford who died in the Crimean War (1855) and to encourage the study of Latin. The prize is awarded annually to the student in his first year who makes the highest mark in either Latin 100 or Latin 200. provided the mark is not less than 65%.

The McCawley Classical Prize - \$35, Established as a testimonial to the Rev. G. McCawley. D.D., on his retirement from the office of President.

Open to students who have completed their

The Zaidee Horsfall Prize in Mathematics \$10. Established as a memorial to the late Zaidee Horsfall, M.A., D.C.L. Awarded to the student who makes the highest mark, in first vear Mathematics.

Khaki Bursary - \$60. Awarded to the sons and daughters of the soldiers of the Great Wars. Written application must be made to the Registrar showing claim for consideration.

The Binney Bursary - \$50. Founded in the year, 1858, by Miss Binney, sister of the late Bishop Binney, and daughter of the late Rev. Hibbert Binney, in memory of her father.

may require assistance, and who shall have commended themselves by their exemplary conduct, although their abilities and achievements may not qualify them to be successful competitors for an open scholarship.

Charles Cogswell Bursary - \$20, Charles Cogswell, Esq., M.D., made a donation of \$400 to the Governors of King's College, the object of the donation being "to promote the health of the students and encourage them in the prosecution of their studies".

The Harry Crawford Memorial Prize - \$40. Offered annually by a friend in memory of Harry Crawford, son of Thomas H, and Elizabeth A. Crawford, Gagetown, N.B.; a student of this College, who died true to his King and his Country, April 14, 1915, while serving in the Canadian Motor Cycle Corps.

The prize is awarded to the student completing the second year Arts course, of good character and academic standing, who in the opinion of the Faculty deserves it most.

The Jackson Bursary - \$25, Founded by the Rev. G. O. Cheese, M.A. (Oxon.), in memory of his former tutor, the late T. W. Jackson, M.A., of Worcester College, Oxford.

C. Graduate Scholarships, Medals and

The Governor General's Medal. Awarded to the candidate who obtains the highest standing in the examination for B.A. or B.Sc. Degree. Preference will be given to an Honours Student.

The Rev. S. H. Prince Prize in Sociology. This prize was made available by a \$1,000 bequest under the will of the late Dr. S. H. Prince for annual award to both Dalhousie and King's

The Rhodes Scholarship. This scholarship is of the annual value of 750 pounds sterling. Before applying to the Secretary of the Committee of selection for the Province (which application must be made by November 1), consult the Registrar, King's College.

Rhodes Scholars who have attended the University of King's College

1909 Medley Kingdom Parlee, B.A., '08 1910 Robert Holland Tait, B.C.L., '14 1913 Arthur Leigh Collett, B.A., '13

- 1916 The Rev. Douglas Morgan Wiswell, B.A., '14 M.A., '16
- 1916 The Rev. Cuthbert Aikman Simpson,
- 1919 William Gordon Ernst, B.A., '17

B.A., '15, M.A., '16

- 1924 The Rev. Gerald White, B.A., '23, M.A., '24
- 1925 M. Teed, B.A. '25
- 1936 Allan Charles Findlay, B.A., '34
- 1938 John Roderick Ennes Smith, B.Sc., '38
- 1946 Nordau Roslyn Goodman, B.Sc., '40, M.Sc., '46
- 1949 Peter Hanington, B.A., '48
- 1950 Ian Henderson, B.Sc., '49
- 1950 Eric David Morgan, B.Sc., '50 1955 Leslie William Caines, B.A., '55
- 1962 Roland Arnold Grenville Lines, B.Sc., '61
- 1963 Peter Hardress Lavallin Puxley, B.A., '63
- 1969 John Hilton Page, B.Sc., '69

University Women's Club Scholarship - \$500. The University Women's Club of Halifax offers a scholarship of the value of \$500 every second year, 1964, 1966, etc., to a woman graduate of Dalhousie University or King's College, to assist her in obtaining her M.A. or M.Sc. degree at any recognized graduate school. For particulars apply to the Registrar.

The Canadian Federation of University Women Fellowships - \$1500 to \$2500. For information apply to the Registrar.

The Imperial Order Daughters of the Empire Post-Graduate Scholarships - \$5000. (For study overseas) and \$3000 (For study in Canada) For information apply to the Re-

Imperial Oil Graduate Research Fellowship \$3000 for three years. For information apply to the Registrar.

Commonwealth Scholarships. Under a Plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and living allowance. For details of the awards offered by the various countries consult the Registrar's office or write to the Canadian Universities Foundation 75 Albert Street, Ottawa.

Rotary Foundation Fellowship. Open to graduate students for advanced study abroad. Available every second academic year, 1963, 1965, etc. Applications must be considered before August 1st of previous year. Information may be obtained from Rotary Clubs or the Registrar.

#### Divinity

Owen Family Memorial Scholarships - Two of \$250. Established by Mr. and Mrs. D. M. Owen, in memory of the Owen family, tenable for one year, but renewable, and open to applicants who are Nova Scotia born, and resident therein, and are or are about to become theological students at King's College, preference being given (1) to native residents of the town of Lunenburg, and (2) to native residents of the county of Lunenburg.

Canon W. S. H. Morris Scholarship - \$1,500. This Scholarship was founded by the late Robert H. Morris, M.D., of Boston in memory of his father, the Reverend Canon W. S. H. Morris, M.A., D.D., Kingsman, Scholar and Parish Priest in the Diocese of Nova Scotia for forty years.

The Scholarship may be awarded annually by the President and Divinity Faculty to the most deserving member of the present or recent graduating class of the Divinity School, who has been at King's at least two years, and who, in the opinion of the Faculty, would benefit from travel and/or study in Britain, the U.S.A. or some other area outside the Atlantic Provinces of Canada, provided he reaches a satisfactory standard. Applications, stating the use which the applicant expects to make of the Scholarship, must be submitted to the Dean of Divinity on or before January 8, of the year in which the applicant, if successful, intends to use the scholarship. The recipient will be required to serve in the Atlantic Provinces for a minimum of three years after his return from abroad.

William Cogswell Scholarship. Open to students intending to work in the Diocese of Nova Scotia, Scholarship (A): Under the direction of the Trustees of the William Cogswell Scholarship to be awarded to the student who passes a satisfactory examination and who takes his Divinity course at any recognized Divinity College of the Anglican Church in Canada best fitted, in the opinion of the Trustees, to serve the terms of the Trust, giving when possible preference to King's College.

Scholarship (B): Under the direction of the Faculty of Divinity of the University of King's College, Halifax, Nova Scotia, an entrance scholarship of \$200 or \$300 depending on quality of work submitted, will be awarded to the properly accredited student entering the Divinity course for the first time and who stands highest in a special examination to be held in the month of admission provided he reaches a satisfactory standard. The recipient will be required to sign a statement promising to serve in the Diocese of Nova Scotia for a period at least as long as the period during which he holds the scholarship.

This examination will consist of two papers: a. A paper on the content of the Old and New Testaments, and

b. A paper on A. H. McNeile's Introduction to the New Testament (revised edition by C. S. C. Williams) Oxford, 1953.

Awards will not be made every year.

The Daniel Hodgson Scholarship - \$240. Founded in 1883 by Edward J. Hodgson and

the Reverend G. W. Hodgson in memory their father Daniel Hodgson, who died ahea that time. This Scholarship of an annual value of \$60, tenable for four years, is for a purpose of encouraging students to take an A. Degree before entering upon the study no scribed for Holy Orders. Candidates, who m be residents of Prince Edward Island, shall a their applications and certificates of havin passed the full Arts matriculation requirement before August 15th, and must not be over years of age at that time. They must also satisfied the Diocesan Committee for Holy Orders as their aptitude for the Ministry of the Chu At the end of each academic year the Scho shall file with the Trustees a certificate the President or Secretary of the Univer-"that during the past year he has resided College (or has been excused from residence) and has attended the full Arts cour in the College", together with a certificate the his moral conduct, his attention to his studi and his general conduct have been satisfactor to the Board of Governors.

Scholars who fail to comply with the foregoin The Margaret Draper Gabriel Bursary - \$450.

Clements) - \$150. The Parish of Clement Nova Scotia, wishing to give tangible expression to its appreciation to the Rt. Rev. R. Waterman, D.D., for his services to the Pari immediately following upon his death of the Rector (Rev. W. H. Logan, December 1964), has set up a Bursary Fund, to be kno as the Bishop Waterman Bursary Fund, to h young men entering King's College to under training for the Ministry. An amount not than \$150 is to be forwarded by the Treasur of the Parish to the Bursar at King's of September 1st of each year. This money be used at the discretion of the Dean Divinity in consultation with the Bishop of the Diocese for the assistance of any candidate for Holy Orders needing it from any Parish of b Diocese of Nova Scotia enrolled at King's training for work in the Diocese of Nova Scot or any Missionary Diocese. If any young many from the Parish of Clements offers himself for tion in the awarding of the Bursary.

The Mabel Rudolf Messias Divinity Bursary \$120. The interest on an endowment Organ Fellowship A stipend is awarded to a King's College, on the nomination of the Dei Faculty. and the Faculty of Divinity.

Order of The Eastern Star - \$300. F scholarships are to be awarded, primarily on the being given to Divinity students. basis of financial need, to 2nd or 3rd year students, or to older men with their Ar degree, in their 2nd or 3rd year of Theology.

Mary How Donaldson and Cornwallis W. A. Bursary - \$400. This Bursary was established by St. John's (Cornwallis, N.S.), Anglican Church Women to provide a living memorial to the life and work of Mary How Donaldson, who had family connections with King's, and of Cornwallis W. A., of which she was a charter member. It is to be awarded on the recommendation of the Dean and Divinity Faculty to deserving member of the Divinity School at King's, male or female, preferably a Nova Scotian, who is prepared for full-time service in the Church and is in need of financial assistance.

The George M. Ambrose Proficiency Prize. (\$300. Approx.) The income from a trust fund set up in memory of Canon G. M. Ambrose, M.A., an alumnus of King's, provides an annual award to the Divinity student who receives the highest aggregate of marks at the end of his first year, provided that during that year such student takes the regular full course in theo-

conditions automatically forfeit the Schola A Fund has been established in memory of ship, but in special cases the Bishop, on the Margaret Draper Gabriel by her son, Rev. A. E. representations of the Trustees, may restor: Gabriel, M.A., an alumnus of King's, the yield terminated Scholarship in whole or in part. from which is to be used to give financial aid to a Nova Scotian Divinity Student entering King's The Bishop Waterman Bursary (Parish College in preparation for the Ministry of the Church. The recipient must be nominated or recommended by the Bishop of Nova Scotia, If in any year there is no candidate for this assistance the yearly yield is to be used to augment the Fund. Should King's College Divinity School cease to exist as such, the fund is to be transferred to the Diocese of Nova Scotia and the income used as aforesaid.

> H. H. Pickett Memorial Scholarship - \$175. This scholarship is payable to the student entering the final year of study for the Sacred Ministry who has shown the greatest all round improvement during his time in Divinity studies. Preference is to be given, first, to a student from Trinity Church, Saint John, and, second, to a student from the Diocese of Fredericton.

John Clark Wilson Memorial Bursaries - \$100. each. Established in 1947 by Miss Catherine R. such training, he shall be given first consider bursaries of \$100 each, tenable for one year. Kaiser, in memory of John Clark Wilson. Two Awarded to Divinity students deemed worthy of financial help.

\$2,000.00, the gift of Mrs. M. R. Messias student qualified and willing to play the organ Wolfville, Nova Scotia, is to be used to provide in the College Chapel (Casavant-2 manual pipe an annual bursary for a needy and deserving organ) at services throughout the year. The Divinity student studying at the University amount set in negotiation with the Divinity

> Glebe Scholarship. A scholarship of approximately \$250 is offered annually to Anglican students of Prince Edward Island, preference

Application, accompanied by a certificate of

character from the applicant's Rector, must be sent to Canada Permanent Trust Company, Charlottetown, P.E.I. on or before May 31st.

Moody Exhibition - \$100. The "Catherine L. Moody" Exhibition of \$50 a year for two years is awarded every two years to the student entering the second year preparing for Holy Orders, whose scholarship and exemplary conduct shall, in the opinion of the Faculty, merit it. (Next award 1973).

The George Sherman Richards Proficiency Prize - \$120. In Memory of the Reverend Robert Norwood, D.D. The income from a fund of \$2,000 to be awarded annually to the Divinity student who gains the highest aggregate of marks at the end of his penultimate year, provided that in that year he takes the regular full course in Theology.

The Countess de Catanzaro Exhibition – \$100. The income from a fund of \$2,000 to be awarded by the Faculty to a Divinity student during his second year in college. The award will be made on the basis of character and need.

The McCawley Hebrew Prize – \$25. Open to all members of the University who are below the standing of M.A.

This prize is given out of the interest of a Trust Fund, the gift of the Reverend George Mc-Cawley, D.D., in the hands of the Society for the Propagation of the Gospel in Foreign Parts.

This prize will be awarded to the student who leads the class in Hebrew 2 and receives a recommendation from the professor of Hebrew.

Junior McCawley Hebrew Prize - \$25. With the accumulated unexpended income from the McCawley Hebrew Prize a fund has been set up establishing a second prize, to be awarded to the student standing highest in first year

Archdeacon Forsyth Prize - \$50. The Ven. Archdeacon D. Forsyth, D.C.L., of Chatham, N.B. who died in 1933, left to King's College \$1,000 to provide an annual prize or scholarship, to be awarded to a Divinity student for proficiency in the study and knowledge of the original Greek Scripture. To be awarded on the combined results of Greek Testament 1 and 2.

Shatford Pastoral Theology Prize - \$40. Established by an anonymous donor, in memory of the late Rev. Canon Allan P. Shatford, C.B.E., D.C.L. Awarded annually for Pastoral Theology. The winner must receive a recommendation from the Professor of Pasto-

Laurie Memorial Scholarship. One or more scholarships of about \$250 each, founded in memory of Lieut.-Gen. Laurie, C.B., D.C.L., open to candidates for the Ministry, under the direction of the Trustees, Particulars may be had from the Registrar.

The Wiswell Trust Divinity Studentship -\$120. A. B. Wiswell, D.C.L., Hon. Fell. (Vind.) of Halifax, N.S., in order to perpetuate the memory of the Wiswell Family, augmented a bequest from members of the family, thus providing a capital sum of \$2,500, the income of which is to assist Divinity students at King's College, who were born in Nova Scotia and who propose entering the ministry of the Anglican Church in Canada.

Prince Prize in Apologetics - \$60. Established by a bequest of the late Dr. S. H. Prince. Awarded every alternate year, at the discretion of the Faculty. (Next award 1973-74).

Wiswell Missionary Bursary - \$200. Founded by Dr. A. B. Wiswell for help to a Divinity student who believes he has a call to the Mission Field either Overseas or in the Canadian

Preference will be given to a student who has given promise of the needed qualities and has taken his degree or is within a year of completing his Arts course. If there is no student meeting the above requirements the award will be left to the discretion of the Divinity Faculty.

Clara E. Hyson Prize - \$5.00 Founded by Miss Clara E. Hyson and awarded each year on vote of the Faculty

A. Stanley Walker Bursary - \$200. Awarded by the Alexandra Society of King's College, To be given annually to a Divinity student.

Johnson Family Memorial Bursary - \$60. Founded by the Misses Helen and Marguerite Johnson in memory of their parents. This bursary is to be awarded annually at the discretion of the President and Divinity Faculty to the Divinity student considered most worthy on grounds not only of scholarship, but also, of financial need and of devotion to his vocation. Preference will be given to a student from the parish of St. Mark's, Halifax.

Divinity Grants. Grants to aid students in Divinity who require assistance are made by the Archbishop of Nova Scotia, and by the Bishop of Fredericton. The holders of these must fulfill such conditions as the Bishops lay down and in every case attend a personal interview. For further particulars apply to the Divinity

The King's Divinity Scholarship - \$150. The Anglican Church Women in the Diocese of Nova Scotia makes an annual grant of \$150 towards the expenses of Divinity students who agree to work in the Diocese of Nova Scotia after ordination.

Archbishop Kingston Memorial – \$100. Awarded annually by the Nova Scotia Diocesan A.C.W. on recommendation of the Divinity Faculty, to a needy divinity student.

The Wallace Greek Testament Prize - \$50. A Book Prize established by the late Canon C. H. Wallace of Bristol, England, in memory of his father Charles Hill Wallace, barrister, of Lincoln's Inn, who graduated at King's College in 1823, and died in England in 1845. Subject: Epistle to the Hebrews. Application to be made to the Registrar by March 1st.

Agnes W. Randall Bursary. Two bursaries of \$8.00 each will be given each year to the students in Theology who show the greatest diligence in their studies. An award will not be made twice to the same student.

Bennett-Cliff Memorial Prize. A prize of \$10.00 each year. Award to be at the discretion of the President.

Kenelm Eaton Memorial Scholarship - \$60. This scholarship is provided by the Synod of Nova Scotia as a memorial to The Hon. Captain Kenelm Edwin Eaton, B.Sc., L.Th., who made the supreme sacrifice while serving as a Chaplain in Italy, August 31, 1944. For particulars apply to Registrar.

Dr. C. Pennyman Worsley Prize - \$100. A memorial to the late Dr. Worsley. To be used in alternate years for a prize in Church History. Next award 1973-74.

Fenwick Vroom Exhibition - \$40. To be awarded to a Divinity Student at the discretion of the Faculty.

The Church Boy's League Bursary Fund. Students eligible for assistance from this Fund are those who have, at one time, been full-pledged members of any Parochial C.B.L. branch in Canada. Particulars are available from the Registrar.

The Reverend Canon R. A. Hiltz Memorial Bursaries. To be awarded to present or former members of the A.Y.P.A. who are in full course of Theology and in need of financial assistance.

Bursaries up to a total of \$300 each year.

Archbishop Owen Memorial Scholarships, A number of scholarships of \$300 each are awarded each year by the General Synod Committee concerned to students in their final year in Theology, who are ready to take up missionary work, either in Canada or overseas. Academic standing and financial need are taken into account in making the award.

Application should be made to the Divinity Faculty by November 1st of each year.

The Florence Hickson Forrester Memorial Prize - \$100. The prize, presented in memory of the late Mrs. Forrester, by her husband, is to be awarded on Encaenia Day to the Divinity Student in his penultimate or final year who passes the best examination on the exegesis of the Greek text of St. Matthew, Chapter V-VII provided always that the standard is sufficiently high.

Bibliography:

T. W. Manson: The Sayings of Jesus (SCM)

J. Jeremias, The Sermon of the Mount, (Athlone Press)

F. W. Beare: The Earliest Records of Jesus, (Blackwell) pp. 52-69 and 95-98.

H. K. MacArthur: Understanding the Sermon on the Mount (Epworth).

The Bullock Bursary - \$225. Established by C. A. B. Bullock of Halifax for the purpose of defraying the cost of maintenance and education of divinity students enrolled at King's College who were, before being enrolled, residents of Halifax, and members of a Parish Church there, and who are unable to pay the cost of such maintenance and education.

The Harris Brothers Memorial - \$100. To be awarded at the beginning of each college year as a bursary to a student of Divinity at the University of King's College. The student shall be selected annually by the Divinity Faculty, preference being given to a needy student from Prince Edward Island, failing that, a needy student from the Parish of Parrsboro, and failing that, to any deserving student of Divinity at the said University.

The Carter Bursaries - \$160. Two bursaries of a value of \$160 each, established under the will of Beatrice B. Carter of Amherst, Nova Scotia, to be used to assist young men studying for the

Royal Canadian Air Force Protestant Chapel Bursary - \$120. This Bursary, established in 1959 by endowment from collections taken in R.C.A.F. chapels, is awarded annually at the direction of the Divinity Faculty to a bona fide ordinand, preference where possible being given to (a) ex-R.C.A.F. personnel, (b) children of

The Ott Reading Prize - \$25. Established by Dr. T. Gordon Ott. Awarded annually to a student of Divinity for the best reading of the Bible and the Services of the Church.

The Ott Preaching Prize - \$25. Established by Dr. T. Gordon Ott. Awarded annually to a student of Divinity for the best extempore sermon of an expository nature.

William A. and Kathleen Hubley Memorial Bursary - \$175. This bursary is designed to assist students from St. Mark's Parish, Halifax. and failing a suitable candidate then from any parish in the Diocese of Nova Scotia, who are studying for the Sacred Ministry at any recognized College in the Anglican Communion, preference being given to students studying at the University of King's College. The award is made on the basis of need and may be renewed provided a certain acceptable standard is attained. The recommendations of the Rector of St. Mark's and the Divinity Faculty are necessary conditions. The bursary must be applied for annually.

The Reverend Dr. W. E. Jefferson Memori Bursary - \$100. This bursary, the gift of Parish of Granville, N.S., is established memory of Reverend W. E. Jefferson, D.R. an alumnus of King's and a graduate engine to give nearly twenty years of devoted servi dents' Union to the ordained ministry. Preference will given to older men pursuing post-grad<sub>Ual The</sub> University of King's College Students'

\$20. Established by Miss Elaine Harrison memory of her father. To be awarded to deserving and needy Divinity student, at # discretion of the Faculty.

St. Paul's Garrison Chapel Memorial Prize \$20. To be awarded to the Divinity stude

established by the late Reverend Canon W. Clarke of Kingston, New Brunswick, the f copies of "The Imitation of Christ" to membe Association of each year's graduating Class in Divinity. T balance of the income each year is to awarded by decision of the Divinity Faculty a deserving Divinity Student for the comin

A bursary in the amount of \$100, or mo nominated by the Divinity Faculty.

#### **Loan Funds**

Edith Mabel Mason Memorial Students Fund.

Established by Alumni and friends as a morial to the late Miss Edith Mabel Masor M.A. a former Dean of Women and Professor Modern Languages. Available to women dents entering upon their third or fourth yes Application to be made in writing to the Registrar.

#### Canada Student Loans

1. All Canadian students and landed migrants who have resided in Canada for least 12 months are eligible to be considered for Canada Student Loans which, in most pr inces, are administered in conjunction provincial bursary plans.

2. Students should apply as early as possible requesting application forms from the provi cial authority in order to have the mont available for registration.

**Student Organizations** 

who was ordained late in life and yet was all The University of King's College Stu-

studies or to older men preparing for ord h Union is the organization in which the students tion. The award is to be made by the Diving enjoy their right of self government. The Constitution revised in 1964, provides for a democratic government in which the participa-The Archbishop Harrison Memorial Bursary tion of every student is expected. The students endeavour to play a determining role in every aspect of university life. The Union's main organs are the Student Assembly, the Executive of the Students' Union, the Students' Council. The power of self discipline is exercised through the Union's Male and Female Residence Councils and the Campus Police.

chosen by the Faculty to attend a Christa The Union operates through a number of permanent committees, e.g.: the Academic Committee, the Social Committee, committees The Clarke Exhibition. An endowment w on the constitution, elections, finances, Dalhousie relations, awards, etc.

charge upon which shall be the provision King's College Women's Amateur Athletic

The object of this association is the promotion of women's amateur sports at the College. The K.C.G.A.A.A. is a member of the Atlantic Women's Intercollegiate Athletic Association and competes in the Intermediate section of this Association, field hockey, volleyball, and Halifax Deanery Laymen's Association Bursan basketball are played at the Intercollegiate level, and floor hockey, badminton, table tennis, and swimming are available on a awarded to a deserving Divinity stude regularly scheduled basis in the University Gymnasium

King's College Amateur Athletic Associa-

The object of this association is the promotion of amateur sports at the College. The K.C.A.A.A. is an honourary member of the Atlantic Intercollegiate Athletic Association and a full member of the Nova Scotia College Conference. The University competes in interscholastic competition in the following sports: soccer, golf, hockey, volleyball, and basketball. There is also strong inter-bay or inter-residence competition in volleyball, road racing, softball, hockey, volleyball, basketball, and floor hockey. The gymnasium also has available for personal use a swimming pool, weight lifting room, and regulation size gymnasium.

King's College Dramatic and Choral Society

This society was founded in 1931 to further interest in dramatic and choral work. The society presents an evening of one-act plays during the first term, and a three-act play. In addition, the society sponsors an inter-bay play evening and enters a play in the Connolly Shield Competition.

The Dalhousie Drama Workshop, a branch of the Department of English, offers training in voice production, acting, dance, movement, make-up, costume, set design and construction, and lighting under the direction of experienced instructors. King's students are invited to participate in the activities and productions of the Workshop on the same basis as Dalhousie

The King's College Record

The Record (founded 1878) is published by the undergraduates of the College during the academic year. It contains a summation of the year's activities and awards.

The Quintilian Debating Society

This Society was founded in 1845. Quintilian sponsors interbay debates in competition for the Alumni Association (Halifax Branch) Interbay Debating Award. In addition further campus debates are seen in competition for the Rev. Canon A. E. Andrew Memorial Award for Block Debating. During the Easter weekend of each year a High School competition is coordinated by the Society, the Quintilian Exhibition Shield being awarded to the successful school in the Metro area (the Shield having been given by the Alumni Association, Saint John Branch). Annual tours of Upper Canadian Colleges and Universities complete the Society's wide range of academic activities.

The Haliburton

The Haliburton was founded and incorporated by Act of Legislature in 1884, and is the oldest literary society on a college campus in North America. Its object is the cultivation of a Canadian Literature and the collecting of Canadian books, manuscripts, as well as books bearing on Canadian History and Literature. College students and interested residents of the metro area meet to listen to papers which are given by literary figures and by the students.

The Ancient Commoner

The "Ancient Commoner" is the students newspaper.

The Students' Missionary Society

This society was founded in 1890. Its object is to promote interest in missionary work and to further the missionary work of the Church, especially in the Maritime Provinces. The annual meeting is held on Saint Andrew's Day, or as near to it as possible. Through the efforts of this organization, divinity students are provided with summer charges and foreign

students have been afforded the opportunity of studying Theology at King's. The society at present holds a special status in the Theological Community of King's.

The King's College Theological Com-

The Theological Community is the Divinity and pre-Divinity student body of King's. The community is the co-ordinating body of all Anglican Divinity student activities. It also provides a means of fellowship for Divinity and pre-Divinity students at King's. The community holds regular business meetings. Other activities include the delegating of members to national conferences and participating in ecumenical discussions.

Awards

The Student Body of the University of King's College awards an overall "K" to participants in King's activities. Under this system, begun during the 1956-1957 term, a student may receive a silver "K" upon amassing 160 points and a gold "K" upon amassing 250 points.

In addition several awards are presented to students for outstanding achievements in extracurricular activities.

Bob Walter Award. Awarded to the graduating male student who best exemplifies the qualities of manhood, gentlemanliness, and learning, and has contributed to the life at King's.

Warrena Power Award. Awarded annually to the graduating female student who best exemplifies the qualities of womanhood, gentleness, and learning, and has contributed to the life at King's.

The R. L. Nixon Award. This award is given annually to the resident male student who, in the opinion of his fellows, contributes most to residence life in King's.

The Prince Prize. This prize is designed for the encouragement of effective public speaking. The recipient is chosen by adjudicators in an annual competition.

The H. L. Puxley Award. Awarded annually to the best all-round woman athlete.

The Bissett Award. This award is given annually to the best all-round male athlete.

The Arthur L. Chase Memorial Trophy. This is presented annually to the student who has contributed most to debating in the College.

### Alumni Association of King's College

This Association, incorporated in 1847 by Act of the Legislature, consists of graduates and others whose object is the furtherance of the welfare of the University.

The Association maintains annual scholarships.

The annual meeting of the Association is held the day before Encaenia.

The Officers of the Association in 1972-73. President.

The Rev. Emery G. Harris, 21 Lynn Drive, Dartmouth, N.S.

Vice-President,

Mr. Carmon W. Stone, 6071 Shirley St., Halifax, N.S.

Dr. Henry Muggah, Q.C., 6033 Belmont Road, Halifax, N.S.

Executive Secretary,

Mrs. J. Desrosiers, University of King's College, Halifax, N.S.

#### The Alexandra Society of King's College

This Society, which has branches all over the Maritime Provinces, was formed in Halifax in 1902 as the Women's Auxiliary to the College. It maintains an annual scholarship and bursary and supports the Alexandra Special Lecturer in Pastoralia (Director of Parish field Work).

#### Officers 1972-73

Patroness. Mrs. W. W. Davis.

Hon. President. Mrs. H. L. Nutter.

Hon. Vice-President, Mrs. G. F. Arnold.

Immediate Past President.

Mrs. A. G. MacIntosh, 48 Beechwood Drive,

Miss Miriam Morris, 2438 Brunswick The Rev. Carmon W. F. Stone Halifax, N.S.

#### Vice-Presidents.

Mrs. A. MacKeigan, 68 Reserve St., Glace Ba Life President,

Mrs. P. N. McIvor, 8 Lakeview Point, D.

Mrs. J. E. Lane, 91 Hazelholme Drive, Halifa N.S.

Mrs. C. A. Orford, 86 Kent St., Charlottetow, Life Secretary,

Mrs. E. R. McCordick, 72 Church St., S John West, N.B.

Recording Secretary.

Mrs. H. B. Wainwright, 9-1-7, SS No. 1 Valedictorian Armdale, N.S.

Corresponding Secretary,

Mrs. D. L. Walker, 92 Crichton Ave., Dan mouth, N.S.

Mrs. W. F. Palmer, 1652 Chestnut St., Halifa



### Graduating Class — 1971

Honorary President (Posthumously), \*\*Gibson, Barbara Corinne, Bridgewater, N.S. Grandy, Linda Janet, Dartmouth, N.S. \*Grant, Arthur Angus Spence, Halifax, N.S. Honorary Life President,

Dr. F. Hilton Page

on-the-Lake, Ont.

MacDonald, Wayne Douglas, Kentville, N.S. MacInnis, Ian Kenzie, Dartmouth, N.S. MacKay, John Prescott Roderick, Oakville,

McLachlan, Robert Gordon, Ottawa, Ont. McTimoney, Constance Elaine, Sydney, N.S. \*Marsden, Janet Loys, Schenectady, N.Y.,

Oldershaw, Audrey Florence, Hantsport,

Oldershaw, Nancy Eleanor, Hantsport, N.S. Potter, Adrian Brent, Clementsport, N.S. Pretty, Kathleen Joan, Truro, N.S. Proctor, Georgia Lousie, Halifax, N.S. Robinson, Sara Jane, Middleton, N.S. Ross, Susan Maureen, Charlottetown, P.E.I.

\*\*Schnare, Madeline Laura, Halifax, N.S. Sorge, Lynn Marion, Halifax, N.S. Strople, Rebecca Ann, Sackville, N.S.

Arthur Iulian Andrew George Franklyn Smith, Jr. Catherine Therese Wallace

Graham, The Reverend Matthew, B.Sc.,

Doctor of Divinity (honoris causa) Leonard Weldon Mosher

Doctor of Civil Law (honoris causa)

#### Bachelor of Sacred Theology

The Rev. James Theodore Irvine

Life Vice-President

Ronald Irwin Coll

Life Treasurer,

\*\*In absentia

Sara Jane Robinson

**Bachelor of Divinity** 

Sackville, N.B.

Catherine Ann Veinotte

The Rev. Don Robert Shipton

\*Conferred during the session

Irvine, The Reverend James Theodore, B.A., Fredericton, N.B. Kent, The Reverend Vernon Glen, M.A.,

Halifax, N.S. Pierce, The Reverend Brenda Jean, B.A.,

Halifax, N.S. Price, The Reverend Robert David, B.A., Lower Sackville, N.S.

Shipton, The Reverend Don Robert, B.A.,

Wissler, The Reverend Kenneth John, B.A., Halifax, N.S.

### Bachelor of Arts

Bailey, Jane Elinor, Dartmouth, N.S. Bernier, Joseph John, St. Hyacinthe, P.Q. Buck, Donald Cameron, New Glasgow, N.S. Clarke, Marsha Frances, Lunenburg, N.S. Clow, Beatrice Elizabeth, Charlottetown,

Cole, Brenda Lou, Dartmouth, N.S. Crawford, David Haddon, Hubbards, N.S. \*Doehler, Joan Irene, Halifax, N.S. Doucet, Nancy Anne, Middleton, N.S. Earle, The Reverend John Chipman, Halifax,

\*Fearn, Judith Weir, Ormstown, P.Q. French, Barbara Lynn, Sydney River, N.S. George, Monica Mary, New Glasgow, N.S. Gesner, Lloyd Frederick, Sydney, N.S.

Hamlin, Keith Allan (Distinction), Halifax,

\*Hare, Andrew Henry, Kingston, Ont. Jewett, Deborah Fay, Halifax, N.S.

\*\* Jones, Alexander Douglas Caverhill, Niagara-

Saunders, Heather Joy, Sydney, N.S.

Wilson, Kathryn Gay, Saint John, N.B.

#### Bachelor of Science

Archibald, John Frederic, Shelburne, N.S. Banks, Donald Ewen (Honours in Physics), Bethesda, Md., U.S.A. Coll, Ronald Irwin, Sydney River, N.S. Leslie, Barbara Lynn, Dartmouth, N.S.

Moody, Penny Frances Lorraine, Halifax, Nichol, Harold Wilfred, Ottawa, Ont.

Oram, Franklyn Llewellyn, Sydney Mines, Taylor, Alice Irene, Bridgetown, N.S. Veinotte, Catherine Ann, West Northfield,

\*Williamson, Hugh Robert, Halifax, N.S.

#### **Diplomas in Divinity**

Title of Associate in Theology

Legassick, The Reverend Kenneth, Campbellton, N.B.

Associate of King's College, Nova Scotia Coote, The Reverend Robert Horton, L.Th., Mahone Bay, N.S.

**Certificates – Clinical Pastoral Education** 

Dykstra, The Reverend Jerry, B.A., B.D., Halifax, N.S.

Hergett, The Reverend Harold Douglas, B.Com., B.S.T., Dartmouth, N.S. Irvine, The Reverend James Theodore, B.A., Fredericton, N.B.

Lawty, Ann, B.Sc., Dip.Th., Helperthorpe,

Sharam, The Reverend Henry John, B.A., B.D., Halifax, N.S.

#### 1971 Encaenia Awards

#### **Arts and Science**

The Governor General's Medal, Keith Allan

April Fund Scholarship, Kenneth Tutty President's Scholarship (Third year), John Tha

President's Scholarship (Second year), Eliza-

President's Scholarship (First year), Cathy

Alexandra Society Scholarship, Tricia Murwin Stevenson Scholarship, Cathy Meisner

Lawson Prize, Douglas Ruck Dr. M. A. B. Smith Prize, Robert Anthony Bishop Binney Prize, Robert Anthony

Beatrice E. Fry Memorial Prize, Judith Tomlin Zaidee Horsfall Prize in Mathematics, Lynda Harfield

Almon-Welsford Testimonial Prize, Reginald

McCawley Classical Prize, David Seegmiller Binney Bursary, Reinhold Endres Charles Cogswell Bursary, Margaret Mader Harry Crawford Memorial Prize, Margaret

Mader Jackson Bursary, Reinhold Endres

## Henry D. deBlois Prize, Beverley Greenlaw, Jr.

The George Sherman Richards Proficiency Prize, Peter Wright Harris

The McCawley Senior Hebrew Prize, Peter Wright Harris

The McCawley Junior Hebrew Prize, John William Tattrie The Archdeacon Forsyth Prize, Kenneth John

The Shatford Pastoral Theology Prize, James

Theodore Irvine The Kenelm Eaton Memorial Scholarship, Mal-

colm Garth Maxwell The Florence Hickson Forrester Memorial Prize, Malcolm Garth Maxwell

The Ott Reading Prize, Terrance Kenneth Doncaster

The Ott Preaching Prize, Robert David Price The Canadian Bible Society Book for the Reading of Holy Scripture, Kenneth George

The George M. Ambrose Proficiency Prize, Paul **Tyler Barnes** 

The Wallace Greek Testament Prize, Kenneth John Wissler

The Moody Exhibition, Lloyd Harold Ripley

### **Entrance Scholarships and** Bursaries Awarded May, 1971 (Arts and Science)

Susanna Almon Scholarship

Joseph Calvin Atkinson,

Chancellors' Scholarship
Alistair Charles Stuart Dow.

Alumni Living Endowment Scholarship Juanita Rae Mason, Michael Earl Foley.

King's Foundation Scholarship Patrice Kathleen McGloin.

Halifax-Dartmouth Entrance Scholarship

David Norman Hunter,
Alexis Nora Inkpen,

Blair Harris Mitchell, Brenda Jane Silver, John Wilson Fitt, Frederick John Lewis, Janet Lynn Chapman, Patricia Rae Hinch.

Alumni Scholarship Thomas George Lewis, Anne Marie MacLean, Frederick William Weidhaas.

Winfield Memorial Scholarship

Walter Lawson Muir Bursary
Juliana Louise Mason.

David Wayne Andrews.

Keating Trust Scholarship Patricia Kim Sheehy, Wade Russell Levy.

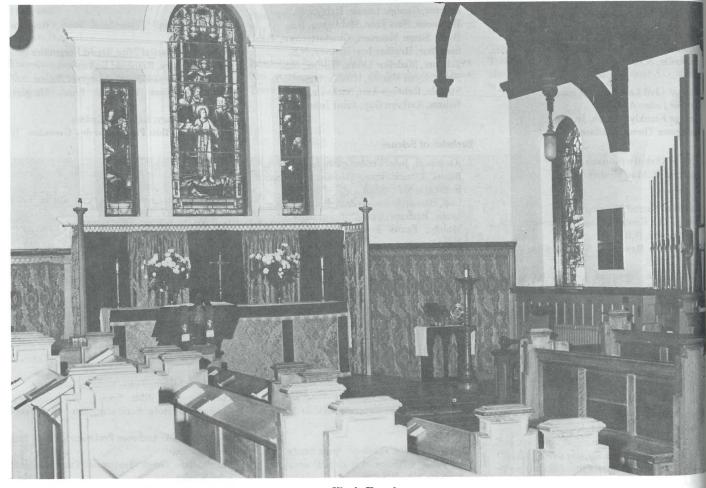
Naval Bursary
Susan Victoria Pitt.

**Deihl Bridgewater Bursary** Patricia Elizabeth Mossman.

University Bursary

David Wayne Andrews,
Patricia Kim Sheehy,
Wade Russell Levy,

Elizabeth Anne Mary Chisholm, Valerie Ann Hutt, Susan Elizabeth Wood.



King's Chapel



Alexandra Hall in a Winter Setting



Chancellors' Scholarship

Alistair Charles Stuart Dow.

Alumni Living Endowment Scholarship

Juanita Rae Mason, Michael Earl Foley.

King's Foundation Scholarship

Patrice Kathleen McGloin.

Halifax-Dartmouth Entrance Scholarship

David Norman Hunter, Alexis Nora Inkpen, Blair Harris Mitchell, Brenda Jane Silver, John Wilson Fitt, Frederick John Lewis, Janet Lynn Chapman, Patricia Rae Hinch.

Alumni Scholarship

Thomas George Lewis, Anne Marie MacLean, Frederick William Weidhaas.

Winfield Memorial Scholarship

David Wayne Andrews.

Walter Lawson Muir Bursary Juliana Louise Mason, Keating Trust Scholarship

Patricia Kim Sheehy, Wade Russell Levy.

**Naval Bursary** 

Susan Victoria Pitt.

Deihl Bridgewater Bursary

Patricia Elizabeth Mossman.

**University Bursary** 

David Wayne Andrews,
Patricia Kim Sheehy,
Wade Russell Levy,
Elizabeth Anne Mary Chisholm,
Valerie Ann Hutt,
Susan Elizabeth Wood.



King's Chapel



Alexandra Hall in a Winter Setting



The following pages contain information about the programmes of study leading to the Degrees of Bachelor of Arts and Bachelor of Science and are reprinted, with permission, from the Calendar of Dalhousie University. Students enrolled at King's College in Arts and Science are admitted to the same programmes and classes as students enrolled at Dalhousie University (see p. 10), with the exception of King's College students enrolled in the Foundation Year Programme (see p 19). The sections dealing with programmes leading to other degrees (such as Bachelor of Commerce, Bachelor of Education, Engineering, etc.) are also included for information, but only students enrolled at Dalhousie University may enter these other degree programmes.

Classes with numbers below 100 do not carry credits but may be prerequisites for entry to credit classes for students whose matriculation backgrounds are deficient.

## Experimental Classes

- 1. Experimental classes, on any subject or combination of subjects to which the arts and 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 of faculty members.
- 2. If formed on the initiative of students, the students concerned shall seek out faculty members to take part in the classes.
- 3. 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.

half-year length.

- 5. 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, and in the case of one half-year classes when a class in the other one-half year is available.
- 6. 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 Programme; if they are formed later, they shall be announced (a) in the Dalhousie Gazette, (b) in the University News, (c) on a central bulletin board set aside for this purpose.
- 7. One faculty member taking part in each experimental class shall be designated the

4. The classes may be of one-year length or rapporteur of the class. It shall be his responsibility (1) to advise the Curriculum Committee of the formation and content of the class; (2) to obtain 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; (3) to report to the Registrar on the performance of students in the class; and (4) to report 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).

> 8. A student 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.

## **Degrees and Courses**

**D** Sciences

Biology

Geology

Physics

Chemistry

Biochemistry

Mathematics

**Bachelor of Arts** 

**Bachelor of Science** 

**Bachelor of Commerce** 

**Bachelor of Education** 

Uniform Bachelor of Science for Engineering

Bachelor of Science in Engineering Physics

**Bachelor of Music Education** 

Architecture

Certificate in Public Administration

Subject Grouping for Degree Courses

In the curriculum, subjects offered as essential parts of the degree programmes are grouped as follows:

A. Languages B. Humanities French Classics Comparative Literature German Greek English Hebrew History Latin Philosophy Russian Music Spanish Theatre

**C Social Sciences** Economics Political Science Psychology Sociology/Anthropology

Specific regulations indicate the minimum number of classes which must be selected from each group. Classes are offered also in other subjects, which may be taken as electives where no particular group is specified in the requirements. These subjects are: Art History; Education 401, 402; Religious Studies 100; Engineering; and not more than three classes in Commerce.

Properly qualified students may take certain classes in Oceanography as electives having obtained the permission of the Director of the

Classes within the groups may also be taken as electives.

Numbering of Classes

Classes are numbered in order to indicate their general level and to suggest the year of study in which they might first be taken. Classes in the 100 + series are introductory and can ususally

be taken by fully matriculated students without any special prerequisites. Completion 100-level class is normally a prerequisite & General Bachelor of Arts admission to further classes in the subject level (second year) classes, 300 + third level an fifteen classes. 400 + fourth level. Classes numbered in the + and 600 + series are normally regarded graduate classes; however, some may be open to general and honours courses). senior undergraduates. Classes numbered in t 250 +, 350 + and 450 + series are open only 1 Each full time student planning to take a B.A. honours students and may not be taken students in the general degree programme except with special permission.

The letters A, B and C suffixed to a three-dis class number indicates a half-credit class, i class having one-half the value of a full class determining the standing of students. letters indicate the terms during which classes are offered, as follows:

A: First term only, final examination before December vacation.

B: Second term only, final examination after close of lectures in Spring.

A/B: Given in the first term, examination before December vacation; repeated in second term, examination in Spring.

C: Spread over both terms, final examination in the Spring.

Points for half-credit classes will be award amounting to one-half the value for a full class of equivalent standing.

Classes numbered in the 200 + series are secon The General Bachelor of Arts degree requires

1. First-year Requirements (common to

degree will in his first year normally take five classes. It is recommended that, of these, one class be chosen from each of the groups A, B, C and D. In any case, students are required to choose one class from each of three of the groups A, B, C and D.

2. Requirements for the Second and Third

The ten classes making up the course for the second and third years shall consist of:

(a) Six classes beyond the 100 level in two subjects (Students should choose these six classes as early as possible and approach the departments concerned for guidance in deigning their programmes).

(b) Four classes, normally in subjects other than the two offered to satisfy requirement 2(a) above, at least one of the four to be beyond the 100 level in the subject treated. The

## subjects may be chosen from Groups A, B, C, D. or from Art History; Education 401, 402;

than three classes in Commerce.

**Degree Programmes** 

(Students who wish to offer, under section 2(a) above, a subject begun only in the second year may, by exception, offer the introductory class in that subject as one of the four classes required in section 2(b).

Students making progress in a language begun for the first time at the University are strongly advised to take a second class in the same language in order to consolidate what they have learned

For details of classes in the various departments, see Programmes of Study.

An honours class may be taken by students who are not in an honours course, if approved by the department.

All students contemplating entry to the teaching profession after graduation are required to consult the Chairman of the Education Department, before registration, concerning their programme of study. Students contemplating music education should similarly consult the Chairman of the Department of Music.

For honours courses, see Programmes of Study where each department gives the contents of its Religious Studies 100; Engineering; not more honours programmes.

### General Bachelor of Science

1. First Year Requirements (common to general and honours courses)

Each full time student planning to take a B.Sc. degree will in his first year normally take five classes. It is recommended that, of these, one class be chosen from each of the groups A, B, C and D. In any case, students are required to choose one class from each of three of the groups A, B, C and D.

2. Requirements for the Second and Third

The ten classes making up the course for the second and third years shall consist of:

(a) six classes beyond the 100 level in two subjects chosen from biology, chemistry, engineering, geology, mathematics, physics, psychology; classes in Computer Science (see entry under Mathematics) may from a minor part of the offering in this section.

(b) four classes normally in subjects other than the two offered to satisfy requirement 2(a)

above, at least one of the four to be beyond the 100 level in the subject treated. The subjects may be chosen from Group A, B, C, D or from Art History; Education 401, 402; Religious Studies 100; Engineering; and not more than three classes in Commerce. (Students who wish to offer, under section 2(a) above, a subject begun only in the second year may be exception, offer the introductory class in that subject as one of the four classes required in section 2(b).

For honours courses see Programmes of Study where each department gives the contents of its honours programmes.

#### Honours Courses

Students of ability and amibition are urged to take a course leading to the bachelor's degree with honours. These courses entail (a) a number of advanced classes, (b) a higher quality of work than that required for the general bachelor's degree, and (c) a four-year programme from Senior Matriculation. There are two types of honours courses: concentrated, involving a major concentration in a single discipline or a combined concentration in two related disciplines; and unconcentrated, involving an integrated and well-focused plan of study which cuts across disciplinary boundaries.

It will be observed that in all cases the honours programmes satisfy the requirements for the general degree so that a student may transfer from the honours to the general programme without serious inconvenience. Students considering an honours course are advised to consult as soon as possible - preferably before their first registration - with the departments in which they may wish to do their advanced

The following are general rules relating to Honours courses:

- 1. Twenty classes are needed for the B.A., B.Sc. or B.Com. degree with honours.
- 2. At the end of a concentrated honours course, a student must pass a comprehensive examination covering his honours work and he must attain an average of not less than B - in the classes in the two disciplines in which he has concentrated; attainment of an average of at least A - in this examination and these classes is required to obtain First-Class
- 3. At the end of an unconcentrated honours course, a student must obtain a grade of B - or higher on an honours essay or a comprehensive examination regarding his honours work. In addition, he must attain an average of B - in the required advanced classes which comprise his honours programme. Achievement of an average of at least A - on the honours essay or examination and in the required advanced classes is required to obtain First Class Honours.

4. Honours students in a concentrated programme must be accepted by the major department concerned, which will supervise their whole programme of study. Concentrated honours programmes are set out in the Programmes of Study. Honours students in an unconcentrated programme must be accepted by the Committee on Studies, which will appoint an interdisciplinary advisory committee of two or more Faculty members to supervise the programme of study.

To be acceptable, a proposed unconcentrated honours programme must have a clearly stated unifying or integrating principle (e.g. Compara- 10). tive Literature of the 19th Century, or the history and philosophy of natural science, or (c) Requirements for an Unconcentrated R technology and modern society).

5. Application for admission to an honours At least eight classes of the twenty require Uniform Bachelor of Science for course must be made in triplicate on forms that are available from the Registrar's Office. Students desiring to pursue a concentrated programme must submit these forms to the head of the department concerned. Those desiring to follow an unconcentrated honours course should make application to the Chairman of the Committee on Studies.

#### Honours Programmes

- 1. The regulations for the first year of study are the same as for the General B.A. or General
- 2. The overall requirements are the same as those for the General B.A. and General B.Sc. degrees respectively.

#### Concentrated Honours Programmes

- (a) Honours in a major programme are based on the general requirements that the 15 classes beyond the first year of study comprise:
- (i) nine classes beyond the 100 level in one subject (the major subject);
- (ii) two classes in a minor subject satisfactory to the major department; and
- (iii) four classes not in the major field.
- (b) Honours in a combined programme are based on the general requirement that the 15 classes beyond the first year of study comprise: (i) eleven classes beyond the 100 level in two allied subjects, not more than seven classes being in either of them;
- (ii) four classes in subjects other than the two offered to satisfy requirement 3(b) (i) above.

Details of specific departmental honours programmes will be found under departmental listings of Programmes of Study. It may be noted that there are occasional minor departures in detail from the general regulations given above; these programmes have been given specific approval by the Faculty of Arts and

#### Unconcentrated Honours Programmes

grammes are based on the general requirem. that the fifteen classes beyond the first year study comprise:

- (i) twelve classes beyond the 100 level in the or more subjects. No more than five of the purpose. may be in a single subject; no less than six no more than nine may be in two subjects.
- (ii) three other classes.
- (b) Requirements for an Unconcentrated R (Honours).

At least ten classes of the twenty required man be selected from Groups A, B, and C. (see Fa

- (Honours).
- must be selected from biology, chemis geology, mathematics, physics and psychological and at least six additional classes must h selected from groups C and D.
- 5. The regulations pertaining to the hone programme leading to the Bachelor of Co merce degree may be found in Programmes

#### Bachelor of Commerce

Courses are offered leading to a General and tecture below. an Honours Bachelor of Commerce degree.

will enter a revised programme which me Study. permit some concentration in one of seven fields of business studies. Students planning Bachelor of Science in Engineering Physics follow a concentration programme shoul Physics consult the Department of Commerce prior registration.

- graduates in commerce of Dalhousie who a Accountancy.
- ants offers exemptions to graduates in com merce of Dalhousie who are candidates for Diploma in Registered Industrial Accountant

Details of the curriculum for the General and for the Honours degree course are given under Commerce (see page 29).

#### Bachelor of Education

There are two courses which lead to the degree of Bachelor of Education:

- 1. a four-year integrated course in whi classes in education are taken concurrently wi classes in arts and science; two degrees and awarded on the completion of this course, B.Ed. and the B.A. or B.Sc.;
- 2. a one-year sequential course in which class? in education are taken only after completion of (a) Honours in the unconcentrated pro- all classes in arts and science. Candidates [6]

admission to this course must have received the degree of B.A., B.Sc. or B.Com. from a college or university recognized by the Senate for the

By arrangement with the Nova Scotia Department of Education, students completing either of these courses in education may receive a Teacher's Certificate (Class 5). Both B.Ed. courses are divided into two types, Elementary and Secondary.

#### Diploma in Education

Award of the Diploma in Education for the Integrated (Elementary) course will be discontinued following the Spring Convocation

## Engineering

The work of the uniform Bachelor of Science for Engineering covers three years. Students who complete the course successfully receive a General Bachelor of Science degree from Dalhousie and qualify for admission to the junior year of the Nova Scotia Technical College. Students who plan to continue their studies at a college other than the Nova Scotia Technical College should consult the department before the first register. See also Archi-

Details of the curriculum for the course are For 1970 and subsequent years new studen given under Engineering in Programmes of

This is a special four-year course designed to give students more training in physics and 1. The Institute of Chartered Accountants | mathematics than is usual in the ordinary most provinces in Canada offers exemptions engineering course. Students are also given the opportunity to specialize in such fields as candidates for the Diploma in Charten electronic systems engineering, semiconductor engineering, communications and underwater acoustics. Completion of the course is excellent 2. The Society of Industrial and Cost Account preparation for graduate work in physics, engineering or earth sciences.

Details of the curriculum for the course are Classes taken for the Certificate may be given under Engineering in Programmes of

#### Bachelor of Music Education

This is a special four-year course. By arrangement with the Nova Scotia Department of Education, students completing the course are awarded a Teacher's Certificate (Class 5).

Details of the curriculum and requirements for admission to the course are given under Music in Programmes of Study.

#### Certificate in Public Administration

A programme leading to the Certificate of Public Administration is available to persons who meet the admission requirements of Dalhousie University and who neither hold a first degree nor are enrolled in a programme leading to a first degree. Those not meeting the formal admission requirements may apply for admission under the Special Cases (see page 5) provision. The Department of Political Science will review applications for admission under this provision and make recommendations thereon.

#### Prerequisite Requirement

Standing in Political Science 100 or its equiva-

#### **Programme Requirements**

- 1. Government of Canada (Political Science 202);
- 2. a class in economics
- 3. Public Administration (Political Science
- 4 and 5. two other classes in the social sciences chosen in consultation with the Department.

Normally four of the five classes in the programme must be taken at Dalhousie University. Except for the prerequisite class, credit will normally be given only for classes taken after the student has registered in the programme.

credited toward a bachelor's degree, but a student must complete at least five of the subjects required for the degree after the award of the Certificate.

The degree programme and the Certificate programme cannot be taken concurrently. A person registered in a degree programme cannot also be registered in a Certificate programme, nor can a Certificate in Public Administration be awarded for work taken as part of a degree programme.

#### Architecture

Qualification for entrance to the School of Architecture at the Nova Scotia Technical College is the satisfactory completion of at least two years at any university or equivalent institution of recognized standing. A university course in mathematics is prerequisite, except that the applicant may instead be required to take a written examination in this subject.

Providing it has been undertaken at a recognized university, virtually any course of studies, including arts, fine arts, engineering and other technologies, science, agriculture, social sciences, education, medicine, is acceptable.

A candidate for admission to the first year in architecture should submit to the Registrar of the Nova Scotia Technical College by July 4 the following documents; a) an application form obtained from the Registrar, NSTC; b) an official transcript of his university record; c) a letter of recommendation from some person of academic rank with close personal knowledge of his academic background.

#### Nova Scotia College of Art and Design

Students successfully completing one year of a university arts programme (entered after Grade 12) may be admitted into the second year of the four-year programme leading to the Bachelor of Design degree in Communication Design or Environmental Design at the Nova Scotia College of Art and Design.

## **Programmes of Study**

### Art History

Assistant Professor and Director of the Art Gallery E. Smith

#### Classes Offered

101A Survey of the History of Art, lect.: 2 hrs.; E. Smith

Palaeolithic to the end of the 18th Century

101B Survey of the History of Art, lect.: 2 hrs.; E. Smith.

The 19th and 20th centuries: A survey of painting, sculpture, architecture and allied arts from the earliest times to the present.

#### Biochemistry

#### Professors

C. W. Helleiner (Chairman)

L. B. Macpherson

S. J. Patrick

D. W. Russell

S. D. Wainwright

#### Associate Professors

A. H. Blair

F. I. Maclean

F. B. Palmer

#### **Assistant Professors**

W. F. Doolittle

C. B. Lazier

C. Mezei

L. C. Stewart

J. A. Verpoorte

M. W. Gray

F. M. Smith

## M. W. Spence

Lecturers M. S. DeWolfe

P. Dobos

E. S. MacFarlane

Biochemistry, the study of the structure and behaviour of the molecules of living things, is a new science: most of what we know has been discovered since 1945, so that even elementary textbooks are changed and added to constantly.

Structure can be investigated in various degrees of detail. Scientists have progressed from study with the naked eye (gross anatomy) to examination of the whole specimen or parts of it with light and, in recent years, electron microscopes (microscopic anatomy). These optical methods led to the discovery of such minute particles that it became necessary to apply methods of chemistry and physics. Thus, the biochemist of today studies the structure of small molecules

by the well-known methods of organic chemistry. Study of the larger molecules which are characteristic of living organisms and the measurement of their physical properties requires special methods. Old methods must be expanded and adapted, and new ones evolved, to study even larger molecules — in some cases with the return to the use of the electron microscope.

Biochemists also try to explain, in chemical terms, the behaviour of the living organism how it becomes what it is and maintains itself. An organism takes its food from the environment and converts it, by the process of metabolism, into its own molecules and larger structures. Biochemists have provided most of our knowledge of this complex and important series of reactions, largely by tracing the sequence of changes in chemicals labelled with radioactive isotopes.

Biochemical genetics (the biochemistry of heredity) is concerned with the mechanism by which a cell specifies the structures not only of its own molecules but also those of its daughter cells. A recent major break-through was the elucidation of the structures of DNA and RNA; this, together with even more recent knowledge of the action of viruses, has resulted in our present understanding of the chemistry underlving heredity.

Biochemists are also concerned with the study of enzymes: most of the chemical reactions in living things would proceed very slowly, or not at all, if these specific catalysts were lacking. Studies now in progress are investigating the properties of enzymes and the ways in which they function in the many, varied types of organic material.

The results of biochemical research are applicable in almost every aspect of life. The biochemist relates the structure of soil and the functioning of its micro-organisms to the needs of agriculture and of animals, and helps to design pesticides and fertilizers, additives and substitutes. The drug, fermentation and foodprocessing industries, to name but a few, rely heavily on biochemical techniques and knowledge. Much of fundamental biology is best understood in biochemical terms, and problems relating to such apparently remote areas as ecology and psychology are being referred, more and more often, to the biochemist. Medicine turns to biochemistry for explanations of hereditary and metabolic disorders and for an understanding of the actions of drugs and is on the threshold of explaining some psychiatric conditions in biochemical terms.

Where are biochemically trained people employed? In Canada, most of them work in universities, in agricultural research, or in government or hospital laboratories; some are employed in industry. Training to the B.Sc. 5. Physics 101.

level enables one to work as a technician Minor in Mathematics research assistant; more responsible positi usually require a higher degree. Graduates biochemistry can go on to further training medicine, pharmacology, physiology, various other branches of the biological

The Biochemistry Department is located in a Sir Charles Tupper Medical Building, Althou administratively the department is in Faculty of Medicine, it is also an integral Description of the Faculty of Arts and Science; its members take an active part in teaching in both faculti and most of the research work is as relevant biology in general as to medicine. The dense ment has exceptionally up-to-date equipmen and almost all current biochemical interests a be handled.

#### Degree Programmes

The study of biochemistry requires a pr 11. Biochemistry 302. knowledge of elementary biology, mathemat 12. Chemistry 210. and physics, and a good grounding in organ and physical chemistry. Accordingly, the he ours programme in biochemistry is planned Minor in Biology such a way that these subjects are covered in 14-15. Two biology or microbiology classes of of biochemistry proper. Students who are n 203, 204, or 205. concentrating in biochemistry, but who wish include a class in biochemistry in their p grammes, should plan to do so in their third 14. Elective. fourth year. They should ensure that # 15. Additional physics class. necessary background is provided in th earlier years. The outline of the honou programmes will serve as a guide in this respe-It should be noted particularly that a class organic chemistry is a prerequisite for t elementary class in biochemistry, and that of in physical chemistry is strongly recommended

#### B.Sc. with Honours in Biochemistry

The honours programme in biochemistry air to provide the student with the backgroun necessary for graduate work in biochemist and allied fields. It is also a suitable preparation for the study of medicine or dentistry. Becau Minor in Mathematics the chemical content of all branches of biological is rapidly increasing, biochemistry can recommended as a starting point for a career many fields of biology.

Three major programmes in biochemistry outlined below, with minors in biology, physical and mathematics. Honours students must pa comprehensive examination in biochemistry the conclusion of their period of study.

1-2. Two electives from groups A, B or C, not both from the same group.

3. Mathematics 100. 4. Chemistry 110.

Minor in Biology

Minor in Physics 5. Physics 110.

5. Biology 101.

6. Chemistry 230.

7 Chemistry 242.

Minor in Biology

8. Elective 9. Physics 110.

10. Biology 200.

Minor in Physics

8. Biology 101.

o Physics 230. 10. Physics 221 or 222.

## Minor in Mathematics

g Elective.

9. Physics 110.

10. Mathematics 200.

#### Year III

13. Additional Chemistry class.

orderly fashion before students begin the students which at least one must be chosen from Biology

Minor in Physics

#### Minor in Mathematics

14. Elective.

15. Additional mathematics class.

#### Year IV

16. Biochemistry 403.

17. Biochemistry 406.

18. Biochemistry 407.

19. Additional chemistry class.

Minor in Biology

20. Additional mathematics or physics class.

Minor in Physics

20. Additional biology or microbiology class.

20. Additional biology or microbiology class.

### Classes Offered

302 Introductory Biochemistry, lect.: 2 hrs.; lab.: 6 hrs.; A. H. Blair/M. W. Gray/F. B. Palmer.

This class is designed to introduce the student to the various aspects of the general field of biochemistry.

Approximately half the class is devoted to a study of the structures and chemical and biological properties of the molecules of which living things are composed. These include the biological macromolecules: polysaccharides, proteins and nucleic acids. The properties of enzymes as catalysts and the basis of their activity are discussed.

The remainder of the class deals with intermediary metabolism: the pathways of transformations which molecules undergo in the living organism. These pathways provide for the generation of usable energy, and for the utilization of this energy for the synthesis of new molecules characteristic of the organism. Finally, the class includes an introduction to biochemical genetics: the means by which the living cell specifies the structures of the molecules to be synthesized by itself and by its descendants.

This class, or an equivalent one, is a prerequisite to more advanced classes in biochemistry. Enrolment is limited to about 40.

Prerequisite: a class in organic chemistry; it will be assumed that students are familiar with the structures and reactions of the major classes of organic compounds. A basic class in physical chemistry is very desirable. The prospective student will be much better prepared for this class if he has some prior knowledge of chemical equilibrium, pH and elementary chemical kinetics.

403 Topics in Intermediary Metabolism, lect.: 2 hrs.; M. S. DeWolfe, F. I. Maclean, C. Mezei, F. B. Palmer

This class is intended to expand and complement the study of intermediary metabolism begun in the introductory class. Topics previously introduced are studied in greater detail and complexity. These are supplemented by a selection of more specialized topics of particular interest. The material is taken from the recent scientific literature and is principally concerned with aspects of carbohydrate, lipid and amino acid metabolism in animals, plants and micro-organisms. Emphasis is placed on the interrelationships between the different metabolic systems and, wherever possible, both cyclic and non-cyclic systems are examined for mechanisms by which the control and direction of metabolism are achieved. The structure and metabolism of biological membranes, particularly the myelin of nerves, is dealt with in some detail. Also discussed are the biochemical aspects of synaptic transmission in nerves. A study of energy generating systems and the metabolism of their more important components is included. In addition to the details of the oxidative and photosynthetic phosphorylation systems, the diversity of different energy yielding systems which occur throughout nature is presented. Prerequisite: Biochemistry 302 or an equivalent

class in basic biochemistry.

406 Advanced Instrumentation Techniques. lab.: 6 hrs.; J. A. Verpoorte.

Instruction is provided for advanced students in the use of modern instrumentation. The principles and operation of the equipment will be discussed. This includes spectrophotometers, ultracentrifuges, spectropolarimeters, flame

spectrometers and column chromatographic

Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

407 Physical Biochemistry, lect.: 2 hrs.; A. H. Blair, J. A. Verpoorte.

Selected aspects of the chemistry of biological macromolecules, mainly proteins, are discussed. Topics include: discussion of the relationship between structure and biological activity; physical and chemical methods for studying polymers; enzyme kinetics, including the behaviour of enzymes involved in the control of metabolism; structure of the active sites of

### Biology

#### **Professors**

M. L. Cameron

K. E. vonMaltzahn

I. A. McLaren

J. G. Ogden E. C. Pielou

L. C. Vining

#### Professors (Part-time)

C. M. Boyd

F. R. Haves E. L. Mills

G. A. Rilev

### **Associate Professors**

R. G. Brown

R. W. Dovle

I. Farley E. T. Garside

M. I. Harvey

O. P. Kamra W. C. Kimmins

#### Associate Professors (Part-time)

L. M. Dickie

K. H. Mann

H. Schwassmann

#### **Assistant Professors**

E. W. Angelopoulos

A. R. O. Chapman

I. V. Collins

L. E. Haley

B. K. Hall G.S. Hicks

R. P. McBride

#### Senior (Killam) Fellow

D. P. Pielou

#### Research Associates

D Rrewer J. S. Craigie

R. F. Shaw

The programme in biology is designed to provide the student with an understanding of living things. Understanding of the biological world is so important for us because we are part of it. We carry to a large degree the responsibility for the state of the biosphere and we can act responsible only if we understand it and relate ourselves to it.

The programme offered by the Department gives also a basic training in the biological sciences which may serve as preparation for graduate and professional work in biology, medicine, dentistry, pharmacy, the health professions, bioengineering and education; in agriculture, aquaculture, forestry and environmental architecture and engineering.

#### Degree Programmes

The Department offers classes leading to the General B.A. and B.Sc. degree in biology and to a concentrated or combined Honour B.Sc. programme. A student intending to study biology as his main subject is asked to consult the Department early in his course so that a proper programme can be worked out.

#### General B.A. or B.Sc. programme with concentration in Biology

Students reading for a General degree in biology and especially students contemplating a teaching career are urged to take all the core classes. A suggested programme is outlined below under general biology. Students interested in this general programme should consult the Biology Department and be assigned a counsellor to assist in the selection of classes. (See following table).

Students who may have special interests in Molecular, Developmental, or Environmental Biology may elect to follow one of the three streams as outlined below. Such students must consult the Department and be assigned a counsellor to assist in the selection of classes. (See following table).

#### Honours in Biology and Preparation for Graduate Study

For entrance to the Graduate School an Honour degree or equivalent four-year background is required. Students should be aware that in Graduate School they will need a reading knowledge of one or more of French, German or Russian, and also that a thorough

grounding in basic sciences is as important as advanced undergraduate training in Biology.

Students reading for a Bachelor of Science degree with honours in biology must satisfy the general requirements for honour degrees and arrange their course programme as early as possible in consultation with the Department. The following course programme is recommended for Honours in Biology, However, in many cases where this degree of specialization is not the best preparation for graduate school. a combined or unconcentrated Honours programme may be preferable. Students are advised to discuss this matter with the department at an early date.

- 1. Biology 200 or two half-classes from Biology 201A/B-206A/B.
- 2-3. Two classes in Chemistry, Math or Physics. 4. One class in a foreign language.
- 5. One class in humanities or social sciences.

#### Year II

- 6. Biology 200 if not already taken, otherwise another Biology class.
- 7. Two half-classes from Biology 201A/B-
- 8. Another class in Chemistry, Mathematics or
- 9. One other class in science or mathematics. 10. An elective.

### Year III

- 11-13. Three classes in Biology of which at least one should be at the 300-level.
- 14. Another class in chemistry, mathematics or physics.
- 15. An elective.

#### Year IV

- 16-19. Four classes from the Biology 300 and 400 group, of which one should normally be Biology 490.
- or an elective.

Marine Biology is simply the application of basic Biological principles to marine organisms. Thus, a student interested in this field must first obtain a sound general science background.

Specialization in marine aspects is only possil in a 4th year and in graduate school.

Students with marine biology interests sha take a 4-year programme as outlined above Biology electives in the 4th year can be ch predominantely from specialized 400 classes in marine subjects.

Honour students must pass a comprehens examination at the conclusion of their per

#### Classes Offered

A class number that is suffixed by one of letters A, B or C is a half-credit class, comments on these classes under the head Numbering of Classes under Degrees Courses (page 10).

Biology class offerings may be grouped into fi

- 1. Introductory biological principles Biological 101. This class is designed for students with previous biology or for students in the heal sciences or other sciences who require overview of biology.
- 2. Classes for those students who do not inter to take biology as their area of concentration Biology 140 and 160. These classes do not sen as a prerequisite to other biology classes.
- 3. Core classes These consist of a full-year class Biology 200 and six half-year class 201A/B-206A/B. Collectively these classes for the basis of Biology class offerings, It recommended that a student who takes biological as his area of concentration completes as man of these classes as possible.
- 4. 300 level classes Intermediate classes a mainly for second and third year students. The classes Biology 311-324 represent studies of the biology of the groups of organisms specifie The other 300 classes are concerned partic 20. One class in the minor field, if necessary, larly with principles in molecular, devel pmental and environmental biology.
  - 5. 400 level classes These classes primarily for honour and graduate studen They are open to others with permission of the

Recommended programmes of classes for B.A. or B.Sc. in Biology

	General Biology	Molecular Biology	Development Biology	Environmental Biology
	Counsellors — I. A. McLaren — L. E. Haley	Counsellors — W. C. Kimmins — L. C. Vining	Counsellors — B. K. Hall — G. S. Hicks	Counsellors — J. G. Ogden — R. W. Doyle
Year I	1. Bio. 101 or 200 or 2 of 201-206	1. Bio 200	1. Bio 200	1. Bio 206A/B and 204A/B
	2. One other introductory sci. or math class	2. Bio 201A/B and 203A/B	2. Bio 205A/B and 203A/B	2. Math 100 or 150
	3.4. Two classes from Humanities, Soc. Sci or languages	3. Chem 110	3. Chem 110	3. Chem 110
	5. One other class	4-5. Two classes in humanities, soc. sci. or languages	4-5. Two classes in humanities, soc. sci. or languages	4-5. Two classes in humanities, soc. sci. or languages.
Year II	Students are required to take six classes above the 100 level in Biology and one other science. It is recommended that the Biology student take all the Bio core classes (200, 201-206) and 1 or more 300 level classes. However, variations of this are possible. Generally 200 level chem or math or physics are recommended for the other science.	<ul> <li>6. Bio 330A and 311A</li> <li>7. Bio 202A/B and 313B</li> <li>8. Chem 242</li> <li>9. Math 150</li> </ul>	<ul> <li>6. Bio 201A/B and 202A/B</li> <li>7. Bio 350A or 351B and 331A or 313B</li> <li>8. Chem 242</li> <li>9-10. Two electives</li> </ul>	6. Bio 200 7. Two of Bio 201-206 or Bio 360 or 361 (by permission) 8. Math 206A plus one half class 9-10. Two electives, (geology, etc.)
Year III	The remaining four classes may be chosen from other	11. Bio 415	11. Bio 353B or 340B and 330A	11. Bio 360
ter modern	sciences which complement his area of concentration	12. Bio 412 or 418	12. Bio 350A or 351B and 331A or 313B	12. Bio 361
locally lie	or may be selected from other Arts and Sci.	13. Bio 313A and 205B	13. One other Bio or Chem class	13. Two of Bio 201-206
talianon da	subjects.	14-15. Two electives.		14-15. Two electives.

#### Introductory Classes Offered

All students registering for a biology class for the first time should read the following regulations carefully before completing registra-

- (a) students who do not have senior matriculation biology credit will take Biology 101 as a first class in biology.
- (b) students who have senior matriculation biology credit will take Biology 200 or two of Biology 201 A/B-206 A/B (core classes).
- 101 Principles of General Biology, lect.: 2 hrs.; tutorials: 1 hr.; lab.: 3 hrs. R. Brown/M. L. Cameron, L. Haley, M. J. Harvey, R. P. matic principles. McBride

The purpose of the class is two fold: to acquaint the student with the disciplines and methods of formal, experimental science, and to prepare the student for classes at a higher level in biology and in related subjects. To achieve these aims, the class is presented from the experimental evidence on which are based all the theories and hypotheses discussed. The cell is taken as the unit of study and the topics discussed are: the scientific method as applied Chapman

to biology; the structure of the cell; the functions of the cell as a living unit; the structures and functions of cell organelles; the structures and functions of organic molecules (proteins, carbohydrates, nucleic acids); the replication of cells (the basic theories of inheritance, genetics and cell division); the functions of DNA and the known mechanisms of protein synthesis; the cell as a unit in higher organisms; the higher organism as an integrated unit (a typical plant and a typical animal are examined); the individual organism as a unit in a bioecological organization; theories of natural selection and evolution; theories of the origin of life on the earth; the implications of these theories for the organisms presently on the earth; a brief survey of taxonomic and syste-

The laboratory programme is arranged to follow the lecture programme as closely as

The following two classes are for students who do not take biology as their area of concentra-

140 Inheritance, Evolution and Man, lect.: 1 hr.; tutorial: 3 hrs.; J. V. Collins, A. R. O. This class introduces basic concepts in genetics and evolution, and uses these to examine the nature of living organisms and how they function. One particular aim of the class is to consider man as part of the living world and to explore the impact of genetic and evolutionary forces on man's past and future. The class is taught as a series of lectures and tutorial sessions during which students discuss topics on which they have done independent reading, e.g. the nature of inheritance, the origin of life on earth adaptation of organisms to specific environments. Students are also required to write a number of essays on assigned topics, related to the general themes of the discussion.

160 Environment and Man, lect.: 2 hrs.; tutorial: 1 hr.; optional lab.: 3 hrs.; J. G. Ogden and members of staff.

The relationship of man to environmental systems is the principal emphasis of this class. First term reviews the history and distribution of living systems, and the environmental controls which regulate population size, diversity, and distribution. In the second term, the uniqueness or ubiquity of specific biological systems is explored from molecular to organismic levels.

Tutorials offer an opportunity through discussion and reports to develop an ecological view of economic man. The laboratory offers an opportunity to develop individual research projects related to the class.

The following classes are core classes in the general biology programme. Students concentrating their studies in biology may want to include all of these classes in their programme of studies.

200 Diversity of Organisms, lect.: 3 hrs.; lab.: 3 hrs.; K. E. vonMaltzahn, I. A. McLaren and others.

This class is concerned with the great variety of living things, from viruses to higher plants and animals. This diversity cannot be understood without some knowledge of classification and evolutionary relationships of major groups. The class is not simply a survey of diversity, as many important anatomical, physiological, and developmental principles are derived from the comparative approach in biology.

Students are advised to take this class early in their programme of biology classes, since some knowledge of diversity of organisms is required in other classes.

201A/B Molecular Biology, lect.: 3 hrs.; lab.: 3 hrs.; W. C. Kimmins, L. C. Vining.

This class serves as an introduction to biological chemistry. Biological organization from the atom to the community may be seen as various combinations and rearrangements of quasiidentical structures. That is, a box-within-box arrangement not unlike the more classical "great chain of being".

The commitment in this class is to discuss how the properties of each box emerge from the properties of atoms and the forces between

Application of this principle to the three boxes of lowest magnitude (atom, molecule, molecular assemblies) constitutes the discipline of Molecular Biology.

In addition to lectures there will be opportunities to participate in laboratory projects and seminars. Background in chemistry is essential. Text: Lehninger, Biochemistry, 1970.

202A/B Cell Biology, lect.: 2 hrs.; discussion: 1 hr.; lab.: 3 hrs.; E. W. Angelopoulos, J. V. Collins.

The class introduces the basic concepts of cell structure and function, through lectures, laboratory sessions, demonstrations and films. Lectures correlate the findings of light and electron microscopy with bio-chemistry.

Laboratory work is integrated with the lecture material and includes the theory and practice of light microscopy, staining and histochemistry, and observations on cell division and chromosome structure.

Students are expected to develop and show competence in expressing ideas in writing, in performing and recording observations in the laboratory, and in expressing themselves orally in group discussions.

203A/B Genetics, lect.: 3 hrs.; lab.: 3 hrs.; L. E. Haley, O. P. Kamra.

The following three questions will be discussed in this class: (1) What is the nature of the genetic material, i.e. the structure and function of DNA; (2) How is the genetic information transmitted from one generation to the next; and (3) How does the genetic material act? Text: Levine, Biology of the Gene.

204A/B Evolutionary Biology, lect.: 2 hrs.; tutorial: 2 hrs.; R. W. Doyle.

A study of evolution as the interaction of genetic and ecological processes. The first half of the class introduces certain areas of population and biometrical genetics, an explicit statement of natural selection and an ecological model of population growth and competition. In the second half of the class these ideas will be applied to the problem of the origin of new species in space and time, to aspects of human cultural and biological evolution, to the evolution of complex life cycles and to the evolution of the genetic system itself.

There are two lectures and a tutorial every week with a problem set or paper due at each tutorial. A thorough grasp of Mendelian genetics at the senior matriculation or Biology 101 level will be assumed from the beginning; there are no other prerequisites although experience indicates that the background provided by Biology 203 may be helpful.

205A/B Developmental Biology, lect.: 2 hrs.; lab.: 3 hrs.; B. K. Hall, G. S. Hicks.

This class discusses the principles of both plant and animal development, emphasizing the experimental approach. Opportunity is given in the laboratory to carry out some experimental analysis of development. Topics covered include: factors initiating development; embryogenesis; typical developmental patterns; analysis and regulation of growth and ageing; cell specialization and its possible reversal.

Text: J. D. Ebert and I. M. Sussex, Interacting Systems in Development, 2nd ed., (Holt, Rinehart and Winston, 1970).

206A/B Ecology, lect.: 2 hrs.; lab.: 3 hrs.; I. A. McLaren, J. G. Ogden, Ill.

The lectures offer an overview of ecology, considering in order the ecology of individuals, the regulation of numbers in single-species populations, various interactions among such populations, and finally the complex interactions involved in the structure, function, and development of ecosystems. The laboratories

give some insight into techniques and modes thought used by ecologists, and include dependent projects by students. Text: Kormondy, Concepts of Ecology; Odna Ecology.

Intermediate Classes Offered

Intermediate classes are mainly for second third-year students. They may be taken bef completion of the core of classes describe above. Please notice, however, prerequisites for the classes listed below.

The classes 311-324 represent a more thorough study of the biology of the groups of organis specified.

311A Bacteria, Viruses and Fungi I, lect hrs.; lab.: 3 hrs.; R. Brown.

A comparative study.

311B Bacteria, Viruses and Fungi II, lect. hrs.; lab.: 3 hrs.; R. Brown, R. P. McBride.

Study of their physiological and ecologic characteristics. Admission to 311B requires completion of 311A. The object of Biology 31 is to acquaint students with the "microbia world". In so doing, the following three questions are considered:

What are micro-organisms? In deciding microbes are one must compare them with other living organisms and with each other Consequently, a comparative study of micro organisms based on morphological, physiological gical, developmental and chemical considera tions is made in the first term. The object is to delimit the microbial world.

Where are micro-organisms found? For answer to this question one turns to microbal ecology. Microbial interaction with other or ganisms is important because of their sapio phytic and/or parasitic nature. To demonstrate this interaction, topics such as symbiotic nitrogen fixation, ruminant digestion, and disease are discussed.

Finally, what do microbes do? Birds sing, ea insects and seeds, etc. Without seeing them how do we know that micro-organisms present? To illustrate the diversity of microbia action, selected metabolic activities of micro

Students entering this class should have taken classes in organic chemistry and cell physiology although students taking these subjects concurrently will be admitted.

Prerequisite: Normally Biology 201A/B 203A/B, 202A/B.

312A Algology, lect.: 2 hrs.; lab.: 3 hrs.; A. R O. Chapman.

This class is designed to introduce a broad spectrum of topics which may be included i the field of algal biology. These will include

morphological diversity presented from a demorphological viewpoint, some aspects of ultra velopinotal marine benthic ecology, phytoplankton ecology and economic importance. Prerequisite: Biology 200.

Texts: E. Y. Dawson, Marine Botany, (Holt, Reinhardt and Wilson, 1966); Reference texts: Rehmand Republic Repu Ecology; J. Lewis, Ecology of Rocky Shores.

313A Plant form and function I: Morphology, lect.: 2 hrs.; lab.: 3 hrs.; K. E. vonMaltzahn, G.

An analysis of the architecture of plants with emphasis on the flowering plants. Prerequisite: Biology 200.

314B Plant form and function II: Physiology, lect.: 2 hrs.; lab.: 3 hrs.; G. S. Hicks.

Generally the class deals with internal and external regulations and with the uptake, movement and exit of various substances. Within this framework, the following topics are treated in depth: physiology of growth; mechanisms of hormone action; light effects mediated by phytochrome; overall water economy of the plant; translocation of assimilates. The laboratory involves a project which explores physiological aspects of seed germination. Prerequisite: Biology 200.

315A Systematics of Higher Plants, lect.: 2 hrs.; lab.: 3 hrs.; M. J. Harvey.

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'. The latter is still in an experimental stage here and will involve some study of numerical taxonomy, automated identification and key construction. Prerequisite: Biology 200.

316B Adaptation and Speciation in Higher Plants, lect.: 2 hrs.; lab; seminar: 3 hrs.; M. J.

This is a biosystematics class designed to account for a minute fraction of the great organisms are considered at the molecular level variety and intricacy of the adaptive mechanisms which are found in the flowering plants and ferns. It attempts to integrate evidence derived from related sub-sciences such as genetics, cytology, morphology, ecology, plant geography and systematics, and at least one of these topics must have been studied prior to taking this class. Prerequisite: Biology 200, normally 315A.

> 321 Invertebrates, lect.: 2 hrs.; lab.: 3 hrs.; C. M. Boyd, J. Farley, E. L. Mills.

> This class gives a survey of the invertebrate phyla, with strong emphasis on laboratory

work. Knowledge of the basic structure and classification of the phyla will be gained in the laboratory, whilst lectures will deal with such aspects of phylogeny, functional morphology, comparative physiology, etc. There will be some field work during the class in local marine areas. Geology students may enter this class without fulfilling the prerequisite given below. Prerequisite: Biology 200.

322B Animal Parasitology, lect.: 2 hrs.; lab.: 3 hrs.; E. W. Angelopoulos.

The class is intended to give students an understanding of parasitism, diversity and ubiquity.

Although the class gives a survey of parasites from parasitic protozoa to vertebrates, the emphasis is not on taxonomy and morphology. Instead, one or more representative species from each group are discussed in detail and used to demonstrate the life cycle as well as the host-parasite relationships. Morophology and physiology are brought into the study of specific adaptations to the environment during free-living and parasitic stages. Problems of the reproduction and transmission of parasites are stressed. Different hypotheses of the origin of parasitism and recent trends in evolution are considered.

Prerequisite: Biology 200.

323 Vertebrates, lect.: 2 hrs.; lab.: 3 hrs.; E. T. Garside, F. R. Hayes.

The main purpose of this class is to acquaint the student with the current state of knowledge and speculation concerning the evolution of vertebrate animals from an invertebrate ancestral line at least 500 million years ago.

The structure of vertebrates and their sequential deposition of fossils in progressively more recent formation of the superficial crust of the earth form an unparalleled and unequivocal exposition of organic evolution, the gradual, natural development, through the long expanse of time, of progressively more complex organisms. Those vertebrates which have survived the stresses imposed by the restless environment 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 threequarters of the programme is given to an analysis, by procedures of comparison and contrast, of these changes and their relevance in the synthesis of the evolutionary pathway of vertebrates.

The laboratory study of a broad array of vertebrates provides the core of this class and serves to familiarize the student with the gross anatomic features of these animals while giving instruction in the traditional approach to comparison and contrast. The background which is required for this study is not particularly extensive but should incorporate the rudiments of animal form and function and an introduction to the principles of evolutionary Text: Lehninger, Biochemistry, 1970.

biology. Although this class is often considered to belong at the intermediate level, it can be mastered by any diligent student who has completed a basic class in biology.

An appreciation of the classification, structure and evolution of vertebrates is essential to considerations of the development and functional capacities of vertebrates and of their relations with their surroundings and with each other. While man is not given any special position in this strictly zoological treatment, the opportunity exists nevertheless for the student to evaluate his personal philosophy in the light of our knowledge of vertebrate evolution. In this respect the class should be of value to those entering the social sciences, theology, teaching and the health professions. Various agencies of government employ personnel to conduct research in areas of fish and wildlife research and management; the content of this class forms an important segment of the necessary training for these pursuits. Prerequisite: Biology 200.

324 Entomology, lect.: 2 hrs.; lab.: 3 hrs.; D. P.

Entomology, the study of insects, is not only an important branch of academic biology; it is also one of the largest divisions of applied biology. There are considerable career prospects for entomologists.

This class is an introduction to the study of insects and it deals with:

- (1) The classification and evolutionary diversity of insects.
- (2) The biology, ecology and behaviour of
- (3) Applied aspects medical, agricultural and forest entomology; harmful and beneficial insects; the pros and cons of chemical control; other methods of pest control. Prerequisite: Biology 200.

The following classes represent extension of the six half-classes of the core and they have corresponding prerequisites as given below.

330A Metabolism, lect.: 2 hrs.; lab. or tutorials: 1-3 hrs.; W. C. Kimmins.

The pathways of degradation and synthesis of molecules within the cell and the transformation of energy.

Prerequisite: Biology 201A/B.

Text: Lehninger, Biochemistry, 1970.

330B Metabolism II, lect.: 2 hrs.; lab. or tutorials: 1-3 hrs.; L. C. Vining.

Information transfer and control of metabolism within the cell. The mechanism of gene action; role of nucleic acids and proteins. Prerequisite: Biology 201A/B.

331A Animal Physiology, lect.: 3 hrs.; lab.: 3 the dynamics of communities and ecosystems Prerequisite: Normally Biology 201, 330A, and animal Physiology 201, 330A, an hrs.; J. V. Collins.

The theme of the class is regulation at all levels from cell to organism. Problems facing the organism in the control of its internal environment and the solutions to these problems are examined with equal emphasis on vertebrate and invertebrate animals. Transport and regulation of intracellular and extracellular fluids, and the co-ordination of body functions are considered in detail. Selected topics are investigated in depth by the student. Prerequisites: Biology 201 or 202.

340B Molecular Genetics, lect.: 2 hrs.; lab.: 3 hrs.; L. E. Halev.

The replication, transmission and control of genetic information in various organisms from viruses to higher cells. Prerequisite: Biology 203A/B.

343B Developmental Genetics (1973-74), lect.: 2 hrs.; lab.: 3 hrs.; L. E. Haley.

Will deal with those aspects of gene action which are involved in developmental processes, especially differential gene activity. Prerequisites: Biology 203A/B, 205A/B and

350A Development and Morphogenesis in Animals, lect.: 2 hrs.; lab.: 3 hrs.; B. K. Hall.

preferably 340B.

This class assumes the material of Biology 205A/B as background and studies the mechanisms underlying the control of development, morphogenesis and growth in animals. Topics studies include: descriptive embryology of invertebrates and vertebrates; mammalian development and its hormonal control; histogenesis and morphogenesis of tissues and organs; regeneration of lost body parts; growth; cellular differentiation; aspects of metamorphosis.

The laboratory classes emphasize the experimental approach to the lecture topics. Prerequisite: Biology 205A/B.

Text: C. W. Bodemer, Modern Embryology, (Holt, Rinehart and Winston, 1968).

351B Development and Morphogenesis in Plants, lect.: 2 hrs.; lab.: 3 hrs.; K. E. vonMaltzahn, G. S. Hicks.

Descriptive and experimental analysis of form development in plants and its regulation. Prerequisite: Biology 205A/B.

360 Population Biology, lect.: 2 hrs.; tutorial: 1 hr.; R. W. Doyle/I. A. McLaren.

This class attempts to explain some of the rules governing the distribution, abundance, and evolution of organisms. Beginning with a consideration of the dynamics of single species populations and interactions between species, can then be dealt with.

The evolutionary viewpoint is introduced by a consideration of the strategy of various types of life-history. This is followed by an account of modern thinking on the evolution of complex genetic systems in a varying environment. Prerequisite: Biology 204A/B, 206A/B; Mathematics 100 or 150.

361 Structure and Function of Ecosystems, lect.: 2 hrs.; lab./field work about 3 hrs.; M. J. Harvey, R. McBride, J. G. Ogden.

The class will consist of an intensive study of a particular area near Halifax by field and laboratory work. An attempt will be made to study all aspects of the ecology taking a transect of habitat from exposed coast through various communities to closed forest. Community structure and organization, nutrient cycling, productivity and decomposition will be among the parameters to be measured.

Prerequisites: Biology 206 and 204, Math 100

#### Special Classes Offered

390 History of Science, lect.: 2 hrs.; tutorial: 1 hr.; J. Farley.

This class is designed to accommodate students of the sciences and the arts. There are no formal prerequisites although all students must have a strong background in either a science, history or philosophy. The class will stress the period from the 16th to the 20th centuries, and will attempt to show how ideas of what constitutes an acceptable scientific explanation have changed. There will be constant emphasis on the social context of science and the interactions between the different sciences. This class is cross-listed in the History Department classes as History 310.

The following classes are primarily for honour and graduate students. They are open to others with permission of the instructor.

400 Ethology, lect.: 2 hrs.; lab. or field work: 3 hrs.; H. O. Schwassmann, F. J. Mortenson.

The behaviour of animals is studied in the field and in the laboratory. These observations and other presented material will be discussed in the context of modern ethological theory.

402A History of Biology (1973-74), seminar: 2 hrs.; J. Farley.

This class will deal exclusively with the "Biological Revolution" of the 19th Century.

412 Physiology of Marine Plants, lect.: 2 hrs.: lab.: 3 hrs.; J. S. Craigie.

A comparative study of the physiology and biochemistry of the various algal classes will be conducted. This will include studies of carbohydrates, proteins, fats, pigments and nutrition.

415 Advanced Molecular Biology, (1973.74) lect.: 2 hrs.; lab.: 3 hrs.; L. C. Vining.

The class will examine the biochemical basis structure and function in biological systems limited number of topics will be chosen intensive study, the main themes being cellula architecture and biosynthesis. Prerequisite: Biology 201 or equivalent.

417 Influence of Chemical Agents on Liv Organisms, lect.: 3 hrs.; lab.: 3 hrs.; C. Dean, D. J. Ecobichon.

A study will be made of chemical agents which affect various physiological and biochemic processes in man and other animals.

haviour (Sensory Physiology), lect.: 1 hr.; lah Prerequisite: Biology 203. 4 hrs.; H. O. Schwassmann.

This laboratory class provides first hand know ledge of sensory mechanisms in perception an in nervous control of behaviour. Emphasis is 0 understanding of fundamental neurophysio logical principles and application of moden sensory systems.

hrs.; B. Issekutz.

A class dealing with the physio-chemical basi. This class considers ecological problems whose of the physiological processes in man.

and Physics. Permission of the instructor

hrs.; lab.: 3 hrs.; O. P. Kamra.

knowledge of the effects of ionizing radiation on biological materials on the three levels methods of dosimetry, autoradiography contribute to general ecological theory. somatic and genetic effects, radiomimetic chemicals and biolasers are discussed.

423B Cytogenetics, lect.: 2 hrs.: lab.: 3 hrs.: 0

Detailed consideration of certain genetical a cytological mechanisms in relation to chromosomal modifications, gene mutations and evolution.

Prerequisites: Biology 202 and 203.

445B Population Genetics, lect.: 2 hrs.; to torial: 1 hr.; R. F. Shaw (limited to 15).

The first part of the class is devoted to concepts and theorems of population genetics So far as possible illustrations are taken from

In the second part of the class the students do

special problems. These consist of computer special runs simulating real or hypothetical populations. Those interested in hereditary disease in man can explore methods of estimating mutaman can find the first the may calculate whether and how fast certain may diseases may increase or decrease under new social and medical conditions. Or, assuming certain familiar but genetically puzzling diseases to be of constant frequency from one generation to the next, some students may wish to experiment to see what modes of inheritance, mutation rates, etc. are consistent and which inconsistent with such constant frequency. Those interested in natural populations of vertebrates can calculate the degree of heterozygote advantage that would suffice to explain certain balanced polymorphisms; those whose interests are in plants or invertebrate animals can investigate the evolution of separate sexes in hermaphrodite populations of unisexual 418 Physiological Mechanisms in Animal & broods in dioecious populations, and the like.

> 457 Theoretical and Experimental Embryology, seminar 2 hrs.; laboratory projects; B. K. Hall.

Advanced reading and project study in animal development, morphogenesis, differentiation, regeneration and growth.

electrophysiological techniques to the study ( Prerequisites: Biology 205A/B and 350A, and permission of Instructor.

419 Human Physiology, lect.: 3 hrs.; lab.: 460 Mathematical Ecology, lect.: 2 hrs.; lab.: 3 hrs.; E. C. Pielou.

solution entails mathematical reasoning. Discus-Prerequisite: Introductory classes in Chemistra sion of recent research will illustrate, with a variety of examples from both plant and animal ecology, the whole sequence of steps that an investigation follows: this starts with formulat-421A Biological Effects of Radiation, lect.; 1 ing a problem and deciding what observations would lead to a solution; then follows the planning, performing and analysing of the The class consists of a survey of the current observations and finally the drawing of conclusions. Emphasis is given to the overriding importance of judging how much (or how little) physical, chemical and biological. In addition a particular set of field observations can

Prerequisites: The class is intended for honours students. One year of calculus is assumed. Other mathematical topics will be explained as they arise; the time to be devoted to them will be adjusted to the needs of the class. For students who have not done a course in elementary statistics, N. T. J. Bailey's Statistical Methods in Biology is required reading.

464A Pleistocene Biogeography (1973-74), lect.: 2 hrs.; lab.: 3 hrs.; J. G. Ogden III.

Lecture, discussion, and laboratory experience in the reconstruction of environmental change since the retreat of the last ice sheet. Particular attention to the environmental history of the Maritime region, including environmental changes caused by man. In addition to field and laboratory work in pollen analysis, techniques of geochemical and isotopic dating will be explored.

Prerequisite: Biology 360 and/or a class in Geology is desirable.

465A Trophic Ecology and Biogeochemical cycling, lect.: 2 hrs.; K. H. Mann, G. Ogden.

Discussion of the relationship of studies on productivity and biogeochemical cycling to the dynamics of ecosystems including interactions between populations at different trophic levels and environmental controls on population size, diversity, and distribution. Applications of mathematical modelling and systems analysis techniques to ecosystem energetics.

Prerequisite: Biology 360 or permission of

466B Microbial Ecology, lect.: 2 hrs.; lab.: 3 hrs.; R. P. McBride.

A format of directed reading, essays and discussions will be used to introduce the following topics: micro-organism populations; the functioning of micro-organism communities; interactions between microbes and macro-organisms; and the use of microorganisms to examine ecological theory. A laboratory project will be chosen to suit the student's interest and background, Permission of the instructor is required.

467B Introduction to Biological Oceanography, lect.: 2 hrs.; E. I. Mills.

A survey of marine populations and their relationships with their physical environment and with each other. Permission of the instructor is required.

468 Advanced Biological Oceanography, lect.: 2 hrs.; G. A. Riley, C. M. Boyd, E. L. Mills.

Physiology and ecology of marine organisms with particular reference to community structure and population dynamics; seasonal and regional variations in populations, interrelations with the physical and chemical environment. Prerequisite: Biology 360. Permission of the instructor is required.

471 General Virology, lect.: 2 hrs.; lab. projects; R. G. Brown, W. C. Kimmins.

Permission of the instructor is required.

472 Bacteriology, lect.: 2 hrs.; tutorial: 1 hr.; R. G. Brown and members of staff.

Study of selected topics in advanced bacterio-

Prerequisites: Biology 311A and 311B. Permission of the instructor is required.

473A Mycology, (1973-74), lect.: 2 hrs.; lab.: 3 hrs.; R. G. Brown.

A basic knowledge of fungi will be assumed. This class will consider structure of fungi especially in relation to morphogenesis. This will be covered at the biochemical level and proceed to a general discussion of fungal

physiology. Biosyntheses which are unique to fungi will be discussed as well as systems where fungi have special significance.

Prerequisite: Biology 311 or Microbiology 302.

475B Topics in Algology, seminar: 2 hrs.; lab. projects; A. R. O. Chapman.

Algology, which covers all of algal biology, is a vast field. No attempt will be made to offer a comprehensive review of this field, instead some fundamental approaches to algology will be explored in a seminar series which will constitute the theoretical part of this class. The major part of the laboratory work for this class will consist of a small research project designed to introduce the student to some of the current methods used in studying algal taxonomy, ecology or development.

479B Ichthyology, lect.: 3 hrs.; E. T. Garside.

Evolution, systematics and structure, embryology, life history and distribution of fishes. Prerequisite: Biology 323.

480 Special Topics in Biology, Members of

490 Honours Research and Thesis, Members of

590 M.Sc. Thesis

690 Ph.D. Thesis

Combined Honours in Microbiology

The Departments of Biology and Microbiology offer an honours programme for students interested in microbiology. The programme consists of classes which will allow the student to deal with the subject in depth. These classes are as follows:

#### 1. Biology 311, Microbiology 302.

Two classes are planned for beginning microbiologists. These will be considered as equivalent classes and will differ in their basic approach to the subject. One will be given in each department and although differing in the approach, a common pool of lecturers will be employed. Students planning on taking 400 level classes will be required to have satisfactorily completed one of these classes.

### 2. Microbiology 303B.

A half-class in ultrastructure. The laboratory programme will center around the electron microscopic unit of the Microbiology Department and lectures will deal with suitable topics in microbial structure.

#### 3. Microbiology 403/Biology 472/572.

A class for advanced students in bacteriology. Two of three topics will be chosen and covered

#### 4. Microbiology 404/Biology 471/571.

A class for advanced students in virology. All types of viruses will be considered - animal,

insect, plant and bacterial. Structure, replication, natural history and classification will be included in the class coverage.

#### 5. Microbiology 405.

A class for advanced students in immunology. This class is limited to 12 students.

#### 6. Biology 415/515.

A class for advanced students in microbial chemistry.

#### 7. Biology 473/573A.

A half-class in mycology. It would ordinarily be paired with Microbiology 303B (Microbial Structure) or Biology 322B (Parasitology).

#### 8. Biology 322B.

A half-class in parasitology. It would ordinarily be paired with Biology 473A/573A (Mycology) or Microbiology 406A (Microbial Genetics).

#### 9. Microbiology 406A.

A half-class for advanced students in microbial genetics. It would ordinarily be paired with Microbiology 303B (Microbial Structure) or Biology 322B (Parasitology).

#### 10. Biology 401B.

A half-class in statistics which ordinarily would be paired with either Microbiology 406A (Microbial Genetics) or Biology 473A/573A.

#### Courses in Each Year

Microbiology and Biology Honours (four years)

- 1. Biology 101 (Principles of Biology) or Biology 200 (Diversity of Organisms).
- 2. Chemistry 110 (General Chemistry).
- 3. Math 100 (Differential and Integral Calculus).
- 4. Foreign Language (100 series).
- 5. Elective (Humanities or Social Sciences, 100

#### Year II

- 6. Microbiology 302 or Biology 311.
- 7. Chemistry 242 (Introduction Organic Chemistry).
- 8. Physics 110 (General Physics).
- 9. Biology 202A/B (Cytology); Biology 203A/B (Genetics).
- 10. Elective (Language, Humanities or Social Science).

- 11. Biochemistry 302 (Introductory Biochemistry) or Biology 201A/B (Molecular biology).
- 12. Microbiology 404/Biology 471 (Virology) or Microbiology 403/Biology 472 (Bacterio-
- 13. Microbiology 406A (Microbial Genetics or Biology 473A/573A (Mycology), Microbiology 303B (Microbial Structure) or Biology 322B (Parasitology).

#### Year IV

- 16. Microbiology 407 or Biology 490 (Thesis).
- 17. Microbiology 404/Biology 471 (Virology)

or Microbiology 403/Biology 472 (Bacterio-

- 18. Choice of Microbiology 405 (Immunology) or Biology 415/515 (Microbial Chemistry).
- 19. Biology 401B (Statistics), Choice of Microbiology 406A (Microbial Genetics) or Biology 473A/573A (Bycology).
- 20. Biochemistry 400 series or Chemistry beyond 100 series.

#### Classes to be Given Annually

Biology 311 - General Microbiology Microbiology 302 - General Microbiology Microbiology 403/Biology 472 - Bacteriology Microbiology 404/Biology 471 - Virology Biology 322B - Parasitology, Statistics.

#### Chemistry

#### Professors

D. E. Ryan (Chairman of Department)

- W. I. Chute
- K. E. Hayes
- O. Knop

#### **Associate Professors**

- G. A. Dauphinee
- T. P. Forrest
- R. W. Frei
- I. W. S. Jamieson
- W. E. Jones
- K. T. Leffek
- L. Ramaley

#### **Assistant Professors**

- G. D. Abrams
- J. B. Faught
- J. S. Grossert D. L. Hooper
- J. C. T. Kwak
- P. D. Pacey
- R. Stephens

#### C. H. Warren

- Demonstrators M. L. Heit
- P. Renault

#### **Postdoctoral Fellows**

- D. B. Armitage
- K. S. Bhatia
- T. Bidleman
- R. Cassidy
- F. Chen J-H Kim
- K. Koh
- P. Mathiaparanam
- T. L. Pollock
- S. Ray
- R. G. Stevenson
- I. W. Thorpe
- M. Walter

Chemistry is one of the physical sciences and the language of physical science is mathematics. Any student who does not enjoy mathematics should not contemplate embarking on an honours programme in chemistry. We say honours programme advisedly, for the honours

B.Sc. is the minimum professional requirem. for a chemist - the general B.Sc. with a m. in chemistry has no professional standing. Mo General B.Sc. in Chemistry students with an honours degree in chemissis will undertake further studies in the subjection working towards the degrees of M.Sc. and Ph A postgraduate degree is essential for those wi wish to engage in independent original research or in university teaching.

The first class in chemistry is an introduction. the discipline. Non-science students who ele to take chemistry to fulfill requirements for degree will find that the subject provides a go insight into the scientific method, though on B.Sc. with Honours in Chemistry again it should be stressed that because che This programme is intended to provide a good istry is a physical science, the laboratory tory chemistry and may be required to tal selection. second and third-year classes in the subject well. This group of students can include the taking courses in engineering, pre-medicin pre-dentistry, dental hygiene, nursing and pharmacy. Engineering students contemplate chemical engineering should consult the Depart ment of Engineering for advice on desirab classes in chemistry. All students intending take classes in chemistry beyond the first w level should include classes in mathematics a physics in their first year, and final grades these classes should not be less than 65%. they are, the student is bound to find advance classes in chemistry difficult and frustrating.

At the second year level the student is expose in the laboratory to the four areas of specialize tion into which chemistry has been trad tionally subdivided. Inorganic chemistry dea with all the chemical elements except carbon and the compounds which these elements form Organic chemistry is devoted to the study the almost limitless number of compound containing carbon. Analytical chemistry concerned with the determination of t composition of substances, and with the deter tion of elements in quantities however minut Physical chemistry is primarily devoted to the study of the nature of chemical reactions and undoubtedly the most purely mathematic area of chemistry. Beyond the second ye level, a student's studies in chemistry become increasingly concentrated in one of these for areas. The student may also be introduced biochemistry, or the chemistry of living In all cases it is in the interests of the student to and theoretical chemistry.

Because advances in chemistry have been and discussion of a future programme. continue to be published in many language those who look forward to postgraduate stu and research are urged to acquire a reading knowledge of at least two foreign language 100 General Chemistry, lect.: 3 hrs.; lab.; These are usually chosen from among Frend tutorial: 3 hrs. German and Russian. The student is referred the regulations of the Faculty of Gradua Chemistry 100 is an introductory class provided advanced degrees.

### Degree Programmes

A candidate for this degree must satisfy all of A canada requirements. He will take Chemistry 110 in the first year. In the subsequent two years he may undertake as many as five classes chosen from Chemistry 210, 230, 241, classes 330, and 340. It is essential that Mathematics 100 be secured as a prerequisite to Chemistry 230. Mathematics 200 is a prerequisite to Chemistry 330. Physics 110 should be included in the course.

training in chemistry while at the same time it class work stresses mathematics more than  $d_0$  makes provision for the individual interests of that of a life science such as biology. Man students. All students are required to consult students who do not intend to become ph annually with the Chairman of the Department, fessional chemists are required to take introdu and to obtain his approval of their course

### Year I will normally consist of:

- 1. Chemistry 110
- 2 Mathematics 100
- 3. A foreign language at 100 level
- 4. One of Biology 101, Geology 100 or Physics 110
- 5. Elective

#### Years II. III and IV must include:

- (a) Six classes from Chemistry 200 and 300
- (b) Three classes from Chemistry 400 level
- (c) Mathematics 200 (a prerequisite for Chemistry 330)
- (d) Five other classes. These must be chosen as
- (i) If Physics 110 or a foreign language were not taken in Year I, they must be taken in
- (ii) Two classes beyond the 100-level must be taken in a minor subject. Minor subjects allowed for this degree are biochemistry. biology, geology, mathematics or physics.

It is suggested that these five other classes be chosen according to the future plans of the student. For example: those planning future study in physical chemistry should take additional mathematics and physics classes; those planning future study in organic chemistry should take one or more biology classes; those planning future study in geochemistry should take one or more geology classes.

ganisms, as well as such specialties as structule consult with the Chairman and other professors chemistry, radiochemistry, electrochemist in the department. This may be done at any time during the first year. Experience indicates that March is the most suitable time for

### Classes Offered

Studies regarding language requirements for students majoring in other than the natural

sciences. The approach is less rigorous than that of the regular first year chemistry class (e.g. Chemistry 110) and it deals with selected topics designed to give non-science students some understanding of present day science and its

Emphasis is placed on understanding the concepts introduced and, to further this aim, most tests and examinations are open book.

Chemistry 100 is a terminal class which is not acceptable as a prerequisite for further classes in chemistry.

Text: 1971-72, Kieffer, Chemistry: A Cultural Approach. This text will not necessarily be used in 1972-73.

105 Chemistry (for dental hygiene students), lect.: 3 hrs.; lab.: 3 hrs.; G. A. Dauphinee.

This class is taken by dental hygiene students in their first year. It will not serve as a prerequisite to second-year chemistry classes. Organic chemistry is discussed in the second half of the year, since the regular programme of the students does not include further study of chemistry. The subjects discussed in the first term include atomic structure, solution equilibria and simple inorganic chemistry. Laboratory experiments are integrated with the material discussed in lectures. Quantitative aspects of chemistry are not emphasized in this class.

110 General Chemistry, lect.: 3 hrs.; lab.; tutorial: 3 hrs.; W.J. Chute, G.A. Dauphinee, J.B. Faught, D.L. Hooper, J.W.S. Jamieson, J.C.T. Kwak, P.D. Pacey.

This is an introductory class in college chemistry with lectures and tutorials on a number of topics in physical and structural chemistry. Included are stoichiometry, acid-base and oxidation-reduction reactions, gases, liquids, and solids, solutions, thermochemistry, equilibrium, chemical kinetics, and atomic and molecular structure.

Emphasis is placed on the formulation of theories which will be useful in the correlation of experimental facts, rather than on the memorization of the facts themselves. Wherever possible, such a theory is derived using standard mathematical methods from basic physical principles. In tests and examinations the student is expected to demonstrate his knowledge of the basis of these theories and of their limitations and to show a logical approach to the solution of numerical problems.

It is assumed that students entering this class will have some knowledge of elementary chemistry, mathematics and physics. The minimum background in chemistry is the equivalent of Nova Scotia Grade XI with emphasis on its numerical aspects. It is important that students Leffek. be able to use exponents and logarithms. proportionality and variation, and be able to solve quadratic and simultaneous equations. Texts: (1971-72) Dickerson, Gray and Knight,

Chemical Principles; (Benjamin, 1970); This text will not necessarily be used in 1972-73.

210 Analytical and Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; R. W. Frei.

The first term will be concerned with Chemical Equilibria. An intensive discussion of chemical equilibria (solubility, acid-base, redox, metal complex) with and without the use of approximation will be given. Correlation to qualitative and quantitative analytical chemistry, such as compéting equilibria, titration of weak and polyprotic acids, is attempted. The laboratory work will involve modern physical separation methods [ion exchange, thin-layer chromatography and quantitative analysis (precipitation, titration)].

The second term will concentrate on Inorganic Chemistry and will include a discussion of electronic structure of atoms and molecular orbital theory. These principles will then be applied to the chemistry and structure of the compounds of the first and second row representative elements and the first transition series. Organometallic chemistry will also be discussed. The preparation and analysis of inorganic compounds will be the laboratory

Prerequisite: Chemistry 110 or equivalent; Mathematics 100.

Texts: To be determined.

230 Physical Chemistry I, lect.: 2 hrs.; lab.: 3 hrs.; W. E. Jones/C. H. Warren.

This class is designed to give a theoretical and practical background in the fundamentals of physical chemistry. The lecture periods include discussions of the following topics: properties of real gases, liquids and solutions; atomic structure; molecular structure; thermodynamics; thermochemistry; electrochemistry; chemical kinetics.

With the exception of topic (a), where background knowledge in the properties of the ideal gas is assumed, the discussions begin at an introductory level. A knowledge of simple calculus will be assumed.

The laboratory sessions will give students an opportunity to perform experiments which illustrate many aspects of the above topics with modern techniques and apparatus.

Prerequisites: Chemistry 110; Mathematics 100.

Text: (1971-72), Barrow, Physical Chemistry, 2nd ed., McGraw-Hill, 1966. This text will not

necessarily be used in 1972-73.

241 Introductory Organic Chemistry, Three sections. lect.: 2 hrs.; optional tutorial: 1 hr.; lab.: 3 hrs.; G. D. Abrams, J. S. Grossert, K. T.

In particular, the student is required to understand the relation between carbon and the other elements of the periodic table; valence;

covalent and ionic bonding; electronic orbitals; orbital hybridization and the determination of molecular geometry by all types of s and p atomic orbital hybridization; electronegativity; the physical chemistry of solutions; chemical equilibria; velocities of reactions; oxidationreduction; acids and bases. An examination may be set on these topics at the beginning of the academic year.

This class will provide a broad introduction to the chemistry of carbon compounds, including molecular shapes and bonding, characteristic reactions and the way in which they take place, and the application of spectroscopy to organic

Prerequisites: A good comprehension of the principles studied in Chemistry 110.

243 Introductory Organic Chemistry with Biochemistry, lect.: 2 hrs.; lab.: 3 hrs.; W. J. Chute.

This class is taken by nursing students. It will not serve as a prerequisite to third-year classes in chemistry. During the first term a basic introduction to the chemistry of carbon compounds is given. In the second term students transfer to the Biochemistry Department.

320 Analytical Chemistry, lect.: 2 hrs.; lab.: 5 hrs.; L. Ramaley.

Chemistry 320 deals with the techniques and methods used to determine the chemical composition of a material. The chemical and physical principles underlying the analytical methods are examined in detail in order that methods of analysis may be rationally selected and used, or modified if needed. Statistical treatment of data, chemical equilibrium, theory of titrations, electrochemistry, separation theory, and the interaction of light and matter are topics covered in presenting volumetric, electro-analytical, spectroscopic, and chromatographic methods of analysis.

The laboratory work is primarily concerned with modern separation techniques and the final step in the analysis process, the quantitative determination. Examples of all methods discussed in the lecture are performed in the laboratory. Essential to the class is the ability, both chemical and mathematical, to handle stroichiometric problems. A basic knowledge of chemical structure and solution equilibria is assumed.

Prerequisites: Chemistry 210.

Text: (1971-72), Skoog and West, Fundamentals of Analytical Chemistry, Holt, Rinehart, Winston, 1969. This text will not necessarily be used in 1972-73.

330 Physical Chemistry II, lect.: 2 hrs.; lab.: 3 hrs.; K. E. Haves.

The first part of this class develops the laws of thermodynamics in the classical manner and applies them to ideal and real systems of chemical interest. Extensive use of the chemical potential is made. The second part is devoted to a study of the kinetic theory of gases from the classical Maxwell standpoint, followed by the development of thermodynamic functions by using the methods of statistical thermodyna-

The laboratory, where students must complete six or seven experiments through the year, is open at all times. The laboratory work is designed to help the student gain confidence in results that he may obtain in any laboratory. Four of the experiments will be written up during the year as formal reports, following the format of the Canadian Journal of Chemistry. Prerequisites: Mathematics 100 and 200; first and second year chemistry, particularly Chem-

References: Glasstone, Textbook of Physical Chemistry, (van Nostrand, 1946); Moore, Physical Chemistry, 3rd ed., (Prentice-Hall, 1962); Castellan, Physical Chemistry, (Addison-Wesley, 1964); References beyond this minimum list will also be consulted.

340 Organic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; T. P. Forrest.

This is an intermediate class in organic chemistry. The main purpose of the class is to develop an understanding of the principles of organic chemistry and their application to problems of synthesis and structure determina-

The laboratory section of the class involves the determination of structures of unknown substances by chemical testing and spectroscopic methods. Each student has individual problems in the laboratory and is given freedom to use his initiative in solving these.

The first section of the lectures is devoted to an outline of the principles of organic reaction mechanisms and their use in the prediction and understanding of organic reactions. The application of these principles to synthetic organic chemistry is next considered with the purpose of developing in the student a facility in designing schemes for the synthesis of organic compounds. Examples are used from a variety of fields in order to familiarize the student with a large number of classes of compounds.

Students taking the class are expected to have a knowledge of the nomenclature of organic compounds. They should also be familiar with the functional group classification of organic compounds and the basic reactions of these functional groups, and with the basic concepts of kinetics and thermodynamics as applied to chemical reactions.

Prerequisites: Chemistry 110 and 241 or equivalents.

Texts: (1971-72), R. O. C. Norman, Principles of Organic Synthesis: Shriner, Fuson and Curtin, The Systematic Identification of Organic Compounds, 5th ed., (Wiley, 1964). These texts will not necessarily be used in 1972-73.

400 Theoretical Chemistry, lect.: 2 hrs.; C.

This class consists of an introduction quantum mechanics and its application various aspects of atomic and molecular tronic structure such as the multiplet struct of atoms, molecular orbital theory, valabond theory and ligand field theory.

Prerequisites: As many classes as possible chemistry, mathematics and physics, Mar registered for only with prior consent of

Text: (1971-72), I. N. Levine, Quantum Cha. be available for problem discussion. istry Volume I; Quantum Mechanics and M ecular Electronic Structure, (Allyn and Baco Inc., 1970). This text will not necessarily used in 1972-73.

References: Hanna, Quantum Mechanics Chemistry, (Benjamin, 1969); Pauling Wilson, Introduction to Quantum Mechan (McGraw-Hill 1935); Coulson, Valence, (Oxfo University Press, 1961); Pilar, Elemento Quantum Chemistry, (McGraw-Hill, 196 References beyond this minimum list will a be consulted.

410 Advanced Inorganic Chemistry, lect.: hrs.; lab.: 3 hrs.; O. Knop.

in such solids, known as crystal structure essential. closely reflect the bonding properties of crystal structure. The aim of this class is spectroscopy. acquaint the student with the methods i frequently employed for this purpose and wi Other topical subjects will be added.

Prerequisites: Chemistry 320 and 330 equivalents) or consent of instructor. May References: Current and bound Journals in the registered for only with prior consent of \$\mathbb{t}\$ Science Library.

Texts: (1971-72), Evans, An Introduction lab.: 3 hrs.; Staff. Crystal Chemistry, 2nd ed., (Cambridge); W The Third Dimension in Chemistry, (Oxford The lecture portion of this class consists of

lab.: 3 hrs.; R. Stephens.

for identification purposes or for determini group analysis, identification and structul prior consent of the Department. determination, trace determination, etc.

The first part of the class considers ingl mental techniques for the elemental analysis trace and micro samples; the second p

structural analysis. Techniques discussed structure arc-spark emission spectroscopy, flame photometry, atomic absorption, reflectance, photonics, and ultraviolet-visible spectroscopy, mirates, nuclear magnetic resonance, mass spectrometry, nuclear in a peculometry, nuclear fluoresence, gas chromatography, polarography. Each student will be required to solve a graphy. Do of three problems by instrumental techniques.

Members of the chemistry department who have specialized knowledge of particular techniques will participate in the class and will

Prerequisite: Chemistry 320. May be registered for only with prior consent of the Department.

Text: (1971-72), Reilly and Sawyer, Experiments for Instrumental Methods, (McGraw-Hill, 1961). This text will not necessarily be used in 1972-73.

430 Physical Chemistry III, lect.: 2 hrs.; lab.: 3

The first part of this class deals with the development of the principles of reaction kinetics, the treatment of experimental kinetic data and the derivation of kinetic mechanisms for homogeneous and heterogeneous reactions. Simple and complex reactions are studied. The All chemical elements and compounds can exist theory of absolute reaction rates is introduced as crystalline solids, and most of them normal and applied to systems of interest. Student do. The arrangements of atoms and molecul participation in lectures is considered to be

constituent elements. They can only be studi. The second portion of the class deals with by methods that do not destroy or modify t selected topics in modern chemical kinetics and

the principles of structural inorganic chemist Prerequisites: May be registered for only with prior consent of the Department.

440 Advanced Organic Chemistry, lect.: 2 hrs.;

These texts will not necessarily be used specialized topics in organic chemistry. The 1972-73. Further references should be co topics have included synthetic organic chemistry, applied physical methods, n.m.r., mass spectrometry, reaction mechanisms, molecular 420 Instruments in Chemistry, lect.: 2 in rearrangements, stereochemistry and conformational analysis. The subject list will vary depending upon the interests of the student Instrumental measurements are used primar members and the availability of lecturers.

how much of a particular constituent is prese Laboratory exercises make up a part of the in a sample. In practice, one finds that me class. These will include more sophisticated problems fall into distinct types; composition, syntheses and work on structure determination, problems include elemental analysis, function Prerequisites: May be registered for only with

Texts: (1971-72), Hutchison, Study Problems in Organic Chemistry, (Addison-Wesley, 1968); Hallas, Organic Sterochemistry, (McGraw-Hill, 1965); Mislow, Introduction to Stereoconsiders methods for functional group chemistry, (Benjamin, 1966); Ireland, Organic

Synthesis, (Prentice Hall, 1969); Williams and Fleming, Spectroscopic Methods in Organic Chemistry, (McGraw-Hill, 1966). These texts will not necessarily be used in 1972-73.

All elasses, and particularly the advanced classes, are required to consult material beyond the texts and references stated.

#### **Graduate Studies**

The department offers graduate classes leading to the degrees of M.Sc. and Ph.D. 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.

#### Classics

**Professors** 

J. A. Doull

T. E. W. Segelberg

**Associate Professors** 

R. D. Crouse (Chairman) B. W. W. Dombrowski

M. A. Usmiani

J. P. Atherton

Assistant Professor R. Friedrich

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 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 much 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 during his university course.

A student taking classics at Dalhousie can approach the study of ancient cultures through literature or through history and the study of social structures or through the study of Greek and Christian philosophy. Honours courses are offered which concentrate on any one of these three approaches.

The department also offers combined honours courses in Greek and German and in Latin and French. These courses take account of the exceptionally close links between French culture and Latin literature on the one hand and between German and Greek poetry and philosophy on the other.

While students of classics usually learn Greek and Latin, it is possible sometimes to substitute or add a Near Eastern language. Instruction may be had in Hebrew, Coptic, Syriac, Arabic, and Akkadian.

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 prepare students for a life of teaching and scholarship in several directions. Now that Canada is no longer a colony culturally; but responsible for its own culture, 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 in general, Classics leads also to ancient Near Eastern studies (Jewish, Babylonian, Egyptian, etc.) and to archeology.

#### Degree Programmes

#### General B.A. and B.Sc.

Of classes offered by the department, Classics 100, Classics 354, and those Ancient History and Ancient and Medieval Philosophy classes not having a language prerequisite should be especially useful to students taking a general degree.

#### **Honours Programmes**

The candidate may choose between three programmes: B.A. with Honours in Classics, B.A. with Honours in Classics (Ancient History), or B.A. 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. In conformity with University regulations, the fifteen classes of the Honours programme are normally distributed according to the following schedules (Note that 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).

### B.A. with Honours in Classics

(i) Nine classes beyond the 100 level in the major subject must include advanced work in both Greek and Latin, at least two 300 level classes in each. The course must include work beyond the 100 level in both Ancient history

and Ancient Philosophy, one of which may be counted as the minor subject.

- (ii) Two classes in a minor subject: either Ancient History or Ancient Philosophy.
- (iii) Four classes not in the major field: Ancient History or Ancient Philosophy classes might be included here along with other electives.

#### B.A. with Honours in Classics (Ancient Philosophy)

- (i) Nine classes beyond the 100 level in the major subject must include, besides the available classes in Ancient and Medieval Philosophy, advanced work in Greek (including two classes at the 300 level) and some work in Latin (at least to the level of Latin 201).
- (ii) Two classes in a minor subject: History (Ancient and Medieval).
- (iii) Four classes not in the major field may include additional classes in History or Philosophy, or other electives.

#### B.A. with Honours in Classics (Ancient History)

- (i) Nine classes beyond the 100 level in the major subject must be mainly in Ancient History, but must include work to the 300 level in at least one of Greek and Latin, and at least elementary work in the other. If the field of study requires work in other ancient languages, such classes may be counted either as Classics credits or as electives.
- (ii) Two classes in a minor subject: Philosophy (Ancient and Medieval).
- (iii) Four classes not in the major field may include additional classes in History or Philosophy, or other electives.

#### **Combined Honours**

Classics may be taken as part of a combined honours programme with French or German. Students interested in either of these programmes should consult with the heads of the respective departments.

#### Classes Offered

#### Literature, History and Philosophy

Note: The history and philosophy classes listed below may be given credit as classics classes or as history or philosophy classes respectively. Except for advanced seminars in these subjects, knowledge of ancient languages is not presupposed.

Classics 100 Classical Literature in Translation, lect.: 2 hrs.; R. D. Crouse.

Classics 100 is intended to introduce the student to the poetry and literature of classical and Christian antiquity, by means of a study, in English translation, of some of the greatest works of ancient authors.

The first part of the class will be devoted to a study of Greek Epic and Drama (Homer's Iliad, tragedy and comedy) and Plato's Republic. The second part will be given to Roman poetry and literature (Vergil's Aeneid and Juvenal's Satires). The lectures will conclude with a study of St. Augustine's Confessions.

The course will concentrate on the most important literary forms and themes and political and philosophical ideas expressed in these works. Thus, this class should serve as an introduction to both the study of ancient and Christian literature and the study of world literature; it should also be of value to students in other fields of the humanities and social sciences in that it shows the origins and significance of many of the ideas which have been of central importance in the formation of the traditions of Western thought.

As the class is intended as an introductory one, no special preparation is expected, and there is no foreign language requirement. (See also under Comparative Literature.)

Classics 101 Ancient History: An Introduction to the Cultural History of the Ancient World, lect.: 2 hrs.; J. P. Atherton.

The first term will be devoted to a study of the major pre-classical civilizations (Sumer, Egypt, etc.) in which attention will be 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 will be studied, and their issue in the Early Christian world considered.

As the class is intended as an introductory one, no special preparation is expected, and there is no foreign language requirement.

Classics 221 History of the Ancient Near East, lect.: 2 hrs.; (2 half-classes).

Classics 222 Greek History, lect.: 2 hrs.; J. P.

A study is made of the main features of the history of the Greek world and of Hellenism. Prerequisite: A history class or a classics class, possibly a class in the social sciences, at the discretion of the instructor.

Classics 223 Roman History, lect.: 3 hrs.; (Not offered in 1972-73).

Classics 225/525 History of Religion/ Comparative Religion/Ancient World, seminar: 2 hrs.; E. Segelberg, (Not offered in 1972-73).

This seminar will discuss various aspects of religions in Greece, Rome, and the Ancient Near East up to the victory of Christianity and

Emphasis will sometimes be laid on the background of Christianity and Islam, sometimes on Hellenistic syncretism and Gnosticism, sometimes on earlier stages of religion in the

Classics 226/526 Roman Religion, seminar: 2 hrs.; E. Segelberg.

The background in Indo-European, Etruscan and Greek religion, through the classical period to the restoration and its final decline.

Classics 252/552 Seminar on Problems of Hellenistic Period, seminar: 2 hrs.; E. Segelh (Not offered in 1972-73).

This class is intended for honours, graduate theology students only. Prerequisite: As for 222.

hrs.; J. P. Atherton.

Selected topics from the transition from et sical to Christian culture will be sta Particular attention will be paid to the comtion between religious innovation and charge political and social life and the effect of new beliefs on literature, art and philosonle (The class is intended primarily for honours graduate students. Others may be admitted the discretion of the instructor.) Prerequisite: As for 222.

Classics 336 Ancient Philosophy from Aristo to St. Augustine, (same as Philosophy lect.: 2 hrs.; R. D. Crouse/J. A. Doull.

Classics 336 (Philosophy 336) studies development of classical and patristic the from Aristotle to St. Augustine and exam the manner in which the philosophical achie ment of ancient Greece came to form, in thought of the Church Fathers, the intellect foundation of European culture.

The class will begin with a careful consideration. The purpose of this seminar is to determine the considered in detail. Among the works Aristotle, the Metaphysics will receive spec attention, particularly the theology of Bo XII. In the second term the class will concerned with the later history of G philosophy, and with the problems of Graeco-Roman, Jewish and Christian religio movements. The authors most closly studi will be Plotinus and St. Augustine.

Classroom discussion and occasional semin papers will focus on a few of the m important texts, while the general continuity the history will be studied in lectures supplementary readings.

Classics 338 Medieval Philosophy, (same Philosophy 338), lect.: 2 hrs.; R. D. Crouse.

Classics 338 (Philosophy 338) studies development of philosophy in the formative of European civilization and examines reful political, institutional, literary and theological concerns. An attempt is made to show how legacy of classical and Christain antiquity The subject for 1972-73 will be St. Augustine's ideology of medieval Christendom.

The class will be devoted mainly to the still Classics 468/568 Seminar on Neoplatonism. and discussion of a few fundamental to

beginning with Boethius' Consolation of Philobeginning Special attention will be given to sopny.

Sopny.

Anselm's Proslogion and the first few questions Ansenin San Aquinas' Summa Theologiae. It will of modern of lectures to present the be une present the continuity of the historical development and to emphasize the broad implications of the philoemphasized doctrines presented in the texts. In the tom latter part of the class, some attention will be Empire and the Rise of Christianity, seminant given to late medieval Platonism and Mysticism, given to the something can be shown of the beginnings of Reformation and modern philosophical and religious thought.

Classics 354 Theory and Practice of Drama: Aristotelian and Non-Aristotelian, (same as Comparative Literature 354), lect.: 2 hrs.; R. Friedrich.

This class will study the basic concepts of Greek theory of drama, its effects on the practice and theory of Western drama, and Brechts' non-Aristotelian theory of the theatre as opposed to the tradition of Western drama. Current trends in modern theatre will be discussed in the wider context of the opposition between "drama based on ritual" and "drama based on 'politics.". (Brecht, W. Ben-

Prerequisite: Comparative Literature 100, English 100, or Classics 100.

Classics 461/561 Seminar on the Philosophy of Aristotle, seminar: 2 hrs.; J. A. Doull, (Not offered in 1972-73).

of Aristotle's account of the history of earl original sense of Aristotlean philosophy Greek thought, especially that of Plato, and through the close study of one or more works. this connection, part of Plato's Timaeus will Some previous study of ancient philosophy and the ability to read Greek or Latin are assumed.

> Classics 462/562 Seminar on the Philosophy of Plato, seminar: 2 hrs.; J. A. Doull.

Parmenides, Sophist and Philebus will have relationship of the philosophical tradition will special attention, together with Aristotle's criticism of Platonism. There will be some discussion of Neoplatonic and later interpreta-

> Prerequisite: A class in Greek or Medieval Philosophy.

> Classics 466/566 History of the Interpretation of Aristotle, seminar: 2 hrs.; J. A. Doull.

> To be studied in 1972,73 is the Hegelian Philsophy as a Neo-Aristotelianism, with readings especially in the Phenomenology of Spirit and the History of Philosophy.

> Prerequisite: A graduate seminar in Ancient Philosophy or the approval of the instructor.

> Classics 467/567 Seminar on the Philosophy of the Church Fathers, R. D. Crouse.

appropriated and reformed to constitute Confessions, Bks. XI-XIII. Ability to read Latin is expected.

its relation to the theology of the Greek Church will be studied.

#### Classes Offered

#### Classical Languages and Literature

100 Introductory Greek, lect.: 4 hrs.; R.

This is the beginners' class in the Greek

language, and no previous knowledge is required. The aim of this class is to teach the student to read, not simply to translate, a Greek text. After he has become 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; in the first term chapters I-VI the Gospel of St. John; in the second, the first book of Xenophon's Anabasis. Thus, the student begins with the simpler Greek of the New Testament, and then proceeds to the more complex Classical Greek of the most important authors of the Greek literature that has been

At least once a week students will pass in for correction grammatical exercises and/or translations from Greek into English. There will be no lab work and no oral classes.

Text: Stephen W. Paine, Beginning Greek.

200 Intermediate Greek, lect.: 3 hrs.; R.

Greek 200 is a continuation of Greek 100. The aim of the class is to develop the student's ability and to read and translate prose as well as poetic Greek texts. At the beginning of the class there will be a brief but systematic review of Greek syntax. This will be followed by the reading of two prose texts and a poetic passage. Other topics, treated by students in short papers, will be the life and thought of Socrates; the political and historical background that led to his trial; the judicial system at Athens; Socrates as dramatic character in Aristophanes' comedy; and the historical significance of Socrates' condemnation.

Through the reading of one book of the Iliad, students will be introduced to the language of Homeric poems; this will also provide an opportunity to deal with the Greek dialects.

The essential knowledge that the instructor assumes students possess at the outset of the class is a thorough knowledge of Greek grammar as far as the declension of nouns, adjectives, and pronouns and the conjugation of the Greek verb is concerned. Students should therefore, if necessary, review the respective passages in either Paine's Beginning Greek or White's First Greek Book. They will most profit from this class if they read or re-read a number of passages from Xenophon's Anabasis to be found in either of these two primers. Prerequisite: Greek 100.

Topics from the history of Neoplatonism and Texts: Plato, Apology and Criton; Book VI of Homer's Iliad.

> 300 Greek Drama, (Offered in 1973-74). Prerequisite: Greek 200.

301 Greek Historians, (Not offered in 1972-73).

304/504 Greek Poetry (Homeric Epic), lect.: 2 hrs.; R. Friedrich.

Homer's Iliad and/or Odyssey will be studied in Greek and discussed and interpreted as to form and meaning. This will be accompanied by a study of the historical and cultural background of the Homeric poems. Students should be familiar with the history of Greek literature and are therefore advised to study in advance either Bowra's Greek Literature or Hadas' History of Greek Literature and Chapter III of A. Lesky's History of Greek Literature. Prerequisite: Greek 200.

100 Introductory Latin, lect.: 4 hrs.; M. A.

Special classes will be provided upon request for students who wish to begin the study of Latin in the University.

200 Latin Language and Literature, lect.: 3 hrs.: M. A. Usmiani.

The purpose of this class is: a general introduction to Latin literature through the reading of some basic works of prose and poetry.

In the reading of Latin texts, special emphasis is placed on the handling of Latin language by the authors and on their personal style. For the reading of Latin prose a text of Cicero is chosen because it is the best example of Latin prose and because by his quotations and literary references, Cicero gives an opportunity for a brief survey of Latin literature before his time. The poems of Catullus and the Odes of Horace are studied as an introduction to Latin prosody as well as for their contribution to Latin poetry in general.

This class is required for any more advanced class in Latin.

Prerequisite: Senior Matriculation Latin or Latin 100.

203 Latin Poetry, lect.: 2 hrs.; M. A. Usmiani. (Not offered 1972-73).

This class is the continuation of the second part of Latin 100. Its purpose is to complete the study of Latin poetry, for the undergraduate, A selection of Lucretius is read as the best example of Latin didactic poetry. However, the main part of the class is devoted to the study of Latin elegy, its origin and significance for Latin literature. A selection of the best examples of the poetry of Propertius, Tibullus and Ovid is studied, to familiarize the student with these

55

Latin literature.

The student is expected to possess good reading knowledge of Latin, Textual criticism is attempted with the study of some problems connected with Latin manuscript tradition.

Students are given weekly assignments for reading and are required to come to class prepared to give a correct translation of the assigned poems. Except for a few lectures given by way of introduction to each section (didactic poetry and elegy), there are no formal lectures and the work in class is conducted seminar style, and with informal discussions and commentaries on the poems. Prerequisite: Latin 100.

201 Latin Philosophical Texts, lect.: 2 hrs.; J. A. Doull, R. D. Crouse.

The purpose of this class is to give students interested in ancient and medieval philosophy experience in reading philosophical Latin. Various authors will be read from Cicero to the late Middle Ages. Prerequisite: Latin 100.

202 Roman Historians, lect.: 2 hrs.; J. P. Atherton

This class studies Roman historical texts (writers, inscriptions, and other documents). During the 1971-72 session, selections of Livy and Suetonius will be studied. This is essentially a reading class to familiarize students with the language and content of the writings of these two great historians. Students are expected to come to class prepared in advance for every meeting.

Prerequisite: Latin 100.

300 The History of Roman Satire, lect.: 2 hrs.; M. A. Usmiani.

This advanced class is designed primarily for graduate students and undergraduate honours students. By special arrangement the class can also be taken by students from other departments even if they possess little or no knowledge of Latin. They would be permitted to read the texts in translation.

The class follows the development of Latin satire from its origins to Juvenal. The chief representatives of Latin satire that survived are Horace and Juvenal, and a wide selection of their works is read and studied thoroughly. Students are required to read the assignments for themselves and to follow the lectures which are informal and are combined with discussions of problems that arise from the texts. There are also occasional seminars on special topics and problems in the Roman satire.

Additional reading is suggested as an aid and is left to the discretion of the individual student. Prerequisite: Latin 200.

poets and to determine their contribution to 301 A Study of Vergil, lect.: 2 hrs.; M. A. Usmiani, (Not offered in 1972-73).

> The purpose of this class is to study the development and importance of Vergil's basic themes and ideas that are 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 Georgies. 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.

> Lectures are given and discussions and seminars are held on special topics as they arise in the course of study.

> This class may be taken also by students who do not read Latin, by special arrangement. Prerequisite: Latin 200.

> 302 Roman Comedy, lect.: 2 hrs.; M. A. Usmiani

> This class consists of readings of selected plays of Plautus and Terence. As an introduction to readings, a brief survey of Greek comedy is given, and in a few lectures the general lines of Roman comedy are sketched. The class work is conducted in seminar style, students reporting on their readings and impressions of the individual plays.

> The class may be taken also by students who do not read Latin. Prerequisite: Latin 200.

> > Classes Offered

Near Eastern Languages

The classes in Hebrew, Coptic, Syriac, Arabic, and Akkadian are available as electives at the discretion of the Department, only in relation to the needs of the particular students.

101 Elementary Hebrew and Introductory Readings, J. B. Hardie.

This class is taught at the Atlantic School of

202 Intermediate Hebrew, J. B. Hardie.

This class is taught at the Atlantic School of

303 Advanced Hebrew, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

Copic

101 Introduction to the Coptic (Sahidic) Language and Literature, E. Segelberg.

Coptic, representing the last stage of devel ment of the Egyptian language, became language of Christian Egypt. Knowledge Coptic is becoming more and more us thanks to the recent discoveries of value texts. Students of Ancient history and eastern religions find a fair knowledge of Co. useful, and to some students of the Testament Coptics is indispensable.

400 Reading of Coptic Texts, E. Segelberg,

Partly Nag Hammadi Papyri, and partly M

Syriac

100 Introduction to the Syric Language Literature, (Not offered in 1972-73), E. S.

Syriac, a Semitic language very close to a Aramiac spoken by Jesus, was and is to so extent still the language of the Syrian church R. S. Cumming of the Near East and India, once spread in ancient China and Japan. The Syriac literature represents a rich and partly very independent way of Christian thought.

Syriac is useful for any student of the histo and religions of the Hellenistic period and car I. R. Hanrahan church history, and for some students I W Matthews Islamology and Ancient philosophy, the Syria R. C. Shook introducing the Arabs to Aristotle, etc., Syn R. G. Storey is indispensable.

200 Syriac Language and Literature, E. Seg R. U. Doyle

Reading of some early writers such as Aph S. G. Pendse ates and Aphrem, the famous hymnographer. R. S. Sandhu

Arabic

Students wishing to take a class in Arabic mu consult with the Department before register Lecturer for the class.

100 Introductory Grammar and Reading Part-time Special Lecturers

This class is taught at the Atlantic School E. G. Markosky Theology.

200 Intermediate Arabic,

Theology.

100 Introductory Grammar and Reading Texts, (as required).

200 Intermediate Akkadian, (Babylonian)

The major part of this class will be devoted to close study of the old Babylonian Mari-lett and the Babylonian Epics. Students are pected to be well prepared prior to attendant of their class.

300 Advanced Akkadian, (as required).

The major part of this class will be concerned with the study of inscriptions of Assyrian kings selected from all periods.

400 Advanced Akkadian

The major part of this class will be concerned with the study of Mesopotamian documents of the first millenium B.C.

Graduate Studies

The department offers an M.A. programme in classical literature, in ancient history and in ancient and medieval philosophy. For details, see the Calendar of the Faculty of Graduate Studies.

Commerce

Professors

C. R. Brookbank (Sabbatical Leave)

R. E. George (Sabbatical Leave)

W. Schandl

Associate Professors

. D. Misick (Chairman)

R H. R. Glube

**Assistant Professors** 

C McManus

. Muncaster

E. W. Scott

G. E. R. Zinck

C. R. Chesley (Leave of Absence)

. A. Dougall

H. A. MacKinley

J. H. Ovler

R. L. Towler

J. Whittaker (Assistant Prof. NSTC)

This class is taught at the Atlantic School The Department of Commerce offers a curriculum designed to equip students for positions of ultimate leadership in business, government and the professions. On the satisfactory completion of a three-year course of study, students are awarded the degree of Bachelor of Commerce. The programme serves the needs of at least four separate groups of students:

> 1. Those who wish upon graduation to embark immediately upon a business career and who believe that a course offering academic subjects both in arts and science and in commerce is the best preparation for the career objectives they have in view.

2. Those who upon graduation wish to become

chartered or industrial accountants and believe that their career will be strengthened by an integrated study of accounting theory at a university.

The Institute of Chartered Accountants in most provinces in Canada offer exemptions to graduates in commerce of Dalhousie who are candidates for the Diploma in Chartered Accountancy.

The Society of Industrial Accountants also offers exemptions to graduates in commerce of Dalhousie who are candidates for the Diploma in Registered Industrial Accountancy. Although exemptions vary as to classes taken, graduates could possibly eliminate two years of the five-year programme of study.

Students who are interested in the details of such exemptions should contact the office of the Institute or Society in the province in which they intend to obtain their diploma in Chartered Accountancy or Registered Industrial Accountancy.

3. Those who want rigorous preparation in a particular field of commerce or in economics. These students are able, beginning in their third year and extending over an additional year, to read for honours.

4. Those who upon graduation wish to pursue further studies in business administration before starting their business career. (Dalhousie has initiated a graduate programme in business studies leading to the degree of Master of Business Administration to which graduates of all faculties who have obtained a satisfactory standing will be eligible for admission.)

The entire undergraduate curriculum is designed to give, throughout the three years of the general degree course, a balanced programme of academic study in the humanities and social sciences, together with studies in the functional fields of business and quantitative methods.

For students entering in September, 1970 and subsequent years, the curriculum has been revised to give recognition to the increasing emphasis on quantitative and behavioural analysis, while permitting the maximum opportunity for each candidate to pursue those areas which appeal to his interests.

In all the commerce classes the underlying purpose is to teach principles. The application of these principles is not stressed but is included in the programme, where appropriate, to illustrate how theory relates to practice. In addition, special discussion on current development in business, finance, labour and government are held, in which recognized authorities participate.

To summarize, it may be said that the aim of the programme is to produce individuals who have some specialization within a broad background based on general education.

Degree Programmes

The Department of Commerce offers courses leading to a General and to an Honours Bachelor of Commerce degree.

#### **General Bachelor of Commerce**

The General Bachelor of Commerce degree course takes three years and requires the completion of fifteen classes - nine "core requirement" classes and six electives. Two electives will be from subject areas covered in the core requirements, two will be selected from classes titled other than "commerce" or economics", and two may be selected without

Depending on the student's background and/or intended concentration, the sequence in which the following classes are taken may be altered. Consult the Department of Commerce prior to registration to avoid difficulties in later years of the programme.

#### Year I

I Core requirements: Commerce 101 and 102 Economics 100A and 100B Mathematics 110

II Electives: One class outside the business area (i.e., not titled "Commerce" or "Economics").

Year II

I Core requirements:

Commerce 204

Commerce 206 A/B (1 term)

Commerce 207 A/B (1 term) Commerce 208 A/B (1 term)

Commerce 209 A/B (1 term)

Commerce 213 A/B (1 term)

Economics 220 A/B or Economics 221 A/B.

Electives: One class outside the business area (i.e., not titled "Commerce" or "Economics").

#### Year III

I Core requirements: Commerce 302

II Electives: Two classes chosen without restriction, except that overall requirements must be met (see above), and two classes chosen from core requirement subject areas.

#### **Bachelor of Commerce with Honours**

The Honours Bachelor of Commerce degree course takes four years and requires the completion of twenty classes.

Unless there are special circumstances, a student must apply for entry into the honours programme not later than the end of his second

The programme for a student's last two years shall be designed in consultation with the Department and be subject to the approval of the Department.

All requirements for the B. Comm. general degree must be met. An additional five credits must be obtained, at least three must be in the "core area" (one being an honours seminar) and one must be outside the "core area".

No 100-level classes may be taken in the fourth

Students entering in 1969 and Earlier Years

Consult the Calendar for the year in which you were first admitted to the commerce programme.

The English 100 requirement listed in earlier calendars is discontinued, but students are encouraged to choose English as an elective class.

#### Classes Offered

101 Introductory Accounting, lect.: 3 hrs.; workshop; 1 hr.; G.E.R. Zinck, J.R. Hanrahan, R.L. Towler.

Renumbered Commerce 210 for 1970-71 only.

This class gives an introduction to the principles used by accountants in processing financial data and in communicating such data both within and outside the business, and studies the interpretation and use of financial reports for decision-making purposes.

The first half of the term will emphasize principles and their application in what is generally known as financial accounting. In the second half of the term the focus will be on accounting information for management needs.

There are no prerequisites for this class. The number of students who can be accommodated in this class will be limited. Any student who cannot be accommodated will take the class in his second year.

102 Business and Society, lect.: 3 hrs.; workshop: 1 hr.; R. S. Cumming.

Among the most widespread of man's institutions are those that have been developed in the business and commercial sphere. Their history has probably been at least as long as that of man's legal institutions. Yet, students pass through most school and university curricula without being given any awareness of the historical and philosophical foundations of the system in which the majority will spend their working lives. Consequently, it is hardly surprising that young people enter the business world with some strange assumptions.

The purpose of this class is to give the student an opportunity to understand business as an institution and to relate business to other institutions in society. It is intended that students examine for themselves the evolution of Western attitudes toward business and the philosophical ideas and concepts which have

helped to shape business and to affect the interactions between business, society, and the individual. Among the concepts and institutions considered are individual and collective freedom, justice and law, authority and power, pluralism, private property, work and leisure, profit, competition, progress and innovation, and the social responsibility of individuals and organizations.

The class has three parts. One part concerns the rise and development of our business system. The second part consists of an analysis of the dominant features of large-scale business, with its developments of the corporation and the combine, and its complex relations with the worlds of commerce and finance. The third part discusses which features of the operations of industry are desirable and which are undesirable; what general steps might be taken to make business serve society more satisfactorily; what tests might be used to appraise the functioning of business, and how the operation of modern business gives rise to practical problems of public policy in the interest of society.

203 Legal Aspects of Business, (old programme

Requirement may be satisfied by completing both Commerce 213 A/B and 214B.

204 Statistics for Economics and Business, lect.: 3 hrs.; workshop: 2 hrs.; R. S. Sandhu (same as Economics 222).

Topics studies include the definition, functions and sources of statistics; the design and execution of statistical enquiries; statistical tables; graphs and diagrams; measures of central tendency, dispersion, skewness and kurtosis; curve-fitting; probability (estimating mean and proportion in population from samples, and testing hypotheses about means and proportions); quality control; index numbers; time series analysis; elementary correlation.

Background knowledge that is essential for this class includes; algebra at approximately Grade XI level; some experience of constructing and interpreting graphs; the ability to think quantitatively, which is usually gained by the study of geometry and algebra at the high school and university level; familiarity with national accounting concepts.

Note: Each of the following A/B classes may be offered only as A or B.

206A/B Computer Applications to Business Problems, lect.: 3 hrs.; R. C. Shook.

Orientation of the class is toward use of the computer as a problem-solving tool. Practice will be provided in Fortran and Marlan, with emphasis on the use of library subroutines and main programs. Problem selection will be from areas of business applications. Class may be taken concurrently with Mathematics 110, and it must be taken before or concurrently with 207A/B Introduction to Managerial Fin. lect.: 3 hrs.; C. McManus, R. G. Storey

This class gives an introduction to the profaced by business mangers in the acquire and effective utilization of the firm's fine resources and presents analytical concenie evaluating financial decisions. This neces involves consideration of how the firm achieve successful interaction with its evienvironment and make an appropriate contion to the operation of the economy.

Essential background knowledge: An In standing of economic principles and the nomic environment in which a business of ates, and sufficient knowledge of account processes and principles to enable the stud

100B and Commerce 101.

R. H. R. Glube.

understanding of the character and score marketing and its role in business operations focuses upon the concepts and techniq which a business must employ if it is anticipate and satisfy consumer needs.

understanding and analytical ability in following areas: the role of the consum product-line development; channels of distri tion; pricing systems; selling and promotion activities. Case materials are used to give student insight into the analytical tools used problem analysis and decision-making.

No previous training in marketing is assume Students wishing to concentrate in market should plan to take Commerce 208A/B in the first year.

There are no prerequisites for this cla although some knowledge of accounting woll Prerequisites: Commerce 101 and Commerce

209A/B Production, lect.: 3 hrs.; I. Whittake

This half-class is designed to give the students insight into the applications of manageme science as a tool to aid in the decision-maki Storey. process in production.

The topics which will be covered include of model building, the use of models resource allocation, control of inventoric simulation, scheduling and control.

Prerequisites: Commerce 101, Economics 10 Mathematics 110 and Commerce 204. latter will normally be taken concurrently.

The meaning and sources of law, the machine There are no formal prerequisites for the class,

capacity of contract; legality of object, mistake, misrepresentation; statute of frauds.

privity of contracts; interpretation and discharge of contracts; breach of contracts;

214B Commercial Transaction, lect.: 3 hrs.; R.

Contract of sale, bailment, employment; negotiable instruments, real property, tenant and landlord, mortgages; partnerships, corporations, their nature and management; devices for securing credit; bankruptcy, mechanics lien, limitation of actions.

Prerequisite: Commerce 213A/B.

Prerequisites: Economics 100A and Econom. 218B Marketing Management, lect.: 3 hrs.; R. H. R. Glube.

208A/B Marketing Management, lect.: 3 h. This class develops on the theory outlined in Commerce 208A/B with the goal of developing in the student the skill of soundly analysing and This class is designed to give the student a battaking effective action in the marketing situations which face the practicing marketing manager. Instruction will be based on the case method, class participation and role playing and thus will be limited to 40 students. Prerequisite: Commerce 208A/B.

Emphasis is placed on the development 301 Cost Administration, lect.: 2 hrs.; workshop: 1 hr.; J. Matthews.

> Cost accounting is studied as an aid to management control and decision-making. The class examines the informational needs of management and the means of accumulating and reporting the necessary information. Cost determination, planning, control and budgeting (cash and capital) are analyzed in relation to the internal needs of the management team.

> Essential background knowledge: an understanding of accounting processes and principles and the ability to work with accounting information.

310. The latter may, with the approval of the instructor, be taken concurrently.

302 Human Relations in the Work Environment, lect.: 3 hrs.; J. D. Misick, R. Doyle, R. G.

The purpose of this class is the development of insight into human behaviour in organizations and a capacity for objective analysis of it. background of management science, princip Research and text material drawn from the fields of sociology, anthropology and psychology are used as aids in the development of understanding and objectivity. As well as dealing with substantive data from the behavioural sciences, the class pays considerable attention to case material. While the main emphasis is put upon the analysis of this 213A/B Legal Aspects of Business - Contrad material, time is devoted to the formulation of general solutions and decisions for action.

although some background in the behavioural sciences may be helpful.

303 Technological Change and Economic Development, lect.: 3 hrs.; R. S. Cumming (may not be offered in 1972-73).

This class will study the growth of technology in the Western world since 1750 in its relationship to economic and social change, with special emphasis on Canada and the United States. The student will have an opportunity to investigate a subject of particular interest to himself.

304 Economic Statistics, (same as Economics

Renumbered as 204 above.

307B Finance, lect.: 2 hrs.; C. McManus.

A more intensive study of capital budgeting, cost of capital and financial and operational leverage than that of Commerce 207A/B. Special emphasis is placed on the long term capital and the bargain for funds vital in financing the business enterprise.

Prerequisite: Commerce 207A/B and normally Commerce 310 or 312A.

310 Financial Accounting, lect.: 3 hrs.; workshop: 1 hr.; J. Matthews.

This class is concerned with the concepts of external reporting by business firms. The theory and procedures involved in the valuation of resources and obligations are explored. The concepts of income determination are also considered.

This class is the foundation for further study in the area of financial accounting and it should be taken by those students contemplating an accounting career.

Prerequisite: Commerce 101.

#### Commerce 312A/B Management Accounting

Content: Introductory cost analysis for control and decision data. Consolidation of Balance Sheets and Income Statements. Allocation of Income Tax. Accounting for the effect of currency value change. Historical costs and current pricing.

Prerequisites: Commerce 101, Commerce 207

Note: Students whose intended major area of concentration is Accounting should take Commerce 301 and Commerce 310, and should not take this class.

#### 315B Marketing — Communication

This class will develop on a base of consumer psychology and then treat advertising, sales management, re-seller stimulation and other communication tools as part of an overall promotional mix. Problems are viewed through the eyes of the marketing manager in both 350 Special Class for Honours Students

business and institutional organizations and major emphasis is placed on understanding the factors, both business and social, that affect his decision and mold communications strategy. Prerequisite: Commerce 208A/B.

316A Marketing — Mass Distribution, lect.: 3

This class will deal with the important types of mass distribution institutions including department stores, supermarkets, mail order companies and specialty stores. Since these various institutions are continually adapting to a changing environment, the approach will principally be the major policy decisions of top management in the areas of basic strategy and marketing mix.

Prerequisite: Commerce 208A/B.

318A Marketing Research and Information Systems, lect.: 3 hrs.

Though the use of cases, it is the objective of this class to develop in students the potential managerial skills required to specify and utilize marketing research in defining, solving and evaluating marketing decisions. Emphasis will not be on mathematical formulae but rather on the research process, the problem formulation. Besides the study of research for special purpose nonrecurring problems, the class will also deal with planned systems for the regular collection, handling, and reporting of marketing information.

Prerequisites: Commerce 208A/B, Commerce 204. The latter may be taken concurrently.

319B Product Management, lect.: 3 hrs.

The class will expose the student to the many faceted problems of managing the product function in a variety of situations. The class will be based on use of projects involving actual companies and on the use of cases. Prerequisite: Commerce 208A/B.

320A Taxation, lect.: 3 hrs.; H. A. MacKinley.

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.

Prerequisites: Commerce 101 and Economics 100A and 100B.

Commerce 322A and 323B.

Two half-classes in Organizational Behavior requiring Commerce 302 as a prerequisite. Details will be available from the Department early in September 1972.

354 Finance and Taxation, (old programme

The requirements of this class will be satisfied by taking Commerce 207A and Commerce

450 Accounting Theory and Systems, (for honours students), lect.: 2 hrs.; C. W. Schandl.

The class makes independent investigations in the philosophy of accounting and auditing, based on recent literature.

Topics studied include information theory, role and function of "theory", measurement theory, systems, accounting systems; the concept of control; forms of control; theory of auditing; investigation in the nature of "evidence", current problems of accounting and auditing as they are dealt with in recent publications. Prerequisite: Commerce 310.

451 Management Control Systems and Auditing, lect.: 3 hrs.; C. W. Schandl.

This class explores the concepts of management control systems, their establishment and review, together with the standards and procedures involved in the attest function (auditing). The role of the computer and statistical sampling in the attest function are examined. The problems of undertaking investigations for special reports are also considered.

This class is required for honours students in accounting and it should be taken by those persons contemplating an accounting career. Prerequisite: Commerce 310.

#### 452 Advanced Accounting, lect.: 3 hrs.

The class considers the accounting and reporting theory of business expansion and contraction. Partnerships and consignments are discussed. The theory and problems involved in business reorganizations and liquidations are also explored.

This class is required for honours students in accounting and it should be taken by those persons contemplating an accounting career. Prerequisite: Commerce 310.

#### Comparative Literature

#### **Teaching Staff**

- R. Friedrich (Classics)
- G. M. Harvey (English)
- R. Ilgner (German)
- F. A. Kreschmer (Romance Languages)
- R. M. Martin (Philosophy)
- S. Mendel (English)
- M. S. Mounib (Romance Languages)
- M. C. Sandhu (Romance Languages)
- H. S. Whittier (English)

The Departments of Classics, English, German, Philosophy, Romance Languages and Theatre offer the following classes in Comparative Literature. These classes may form part of an area of concentration.

#### 100 Comparative Literature

This is an introduction to an understanding of man's approach to the problems of life through the study of selective masterpieces of European Literature, which may include Dante's Inferno, Chaucer's Canterbury Tales (in part), Cervantes' Don Quixote, Shakespeare's Richard II, Moliere's Don Juan, Goethe's Faust and others. All texts will be studied in English.

Note: English 100 or Classics 100 is acceptable as an equivalent to Comparative Literature 100. For a description of these classes see the entry under Departments of English and Classics.

#### 204 European Novel, S. Mendel

For a description of this class see the entry under Department of English.

## 254 Myth in Dramatic Literature, F. Kret-

The class will examine the use of classical myth in dramatic literature to formulate statements about man and will explore the paradox of artistic creation through imitation.

Prerequisite: Comparative Literature 100, English 100 or Classics 100.

270 Philosophy in Literature, R. M. Martin For a description of this class see the entry under Department of Philosophy.

#### 350 European Romanticism, M. Sandhu

This class will study the origins, main themes and trends of the Romantic movement in Germany, France, England and Spain, with reference to the works of its most important representatives, e.g. Schlegel, Hugo, Byron, Larra and others. The effects of this movement on contemporary society will also be examined. Prerequisite: Comparative Literature 100, English 100 or Classics 100.

#### 354 Theory and Practice of Drama: Aristotelian and Non-Aristolian, R. Friedrich

This class will study the basic concepts of Greek theory of drama, its effects on the practice and theory of Western drama, and Brecht's non-Aristotelian theory of the theatre as opposed to the tradition of Western drama. Current trends in modern theatre will be discussed in the wider context of the opposition between drama based on ritual and drama based on politics (Brecht, W. Benjamin).

Prerequisite: Comparative Literature 100, English 100, or Classics 100.

#### Economics

#### **Professors**

- R. E. George
- J. F. Graham (on leave 1972-73)
- J. G. Head
- Z. A. Konczacki
- R. I. McAllister N. H. Morse
- Y. Murata

A. M. Sinclair (Chairman)

#### **Associate Professors**

R. L. Comeau (on leave 1972) C. Steinberg

#### **Assistant Professors**

- F. M. Bradfield
- P. B. Huber
- G. A. B. Kartsaklis
- E. Klein
- C. T. Marfels
- C. M. Quellette
- T. A. Pinfold U. L. G. Rao

The aim of social science is to understand h. societies function and how they devel Economics is one of the social sciences ar concerned with a particular set of activing related to the production, exchange and sumption of goods and services. These activity in a region or nation constitute an econo Economics also studies how incomes are earn in an economy, why the level of economy activity is what it is, and how different economies or countries are related to another. To understand the operation of economy is to be able to predict the effects changes in any of its parts. It is this power prediction which makes the study of economic relevant to current problems, because e nomics can deal with certain questions whi our society deems significant such as: how o jobs be made available so that young peop ready to earn a living can find work, and rising prices hinder improvements in the stan ard of living?

To answer such questions, one must emple economic theory. This is a systematic body principles that has been developed to expla the operation of an economy as a whole as we as the interconnections of its parts. Training this theory is essential to any study economics. Over time, economic theory h been refined by applying statistical technique to test hypotheses about economic behavior Because of this use of statistics, and because much of economic analysis can be simply a precisely expressed in mathematical form, student of economics will find some knowled of mathematics and statistics helpful.

Economic theory is used for the interpretation and analysis of a wide variety of problems various fields of study within economics. So of the more important of these fields are labor economics, economic development, economics history, international trade, money and ba ing, taxation and government expenditure, a the organization of industry. The programm of study leading to a B.A. in economics allo considerable flexibility in order to accome modate a variety of interests on the part students, and it is possible to combine et nomics and another related discipline such political science, sociology, history or mathematical matics. Students who wish to acquire a m intensive and broadly based understanding economics than is possible in the General B course should seriously consider taking honours degree course.

Students graduating in economics find many Students and interesting opportunities for employment, and the demand for students with postgraduate training in economics is large and posignal expanding. A good record in the General B.A. or Honours B.A. degree course satisfies admission requirements to most postgraduate programmes. Economists with postgraduate training are sought after the teaching, research and administrative positions by universities, business, government and international organizations.

#### Degree Programmes

The department offers undergraduate and graduate programmes in economics. Students should consult the timetable and the department at the time of registration for changes in or additions to the courses listed here.

General B.A. in Economics (Recommended Programme)

#### Year I

- 1. Economics 100A and 100B.
- 2 Political Science 100 or Sociology 100.
- 3. History 100 or Philosophy 100.
- 4. Mathematics 110 (or Mathematics 100).
- 5 Modern language.

#### Year II

- 6-7. Economics 220A/B, 221A/B, 222.
- 8. One other class in economics.
- 9. English 100.
- 10. Sociology 100 or Political Science 100, whichever was not taken in first year; or a higher level class in whichever subject was offered in the first year.

#### Year III

- 11.-12. Two classes in economics.
- 13. History 100 or Philosophy 100, whichever one was not taken in first year.
- 14.-15. Two classes beyond the 100 level, ordinarily selected from fields related to economics, such as sociology, social anthropology, political science, history, philosophy, or mathematics.

### Notes on General Programme

- 1. Students considering economics as an area of concentration are encouraged to consult the department about their programme.
- 2. Although students may offer fewer classes in economics than the six suggested, this number is deemed necessary to provide a basic knowledge of the discipline and should be regarded as the minimum for preparation for a graduate programme in economics.
- 3. The foreign language and English 100 classes are optional but are recommended as part of a well-rounded programme.
- 4. Economics 220A/B and 221A/B are basic classes. It is highly desirable that students complete them by the end of Year II in preparation for taking higher level classes.
- 5. Students must satisfy the overall require-

on page 11.

## **B.A.** with Honours in Economics

- 1. Economics 100A (and 100B as required).
- 2. Mathematics 110 or 100.
- 3. History 100 or Philosophy 100.
- 4. Sociology/Anthropology 100 or Political Science 100.
- 5. Elective.

#### Year II

- 6. Economics 220A/B and 221A/B.
- 7. Economics 222 (or Economics 322).
- 8. History 100 or Philosophy 100, which ever was not taken in Year I.
- 9. Economics 232 or other economic history
- 10. Sociology/Anthropology 100 or Political Science 100 or higher level class in whichever of sociology or political science was taken in Year

#### Years III and IV

- 11.-16. Six economics classes including 327, 320B, 321A, and 450.
- 17.-18. Two classes in minor field.
- 19.-20. Two electives.

#### **Combined Honours**

There are several combined honours programmes:

Economics and Sociology **Economics and Political Science** Economics and Philosophy **Economics and History** 

**Economics and Mathematics** Economics and Psychology

Students interested in any of these combinations should consult with the departments concerned. Combined honours programmes may also be arranged with other departments. For combined honours programmes with economics where the major concentration is in the other discipline, students should consult the other departments concerned.

#### **Notes on Honours Programmes**

- 1. The student's programme will be chosen in consultation with the department and must have the approval of the department.
- 2. Honours students must pass a comprehensive examination at the end of their fourth
- 3. Students in the major programme will normally be required to take at least three classes in a minor field related to economics (sociology, social anthropology, political science, history, philosophy or mathematics). In any case, of the classes selected outside of economics in the third and fourth year, students must include at least two classes above the elementary level.
- 4. Departures may be made from the order of classes with departmental approval.

- ments for the General B.A. degree, as outlined 5. 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.
  - 6. The department may require the student to prepare an honours essay under its supervision.
  - 7. Students planning to do graduate work in economics are advised to include Economics 320B and 321A in their programme. It is also most desirable to have at least one modern language.
  - 8. Students must be careful in arranging their courses to ensure that they satisfy the overall requirements for the General B.A. degree stated on page 11.

#### Classes Offered

100 (and 100A), lect. 2 hrs., tutorial 1 hr., C. Ouellette, N. Morse, T. Pinfold, R. I. Mc-Allister.

The Economics 100 is class is designed to provide a general introduction to the science of economics and to introduce students to the ways in which economic science can be applied to resolve economic problems. To these ends the class has been designed; first, to give a quick survey of the important principles, terms and methods employed by the economist and, then, in the second half of the year, the basic theory of the first term will be applied and extended by identifying specific economic problems and employing the tools of economics to analyze them and to propose policies for their solution.

In the first segment programmed teaching materials are employed to move swiftly over the most important principles and concepts of micro- and macro-economics.

At the mid-term, students are offered an option for the second term. It is expected that most students will continue with the Economics 100 class which will devote the remainder of the year to economic problems and policy applications. At the completion of Economics 100, students who choose to take further work in economics will have the basic preparation needed for other classes offered by the Department of Economics, while students for whom Economics 100 is the only class in economics they will take should have obtained sufficient knowledge of economics to view economic issues more intelligently.

For those students who, at the completion of the first segment of Economics 100

(a) have already decided that they wish to do major or honours work in economics; and

(b) have completed the first segment of Economics 100 with at least second-class standing, the option is offered either to continue with

Economics 100 or to go directly into a first level theory class Economics 220B or 221B. They will then be accorded credits for Economics 100A and Economics 220B or 221B as they complete the second part. This second choice will permit the student who plans further work in economics to move more swiftly into the main stream of the economics programme and increase the range of choice he has among economics classes in the succeeding year. It must be stressed here, however, that those who choose to continue the Economics 100 option are in no way impeded from continuing on to further economics classes, even as honours candidates — indeed it is hoped that many of those who continue with Economics 100 will find their interest in economics quickened and will be moved to undertake further study in the field of economics.

220A/B Micro-Economic Theory I, lect. 3 hrs.; (offered both terms), E. Klein (first term), P. B. Huber (second term)

Microeconomics deals with the economic behaviour of household as purchasers of output and suppliers of input services, and of firms as producers of outputs and purchasers of inputs, as well with the behaviour of groups of households and firms. This class covers material in this area which may be required for other classes in economics at the 200 or 400 level. Geometry and a limited amount of high-school algebra are employed.

In addition to standard topics such as consumer and producer behaviour under various market structures, an introductory treatment of general equilibrium, external economies, and welfare economics is included. Although the major emphasis is on theoretical ideas, application of these ideas are considered, in order to illustrate the range and power of micro-economic theory in dealing with practical economic issues.

Prerequisite: Economics 100 or Economics 100A.

221A/B Macro-Economic Theory, lect. 3 hrs.; (offered in both terms), G. A. B. Kartsaklis, Y. Murata, A. M. Sinclair

This class is intended to provide a sufficient treatment of macro-economic theory to serve as a basis for other classes in economics which require a knowledge of macro-economics. The class is not mathematical in its treatment of the material. Topics covered include: national income accounting; the theory of employment, interest, money, and prices; and the theory of economic growth. Both "open" and "closed" economies are considered. Major emphasis is placed on the development of the theoretical ideas.

Prerequisite: Economics 100 or Economics 100A.

222 Economic Statistics I (same as Commerce 204), lect.: 3 hrs.; workshop 2 hrs.; R. F. George

Topics studied include the definition, functions and sources of statistics; the design and execution of statistical enquiries; statistical tables; graphs and diagrams; measures of central tendency, dispersion, shewness and kurtosis; curvefitting; probability (estimating mean and proportion in population from samples, and

testing hypotheses about means and proportions); quality control; index numbers; time series analysis; elementary correlations.

Background knowledge that is essential for this class includes: algebra at approximately Grade XI level; some experience of constructing and interpreting graphs; the ability to think quantitatively which is usually gained by the study of geometry and algebra at the high school and university level; familiarity with national accounting concepts.

232 Canadian Economic History, lect.: 3 hrs.; desirable.
N. H. Morse (same as History 222)

This survey class is a study of the economic development of Canada from the age of discovery to the present, However, as Canada from the beginning has formed part of a larger system, the approach taken in the class is to present Canadian economic history in relation to the larger system which can be broadly described and analyzed in terms of the relationships between the Old World and the New. The class therefore covers areas of economic history that are considered to be relevant to an understanding of the economic development of Canada. The aim is to make the class a unit as much as possible by using themes of trade, commodity, technology, vested interests, institutions, and so forth, as a means of developing the argument. As the class proceeds, the focus shifts more and more towards Canada. but the general subject matter deals with the penetration of Europeans coming from across the Atlantic and across Siberia into the Western Hemisphere. The class therefore is a study in the formation and breakup or change in empires, the shifting balance of power between countries and regions, the role of the Caribbean areas, the rise of the United States to a position of pre-eminence, and Canadian responses to these changes and to internal problems as well.

More theory is introduced towards the end of the class than is used in the earlier parts, as some theory is helpful in discussing Canadian problems and policies, especially in the twentieth century. However, no strict prerequisites are required, although a class in economic principles and some knowledge of history would be beneficial.

234A Pre-Colonial Economic History of Sub-Saharan Africa, lect.: 2 hrs.; Z. A. Konczacki

The object of the class is to introduce the student to the most important problems of African economic history, with particular concentration on the pre-colonial period, and to prepare him for further reading in this area of study.

The topics considered include: methodology of African economic history; the significance of environmental differenciation; some speculations on economic prehistory; economic contacts between distinct ecological regions and different cultures; introduction and spread of agricultural crops; landholding systems; mining

and metal-working; long-distance trade rout and trade centers; overseas trade; slavery a slave trade; Arab and European penetration at its economic impact.

The discussion concentrates primarily tropical Africa and it is carried up to the tun of the partition of the Continent by the European powers in the late nineteen century.

No prerequisites are required, although  $\mathbb{F}_0$  nomics 100 and some knowledge of history desirable.

235A Economic History of Tropical Afric Colonial Period, lect.: 2 hrs.; Z. A. Konczac (not offered in 1972-73)

This class deals with an era which began with the "scramble" for African colonies, and ende with the coming of independence. A survey provided of colonial economic policies, prior World War II, problems of their implementation and eventual introduction of the "development and welfare" approach. More specifically, the topics discussed include: development of transport; mining; agriculture and trade; some aspects of investment and technological diffusion; growth of labour force and the problems of migrant workers; colonial planning socioeconomic impact of European colonization on Africans; African response to economic incentives; a balance-sheet of colonialism.

No prerequisites are required, although Economics 100 and some knowledge of history desirable.

236B Recent Economic Developments in Sub-Saharan Africa, seminar: 2 hrs.; Z. A. Konczacki

This seminar centres on the discussion of the impact of colonial heritage, present structure of African economies, problems of economies infrastructure, African agriculture, mineral development, industrialization with particular emphasis on import-substitution, problems of trade: overseas and intra-African, foreign investment and aid programs, economic planning, and prospects for the future of African economic development.

241A Comparative Economic Systems: National Economies, seminar: 2 hrs., P. B. Huber

The object of this class is to sharpen the student's ability to think about problems of economic organization and control, to improve his skills in writing and speaking with respect these problems, and to provide him with broad background of institutional material of the structure and performance of a variety of economies. Reading on specific countries provide the basis for several short papers, just there is no written examination.

The student taking this class must underst the interrelated character of economic activity and have a good grasp of the way in which the

price system operates. Preliminary reading should have included *The Making of Economic Society* by R. L. Heilbroner.

Prerequisite: Economics 100 or 100A.

242B Comparative Economic Systems: Economic Organization and Planning, seminar: 2 hrs., P. B. Huber

Initially, this class examines the economic behaviour of organizations and the ways in which this behaviour can be controlled. This provides the basis for consideration of the theory and practice of economic planning at micro-economic and macro-economic levels in various institutional contexts. Readings include selections from Dahl and Lindblom, Galbraith, Mishan, Tinbergen, and Ward.

Prerequisite: Economics 100 or 100A, plus an additional half-class in economics.

250 Applied Development Economics seminar: 2 hrs. and tutorials, R. I. McAllister

The purpose of this class is to enable participants to review some main lessons from economic development theory and comparative experience, and to apply this background by tackling some current problem in project teams.

The class consists of several main strands, which often run concurrently. These include: —

- 1. Economic Development in theory and practice. A survey of some main development theories and their implications, drawing on the experiences of selected countries and regions—including the Atlantic Provinces.
- 2. Development Planning. Particular attention will be given to the Canadian social, political and economic context. Case studies will be utilised from World Bank experience in developing countries, from Canadian and O.E.C.D. member countries at various levels of government, and from the private sector. Regional, urban and rural, as well as national planning, will be reviewed.
- 3. Policy effectiveness. How do policies really evolve? How do they translate into programs and projects? What is the process of formulation, implementation and evaluation really like? What techniques are available to improve the cost-effectiveness of development planning e.g. program budgets, cost-benefit analysis, critical-path scheduling etc.
- 4. Application. The grist of development theory and comparative case study experience is utilised by working on current problems. Project teams will review how agencies in the Atlantic region are planning and budgeting—largely through extensive interviews. Teams will also tackle projects that government agencies and private sector organizations are currently working on. This will provide class members with experience in working at problems that often require an inter-disciplinary approach, and will give them practice in harnessing information and advice from a range of sources.

Class Membership

The class is provided for two main groups of people: -

- 1. Students interested in applying their background in economics and related subjects (e.g. political science, commerce, sociology) in a working environment, as part of a team that will include colleagues who already have some experience of development economics in practice.
- 2. Persons who are presently working in government agencies and businesses, who have an interest in reviewing how they might learn from comparative development experience lessons of value to their present, or future, work situations.

Prerequisites: Members should have at least Economics 100 (preferably more) or already be graudates of either economics or a related discipline. The work requirements are streamed to fit students' backgrounds.

Resources. Experienced advisers from government and private agencies will add further perspective and guidance by participating in some aspects of this class.

**320B Micro-Economic Theory II**, lect.: 3 hrs.; G. A. B. Kartsaklis

This class is mainly concerned with the theory of the firm. The discussion centers around managerial motivation and the equilibrium of the firm in theory and practice. Selected topics include the alternatives to profit maximization, break-even charts, cost-plus pricing, and the pricing of factors of production. This is followed by a discussion of problems of market conduct under oligopoly: collusive behaviour, administered prices, and basing-point prices are the main issues in this part. The last part of the class covers problems of resource allocation and of welfare economics. This class will be of particular value for students intending to do graduate work in Economics. A knowledge of calculus would be useful.

Prerequisites: Mathematics 110 and Economics 220A/B which may not be taken concurrently.

321 A Macro-Economic Theory II, lect.: 3 hrs., G. A. B. Kartsaklis

This is a class for persons 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 will assume 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.

Prerequisite: Economics 221A/B and Mathematics 110 (or equivalent).

322 Intermediate Statistics, lect.: 3 hrs., G. Rao

The student who is familiar with the basic statistical theory can appreciate econometric technique better than one who has had a formal training in statistics, which involves training in computational aspects of statistical measures but which does not give the student any understanding of fundamental theory. The purpose of this class is to equip the student with the basic theory of mathematical statistics. Statistics in its applied form has become a basic tool in all fields; recently, statistical techniques, suited to tackle economic problems, have become increasingly sophisticated. This class is designed as an introduction to econometrics; it is presumed that advanced techniques of econometrics can be understood by the student who has taken this class.

This class concentrates on the Theory of Probability, building from an axiomatic point of view, mathematical expectation, moment generating function, and statistical inference.

Multiple linear regression models will be discussed and a critique of various problems that arise consequent to violations of the assumptions of the general linear model will be presented. This will prepare the student to undertake applied econometric work; besides, it would provide a spring-board for the student to take up advanced econometrics.

The student is expected to have at least a one-year class in calculus (Mathematics 110 or 100) and preferably linear algebra too. Economics 100 (or 100A) is also required.

324 Public Finance, lect.: 2 hrs.; tutorial 1 hr.,

Economics 324 is concerned with the principles of public finance and their application. The first part of the class deals with the objectives of public policy and the reasons for market failure. This section provides the elements of a theory of public expenditure which is illustrated by reference to the major economic functions of government.

The second part of the class is concerned with the theory of taxation in relation to the objectives of public policy. This section explores the possible role of a sample of important taxes in the design of a good tax system. The third section examines the role of public finance in relation to economic stabilization. The final section considers the special problems of public finance in a federal system. The analysis of the various sections will be illustrated from and applied to the fiscal systems of Canada and other countries. Prerequisite: Economics 100 or 100A. Eco-

325 Labour Economics, lect. and seminar: 3 hrs.; C. Steinberg

nomics 220A/B and 221A/B are desirable.

Some nine million Canadians are directly dependent upon wages and salaries for a living, and their earnings constitute about 65% of the National Income. Over two million of these workers belong to trade unions in critical sectors of our economy. Economic analysis of

the factors affecting wages and salaries, employment and unemployment, the conditions of labour, and the labour market is therefore important to an understanding of the economy as a whole.

The subject is introduced by reviewing: the emergence of the labour problem; the development and structure of the labour market; the growth, structure and outlook of trade unions; and the historical and legal foundations of labour relations.

Most of the year is spent in:

- (a) Analysis of the supply of and demand for labour, opening with a review of classical wage theory
- (b) Examination of the theory and practice of collective bargaining, exploring also the interaction and relative strengths of market (economic) forces, and institutional (governmentunion-employer) forces.
- (c) Study of labour's share of the national income and the relative effect of unions on it. (d) Analysis of the determinants of employment in the macro-economic sense, and of the measurement and problems of unemployment.

We conclude with a review of public policy with respect to labour, and an effort is made throughout to relate current events to the theoretical framework.

The class structure is intended to be flexible; however, as a base it has two lectures and one seminar (in which student teams of four each provide the materials) each week.

Prerequisite: Economics 100 or 100A and an interest in social science and its methods. Economics 220A/B and 221A/B are desirable.

326B Money and Banking, lect.: 3 hrs.; R. L. Comean

This class is concerned with tracing the impact of money and financial system on the economy and, in particular, the impact that it has on such aspects of the economy as the level of employment, the rate of inflation and the balance of payments. The principles of the operation of banks and of other financial institutions are discussed, but major emphasis is placed upon the influence of the institutions rather than their detailed modes of operation. Contemporary Canadian institutions form the basis of the course, and Canadian experience in the use of monetary policy to influence the economy is examined. A knowledge of macroeconomics is assumed.

Prerequisite: Economics 221A/B.

327 History of Economic Thought, lect.: 3 hrs.; N. H. Morse

The approach taken in this class is to study "the intellectual efforts that men have made in order to understand economic phenomena". A brief survey of medieval and mercantilist literature is followed by an examination of English classical political economy and Marxian economics together with that of other socialists. The focus then shifts to the marginalists, neo-classicists, and the institutionalists. Problems of economic instability and depression, especially in this century, require that some attention be given to Keynesian economics and its extensions. The time allotted to the study of European writers and schools and of various contemporary writers and current topics depends in part on the interests of students. It is recognized that the tremendous expansion of the literature and the emergence of highly specialized fields in economics makes it necessary to select from recent sources only a relatively small sample of writings which relate this class to others which the student may be taking. The links can be forged, nevertheless, by means of a number of topics such as the following: the theory of value, the treatment of money, the theory of economic growth, the theory of distribution, and the relationship between growth and distribution.

Although this class is intended to supply a background for several other classes in economics, it is also true that other classes serve as background for this one. It is considered essential, however, that students in this class have taken a class in economic principles. A class in micro-economics (price theory) and in macro-economics (income determination) would be helpful. The presentation, except for a few specific points, is largely non-mathematical. Therefore, the main requirement of students is an ability to read and assimilate a certain body of literature rather quickly.

Prerequisite: Economics 220A/B and 221A/B are recommended

328 Industrial Organization, seminar: 2 hrs.; C.

Industrial Organization is the application of the models of price theory to economic reality. In a specific industry, the problems of a firm competing successfully with its rivals in order not only to survive but to acquire a higher marketshare are far more complex than those in price-theory where we have to deal with more or less simplified assumptions to find a solution at all. The traditional approach to the analysis of the competitive process in an industry is divided into three parts: market structure, market conduct, and market performance. These are the three main parts of the class. Briefly, market structure refers to the number and size distribution of firms in general and to economic concentration in particular; in market conduct the pricing process is discussed; market performance concerns the problem of the degree of optimality of allocation of resources. The latter part includes a discussion about whether a reallocation of resources is necessary. and this involves looking at the basic elements of public policies directed towards business. Prerequisite: Economics 220A/B or equivalent

micro-economics course.

329 Urban Economics, lect.: 3 hrs.; T. A. Pinfold

of tools of economic analysis to the probler urban areas. Urban area is loosely defined s to include small towns as well as large c Topics discussed include: the origin of a factors affecting urban economic growth goals of an urban area, problems in intra-ur resource allocation, urban transportation, duction of public goods in urban areas. urban planning. Flexibility in selecting content is considered important. Topics gested by students are welcome. Students expected to present papers on topics of the

Prerequisites: It is strongly recommended i students have a sound background in macro- and micro-economics. Econo-220A/B and 221A/B, or their equivalent would be a minimum. The class is designed as application of theoretical tools. No theory wi be taught. Students will also find a knowledge of calculus useful, but not necessary. prospective student is unsure about the s bility of his background, he should consult the instructor.

330A International and Interregional Exchange lect.: 2 hrs.; P. B. Huber

This class considers the causes of internation and interregional exchange of goods and sen ices and analyzes the effects of international integration on the incomes and growth rates of national economies. The theory and practice of commercial policy and other restrictions of 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 ecopolicy may be discussed in some detail.

Prerequisite: Economics 100 or 100A and 220A/B, or two full-year classes in economics The entering student must have a reasonable good grasp of micro-economic theory. addition, the ability to follow arguments couched in terms of high school mathematics essential since part of the exposition by the lecturer makes use of algebraic and mathe matical techniques.

333A Theories of Economic Development lect.: 2 hrs.; tutorial 1 hrs.; Z. A. Konczacki

The purpose of this class is to provide theoretical framework for the understanding of the process of economic development in the more and the less developed countries with view to an eventual application of this frame work to the solution of practical problems.

Topics considered include: basic definitions and distinctions; measurement of economic magnitudes; characteristics of the less developed countries; selected theories and models economic development and their appraisal. T concluding seminars are devoted to the problem of the foundations of the theory of economic development, and a distinction between the concepts of unilineal and multilineal evolution is discussed.

Urban Economics is essentially the application Prerequisite: Economics 100 or 100A. A class

in macro-econoimes equivalent to Economics in mass and History of Economic thought is desirable but not required in 1972-73.

334B Policy Issues in Economic Development, seminar 2 hrs.; C. M. Quellette

This class is concerned with the application of economic theory to selected developmental problems. The role of capital formation in economic development is examined. Forced saying by inflation, domestic taxation, and foreign aid are considered as alternative ways of increasing the rate of capital formation. The focus of the class then shifts to the problem associated with choosing the best use of investible resources from such alternatives as investment in education, research, population control, and the reformation of institutions and values inimical to growth. This topic leads into a discussion of investment criteria, programming models, and developmental strate-

Prerequisite: One half-year class in economic development, or Economics 241A and 242B; alternatively 220A/B and 221A/B.

422 Econometrics, lect.: 3 hrs., U. L. G. Rao

This class attempts to introduce Econometric theory at a fairly advanced level and is designed mainly for one who likes to work on theory or model-building.

A review of the general linear model will be made. Violations of the assumptions crucial for least squares estimation breeds in various problems. The following problems will be nomic integration and of Canadian commercial discussed in detail: Stochastic regressions, generalized least squares, Autocorrelation, Heteroskedasticity, distributed lags and dummy variables. All these problems are single equation

> Simultaneous equation problems occupy an important place in econometric model-building. A critical analysis of the problem of identification and single equation bias will be made.

> Limited information methods and full information methods of estimation will be discussed.

> Monte Carlo methods as alternatives to analytical techniques will be discussed.

This class requires a high level of work and is open to graduate as well as undergraduate students. Minimum prerequisites for undergraduates will be an undergraduate statistics course and undergraduate work in micro- and macro-economics. The prerequisites are Economics 322 and 220A/B and 221A/B.

423A International Economics of Development, seminar: 2 hrs.; C. M. Ouellette

This class applies international economic theory to problems of economic development policy. Topics discussed include the terms-of-trade, external balance, foreign aid, private foreign hvestment, commercial policy, development through trade, and international. Approximately one-half of the readings is concerned with foreign aid. Subtopics include the economic objectives of foreign aid in relation to national, political and security objectives; the foundations of modern aid theories and strategies in development theories; the macroeconomics of aid, including analysis of dual gap models, aid requirements, absorptive capacity, debt service, and loan terms; the microeconomics of aid, including economic criteria for project assistance and aid strategies; and factors affecting the burden of aid upon the donor countries.

Prerequisite: One half-year class in either economic development or international eco-

424B Economic Development and Ecology, seminar 2 hrs.; Z. A. Konczacki

This seminar is offered to the students whose interest in economics or natural sciences combines with an interest in environmental problems. The approach reflects an economist's view of the relationship between ecological questions and his own discipline. Topics considered include: modern approach to economic development and the lessons of experience; theory of economic development and the scientific view of man and nature; determinants of living levels; population: theory and policy; environmental preservation; problems of economic efficiency; control systems; some problems of research methodology; case studies of the relation between economic development and eco-systems in the less and the more developed parts of the world.

Prerequisite: One half-year class in economic development. Students may also be admitted with special permission of the instructor.

426B Monetary Policy, lect.: 3 hrs.; R. L.

This class assumes that students have a basic knowledge of monetary institutions and monetary theory and attempts to develop out of this a critical analysis of the objects and effectiveness of monetary policy, with particular attention to the Canadian experience. The first part of the class deals with the objectives and instrumental role of monetary policy and introduces such problems as the question of rules versus authority, and the question of lags in monetary policy. The second part is concerned with the effectiveness of monetary policy and considers issues such as the structure of interest rates, the elasticity of spending to changes in interest, the availability doctrine, the problems for policy of a fixed versus flexible exchange rate and the discriminatory effects of monetary policy. The last part considers the adequacy of the tools of monetary policy, again particularly in the light of the Canadian money market experience.

Prerequisite: Economics 326A.

427 Philosophy, Politics and Economics, Same as Philosophy 445 and Political Science 449. seminar: 2 hrs.; D. Braybrooke.

Economics 431B International Payments, seminar: 2 hrs.; C. M. Ouellette.

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

A substantial proportion of class time is devoted to the discussion of papers prepared by students. A comprehensive reading list is distributed.

Prerequisites: Economics 330A or 326B and 220A/B. These are strict prerequisites in the sense that they must be completed before the student enrolls in the class.

In addition the ability to follow arguments covered in terms of high school mathematics is essential since part of the exposition makes use of algebraic and mathematical techniques.

432 Regional Economics, lect.: 2 hrs.; F. M.

This class involves the application of economic theory to the problems created by the differential impact of economic change on the regions of a developed economy. The problems are defined by examining the determinants of income, wage, and output levels in a perfectly competitive system and the effects of various imperfections in the system. Specific topics such as migration, location, and transportation theories, rural problems, and resource use are discussed, the amount of detail depending on the interest of the students. Empirical methods of measuring the importance of specific imperfections are considered. The last part of the class analyzes government policies aimed at overcoming regional problems.

Undergraduates who are interested and who have the necessary background in mathematics may attend a weekly graduate class in which the concepts discussed in regular lectures will serve as the basis for developing models.

Prerequisite: Economics 220A/B and 221A/B. Students must have a knowledge of both macro- and price theory, especially the market mechanisms determining factor flows and the production relationships between factor prices, productivities and proportions.

440 Applied Development Economics, seminar: 2 hrs. and tutorials; R. I. McAllister.

For description see Economics 250.

450 Senior Seminar on Economic Policy, seminar: 2 hrs.; I. F. Graham.

This seminar is intended primarily for students in the last year of their undergraduate programme who are concentrating or taking honours in economics. It is expected therefore,

that the class will be small and that it will made up of those who have a strong interest in economics and who have sufficient preparation to participate in critical discussions of both general and specific policy issues. The topics discussed will depend partly on the particular interests of the students in the class.

Prerequisites: A good preparation in macro- and micro- economics. Under the old programme this means Economics 200 and Economics 300. After 1970-71, Economics 320A and 321B will be required. Students may also be admitted with special permission of the instructor.

Students interested in Economics 450 are advised to register instead for Economics 440, since the former class will not be offered in 1972-73.

#### **Graduate Studies**

The Department offers a graduate programme leading to the M.A. and Ph.D. degrees, Details of these programmes, 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

#### Professors

E. Z. Friedenberg

H. J. Uhlman (part-time)

#### **Associate Professors**

E. T. Marriott (part-time)

S. W. Semple (Chairman)

S. S. Sodhi

### **Assistant Professors**

D. Farnsworth

R. Gamberg (on leave)

W. F. Hare

G. B. Jeffery

P. Keane

D. D. Paré H. E. Poole (on leave)

J. B. Roald

K. L. Sharma

#### Lecturers

Sister Kathleen Dalton

P. A. Johnstone

M. J. Meade

W. D. VanZoost

#### **Teaching Assistants**

D. Allan

R. Gillis

B. Perrott - Coordinator of Field Experience S. Strople

#### **Special Lecturers**

D. Aydelott

W. Brooks

B. Clark E. Coles

R. E. Crickmer

F. Damtoft

V. A. Ellis

B. Jackson J. Lord

H. P. Moffatt

D. Paull M. W. Poulter

C. Purcell

M. Ricker

D. Roe A. G. Scott-Savage

L. F. Scobbie V. Short

K. C. Stickings

J. A. R. Tibbles

L. G. Vagianos

G. Walford

.D. York

Almost everyone nowadays is aware of the importance of the process of education in the modern world. A modern advanced society like our own, when compared with earlier or simpler societies, is characterised by the unparalled extent and complexity of its social heritage, that is, of the total fund of knowledge, skills, laws, customs, and attitudes it possesses. To pass on this heritage (or the relevant parts of it), and to foster conditions under which it may be enlarged and purified, becomes a major task. The task might be made easier if biologically each generation could start the learning process where the last left off, if, for example, the new generation were endowed at birth with speech and the ability to read, write and count. But, whether we might wish it or not, things are not arranged in that way and each generation must start from the beginning. As each generation, taken as a whole, always has more to learn than the last, (and in modern conditions frequently much more), and as there is a continual need for adaptation to changing conditions, it is clear that the problems of modern education are manifold and complex and the challenge severe.

The Department of Education is looking for those who recognize the challenge and wish to take it up, and addresses itself, as one of its tasks, to helping prospective teachers under- Entry Requirements stand the problems and meet the challenge.

#### The department offers:

1. a four year integrated course at the end of which students are awarded simultaneously the degrees of B.A. or B.Sc. and B.Ed., and

2. a sequential course of one year which may be taken by students who have already completed a B.A., B.Sc., or B.Comm. degree course or otherwise fulfill the requirements for admission to the B.Ed. programme, and at the end of which the degree of B.Ed. is awarded.

3. two classes which may be used for credit towards a B.A. or B.Sc. (Education 401 and 402).

The instruction offered in the education classes is substantially the same in both courses: in the sequential course however, all are offered during the same academic year while in the

integrated course, the classes in education integrated with academic classes in the sec. third and fourth years, the first year confined to the regular classes required for B.A. or B.Sc. degree. A student wishing to en the integrated course must apply to department during the first year at the latest

Traditionally the programmes are divided; Elementary and Secondary. The division much less distinct now and this is reflected the large number of options available in courses. Requests for different course combined tions are allowed by the department.

#### **Certification of Teachers**

Licenses to teach are issued by the Nova Sees Department of Education. A B.Ed. has enfit. the holder to a Teachers' Certificate, Class 5 the past. According to the regulations of the Province of Nova Scotia, every applicant for Teacher's License or Professional Certifical must submit with his application, documentary evidence (in a form prescribed by the Minist of Education) respecting the applicant's mo character, age, health, training and qualifitions. Further information may be obtain from the Provincial Department of Education or from the Chairman of the University Department of Education, In New Brunswick B.Ed. graduate may expect to receive a Class certificate.

#### Scholarships

The Nova Scotia Department of Education longer pays the fees of students in the B.R. programme who intend to teach in the Pro-

Details of scholarships and other funding sources are given in the information supplied applicants.

#### Degree Programmes

B.Ed. Elementary and Secondary Sequential Course

1. B.A., B.Sc., or B.Comm. by Septemb 1972. Candidates with other bachelor degree should enquire from the Secretary, B.E.

2. Applications from all students are comed. Opportunity to draw attention strengths is provided by the letter of applied

1. Complete Dalhousie University Application Form which is available on request from the Admissions Office, Dalhousie University, Hall fax, Nova Scotia.

2. Write to the Secretary, B.Ed. Programm Department of Education, Dalhousie University stating preference for the Elementary Division or the Secondary Division. In the case of Secondary Programme specify main teaching subject interests.

Applicants will receive:a) Departmental application form

b) Two reference forms

c) Further details

d) An interview date, which must be confirmed

by the applicant.

## Selection is based on:

Selection record: All applicants, including Dahousie graduates, must ensure that their transcripts are forwarded to the Admissions

### 2. References.

3. Interview, which will include writing and discussion of the Minnesota Teacher Attitude Inventory.

Applicants from outside the Maritime Provinces need not attend for interview; other arrangements are made for them.

### B.Ed. (Elementary); Sequential Course

Candidates for the degree of B.Ed. (Elementary) must complete successfully the following academic classes: Education 401 (if not already completed), Education 402 (if not already completed), Education 403, 404 and 406. If either Education 401 or 402 has been completed previously, Education 405 or another academic class may be taken, subject to the approval of the Department. Candidates must also complete successfully Education 407, 408 (field experience) and Education 414.

#### B.Ed. (Secondary): Sequential Course

Candidates for the degree of B.Ed. (Secondary) must complete successfully the following academic classes: Education 401 (if not already completed), Education 402 (if not already completed), Education 405, 406 and 407. If either Education 401 or 402 has been completed previously, one other academic class in another department may be taken subject to the approval of the Education Department. Candidates must also complete successfully Education 408 (field experience) and an elective approved by the Department.

Students planning a B.Ed. (Secondary level) following a B.A., B.Sc. or B.Comm. should be aware that at present certain areas of concentration in the first degree might not easily lead to effective teaching at the secondary level. They are advised to consult with the Coordinator of the B.Ed. Programme when drawing up the programme for the first degree.

### Diploma in Education

The award of a Diploma in Education will be discontinued following Spring Convocation, 1973. No students are being accepted into this programme.

## Graduates of Teachers' College

Graduates of the Nova Scotia Teachers' College, or other Teacher Education Centres, who also hold a B.A. or B.Sc. from Dalhousie may, by taking further classes in Education, be awarded a B.Ed. degree. Details of the requirements may be obtained by contacting the Department.

#### B.Ed. Elementary and Secondary Integrated Course

Education courses in the integrated programme are in the process of being re-distributed. The programme for students who will graduate at the Spring Convocation 1973 is listed below and indicates the general structure of all integrated courses. Details of the distribution of Education courses for new students entering the programme are issued by the Department at the time applications are made.

Enquiries and applications should be made to The Secretary, B.Ed. Programme by June 15 of the student's first year at Dalhousie.

Students wishing to obtain a B.Ed. (Secondary) and a B.A. or B.Sc. 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 will normally be sufficient to complete this course

## B.Ed. (Elementary): Integrated Course

The first year of the course must conform to the requirements for the B.A. degree (see page 11) or the B.Sc. degree (see page 11). English 100 must be taken.

#### Year II

6-8. Education 403, 406 and 408 (field ex-

12-15. Education 401, 404, 408, and 414. 16-18. Three classes in arts and science.

9-11. Three classes in arts and science.

19-21. Education 402, 408 and 407. 22-24. Three classes in arts and science,

#### **Overall Requirements**

A. Six of the classes in arts and science taken in the second and subsequent years must be beyond the 100 level in two subjects. Four must be in one subject taught in Nova Scotian schools, and declared by the student as his major area of concentration.

B. The remaining arts and science classes taken in the second and subsequent years shall include at least one which is beyond the 100 level and shall be selected from subjects other than those offered to satisfy the requirement in the previous paragraph. The subjects may be selected from Groups A, B, C, and D or from Art History, Hebrew, Commerce 101, 102 or Religious Studies 100 insofar as the requirements below permit. (see also page 10 et seg.).

C. At least one class in English beyond the 100 level must be taken.

D. The arts and science classes in the entire course must satisfy the regulations under Paragraph 3, "Overall Requirements" for the general B.A. or general B.Sc. degrees on page

## B.Ed. (Secondary): Integrated Course

1-5. The first year of the course must conform to the requirements for the B.A. degree (see page 11) or the B.Sc. degree (see page 11), English 100 must be taken.

#### Year II

6-8. Education 401, 406, and 408 (field ex-

9-11. Three classes in arts and science.

12-14. Education 405, 408 and one elective. 15-18. Four classes in arts and science.

19-21. Education 402A, 402B, 407, 408. 22-24. Three classes in arts and science.

#### **Overall Requirements**

A. Seven of the ten classes in arts and science taken in the second and later years must be in two subjects beyond the 100 level; these should be related to subjects regularly taught in Nova Scotian schools. The seven classes must be chosen so that either five classes are taken in one subject and two in the other, or four in one subject and three in the other.

B. The remaining three arts and science classes taken in the second and subsequent years shall include at least one which is beyond the 100 level and shall be selected from subjects other than those offered to satisfy the requirements in the previous paragraph. The subjects may be selected from Group A, B, C, and D or from Art History, Hebrew, Commerce 101, 102 or Religious Studies 100 insofar as the requirements below permit.

C. The fifteen arts and science classes in the entire course must satisfy the regulations under paragraph 3, "Overall Requirements" of the General B.A. or General B.Sc. degrees (page 11 respectively), and must be selected in consultation with the Department of Educa-

#### Classes Offered

The following list represents the 1972/73 classes. Minor changes will be noted in the pre-registration material sent to students accepted into the programme.

Certain Education classes are offered in Summer School. Details may be obtained from the Director of Summer School and Extension.

Within several of the classes listed below, separate sections have been scheduled in order to accommodate the varied academic backgrounds, specific interests, and future needs of B.Ed. students. The sections thus provide a

range of choices within the broad subject area encompassed by the title of the class.

#### 001 Screen Education

The screen education class is considered to be part of Education 405. It is a half year class comprised of two requirements, (1) that each student be able to demonstrate competency in the operation of all of A-V equipment, and (2) one lecture per week. Instruction in the operation of equipment will be provided by the Department's technician. The lectures include such topics as creative uses of A-V machines, what research says about using media, the multi-media thematic approach to teaching, ETV, film types and uses, etc. In addition, for those persons interested in the production of 8 mm. films, video-tapes, and photographic work, facilities, equipment and assistance will be available.

#### 002 Administration of Education

This class will examine the federal, provincial and municipal responsibilities for education in Canada. Particular emphasis will be placed on the provincial structure and the teacher's role within it.

#### 120 Educational Implications of Growth and Development from Pre-Birth to Senesence

A survey of the physical, physiological and psychodynamic factors in the development of the individual from pre-birth until senesence. Various theories and research methods will be introduced to help explain these norms in development. Models of development will be examined and clinical methods of observation and remediation for developmental deficits will be discussed.

## 401 General Principles: (Sociology of Educa-

This class consists of two lecture hours per week and one seminar every two weeks. Mainly theoretical, the accent is placed on the rationale and assumptions of educational systems, socialization in Canadian Society and the positing of alternatives to traditional educational practices.

#### 402 History and Philosophy of Education

Half credits offered under this section are titled: History of Western Education, Philosophy of Education: The Practical Conduct of Schools, The Historical Development of Education in the Canadian Social Context, The Development of Adult Education, Philosophy of Education: Curriculum Problems, and History of Western Education, Full credits are titled The History of British Education and Its European Background and The History of Scientific and Technical Education.

#### 403 Methods of Teaching (Language Arts & Mathematics)

Students select two hours in Language Arts and one hour in Mathematics.

#### Language Arts

This class is geared in the primary grades to the total involvement of the child in all areas of communication through a rhythmical approach to language. The class presupposes an openness on the part of the student-teachers which will facilitate the development of their own potential. Grades 4-6 build on this foundation in the setting up of Language Experience situations.

#### Mathematics

The first semester will be devoted to the mathematical development of children prior to school and through to grade 3. In addition student observation of and work in the department early childhood centre, the Playgroup, will be directed.

In the second semester students choose between continuing the development through grade six or studying the early years in greater A study of the different teaching schem

## 404 Methods of Teaching (Science & Social

One class each week is devoted to Science in the Elementary School and the other to Social Studies. Students take both classes.

#### 405 Methods of Teaching in Junior and Senior **High Schools**

Students select two of the following half-credit classes (405C, 415C, 425C, 435C, 445C, 446C, 447C, 448C, 455C, 465C, 475C). A 200 level class in the appropriate subject is required as a prerequisite (or it may be taken concurrently) for every methods course except Geography.

#### 405C English

The general goal of this class is to enable prospective teachers to design and put into effect appropriate English curricula for students of junior and senior high school. The class requires that students do considerable independent planning, work in laboratory and field situations, and extensive reading.

#### 415C History

Various aspects of curriculum development and teaching strategies will be explored with the view of aiding the student in developing a consistent and workable approach in the history or social studies classroom.

#### 425C Geography

The class will explore the objectives of geographic study; the acquisition of skills and the development of concepts and appreciations. It will also deal with the preparation of curricular units and the use of materials in those units.

#### 435C Mathematics

A large part of the time will be devoted to A class in the practice of language teaching the

computing and mathematics: the remainde the nature of mathematical education and development in school. In addition t classes (one of which will be used for leas the language BASIC and appropriate m matical methods) each student will be tute two/three high school students who w using our facilities as part of their program (10:30 - 11:15 a.m.). Thus students in programme will experience a micro-teach situation. Other opportunities for mathemat work may develop.

#### 445C Physics

A study of the objectives of a high seh physics programme, curriculum development subject evaluation, innovation in science team ing and general instructional methods.

#### 446C Chemistry

available in Nova Scotia with attention al given to relating the learning of Chemistry industrial and domestic uses. The application general teaching techniques to specific portion of the subject matter are demonstrated a practiced. The laboratory facilities provide f student teacher with the opportunity to car out experiments and demonstrations.

### 447C Biology

In addition to studying the current classes Nova Scotia, ways of harnessing student terest in ecological matters as a means promoting broader study are considered, variety of teaching approaches are examine and seminars and discussions relating to lesso planning and science projects are part of the programme.

#### 448C Geology

This subject is taught in Grade 12 classes Nova Scotia. The importance of practical work is examined by use of experimental labs. Il applications of general teaching methods specific lessons and series of lessons demonstrated and practiced. Laborator sessions provide the student teacher w knowledge to carry out demonstrations quired in the teaching of the class and enab him to become familiar with various kinds an arrangements of learning materials and a paratus.

#### 455C Latin

Some of the techniques employed in teaching of a "second language" are examine and discussed re their feasibility in the teaching of a "dead" language; a multi-media approad vs. textbook; relevancy to other subjects on the curriculum; audio-visual aids. Prerequisite: Permission of Instructor.

#### 465C A Second Language

is concerned, in the broad sense, with methodois content deals with the objectives, subject matter, materials, techniques, testing, and currieulum design of second language teaching. This course will serve intending teachers of French and German.

### 475C Economics

This class reviews the basic methods of economic analysis and of teaching economic concepts. The emphasis is on how to relate current economic matters to classroom studies. Types of lessons, curriculum development, and the use of learning materials and aids are examined.

### 406 Educational Psychology

Half credits offered under this title are:-Educational Psychology for Elementary Teachers, Educational Psychology for Secondary Teachers, Psychology of Learning, Language & Cognition, Psychology and Education of the Exceptional Child, Psychology of Adolescence, Psychology & Education of the Young Child, and Psycho-Diagnostic Approaches to Special Education.

#### 407 Measurement, Evaluation and Human Relations

One class per week throughout the year will study writing objectives, teacher-made tests. standardized tests, random variation, basic statistical ideas and the evils of testing.

The other is a class in human relations in the classroom. Emphasis is on understanding and helping the pupil on the affective as well as the cognitive level. A practicum in interpersonal relations is offered in conjunction with this class.

#### 408 Field Experience

Periods of field experience are an integral part of the programme and contribute to a credit. Many students also become involved in noncredit field experience. The programme is under the direction of a Coordinator of Field Ex-

### 409 Physical Education, lect.: 1 hr.; lab.: 2 hrs.

This class will be given by members of the faculty in the School of Physical Education. It intended, firstly, to broaden the student's understanding of physical education by examining its historical, philosophical, physiological, kinesiological and psychological foundations. Secondly, it endeavours to familiarize the prospective teacher with school programmes of physical education and with the specific problems associated with coaching school teams.

The practical laboratory work is intended to encourage the student to specialize in about four activities with the hope that sufficient Interest, depth of knowledge and confidence could be developed in coaching. The student is be analysed and learned, and secondly as a teacher of certain parts of the programme, so that teaching and coaching techniques can be improved.

#### 411 Drama in Secondary Schools

This class pursues techniques of improvisation that will be suitable to drama in the classroom. Especially directed towards teachers of the humanities, it attempts to demonstrate how active involvement in a situation can invigorate the study of social issues.

#### 412 School Music

This is a class in music education which presents philosophy, skill, procedures and material with special reference to the schools in Nova Scotia.

#### **414** Creative Activity

This class is for elementary students. Art, drama, and movement are combined in an integrated class.

A special arrangement with the School of Library Service makes classes in Literature for Young Adults and Children's Literature available to B.Ed. students.

### **Graduate Studies**

The department offers classes leading to the degree of M.A. in Education. Detailed information is given in the Calendar of the Faculty of Graduate Studies.

#### Engineering and Engineering-Physics

#### Engineering Professors

K. F. Marginson (Chairman)

#### Associate Professor

A. Creelman

#### Assistant Professors

D. M. Lewis E. N. Patterson

#### Engineering-Physics Professors A. Levin (Chairman)

H. W. King

#### Assistant Professor S. T. Nugent

The profession of engineering is today expanding its scope and changing its pattern of activity at an ever-increasing rate; it follows, therefore, that the course of training and education for engineers is adding new classes and changing the emphasis placed on older topics. More sophisticated mathematics, com-

involved firstly as a participant so that skills can puter application to the numerical solutions of very large sized problems, and the use of recent discoveries in science are now playing major roles in engineering training while conventional topics such as drafting and surveying call for less time and effort on the part of the student. Dalhousie's course of study in engineering closely follows this modern trend and, combined with the subsequent specialized training at the Nova Scotia Technical College, prepares the serious student to play a responsible role in the modern world.

> In addition, those students who are keenly interested in the research and development functions in closer association with physics may follow the course leading to the degree of Bachelor of Engineering-Physics at Dalhousie.

> The department also offers the first two years of a six-year course in architecture leading to the Bachelor of Architecture degree.

#### Engineering

The work of the Uniform B.Sc. for Engineering covers three years and should follow quite closely the order indicated below. At the end of his studies, the successful student receives a General B.Sc. from Dalhousie and is qualified for admission to the junior year of the Nova Scotia Technical College. See Notes 1 to 4 below. Students planning to continue their studies at some college other than the Nova Scotia Technical College should consult the department when they first register.

#### Architecture

Students who plan to study architecture may take the first two years of the course for the Uniform B.Sc. for Engineering, (See note 1 below). Having completed the course, they will be admitted without further examination to the Nova Scotia Technical College School of Architecture (See page 13 for further details)

#### Degree Programme

#### Uniform B.Sc. for Engineering Year I

- 1. Physics 110
- 2. Engineering 001
- 3. Mathematics 100 4. Chemistry 110
- 5. Elective (see note 3 below)
- 6. Elective (see note 3 below)

#### Year II

7. Physics 221

8-9. Engineering 200, 220A, 220B, 310

10. Mathematics 228

11. Chemistry 230

#### Year III

12-15. Engineering 230, 320, 330A, 330B, 340A, 340B

16. Mathematics 328

1. Students going on to study architecture may substitute arts electives for Mathematics 228 and Chemistry 230 in Year II.

- 2. Students planning to specialize in civil, mining or geological engineering are required to take a class in geology (100) and one in surveying (210 and 211).
- 3. Consult page 10 for Group requirements.
- 4. Engineering 310 is not a degree credit, but is prerequisite for Nova Scotia Technical College admission.

#### **Engineering-Physics**

Engineering-Physics or Applied Physics is the study of physics oriented towards its application to engineering problems. The area is interdisciplinary and the study is suitable for students whose interest involve experimental work in the physical sciences or who contemplate research or development work in industry or resource development. The mathematical content of the course is similar to that of physics with, however, special emphasis on quantitative solutions. The physics content is identical with that of honours physics in the first two years, but has special requirements in the last two years dealing with system design, information and control theory, instrumentation and measurement techniques. The course leads to the degree of Bachelor of Engineering-Physics which has honours standing.

Completion of the course is excellent preparation for graduate work in physics, engineering or earth sciences.

### B.Sc. in Engineering-Physics

#### Year I

- 1. Physics 110
- 2. Mathematics 100 3. Chemistry 110
- 4. Elective (Arts)
- 5. Elective

#### Year II

- 6-7. Physics 211 and 231
- 8. Mathematics 220 or 200
- 9. Mathematics 200-level class
- 10. Elective (Science)

#### Year III

- 11-12. Physics 300, 315
- 13. Engineering 335
- 14. Engineering or Physics 200-level class
- 15. Mathematics 300-level class
- 16. Elective (Arts)

#### Year IV

- 17. Physics 400
- 18. One other Physics 400-level class
- 19. Engineering 400-level class
- 20. Engineering or Physics 400-level class
- 21. Mathematics 300-level class

#### Classes Offered

001 An Introduction to Professional Engineering, lect.: 1 hr.; K. F. Marginson

This class is intended to introduce the new engineering student to some of the broad aspects of the profession. It uses the topic of

engineering design as a framework in which to 220A Engineering Mechanics - Statics, lect. discuss the various formal branches of engineer- hrs.; lab.: 3 hrs.; (one term only), E. ing and the spectrum of engineering functions. Patterson The student will begin to acquire some of the skills of his profession; for example, the technique of sketching for use in communication and thought, the creation of simple verbal and mathematical models, and the writing of technical reports. An attempt is made to establish the professional point of view through group discussion of obligations, ethics, and personal relations in the fields of technological endeavour

200 Graphic Science, lect.; 3 hrs.; lab.: 3 hrs.;

This class gives extensive coverage to the third instrument of thought - the graphic or pictorial. Students entering the class should have completed a class in calculus and have a grasp of the basic vector concept. The work begins with a very rapid coverage of essential drafting techniques, followed by a study of descriptive geometry with extensive applications. Concurrently, students work on conceptual design projects and their graphic presentation. Graphic solutions to the problems of vector algebra are covered parallel with the analytic work of other classes. The same methods are used in the study of graphic calculus, up to and including the solution of differential equations and some of the geometric implications of engineering formula. The class is concluded with a fairly large design project done on a team basis by the students. Prerequisites: Mathematics 100; Physics 110. Text: TBA

210 Surveying, lect.: 3 hrs.; E. N. Patterson

This class is an introduction to the fundamentals of surveying. Topics covered include the theory of land measurement, precise leveling, transit, stadia and plane table surveys, traverse computations, adjustments and plotting of results, the determination of meridian, azimuth and latitude based on celestial observation, construction surveying, alignments, curves.

Text: (1970-71) Smirnoff, Measurements for Engineering and other Surveys.

211 Survey Field Camp, 3 weeks, E. N. Patterson

This is a non-credit class required of prospective civil and mining engineering students.

The survey field camp will normally be held immediately following the final examinations in the spring and will be of three weeks' duration. The use of surveying instruments and equipment will be practiced by all students. Assigned exercises will include the use of hand levels, steel tapes, dumpy, tilting and automatic levels, transits and theodolites and map drawing. Traverse computations will be performed by hand as well as by digital computer methods. Prerequisite: Engineering 210.

Text: Same as in Engineering 210.

This class is an introduction to the study engineering classical mechanics. Following presentation of basic concepts, a brief contained treatment of vector algebra will given. The student will then consider equivalence, resultant and equilibrium of for systems acting on a particle or on idealized ria bodies such as trusses, frames and machine Students will undertake the graphical solution of selected problems.

The class material will correspond very closely to that described in the text. Prerequisite: Mathematics 100. Text: (1970-71) Huang, Engineering Mechanical Volume I - Statics

220B Kinematics, lect.: 2 hrs.; lab.: 3 hrs.; (one term only). K. F. Marginson

Students taking this class should have taken class in calculus and should be proficient a dealing with rates of change. A firm grasp of the vector concept is desirable.

The class will cover the motion of particles lines and rigid bodies. Displacements, velocities first and second degree accelerations will he discussed graphically and analytically.

Applications of the theory will be made to the motion of various types of mechanism, and the use of the computer in kinematic analysis and synthesis will be considered.

Prerequisites: Physics 100; Mathematics 100. Text: (1969-70) Huang, Engineering Mechanica Volume 2.

lect.: 3 hrs.; lab.: 3 hrs.; A. Creelman

The class is an introduction to electrical engineering. However, it is also a terminal class in this subject for certain engineering dis ciplines. Consequently, while the analysis of linear circuits is dealt with in some detail, considerable emphasis is placed upon practical devices and systems. The laboratory period illustrate the use of electrical measuring devices and introduces the student to convention methods of testing electronic and electronic mechanical equipment.

Prerequisite: Mathematics 100; Physics 110 Engineering 310 (taken concurrently). Text: (1969-70) R. J. Smith, Circuits, Devices and Systems.

Methods, 1 afternoon per week, D. M. Lewis/E.

This is a class which will prepare the student to write his own Fortran IV digital computer programs for the solution of engineering pro blems. It will consist of a series of case studie of actual engineering problems which each student will execute on the IBM 360.5 fatigue, creep and viscoelastic behaviour,

computer. Results will be submitted to the compation. Students will also have an opporfunity to use some of the standard application programs which are available, such as COGO, STRUDL, and ECAP.

Prerequisites: Registration in second-year engineering, or consent of instructors.

Text: (1970-71) Murrill & Smith, Fortran IV Programming for Engineers and Scientists.

320 Dynamics of Particles and Rigid Bodies, lect.: 2 hrs.; occasional tutorial, D. M. Lewis

This class completes the study of engineering classical mechanics begun in Engineering 220A and 220B. The first term will deal with kinematics and dynamics of single particles and in the second term these fundamentals will be applied to rigid bodies.

Prerequisites: Mathematics 100; Engineering 220A, 220B; Engineering 310.

Text: (1970-71) Huang, Engineering Mechanics Volume 2.

330B Strength of Materials, lect.: 3 hrs.; lab-tutorial 3 hrs.; second term only, D. M.

This class is an introduction to that aspect of mechanics which is sometimes called mechanics of deformable bodies or mechanics of materials. The class studies the relations between the force system applied to a deformable body of a given material and the resulting deformations and internal forces; the relations between stress and strain for a variety of conditions and materials; and the procedures used for estimating the dimensions of a physical body of a specified material that are necessary for the support of a given load.

The principles and methods used are drawn 230 Introduction to Electrical Engineering largely from prerequisite classes in mechanics and mathematics. The class will stress the use of freebody diagrams, the equations of equilibrium and the geometry of the deformed body together with observed relations between stress and strain for the analysis of the force system acting on a body.

Prerequisites: Engineering 220A or the consent of the instructor.

Text: (1970-71) Higdon, Ohlsen, Stiles, Weese, Mechanics of Materials.

330A Materials Science, lect.: 3 hrs.; lab.: 3 hrs.; H. W. King

The aim of this class is to give engineering students an understanding of the importance of structure in determining the useful properties of materials. The relevant properties are 310 Engineering Problems by Computer mechanical, thermal, electrical and environmental. The approach will be to first describe the properties in engineering terms and then discuss the significance of structure. Elastic properties are shown to be influenced by the nature of the chemical bonds and the plastic properties by the crystal structure and the presence of defects. This approach is continued in the study of fracture, hardening mechanisms,

covering metals, plastics and composite materials, and is continued in the sections concerning thermal, electrical and chemical properties.

The laboratory consists of a series of demonstrations of the dependance of properties on structure or microstructure and includes time set aide for students to prepare an individual project on an aspect of materials science applicable to the particular branch of engineering in which they intend to specialize in the future.

Texts: Hanks, Materials Engineering Science, (Harcourt, Brace & World 1970), Gordon, New science of Strong Material, (Penguin Books,

#### 335 Electronics, lect.: 3 hrs.; A. Levin

The class covers advanced circuit analysis of linear and non linear systems, the physics and resulting properties of solid state devices, the concepts of information and noise and transmission lines and filters. The following topics are treated: network reduction, the 4 terminal network and solutions by matrix methods, non linear systems, modulation, demodulation and rectification; carrier transport in semiconductors, properties of diodes and transistors; electro-mechanical analogues and analogue computation methods, feed-back and control systems, stability criteria, nature of information and noise, properties of distributed constant lines and filters.

Prerequisites: Physics 231, Mathematics 200 or 220, which may be taken concurrently.

Text: Milman and Halkias, Electronic Devices and Circuits.

340A Classical Thermodynamics, lect.; 3 hrs.; tutorial/lab.: 3 hrs.; (one term only), K. F. Marginson

This class covers the theoretical portion of classical engineering thermodynamics. Calculus to the level of partial differential equations is prerequisite. General topics are: first law for open and closed systems, reverisbility, enthalpy; second law, entropy, availability and efficiency, psychrometrics. Various real processes and thermodynamic devices will be discussed. This work covers applications other than those involving chemical reactions.

Prerequisites: Mathematics 100; Physics 110; Chemistry 230 (may be taken concurrently). Text: (1970-71) Van Wylen, Thermodynamics.

340B An Introduction to Fluid Mechanics, lect.: 3 hrs.; lab-tutorial 3 hrs.; (one term only), E. N. Patterson

Fluid mechanics is the engineering science upon which such specialities as aerodynamics, gas dynamics, rate processes, hydraulic and marine engineering are based. It deals with the statics, kinematics, and dynamics of fluids.

As this is an introductory class, considerable time will be devoted to the study of fluid properties, fluid statics and the underlying

concepts, definitions and basic equations of fluid dynamics. Laboratory experiments will be carried out to investigate some of these basic

Prerequisites: Concurrent registration in Engineering 320, or the consent of the instructor. Text: (1970-71) Streeter, Fluid Mechanics.

400 Advanced Physics Laboratory, lab.: 6 hrs.; A. Levin, S. T. Nugent

This is a physics and engineering-physics laboratory class in which students in groups of two work largely on their own initiative. The experimental work covers nuclear disintegration, gamma and beta spectroscopy and absorption measurements; proton spin quantitative measurements and Planck's constant determination; thermonic emission and ionization experiments using a vacuum pumping and instrumentation system; properties of solid state semiconductors and devices; experiments on the spectral noise distribution of transistors and the use of analysis systems; experiments with a Helium-Neon laser, holography, etc.

Experiments in other areas, such as acoustics, optics and fluid dynamics, are available if requested. A report upon a topic to be agreed with the instructor is required as part of this

420/520 Communication and Control Theory, lect.: 3 hrs.; S. T. Nugent

In the first term the class is introduced to the principles of communication theory, Topics discussed include: the time and frequency domain, random signal theory, network analysis and basic information theory.

In the second term the class is introduced to the field of optimal control. Topics discussed include: statistical design of linear systems, state representation of systems, calculus of variations, the maximum principle and dynamic programming.

433A Semiconductors, lect.: 3 hrs.; A. Levin

Texts: TRA

Properties of intrinsic and doped semiconductors; carrier generation and transport, Hall effects and Shockley Haynes experiment; semiconductor diodes, fields and carrier densities, transport equations; sepcial diodes; transient behaviour in diodes; bipolar transistors, properties, limitations and failure mechanisms; the F.E.T., unijunctions, multilayer diodes, tunnel diodes, and thermistors; noise mechanisms in solid state devices.

433B Materials Science, lect.: 3 hrs.; H. W. King

The physical properties of engineering materials are discussed in terms of their crystal structure and microstructure, using the principles of modern physics as a basis. The properties are first formulated systematically in tensor notation and shown to possess an intrinsic symmetry which must be related to the crystal

symmetry of the material. Many useful properties, such as electron transport and plastic deformation, are shown to be strongly dependent on defects in the crystal structure. The nature of such defects, and the methods available for their creation, control or elimination, are considered in relation to the optimization of these properties. This approach is further extended in a discussion of the effects of microstructure on the properties of polycrystalline and polyphase materials.

Prerequisite: 4th year standing and permission of instructor.

Texts: Nye, Physical Properties of Crystals, (Oxford Univ. Press, 1969); Hutchinson & Baird, Physics of Engineering Solids, (Wiley, 1968).

#### English Language and Literature

#### Professors

A. R. Bevan

C. L. Bennet (Professor Emeritus)

I. Gray (Chairman)

M. G. Parks (On leave, 1972-73)

M. M. Ross

S. E. Sprott

D. P. Varma

#### **Associate Professors**

R. MacG. Dawson

I. Fraser

A. J. Hartley

S. Mendel

A. N. Raspa

R. J. Smith

H. P. Sucksmith

H. S. Whittier

#### **Assistant Professors**

S. A. Cowan

R. S. Hafter

G. M. Harvey

M. A. Klug

H. E. Morgan

C. J. Myers N. S. Poburko

R. L. Raymond

C. X. Ringrose

H. D. Sproule G. F. Waller

**Part-time Instructors** 

Elizabeth Horlock

Elizabeth Sutherland

#### Dalhousie Visiting Fellow (1971-72) Michael Griffiths

The central purpose of the study of literature has been well expressed by a distinguished Canadian scholar, Douglas Bush: "Great authors produce great works of art because, given their genius, they have imaginative, emotional, moral, religious experience which they must express and communicate. The richer and more complex such works are the more they are in need of interpretation; and one major difficulty is the fact of the pastness of most of them, of their being scattered over three thousand years. The sine qua non of scholarship, criticism and teaching is the effort to understand, and to help others understand, these works, to make them available to successive generations, to make the authors' recreation of their experience an enrichment of our

The serious study of literature goes far beyond the undoubted pleasures of reading at random and for enjoyment and relaxation. The study of literature is pleasurable, but it is also exacting 2. Classes are offered in the second and the because the student, unlike the casual reader, must seek to understand as well as enjoy, must seek a reasoned and coherent knowledge of a literary work in the context of its author's art and thought and in the context of the age in which it was written. The study of older literature is essential because art, unlike science, does not necessarily improve through the ages; it changes but does not build new structures which supersede and replace the old: a Shakespearian play is not untrue, inconsequential or of no application to ourselves and our times because it was written nearly 400 years ago. Therefore, the student of literature by no means limits himself to the present, as the casual reader is apt to do, but applies his mind and sensibility to great works of the creative imagination in whatever age they have appeared. Such study of English literature takes the student over twelve centuries and often involves him in the closely related humanistic disciplines of history and philosophy. Thus the study of English literature introduces the student to the complexities of human nature from several points of view, and helps him to a deeper understanding of himself and of his fellow human beings in almost every aspect of man's varied experience.

In a more down-to-earth way as well, the study of English literature is a vital part of education. It is a study of words, of words in action in the sentence, in the paragraph, and in the whole composition. One might think that reading and writing in one's mother tongue are elementary subjects that most people master before they reach university. But reading and writing, like mathematics, are performed on many different levels. Unfortunately, the general level, the level that is so influential because it is all around us. is low. Much of the supposedly literate language to which we are constantly subjected is muddled or vague or pretentious or even dishonest - the language of propaganda, of advertising, of political persuasion. The study of literature and the practice of writing that is part of that study offer the student the discipline of words, a discipline as fundamental in the humanities as the numbers of mathematics are in the sciences. But there is no short cut to verbal accuracy; it is to the best writers that we must go for the models of professional writing, to the "classics", old or new, which show us the infinite possibilities that there are in words. The study of English literature and language is therefore a practical study, indeed a practical necessity for the highest development of verbal skill.

At Dalhousie, English is studied on seven

1. English 100 is the introductory class 1 involves the study of various literary w (novels, poems, plays) and the writing fortnightly essays. Each section attends the lectures per week; individual attention is and able to every student in interviews instructors and tutors and in small discussion

years of the General B.A. course for student wishing to concentrate primarily on English study it as an adjunct to their main subject to choose a class as an elective. English 100: the prerequisite for all General classes.

3. The Honours course in English consists nine Honours classes beyond English 100. Its organized as a comprehensive study of Englis literature. In addition to the standard Honour course in English, students have the choice combinations of English and French, English and German, English and Spanish, English a History, and English and Philosophy. English 100 and the permission of the Department an general prerequisites for all Honours classes.

#### Degree Programmes

#### The General B.A. in English

The Department advises General students form coherent programmes of four or five classes in English above English 100, and prepared to suggest suitable classes in other Departments to make up the full ten classe required by Faculty regulations. Of the classe beyond English 100 required to constitute programme in English for the General B.A. degree, not more than three should be draw from any one of the following three groups of classes:

(a) 203, 214, 218, 224; (b) 205, 206, 208, 215;

(c) 209, 210, 212, 213, 217.

Students should note that the classes for General B.A. (English 201-228) are not tended as preparation for graduate study English. It is possible to enter a two-year M course on completion of a General B.A. degree but only if the student has completed for five Honours rather than General classes for by concentration and has attained at least a secon division average in them. Note that General students are not excluded from Honours class but that they must have the Department permission to enrol in them.

#### The B.A. with Honours in English (Major) Programme)

The Honours course in English offers a tematic study of the subject which acquain the student with the major writers and tree from mediaeval times to our century. therefore of particular relevance to the stu who is interested in a comprehensive study English as the basis of a liberal education 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 M.A. 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 subsequent years, Honours students are encouraged to seek the advice of the Department in choice of classes.

The Honours course consists of nine classes beyond English 100. At least one class must be taken from each of the following six sections:

Section A. English 252 (recommended for third year)

Section B. English 253; English 351 (recommended for second year)

Section C. English 251; English 352

Section D. English 254; English 356 Section E. English 354; English 457

Section F. English 453.

The student may choose his three remaining classes from those not already chosen in Sections B to E, or from Section G. Section G. English 201, 206, 207, 218, 452,

English 250A (Bibliography), 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

The Honours student must meet the requirements for the General B.A. degree. He is advised to select a minor from one of the subjects listed under either Group A or Group B in the "Degrees and Courses" section of the Calendar (see page 10).

### **B.A.** with Combined Honours

There are several Combined Honours programmes:

English and French

English and History

English and Philosophy English and German

English and Spanish

Students interested in any of these combinations should consult with the departments concerned. If a student wishes to combine English and a subject other than those menfioned above, he should see the department as early as possible.

#### Classes Offered

100 Introduction to Literature, lect.: 3 hrs., Members of the Department.

Since English 100 consists of sections taught by many different instructors, statements about its objectives and approach must be confined to eneralizations. All instructors of English 100 have these two broad objectives in common:

a) to involve the student in the serious study of literature as a crucial part of education;

b) to involve him in the discipline of words so that he will be a more critical and responsive ing. reader and a more exact and imaginative writer.

The subject matter varies from section to section. Detailed syllabi of all sections are available before registration in September. 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 section conduct small discussion groups and personal interviews with students.

#### Classes for General Degree

201 The English Language, lect.: 2 hrs., H. E. Morgan

English 201 is an introductory class in the study of the English language. Initially, attention is paid to linguistic terminology and to distinctions of meaning, form, and the sounds of linguistic expressions (semantics, morphology, and phonology). Then the history of change in the language and in attitudes toward the language is surveyed, with attention finally being paid to current linguistic research and its application in teaching and in literary criticism.

203 Masterpieces of Western Literature, lect.: 3 hrs., H. S. Whittier.

This class is intended to provide the student with the opportunity to do intensive reading of selected major works from Western literature. The selections vary from year to year. The intensive reading 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.

Generally, works will be taken up in chronological order. As the class proceeds, interrelationships and comparisons of theme, form and artistic perspectives in the various works will be developed. Classes generally consist of a combination of lecture and discussion. Voluntary tutorials are held once a week for open discussion in addition to class meetings.

204 The European Novel, lect.: 2 hrs., S.

This class can best be described as a close study of about twelve representative novels of the last two hundred years in translation.

This class is also offered as a credit in Comparative Literature; for other classes in this field, see the calendar entry under "Comparative Literature."

205 Victorian Literature, lect.: 2 hrs., C. L.

In this class the student studies the prose and poetry of the period: Carlyle; Newman; Ruskin; Arnold; Dickens; Thackeray; Tennyson; Brown-

206 American Literature of the Nineteenth Century, lect.: 2 hrs.; S. A. Cowan/R. L. Raymond.

This class is a survey of American literature through representative works by Irving, Bryant, Cooper, Hawthorne, Poe, Emerson, Thoreau, Melville, Whitman, Dickinson, Twain, Crane and Dreiser. The aim of English 206 is to introduce students to major American writers from 1800 to 1900. The class involves some attempt to relate the writers to particular movements and influences in American literary history, but the focus is only in part on the history of literary development. The main emphasis is on the reading and discussion of the works themselves. It is assumed that this approach will familiarize the student with the thought and style of the individual authors, and generally with the literature of the period. Little outside reading will be assigned. The class will be conducted by a combination of lecture and discussion. Students will write either several short papers or one long paper each

207 Canadian Literature, lect.: 2 hrs.; C. X. Ringrose, H. D. Sproule.

This class is a survey of English-Canadian literature with emphasis on poetry and fiction from the 1920's to the present. Some knowledge of nineteenth-century British literature, though not essential, is very useful to the student of Canadian literature. A few representative writers of the nineteenth century (Howe, Haliburton, DeMille, Isabella Crawford, C. G. D. Roberts, Carman, Lampman, and D. C. Scott) are studied briefly in the first term, and essay topics are set on nineteenth-century writing. Twentieth-century novels and poetry are studied in the last month of the first term and throughout the second term.

208 The English Novel to 1900, lect.: 2 hrs.; D.

This class is designed primarily to acquaint students with the chief landmarks of eighteenth and nineteenth-century fiction and to present a survey of the origins and development of the English novel. This involves a thorough investigation of the antecedents and formative influences of fiction and a close examination of some of the chief works of eighteenth and nineteenth-century novelists. The selection of novels will be announced.

209 Twentieth-Century Fiction, lect.: 2 hrs.; M. A. Klug, A. N. Raspa, A. R. Bevan.

English 209 is intended as an introduction to the main thematic and technical trends in the modern English and American novel. The lectures focus on representative novels of some

of the major figures of the first half-century and on significant novels of the past two decades.

210 Modern Poetry in English, lect.: 2 hrs.; S. E. Sprott.

A study of the creation and development of modern poetry in English based on the seminal poets Yeats, Pound, and Eliot, with some attention to Auden, Dylan Thomas, W. C. Williams, Stevens, and others, including Cana-

212 British Literature of the Twentieth Century, lect.: 2 hrs.; N. S. Poburko.

See the departmental supplement for class description.

213 American Literature of the Twentieth Century, lect.: 2 hrs.; R. S. Hafter.

The class will study representative poetry, drama, and prose. Some of the authors represented will be James, Hemingway, Faulkner, Frost, Anderson, Fitzgerald, Salinger, W. C. Williams, O'Neill, Tennessee Williams, Arthur Miller, Henry Miller.

214 Shakespeare, lect.: 2 hrs.; G. M. Harvey, C. J. Myers, N. S. Poburko.

This class is designed for students in the General course who wish to study selected plays by Shakespeare. The aim of the class is simply to discover what the plays are about. Only minimal consideration is given to textual variations, sources, and influences. The course divides into five parts: (1) History plays; (2) Comedies; (3) Problem plays; (4) Tragedies; (5) Romances.

Students are expected to have a thorough knowledge of these plays by the end of the year. One essay of about 3000 words is assigned for each term. There are December and final examinations.

215 Poetry of the Romantic Movement, lect.: 2 hrs.; H. P. Sucksmith.

A class which will focus on the poetry of Wordsworth, Coleridge, Byron, Shelly, and Keats. At the outset some attention will be directed to the pre-Romantic poets and to the intellectual background of the Romantic move-

217 African Literature, lect.: 2 hrs.; R. J.

English 217 is a class on African literature written in English. Novels, plays, and poems will be discussed. The bulk of the material will be by Southern African and West African writers. Works to be studied will mainly be modern, and will reflect the attitudes of various African cultures towards racism, colonialism, and the African nationalism.

218 Tales from Chaucer and Malory, lect.: 2 hrs.; tutorial: ½ hrs.; H. E. Morgan.

This class comprises an introduction to medieval values and manners and to Chaucer's language through study of selected works from his Canterbury Tales, followed by an introduction to medieval heroic and romantic literature, chiefly through a survey of the legends of King

220 English Drama, (not offered in 1972-73).

See the departmental supplement for class description.

222 English Satire (not offered in 1972-73).

225 Epic Poetry and Prose (not offered

226 Tragedy, lect.: 2 hrs.; M. Estok.

See the departmental supplement for class description.

227 Comedy (not offered 1972-73).

228 Lyrical Poetry, lect.: 2 hrs.; C. X. Ringrose.

See the departmental supplement for class description.

Classes for the Honours Degree

250A Bibliography, lect.: 1 hr.; (first term only), R. L. Raymond.

This class is 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 in his own research. The class also includes instruction in the technical aspects of writing papers (planning, research methods, footnotes, bibliographies), and some discussion of the history of printing insofar as it relates to the establishment of texts, particularly older ones.

The class meets one hour a week during the first term only and includes the assignment of an exercise to be done in the library.

251 Sixteenth-century Non-dramatic Literature, lect.: 2 hrs.; G. F. Waller.

This class is a study of some major works (other than drama) from the time of Sir Thomas More to the end of the century. The main emphasis falls on More, Sidney, Spenser, and Shakespeare, but some attention is given to the poetry of Wyatt and Surrey, to the prose of Hooker, and to continental Renaissance writers such as Castiglione. A major part of the second term is devoted to representative books of Spenser's Faerie Queene.

252 Shakespeare and the Drama of His Time, lect.: 2 hrs.; S. E. Sprott.

Some fifteen plays by Shakespeare are read the context of representative plays hy earlier and later contemporaries, especial Marlowe and Jonson. The class is a semiintended primarily for Honours stude though open to General students who obtained a second-class grade in English 100 have completed an upper-year class in Engli

An entering General student should be abla read a poetic play and write intelligently alit in good English and in standard critical term

253 Old English, lect.: 3 hrs.; R. Macc

An introduction is given to the Old English language (700-1100 A.D.), followed by a st of some of the prose and minor poems, and the second term, of Beowulf. Students will all be introduced to some aspects of Old English art and archaeology. Some knowledge of classical or modern European language (pr ferably German) is desirable, though essential, and an understanding of tradition grammatical terminology will be helpful, The class is not recommended, except in unusu circumstances, to those who are not thorough fluent in modern English.

254 Restoration and Eighteenth-century Liter ture, lect.: 2 hrs.; H. D. Sproule.

In this class the emphasis will be placed upon three great satirical authors (Dryden, Pope, and Swift), upon a study of Restoration come and tragedy, and upon major works of Samur Johnson. Since the literature of the period related exceptionally closely to the men and manners of the age, some time will be spentil class on the contemporary climate of opinion that is revealed in the works of a number of writers representative of literary, political social, and philosophical points of view Hobbes, Halifax, Pepys, Rochester, Butlet Addison and Steele, Mandeville and Shafter

351 Middle English, lect.: 2 hrs.; tutorial: ½ hr H. E. Morgan.

This class offers an introduction to Midd English language and literature through stu of Chaucer's Canterbury Tales and Troilus and Criseyde and of the poems Pearl and Sir Gawal J. Fraser. and the Green Knight.

This class is a study of representative works Bacon, Donne, Jonson, Burton, Browne, He rick, Herbert, Carew, Crashaw, Vaughall Hafter Traherne, Marvell and Milton.

with an understanding of both the individual and traditional characteristics of the poetry prose of the period. Classes will be conducted 455 Twentieth-century American Literature by a combination of lecture and discussion. (not offered in 1972-73).

354 The Nineteenth-century English Novel, lect.: 2 hrs.; G. M. Harvey.

This class is designed to give the student the opportunity of studying the novels of the period from Scott and Austen to Hardy.

356 Literature of the Romantic Period, lect.: 2 hrs.; A. J. Hartley.

For the first few weeks the class will study the beginnings of romanticism in the literature of the later eighteenth century. It will then proceed to examine the major writers of the Romantic period (Wordsworth, Coleridge, Bryon, Keats, Shelley) and, more briefly, selected works of the Romantic essayists and of the novelists Austen and Scott.

452 Nineteenth-century Thought, lect.: 2 hrs.; s Mendel.

The class is chiefly concerned with ideas, the main currents of thought and opinion that influenced the literature of the Victorian Age. It is hoped that, from studying the texts, students will gain an accurate and fairly complete view of Victorian attitudes on social, political, religious, and scientific issues. The background provided by this class is especially helpful for anyone wanting to understand the imaginative literature of the time, for the great Victorian writers of fiction and poetry were intimately concerned with the intellectual problems of their age.

A set of questions is given to the class on each of the texts studied and from time to time an hour is set aside during which the class is invited to discuss these questions. Answering them is entirely voluntary, and no marks are awarded. Their aim is to encourage class discussion and to help students recognize the kind of questions they should ask themselves about the texts.

Prerequisite: Although English 100 is the formal prerequisite for this class, students should bear in mind that it is designed primarily as an honours class for those with special interests in Victorian studies and that the nature of the texts studied demands considerable analytical power.

453 Twentieth-century Literature, lect.: 2 hrs.;

A seminar for senior students. A study of 352 Seventeenth-century Non-dramatic Liter representative works of Hopkins, Conrad, ture, lect.: 2 hrs.; S. A. Cowan/R. L. Raymond Yeats, Forster, Joyce, Pound, Lawrence, Eliot, and Woolf. Summer reading is advisable.

454 Literary Criticism, lect.: 2 hrs.; R. S.

This class is intended for senior honours The aim of this class is, through a study of students. It studies the history, theory, and representative writers, to provide the stude practice of literary criticism from Aristotle to the present.

This is a class in the major poets and prose writers (other than novelists) of the Victorian period. Emphasis will be placed on the poetry of Tennyson, Browning, and Arnold; some attention will be given to Rossetti and Swinburne. Selected prose works of Carlyle, Ruskin, Newman, Arnold, and Pater will also be studied.

#### **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 above. Students should consult the Department or the Associate Registrar before registration, when revised class and text lists will be available.

#### **Graduate Studies**

The Department offers graduate classes leading to the degrees of M.A. and Ph.D. 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.

#### Geology

#### Professors

H. B. S. Cooke (Carnegie Professor) M. J. Keen (Chairman) G. C. Milligan (on leave 1972-73) A. Volborth (Killam Professor)

#### Associate Professors

I. M. Ade-Hall F. Aumento

R. A. Gees

F. Medioli (on leave 1972-73)

P. E. Schenk

#### Assistant Professors

D. B. Clarke

G. K. Muecke D. J. W. Piper

#### **Special Lecturers**

J. F. Jones

L. H. King

B. D. Loncarevic

D. H. Loring N. Munro

I. P. Nowlan

B. R. Pelletier

Did you know that eastern Canada was covered by sheets of ice a few thousand years ago? Do you worry that this ice will return? Do you worry that this ice will return? Can you imagine the economic impact on Nova Scotia if oil is found offshore? Or the even greater impact if uranium is found within one of the poorer

countries of the world. Did you know that the

Atlantic Ocean was barely big enough to bathe

457 Victorian Literature, lect.: 2 hrs.; M. M. in three hundred million years ago? And at that time the equator passed through Nova Scotia, with the day then only twenty hours long? Geology deals with problems such as these. It is the study of the earth and planets - their present nature and their development in time.

> Geology can be pursued by people with many varied interests. Volcanoes are spectacular but are only the surface expression of rock melted within the outer parts of the earth. Earthquakes cause great loss of life - can their occurrence be predicted? Earthquakes and nuclear explosions have told us much of what we know about the inside of the earth. Evolution which has led to Man is shown by animal and plant remains now found in rocks as fossils. What atmosphere did these beasts breath? How salty was the sea at the time they lived? How was the salt at Pugwash formed? Or Cape Breton's coal?

> Old beaches, formed shore-lines, are found now far above present sea-level around Hudson Bay and Newfoundland. Can a geologist describe conditions at the surface of the earth at any time in the past? Or the temperature inside the earth at these same times? Or even now? How do mountains form? Perhaps the Himalayas rose when India and Russia collided. Perhaps the Rocky Mountains are the crumpled leading edge of our continent sailing, as it were, across the Pacific Ocean. Our means of subsistence, food, raw-materials, and energy required for a growing population must be obtained from the outermost rim of the earth. It is one task of the geologist to find these resources.

> 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 protozonas. 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 and production of raw materials such as metals, petroleum and water. Geologists competent in mathematics, or indeed mathematicians with some background in geology, might be involved in processing and analysing data using digital computers; those interested in going to sea might work with the Federal Government's marine institutions. The federal and provincial government employ geologists in their geological surveys and Departments of Mines; the Canadian government is responsible for supplying geologists to agencies such as

UNESCO to work in under-developed countries. A graduate with a geology degree and a reasonable background in other sciences would find teaching in high school challenging.

The tables on the pages which follow are only a A student who intends to take a degree in class in geology in their first year.

guide to classes, and are not rigid requirements. Any student who feels that he or she would like a different combination is welcome to consult the Geology staff members, and in particular studies, should consider taking an honor the Chairman and ask their opinion and advice. course and, if possible, take an introductor

geology should consult the Chairman as 800n possible. Students who intend to make the careers in geology, or intend to pursue gradual

### Table I: General Degree

 $Degree\ Programmes$ 

Year I	Geology 100
	Physics 110 or Chemistry

110 or Biology 101

Mathematics 100

Two classes chosen from Languages, Humanities or Social Sciences

#### Year II Geology 201

Geology 202A and 202B

Two classes from Physics, Chemistry, Biology or Mathematics, one preferably a 200 or 300 level class

Three 200 or 300 level classes in Geology (for example, Geology 301, 302, 303; or 301, 303, 305, 306; or 203, 301, 302) Year III One class in Biology, Chemistry, Physics or Mathematics

An elective

#### Note:

(1) If only one class in Biology is taken, Biology 321 is relevant to Geology students, and may be taken by them with no prerequisites.

(2) If two 200 level Physics classes can be taken, Physics 221 and 230 are sensible choices.

(3) Chemistry 210 is a sensible second class in Chemistry.

(4) Mathematics 200, 220, or 228 are all sensible second classes in Mathematics – but note any restrictions there may be on 220 or 228 a prerequisites, if further classes in Mathematics are planned.

(5) Although the general requirements do not demand a class in Mathematics or a foreign language, students should note (a) that any one planning scientific career may be severely handicapped if he has not taken at least one class in Mathematics, and (b) that many graduate schools demand reading ability in a foreign language.

(6) Any student who is not sure of a suitable programme to plan is invited to consult with the Chairman of the Department,

Table II: Honours (Major)

	I Economic Geology	II Geophysics	III Geochemistry	IV Petrology	V Stratigraphy
Year I		Geology 100 Mathematics Two classes		manities and Social Science	es
	Phys. 110	Phys. 110	Chem. 110	Chem, 110	Biol. 101*
Year II	Geol. 201 Geol. 202A and B Geol. 203B Engin. 210 and 211 Math. 200, 220 or 228 Elective	Geol. 201 Geol. 202A and B or 203A and B Physics 230 Math. 200, 220 or 228 Elective	Geol. 201 Geol. 202A and B or 203A and B Chem 210 Phys. 110 or Biol. 101 Elective	Geol. 201 Geol. 202A and B or 203A and B Phys. 110 Chemistry 230 or Math 200, 220 or 228 or Biol. 100	Geol. 201 Geol. 202A and B Biology 200 or 204A/206 Chem. 110 or Phys. 110 or Math. 200, 220 228 Elective
Year III	Geol. 301 Geol. 302 Geol. 303 Geol. 304 Chem. 210 or 230	Geol. 301 Geol. 306 Geol. 202A and B or 203A and B Phys. 221 Elective	Geol. 301 Geol. 302 or 303 Geol. 202A and B or 203A and B Chem. 230 Elective	Geol. 301 Geol. 302 or 303 Geol. 202A and B or 203A and B Chem. elective Elective	Geol. 301 Geol. 302 Geol. 203 or 305 Biol. 321, 323 or 360 Elective
Year IV	Geol. 306A Geol. 404 Geol. 406 Math. 330 Elective	Geol. 303 Geol. 304 or 401 Geol. 405 Geol. elective (e.g. 460, 445) Math or Phys. elective (e.g. Phys. 416 or 335)	Geol. 304 Geol. 401 Geol. 454 Geol. 459 Phys. or Biol. elective	Geol. 407 Geol. 408 Geol. 460 Geol. 304 or 454 Elective	Geol. 303 Geol. 304, 305, 405 or 461 Geol. 455 Geol. elective Phys. Chem. or Math elective

nbined	]
	nbined

Table III: IX	I with Physics	II with Chemistry	III with Biology		
Year I	Geology 100  Mathematics 100  Two classes chosen from Languages, Humanities or Social Sciences				
	Physics 110	Chemistry 110	Biology 101*		
Year II	Geology 201A and B Geology 202A and B or 203A and B				
	Elective Physics 211 and 231 Mathematics 200, 220 or 228	Elective Chemistry 210 Mathematic 200, 220 or 228	Elective Biology 200 <sup>5</sup> A class in Chemistry, Physics or Mathematics		
Year III	Geology 301 Elective				
	Elective Physics 315 or 335 Geology 202A and B or 203A and B	Chemistry 230 Chemistry 320 Geology 202A and B or 203A and B	Biology 321 Biology 323 Geology 202A and B, 203A and B		
Year IV	Geology 303 Geology 306 Geology elective Physics 320, 416 or 445 Mathematics 200, 220 or 228	Geology 401 Geology 454 Geology elective Physics or Biology elective Chemistry 410	Geology 401, 456 or 457 Geology 302 Geology elective Biology elective Physics 221 or Mathematics 200, 220 or 228		

(1) A student who intends to concentrate on geophysics might consider auditing Geology 452 in his fourth year.

(2) All students are encouraged to attend one or more non-credit computer programming classes.

(3) A student who intends to concentrate on paleontology should consider obtaining Geology 305 and 456 in his third and fourth years respectively.

(4) Honours students have to satisfy Faculty regulations concerning a comprehensive examination. In recent years this has been met by students writing an honours thesis in their fourth year. They should consult a staff member well in advance, in third year.

In the case of students doing Combined Honours, Geology and Biology this requirement may be met in one of three ways:

(a) Write a comprehensive examination (after 20 classes),

(b) Write an honours thesis (after 20 classes), as an Honours student in Geology alone would do,

(c) Write a thesis to count as a class, Biology 490, and write a comprehensive examination.

(5) \*Students with Grade XII Biology should do Biology 200, or two of Biology 201 to 206, not Biology 100, with appropriate changes in other years.

### Classes Offered

#### **Classes in Other Departments**

Students doing the major part of their work in geology should be aware of relevant classes in other departments. They change from time to time, but the following guide may be helpful.

### Biology

- 321 Invertebrates I
- 360 General Ecology
- 361 Structure and Functions of Ecosystems
- 460 Mathematical Ecology
- 464A Pleistocene biogeography
- 465A Trophic Ecology and Biogeochemical Cycling.

### Chemistry

- 510 X-ray Crystallography
- 512 Crystal Chemistry

### Mathematics

- <sup>206</sup>A Probability and Mathematical Statistics (with Geology 521)
- <sup>220</sup> Applied Mathematics

227 Numerical Methods and Fortran Programming

228 Applied Mathematics for Engineers I 328 Applied Mathematics for Engineers II

#### Oceanography

511A, 512A, 513B, 514B Introductory classes. 522, 523, 524, 525 Advanced classes.

#### **Physics**

- 335 Electronics
- 445 Geophysics
- 645 Advanced Geophysics

#### Geology 100 and Geology 101

The study of the earth is based upon observation of natural phenomena, upon experiment and inference. In the last few years intensive study of the rocks of the ocean-floor has led to a revolution in our ideas about the processes responsible for the development of continents and ocean basins; it has led, in a sense, to a new geology. Let us illustrate one aspect only. We know that a huge mountain chain is buried beneath the Atlantic Ocean, running many compass point north? Does the earth's magnetic

thousands of miles and rising above sea-level at islands such as St. Helena and Iceland. This Mid-Atlantic Ridge is the place where rock is slowly brought from the interior of the earth, increasing the area of the Atlantic Ocean; the Americas slowly move westwards away from this Ridge, and Europe and Africa slowly move eastwards. One consequence of this as a theory is that the voungest rocks will be found in the middle of the Atlantic, but the oldest on either side. This turns out to be true. But ask yourself questions of this sort: how would you find the ages of these rocks? or how would you make a map of the rocks of the ocean floor or of Nova Scotia for that matter? Animals living in the sea die and their remains are found in the mud on the sea-floor. They provide the record of evolutionary changes; it is only by the study of fossils that we can trace the rise of man from primitive organisms living billions of years ago.

But topics such as these are only a part of a study of the earth. How are landscapes formed? Or where would you seek oil? Or why does a

field reverse? What happens to living organisms when it does? What did Nova Scotia look like five hundred million years ago?

100 Introduction to Geology lect.: 3 hrs.; lab.: 3 hrs.; H. B. S. Cooke.

This is an introductory class for students intending to take a degree in geology, and for engineers. An attempt is made to guide the student to an understanding of the development and present state of the earth and plantets, and to give groundwork for further classes. A text will be prescribed, and texts and reference books in the library will be recommended at appropriate times in the class. Laboratory work is conducted in the field during the fall and meets at 2 p.m. in the fall term because of early darkness in November. The field exercises result in the production of a geological map of a small area.

101 Introduction to Geology, lect.: 3 hrs.; lab.: 3 hrs.; (alternate weeks), H. B. S. Cooke.

This is an introductory class for students in Arts and Science. It is intended as a science elective for students from disciplines other than geology. It emphasizes the concepts and major ideas which concern the development and present state of the earth and planets, and the influence of geological history upon the human environment. There are demonstration periods and field trips. A text will be prescribed, and reference made to books and reference material in the library at appropriate times.

140 Introduction to Geology, lect. and demonstration: 3 hrs.; one evening per week, M. J. Keen and staff.

This is an experimental attempt to provide a first-year class in geology as a part of an evening programme. The class will probably divide into four parts: rocks, minerals and geological processes; the early history of the earth, particularly as is now known from studies of the moon; the modern earth, drawing upon studies of continental drift and ocean floor spreading; the geology of Nova Scotia, Note that no attempt will be made to present all aspects of lunar geology, for example, hardly possible with beginners; rather, the principles of geology will be illustrated using the moon, the phenomenon of continental drift, and Nova Scotia as examples.

It is not suitable for those who plan to concentrate on geology. It is suitable for those who simply want a first class in geology, for example, high school teachers finding themselves teaching "earth sciences".

It is not suitable as an entry to Geology 201, 202 or 203 unless circumstances are exceptional. If the demand upon the class at registration is very heavy, priority will be given to part-time students.

Two Hundred Level Classes in Geology

introductions to specialized studies of the earth. They may be taken by students at any stage in the University who have taken a first-year class in geology or can demonstrate equivalent background, Consequently, not only are they suitable for second-year students but they are also suitable for, say, physics students in fourth year who intend to specialize in geophysics in their graduate work, and want a better background in geology.

A second-year student might expect to do the equivalent of two full classes in his second year. He or she might plan to pick up at a latter time some of those he was not able to take in second

Note that the normal prerequisite for Geology 201, 202 and 203 is Geology 100, Under exceptional circumstances Geology 101 and 140 may be substituted.

201 Introduction to the Study of Minerals, lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento.

A rock is an aggregate of physically distinct substances called minerals. Most minerals have characteristic external forms and physical properties which reflect the regular arrangement of atoms of which the minerals are made. This class will deal with the detailed study of these minerals from crystallographic, optical, chemical, economic and genetic points of view.

Laboratory studies involve the theory and practice of the identification of unknown minerals in hand specimen and with the petrographic microscope.

202A Introduction to Stratigraphy and Sedimentology, lect.: 3 hrs.; one of which is pre-lab; lab.: 3 hrs.; P. E. Schenk.

A stratigrapher-sedimentologist should be capable of recreating conditions at the surface of the earth for any area at any selected time in the earth's history. Such conditions include the distribution of land and water, water depth and land relief, temperature, wind-direction, water salinities, run-off from the land, distribution of organisms, relations between both organisms and their environment, and many other factors defining geography, Geology 202A, 302, and 455/505 should lead the student to this

Geology 202A introduces topics considered in greater depth in Geology 302. As such, this survey is designed not only for geology students but for students wanting a second class in geology as well as for those specializing in some other area of earth science. The class is in four parts: (1) a brief historical development; (2) a survey of the various tools - specifically sedimentology (rock textures, structures, processes of formation, and sedimentary environments); (3) the application of these tools in studying vertical and lateral variations in the earth's crust; (4) the result of such application in a survey of the evolution of North America, specifically Atlantic Canada.

Lecture notes are distribued before class so. class-time is spent in discussion.

Laboratories deal mainly with study of mentary rock in order to interpret the nati source area, means of transportation deposition and modifications after deposi-Exercises on maps of North America eventually enable the student to unravel evolution of fairly complicated blocks of earth's crust.

The first four laboratories are in the fa whereby the geologic section of Nova Scot. built from the Recent to the Early Paleon Samples from these field trips are studied the students in the labs. Reports are request

Any student may take this class provide she/he has had introductory geology or equi-

202B Principles of Palaeontology, lect.: 3 h lab.: 3 hrs.; F. Medioli

Fossils provide the record of living organis during the development of the earth. They we among the keys used in the theory of evolution They are the basis for correlating sedimentarocks because major evolutionary changes organisms are world-wide phenomena. invertebrates are important because they very abundant and, as many of them lived the oceans, they are widespread and w preserved as fossils entombed in sediment.

In this class a survey will be given of the main concepts of palaeontology, including process ecology and palaecology; biocenosis and that atocoenosis; correlation, biostratigraphy. I also include a very basic survey of the maj phyla of invertebrates.

203A Introduction to Structural Geology, leet 3 hrs.; lab.: 3 hrs.; G. C. Milligan. (This destrate an equivalent background. may not be offered beyond 1972-73).

This class is an introduction to the study of the mechanical aspects of the emplacemen rocks and to their behaviour during de mation. The emphasis is upon the description of these phenomena, rather than upon discuion of their causes. The class will discuss, in example, in sedimentary and volcanic 100 those features which are useful in deciphering later folding of the rocks, the characteristics salt domes, and the internal movements igneous rocks during consolidation. The should provide some understanding of structural features the student will encounter his work during the following field season. can be followed by Geology 303 in a najuf

The class may be taken by any student who prerequisite: any first-level class in geology. had a first-year class in geology, or equivalent background.

Texts: No text is prescribed. The lectures follow approximately the content and form reading may be required.

203<sup>(3)</sup> Field Methods, lect.: 3 hrs.; lab.: 3 hrs.; 2036 Milligan, M. J. Keen and other staff

This class introduces students to field techniq-This class will be useful to them in practical us which will be useful to them in practical ues will in the field. It is primarily a class in elementary surveying methods. It includes, for elements, for example, brief instruction in the use of the plane table, aerial photographs in geological field work and in map making, application and use of geophysical methods. None of the topics can be considered in depth in the time available, but the class should provide a guide for further study, and be useful for students seeking summer employment in the field.

The class may be taken by students in any year who have completed a first-year class in geology, or can demonstrate an equivalent background.

204B Principles of Geochemistry, lect.: 3 hrs.; lab.; 3 hrs.; A. Volborth.

This class is an introduction to geochemistry which shows how chemical processes govern many geological processes. It will demonstrate the relevance of classes in chemistry which a student may have already taken, or is taking concurrently, to studies of the earth. The topics considered will include: the composition of the earth; crystal chemistry - fundamental in understanding mineralogy and petrology; the chemistry of igneous, sedimentary and metamorphic rocks; the composition of the atmosphere and oceans - necessary in considering of fossilization, taxonomy and nomenclature sedimentation processes now, and in the past, for example.

> The text will probably be Principles of Geochemistry, by Brian Mason. The class may be taken by any student who has taken a first-year class in geology or chemistry, or can demon-

> 240 Marine Geology and Geophysics, lect. and discussion: 3 hrs.; one evening per week, D. J.

Geology 240 is an experimental class first offered in 1970-71. An attempt is made to present the new ideas concerning the earth which have developed over the last few years largely through studies of marine geology and geophysics. The class is not suitable under any circumstances as an alternative to other second year classes for students concentrating on geology in a degree programme. It is suitable for those who would simply like a second class in Geology. For example, in addition to regular full-time undergraduates it could be of interest to teachers at high schools or interested professionals at government institutions.

[30] Igneous and Metamorphic Petrology, lect.: 3 hrs.; lab.: 3 hrs.; D. B. Clarke/G. K. Muecke.

products of their environment and mode of

formation; thus macroscopic and microscopic investigations of these rocks provide clues to the condition prevailing at the time of their

Igneous rocks will be discussed under such topics as mineralogical and chemical classification, methods of depicting chemical data, mechanisms and environment of magma production, various mechanisms of magma evolution and comagmatic provinces.

Metamorphic rocks will be considered as the products of thermal and dynamic processes operating on preexisting rocks. Stability relations of minerals under varying temperaturepressure conditions and the concept of metamorphic facies will be stressed.

Prerequisites: Geology 201 or equivalent know-

302 Stratigraphy and Sedimentology, lect.: 3 hrs.; lab.; 3 hrs.; P. E. Schenk.

Topics introduced in Geology 202A are studied to greater depth in this class. Lecture notes are distributed before class so that class-time is spent in discussion. Principles detailed in these notes are illustrated by case study. The syllabus is: (1) tools, involving detailed sedimentology. palaeontology, and sedimentary tectonics, leading to tectonic-environmental models; (2) methods, involving problems in vertical and lateral variations, classification, nomenclature, and correlation; (3) results, involving by seminar the evolution of Atlantic Canada.

Laboratories deal mainly with microscopic and macroscopic study of sedimentary rock clans. A series of problems are presented involving stratigraphic maps and illustrations, emphasizing quantitative, computer-oriented data.

Five field trips in the fall build in some detail the geologic section of Nova Scotia from the Recent to Early Paleozoic. Material collected during these trips are processed by the students, so that the indoor labs deal with thin-sections and unconsolidated sediment collected by the students themselves. Data from these labs augment field observations and assigned reading and are presented in an elaborate synthesis of Nova Scotian geology.

This class is suitable not only for students specializing in sedimentary rock but also those in other areas of earth science, general course B.Sc. or earth science teachers.

303 Structural Geology, lect.: 3 hrs.; lab.: 3 hrs.; G. C. Milligan.

This class is intended as an introduction to the behaviour of rocks during deformation. The emphasis is upon the geometrical aspects of the rock structures and their interpretation but there is also consideration, in an elementary way, of the mechanics of rock deformation. The laboratory work is essentially a brief course in descriptive geometry. This trains the student to visualize the three-dimensional geometry of

rock structures of many problems of a graphic and geometrical character encountered in cartography and other geological work, especially in

Texts: There is no prescribed text for the class. The programme follows approximately the sequence of Billings, Structural Geology, but certain aspects are pursued to greater depth. For this, DeSitter, Structural Geology and other texts are useful, and students are also referred to the technical journals.

304 Introduction to Ore Deposits, lect.: 3 hrs.; (offered in 1973-74 and alternate years), G. C.

This class studies case histories of selected mines and districts illustrating the types of a classification of ore deposits and the factors controlling ore deposition. This class is conducted in the same manner as Geology 404.

Prerequisites: Geology 201, 301. Geology 303 may be taken simultaneously. Exceptions are made to meet specific programmes, but the student should consult the instructor and obtain permission.

305 Systematic Palaeontology, lect.: 3 hrs.; lab.: F. Medioli, H. B. S. Cooke.

This class comprises a systematic survey of the major phyla of fossil organisms. The emphasis will be on morphology and taxonomy of invertebrate phyla, but a short survey of the main lines of evolution of vertebrates will be included. The purpose of this class is primarily to enable the student to recognize at sight the members of the various phyla. However, it is intended also that he should learn how to tackle invertebrate fossil material so as to classify it accurately when the resources of a library and museum are available. Prerequisite: Geology 202A.

306A Plate Tectonics, lect.: 3 hrs.; J. M. Ade-Hall.

The study of the ocean floors by geologists, and geophysicists over the last 15 years has lead to a revolution in our understanding of the way in which the earth's crust is made. The continents are now known to be islands of light material which are carried on enormous plates. These plates are changing in form all the time, being added to at the mid-ocean ridges and lost at the deep trenches of the oceans. The past and present collision of plates has given rise to the fold mountain ranges of the earth. The Coast Ranges, Alps and Himalayas represent active plate collision and older ranges, such as the Appalachians, represent the fossilized effects of former plate collisions.

This class will describe the rapid development of ideas about oceanic geology leading to the current state of the plate tectonic model of the earth's crust. Contributing evidence from many areas of geology and geophysics will be brought together in the current synthesis. This means that the student will be introduced to earthquake seismology, the nature of the earth's

The two-hundred level classes are designed as

of Billings, Structural Geology, but addition The mineralogy and texture of rocks are the

magnetism, the radioactive dating of lavas and to the results of the recent drilling into the ocean floor from the "Glomar Challenger" by the JOIDES team. We shall also be looking at the geology of fascinating areas such as the intersection of the Red Sea - Gulf of Akaba -East African Rift Valley systems, the Gulf of California and the San Andreas Fault and the West Coast of South America. These are all areas where crustal plate interaction is going on today.

The class will be taught so that current concepts, results and problems will be fully discussed. Maths and physics will be kept at the 200 level.

306B Introduction to Exploration Geophysics, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall.

Canada has major mineral resources in the Canadian Shield, and the sedimentary basins of Alberta, the Arctic and the continental margin contain oil and gas. Exploration geophysics has led in part or in whole to the discovery of many of these. For example, aeromagnetic surveys are used to delineate potentially mineral bearing volcanic rocks on the Shield, and seismic reflection studies in the sedimentary basins are used to map structures in which hydrocarbons are trapped. This class is designed to explain the principles of the main techniques used by exploration geophysicists, the seismic, electrical, electromagnetic, magnetic and gravity methods. Relevant mathematics and physics will be at a level that is reasonable for a student who has taken Geology 100 and 200 classes. Each exploration technique will be illustrated by case histories from actual mineral discoveries and students will be able to try out some of the techniques for themselves during the laboratory.

Students who find exploration geophysics to their interest should take 405A at a later date. This latter class will give a more quantitative approach to exploration geophysics than does 306B.

401 Sedimentology and Sedimentary Petrology, lect.: 2 hrs.; lab.: 3 hrs.; D. J. W. Piper.

This class follows naturally from 301. Students who have not taken 301 will be expected to make up the background themselves. Topics to be discussed include: the origin of sediments, sedimentary textures and structures, the composition of sediments, their classification and nomenclature, the petrography of gravels, sandstones, shales, limestones, and non-clastic sediments. Special emphasis is put on the provenance, the dispersal and the deposition of sediments as well as their diagenesis.

During the laboratory period students work on problems which were discussed during the lectures. They will familiarize themselves with the different types of sediments both macroscopically and microscopically. Students are encouraged to participate in one or two seminars. Two term papers are required.

403 Advanced Structural Geology, hours to be arranged, (Offered in 1973-74 and alternate years), G. C. Milligan.

This class will consider the life-history of a The student should discuss with the instru mountain range as a theme upon which to base discussion of tectonic processes. It is proposed to use the Alps as the example.

The class is taught as a colloquium and participants will be required to do considerable reading from the relevant journals.

Prerequisites: Permission of the instructor.

404 Ore Deposits, Advanced Class, (Offered in 1972-73 and alternate years), G. C. Milligan. 1.

This class is designed for graduate and senior undergraduate students interested in mining geology. It is taught by the case history method, in a colloquium, in which each student in turn leads the discussion for a 3-hour session. The case histories are chosen to illustrate the factors controlling the deposition of ores, but considerable flexibility is possible to meet the special interests or requirements of the individuals in the class.

The text material is drawn entirely from the technical journals and reference works, and a considerable volume of reading is required.

The class is complementary to Geology 406, which is also recommended to students interested in economic geology and which may be taken concurrently.

Prerequisites: Geology 201, 301, 303, 304; istry, isotopic studies and phase equilibrium Chemistry 230, Exceptions with the permission studies. of the instructor.

405A/555A Exploration Geophysics, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall.

This class is primarily intended for students with a suitable background of geology, mathematics and physics who intend to specialize in exploration for minerals or oil. It will be assumed that the class has a good knowledge of the principles of exploration geophysics, for example, as given in 306B. We shall be concerned with modern practice in each of the main exploration techniques, in data processing and the quantitative interpretation of anomal-

Prerequisites: Geology 306 or other 300-classes. The student should discuss with the instructor whether his maths and physics levels are suitable for the class.

405B/555B Geophysical Studies of the Earth, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall.

This class will give a more quantitative discussion of some of the features of the earth described in 306A. These will include details of deep crustal refraction and reflection seismics, what can be learned about crustal structure from surface wave studies, and about the sense of movement on the great faults of the world from first motion studies. The mechanism for and history of the earth's magnetic field will also take our attention as will the detail. plate generation at the mid-oceanic ridges plate loss at zones of subduction.

Prerequisites: Geology 306 or other 300-class whether his maths and physical levels suitable for the class.

406 Examination of Mining Properties, I Nowlan.

This is a lecture and laboratory class on evaluation of mineral deposits, and on the of the physical and chemical properties minerals in the recovery of metal from or provides graduate and senior undergrade students with an understanding of the intered responsibilities of geologists and engin employed by the mining industry. The ser will study a "model" property in its succe stages of development from initial explora to production. Emphasis will be placed the design planning by the student of va facets of the operation. No texts are prescribe but extensive use will be made of technic literature from library files.

407 Advanced Igneous and Metamorphi Petrogenesis, lect.: 3 hrs.; lab.: 3 hrs.; D. Clarke, G. K. Muecke.

A wide range of igneous rocks will be discussed from a petrogenetic standpoint. The petrogen etic problem for each rock type will be define and then its origin considered in the light of recent information from the fields of geochem

Metamorphic rocks will be discussed as pro ducts of physiochemical processes in open and J. F. Jones. closed systems. Experimentally determin phase relations of metamorphic minerals will keep critically examined and correlated to natural assemblages. The development of metamorphic belts will be studied in relation to the evolution of the continental crust and plate tectonics. Prerequisites: Geology 301.

lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento, D. B. Clarke, G. K. Muecke.

Advanced work in crystallography and crystallography chemistry preceeds a systematic examination the chemistry, structure and occurrence of the major rock and ore-forming minerals, Laboral ory work includes the use of X-ray and other modern analytical techniques in the identifical tion of minerals and determination of the parameters, symmetry and structure. Prerequisite: Geology 201.

421B/521B Statistics, Computers and Geolog ical Problems, P. E. Schenk.

This class is designed to show how to attack on geological problems, and to store manipulate, and analyze data to solve sur problems. Emphasis is on stratigraphic and sedimentologic questions. The class is in two

naris: (1) Mathematics 206A (Probability and parts: (2) and Fortran (either Nathematical region of texts (2) application of courses using the machine to help in data instatistion and retrieval, data portrayal, sampling tonnation data analysis, and simulation of geologic environments using mapped litho/biofacies. Visits to neighbour institutes are planned.

445/545 Physics of the Earth, lect.: 3 hrs.; P. H. Reynolds.

This is an introductory class in solid earth geophysics. Topics discussed are: the figure of the earth and gravity; seismology and the internal structure of the earth, the geomagnetic field, paleomagnetism - the pre-history of the geomagnetic field, heat flow and the earth's thermal history, electrical conduction in the earth, radioactive processes and the age of the earth. This class assumes the student will have a reasonable background in physics and mathematics. It is taught concurrently with Physics

452/502 Advanced Geophysics, One afternoon per week; P. Reynolds, R. Ravindra, R. Hyndman, M. J. Keen.

A seminar class concerned with current research topics in geophysics. These may involve the fields of seismology, gravity, earth tides, magnetic fields, electrical conductivity, temperature, palaeomagnetism, continental drift, convection currents, time series analysis. It is held in conjunction with Physics 645. Students may register for it either as a class in geology or as a class in physics.

453/503 Hydrogeology, hours to be arranged;

This class studies the occurrence, movement and distribution of water as related to earth materials, with emphasis on the exploration, development and utilization of groundwater. The class work includes the physics of groundwater flow, aquifer hydraulics (with problems), well design and completion, water chemistry, 408 Advanced Mineralogy and Crystallograph, hydrologic systems (i.e. groundwater – surface water interaction), and digital modelling.

> Students will be asked to present and participate in seminars.

> 454/504 Geochemistry, hours to be arranged; A. Volborth.

Abundance and distribution of elements in the lithosphere, hydrosphere, atmosphere and the cosmos. Discussion of nuclides and isotopes. Composition of meteroites and extra-terrestial bodies, with some emphasis on the chemistry of the oceans. Students who wish to take this class should see the instructor first. They will normally be expected to have a reasonable background in chemistry or physics or geology.

455/505 Advanced Stratigraphy and Sedimentology, lect. and seminars to be arranged; P. E. This class is designed for the fourth-year graduate student to discuss specific problems in stratigraphy and sedimentology. In general the three main topics of Geology 202A/302 are continued in a case study/seminar fashion. For each topic, a list of possible problems including main bibliography are submitted. A week-end field trip to the famous Arisaig section is scheduled in the fall. A report is required after

Material collected during field trips in the fall will be processed by the class. Basic statistics and computer programming introduced also in the fall will be used in processing data and constructing graphs and maps.

The student should have taken Geology 302 or

456/506 Introduction to Micropalaeontology, hours to be arranged; F. Medioli.

The class gives a general systematic study of the major groups of microfossils, mainly foraminifers, ostracoda and calcareous nannoplankton. It is intended to provide a survey for those who do not plan to go further with the subject, and to provide the necessary basic knowledge of principles and concepts for those who may wish to continue in stratigraphy, historical geology and micropalaeontology.

Particular emphasis will be put on recent microfauna and techniques for sampling and studying them. The class involves only one hour a week of formal lectures, but at least one afternoon laboratory class. Each student will be asked to present a seminar during the year.

457/507 Principles of Pleistocene Geology, (Offered in 1973-74 and alternate years), H. B. S. Cooke.

A seminar class designed to expose the student to the special problems involved in the interpretation of Pleistocene deposits, rather than to a particular study of Pleistocene stratigraphy. The matters covered include: the origin, distribution and nature of snow and ice; movement in glaciers and ice caps; glacial stratigraphy; sea level fluctuations; ocean floor deposits; climatic changes evidenced in non-glaciated regions; theories of ice ages

Students who are admitted to the class are expected to possess sufficient background to be able to prepare competent seminar talks, which are an essential part of the programme. Although this will normally mean a good background in geology, students with advanced standing in biology may be admitted. Reading forms a substantial part of the class as there is no single text available.

459/509 Analytical Geochemistry, hours to be arranged; A. Volborth.

A practical introduction is given into X-ray spectrography, accelerator neutron activation, atomic absorption and optical emission spectrography, with emphasis on classical silicate analysis. Successful completion of this class may enable the student to meet the requirements of Atomic Energy of Canada concerning scientists involved in the operation of particle accelerators.

460A Principles of Isotope Geochemistry, (Offered in 1972-73 and alternate years), lect.: 3 hrs.; Lab.: 3 hrs.; G. K. Muecke.

The study of naturally occurring isotopes, both radio-active and stable, forms a major and ever expanding field of geochemistry. This clsss introduces the student to the fundamental concepts of nuclear chemistry such as types of nuclear disintegration, nuclide systematics, nuclear reactions, etc. The role of isotope fractionation in geological processes will be discussed with reference to stable isotopes. Particular attention will be paid to the isotope geochemistry of hydrogen, carbon, sulfur and

460B Geochronology, (Offered in 1972-73 and alternate years), lect.: 3 hrs.; lab.: 3 hrs.; P. H.

The absolute dating of pre-historic events, be they the shaping of tools by ancient man or the formation of the solar system, constitutes a fundamental problem encountered in most geological and geophysical studies. The emphasis in this class will be on methods of age dating based on the radioactive decay of naturally occurring isotopes; other methods will be discussed briefly. The role of radioactive isotopes and their daughters as tracers in geological processes will also be stressed. Prerequisite: Geology 460A, or equivalent.

461A Advanced Marine Geology, hours to be arranged; M. J. Keen, R. D. Hyndman, D. J. W.

This part is an introduction to 461B and 462B. The main morphological features of the ocean basins will be considered in some detail.

461B Advanced Sedimentology, hours to be arranged; D. J. W. Piper.

The sedimentological aspects of the marine environments considered in 461A will be discussed in this class. The following topics will receive particular attention: a review of physical properties of sediments; sedimentology of beach and nearshore environments, the shelf platform, the continental slope and rise, and the ocean basins. Additional topics to be discussed are: age determinations in sediments, the Pleistocene record, deep-sea drilling, and the geological history of the ocean basins.

A student will be presumed to have a background equivalent to the material in 202A, 240 and 302.

462B Marine Geophysics, hours to be arranged; M. J. Keen, R. D. Hyndman.

This class is designed primarily for students who are concentrating on geophysics, structural geology and petrology. Consideration will be given to various aspects of marine geophysics. For example in 1971-1972 we spent time making analyses of seismic reflection profiles from Baffin Bay and the Labrador Sea and their interpretation in the light of other geophysical and geological data.

#### **Geology Seminar**

Papers are presented by guest speakers, members of the staff and senior students.

#### Field Classes

Spring Class in Field Geology

In co-operation with Mount Allison, St. Francis Xavier, St. Mary's and Acadia universities, a field course of approximately two weeks' duration is conducted at Crystal Cliffs, N.S. This class is held immediately following the conclusion of spring examinations. It is compulsory for students specializing in geology, after their third year. A fee of \$50 for full board is payable with the second instalment of university fees.

#### **Class in Exploration Geophysics**

A field class of approximately one week's duration is held in the Spring or early Fall. It is not, at present, compulsory.

#### **Graduate Studies**

Students with good degrees in any of the sciences or mathematics who wish to study some aspect of the earth are welcome. Graduate work leading to the degrees of M.Sc. and Ph.D. is possible in a number of different fields. These include, for example: Appalachian studies, economic geology, hydrogeology, petrology, geochemistry, mineralogy, geophysics, instrumentation development, marine geology and geophysics. Quaternary studies, micropalaeontology, and sedimentology.

Interdisciplinary studies are encouraged, and there is active co-operation between the science departments and the Institute of Oceanography at Dalhousie University. There are many studies in earth sciences carried out in other departments of the University; for example, geophysical studies are also conducted within the Department of Physics, and Quaternary studies within the Department of Biology. Students are urged to take full advantage of the opportunities this affords. Research is often done in co-operation with government laboratories such as the Department of Mines, Nova Scotia Research Foundation and Bedford Institute. The complex of departments and laboratories in Halifax and Dartmouth concerned with various aspects of the earth makes graduate study in earth sciences very attractive.

For further information see the Graduate Calendar, and write to the Chairman, Department of Geology.

#### German

**Associate Professors** Detle Steffen Friedrich Gaede

**Assistant Professors** Klaus Fricke Auguste Roulston

#### Lecturers

Richard Ilgner Gerta Iosenhans Reiner Zeeb

German studies are divided into two different programmes. The first is the study of the German language itself, the second the study of German contributions to the European literary and philosophical tradition.

Many students will take German to acquire knowledge of an important foreign language. German is spoken in Central Europe (Germany, 452. Austria, the major part of Switzerland, and some other areas). German will prove useful in academic fields such as philosophy, music, history and the social and natural sciences. It is also relevant to some of the professions involving international relations in government, journalism and business. Several introductory language classes (German 100, 150) intermediate (200, 201, 202), and advanced (300) language classes are offered by the department. Special aids include a language laboratory and the setting up of conversation groups.

Classes in German literature and thought are offered to students who wish to pursue further studies. German culture has produced some of the greatest achievements in the European tradition, particularly in literature, music and philosophy. The years between 1750 and 1830, to mention just a period of eighty years, produced such figures as Goethe and the Romantics, Mozart and Beethoven and Kant and Hegel, the representatives of German

Classes offered cover all German literature from the 16th to the 20th century, studied either in the context of cultural periods or as the work of individual writers.

Advanced studies in German will prove useful to high school teachers; they will also prepare students for graduate studies and professions such as those of critic, editor, translator and university professor.

#### Degree Programmes

#### General B.A. in German

Students concentrating on German should take a minimum of three German classes beyond the 100 level.

### B.A. with Honours in German (major programme)

Students considering an honours course are advised to consult the Department of German.

#### Year I

1. German 100.

2-3. Two classes from Classics 100, Europ. Literature 100, History 100, Philosophy

4. A social science class.

5. An elective.

#### Year II

6-8. German 200, 202, 221.

9. One class from Classics 100, Europe. Literature 100, History 100, Philosophy 10. An elective.

#### Year III

11-12. German 301, 303.

13. One class from German 300, 302, 3

14. A class in the minor subject.

15. An elective.

#### Year IV

16. German 400.

17. German 401 or 402.

18. One class from German 401, 402, 45 for classes beyond the 200 level.

19. One class in the minor subject.

20. An elective.

#### **Combined Honours**

It is possible for students to take an honor degree combining German with Frend Russian, Spanish, English or Greek. Any st dent intending to take such a combine honours degree should consult with the tw respective departments to arrange the details such a programme.

### Introductory Classes Offered

Introductory classes do not require previou knowledge of German.

100 Comparative Literature, lect.: 3 Members of Romance Languages and German Departments.

100 German for Beginners, lect.: 3 hrs.; Iosenhans, A. Roulston.

German 100 is a seminar class for beginner and no previous knowledge other than reasonable background of English grammar required. Its equivalent is two years of Germa in high school with a final mark of 75% better. While the texts may be similar to the used in high schools, the University could offers more facilities for learning, such language laboratories and opportunities for on work, supplies of books, and magazines and papers in German for study. More independent work is demanded of the student than customary in high schools.

The class is taught mainly in German, el phasizes the spoken language, and provides

Intensive language laboratory work and tendance at small conversation groups is Text: Schulz/Griesbach: Deutsche Sprachleh

für Ausländer. Grundstufe in einem Band. für Aussche English. Deutsche Spra-Glossary: Deutsch-English. Glossary für Ausländer. Grundstufe in einem Rand. Hueber Verlag, München.

This class or its equivalent is a prerequisite for all classes on the 200 level.

150 Intensified German, lect.: 5 hrs.; lab.: 2 hrs.; A. Roulston.

This class combines the objectives of both German 100 and 200; no previous knowledge of German is required. German 150 counts as two classes, equivalent to those of German 100 and 200; it is thus designed particularly for those students who wish to take German as their first-year elective. Students who wish to acquire firm command of a foreign language may concentrate their efforts in one year; students planning to proceed to advanced language or literary classes will be provided in their first year with the entrance requirements

The final objectives of the class are the same as those of German 200: oral and writing fluency on the basis of expanded knowledge of grammar and vocabulary.

Students will first become familiar with the basic patterns of spoken and written German and will learn to use them through repetition. Students will acquire a vocabulary of about 600 words. In the second stage, instruction will concentrate on systematic grammatical studies. translation and writing skills, while speaking competence will be developed throughout the whole year.

Students will spend an average of two hours a week in the language laboratory to support grammatical studies and to develop aural comprehension. One hour a week will be dedicated to conversational practice exclusively. Text: Schultz/Griesbach: Deutsche Sprachlehre für Ausländer, Max Hueber Verlag, München.

### Intermediate Classes Offered

Intermediate classes are based on German 100, high school German or an equivalent basic

At the outset of these classes, the student should have a vocabulary of approximately 600 words and the ability to understand simple questions in German, to write a composition of about 80 words and to summarize or retell a simple story. The student should also have a basic knowledge of grammar including declension of nouns and pronouns, conjugations of verbs, active and passive voice, use of preposilions, declensions of adjectives, syntax - main lauses, dependent clauses, questions, imperatives, direct speech. The knowledge required phasizes the spoken language, and provide student with the knowledge of basic graming  $\chi$ ,  $\chi l$ , can be found in books of German 100 or Grade

> 200 Intermediate German, lect.: 3 hrs.; K. <sup>lcke</sup>, G. Josenhans, R. Zeeb.

The main aim of this class is to develop in the student a certain degree of speaking fluency as well as writing skills through the improvement of grammatical knowledge and vocabulary. The class is based on German 100, high school German or equivalent basic knowledge. Since considerable stress is placed in this class on oral training, study of grammar will be limited to one hour weekly, given in English; the rest of the time is devoted to oral German.

Language Laboratory work is required. Small conversation classes once a week as an aid to speaking fluency are compulsory.

This class will continue to employ learning techniques to which students are familiar from their high school instruction and which are designed to teach students how to use a modern vocabulary and common grammatical and syntactical patterns. Students will find that the type of work they have been accustomed to perform in class will now have to be done in the language laboratory, while most of the instruction time in class is dedicated to the development of their language activities.

The class work includes the reading of simple and moderately difficult modern German literature and a complete review of the basic

Prerequisite: German 100 or equivalent.

Texts: Richmond/Kirby, Auslese, (MacGraw-Hill); Robert O. Roseler, German in Review, (Holt, Rinehart and Winston, Toronto).

201 Scientific German, lect.: 3 hrs.; A. Roulston.

This is 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. The grammar text used in the class emphasizes those aspects of grammar that must be known to accomplish this. Class work emphasizes chiefly the analysis of typical sentence constructions found in the reading selections, vocabulary building and sight translations. Reading material is assigned from many sources in the major scientific fields. Students are encouraged to bring in additional reading material of their own interest to discuss in class. Once a student has sufficient knowledge of grammar and the basic vocabulary of scientific texts, he should have little difficulty in acquiring the special terminology of his own particular field, and be able to translate even at sight, with reasonable facility and speed. A reading knowledge of German is a prerequisite for many Ph.D.

Prerequisite: German 100 or equivalent.

Text: Eichner and Hein, Reading German for Scientists, (Chapman and Hall, London).

202 Exercises in Translation and Composition, lect.: 2 hrs.; D. Steffen, E. Josenhans. English texts from various periods and of

different types will be translated into Gérman.

compositions for each class. Dictations are given once a week. The class will be conducted mainly in German. Prerequisite: German 100 or equivalent. 221 Introduction to German Literature, lect.: 2 hrs.; K. Fricke.

These translations will lead to the discussion of

specific difficulties of grammar and construc-

tion. Students must prepare translations or

A study is made of selected texts representing major periods of German literature which will be related to the various stages in the development of German civilization. The class also serves as an introduction to literary criticism. At the beginning, Middle High German (in translation) and Baroque literature will be studied. The class will then concentrate on the

two outstanding periods of German literature:

1750-1830 (Lessing, Goethe, Schiller, Kleist),

These texts will also provide the material for a discussion of the characteristics of literary forms: poetry, narrative, prose, and drama. A tutorial "literary language" will be offered once

Prerequisite: German 200 or equivalent.

and the 20th century (Kafka, Brecht).

#### Advanced Classes Offered

Advanced classes are based on German 200 or an equivalent knowledge.

300 German Composition, 3 hrs.; R. Ilgner.

The aim of the class is to develop in students the ability to express themselves freely and correctly in different styles (e.g. personal and official letters, reports, descriptions) within the vocabulary of present day German social, political, cultural and scientific life. Students will be required to do translations and exercises in syntax, and to write essays on various topics.

The class will also study the various uses of synonyms, idioms, different meanings of similar words, words within changing contexts, and vocabulary within selected word patterns. Prerequisite: German 200 or equivalent.

301 Baroque Age, lect.: 2 hrs.; F. Gaede.

The class studies German literature between the 16th and 18th centuries as a direct reflection of the important religious, social and scientific developments in Germany after the Reformation and during Absolutism, particularly the 30 years' war. Poetics, poetry, drama and prose, their origins in Humanism and the Renaissance and their functions for the following literature will be discussed. An introduction will be given to rhetorics, the art of emblematas and allegory, mysticism and mannerism which determine and characterize the European literature of the Baroque Age. The discussion will concentrate on the works of Brant (Ship of Fools), Grimmelshausen (Picaresque novel), Gryphius (martyrdrama, sonnet), Flemming (petrarcism) and Angelus Silesius (mystic epigram). The study of these texts will give the students a thorough understanding of the enoch.

Prerequisite: German 200 or equivalent.

302 German Literature in the Age of Enlightenment, (Not offered in 1972-73), lect.: 2 hrs.; K. Fricke.

The European movement of Enlightenment laid the social and philosophical foundations of the modern world. Its literature, predominatly a domain of the socially rising bourgeoisie, is the oldest directly accessible to modern man. The writers of the Age of Enlightenment in Germany were influenced by classical Greek and Latin literature, French and German Baroque writing, Cervantes, Shakespeare and 18th century English literature that displays such a vivid awareness of the literary productions of other European nations, whether it was to free itself from their dominance or to draw inspiration from them.

The class will examine the nature and extent of these influences as this is essential if the original achievements of the period are to be evaluated. Knowledge of one of these literary fields would enable students to make considerable contributions to the progress of class work. The class includes the study of important criticism of the period as well as the study of single works, in particular the following topics - fables (Gellert, Lessing), theoretical writings (Gottsched, Baumgarten, Lessing), poetic forms (odes, epigrams), Anacreontic poetry (Klopstock, Uz, Lessing), the epic (Klopstock), the novel (Wieland, "Geschichte der Abderiten"), drama (Lessing, "Minna von Barnhelm", "Nathan der Weise"). Students will also be introduced to the more important interpretations of particular works and of the literature of the whole period. Prerequisite: German 200 or equivalent.

303 The Period of Transition: Goethe and his Time Part I, lect.: 2 hrs.; D. Steffen.

A study is made of German literature and thought of the time which preceded and witnessed the great revolutions of the 18th century. Stimulated by the success of the natural sciences and their rational investigation into nature, the Enlightenment turned against contemporary society, demanding that it be reformed on the basis of reason. The Germans, politically divided, participated in the revolutions not in the form of political action, but in the form of artistic creation and philosophical reflection. German men of letters attempted to understand the tendencies of the age and sought to reconcile the revolutionary spirit with the traditions that the revolution cast aside.

The discussion of major literary and theoretical writings of the time from 1770 to 1800 will first concentrate on later works by Lessing which reflect some of the inherent difficulties of Enlightenment. Following the course of history, the writings of the young Goethe, of Herder, Schiller and their contemporaries of "Storm and Stress" will then be studied.

Criticizing Enlightenment, these writers expressed new conceptions of nature, history and individuality. Finally, Goethe's and Schiller's humanism or classicism will be discussed in an attempt to reconcile the individualism of the "Storm and Stress" with the objective forces in both history and nature.

Prerequisite: German 200 or equivalent.

352 Aesthetic Theories, seminar: 2 hrs.; F.

A study is made of the concepts of the beautiful, the sublime, the tragic and the comic in the aesthetic theories of Winckelmann, Herder, Kant, Schiller, Hölderlin, Hegel, Vischer and Schopenhauer, and a related study of the tradition and development of these concepts in Aristotle, Longinus, Boileau, Shaftesbury, Lessing and Burke. Particular reference will be made to the interpretation given at this time to examples of Greek art, and the influence that this had on the literary works of the epoch.

Historical investigation of aesthetic concepts leads to an understanding of the advantages and limits of a philosophical approach to art and the roots of contemporary art, especially of literary criticism.

Prerequisite: German 200 or equivalent.

353 Kleist and Hölderlin, (Not offered in 1972-73), seminar: 2 hrs.

This class makes a detailed study of two outstanding poets of the transition period between Classicism and Romanticism. Selected examples of poetry, drama, narrative prose and essays in poetical and aesthetic theory of every period of the life of Kleist and Hölderlin will be investigated. The class will examine the evolution of the main themes, motifs, and the various uses of poetical genres, structures and forms in the stages of development of a single poet, and will thus illustrate the special problems experienced by the poet. Prerequisite: German 200 or equivalent.

400 The Period of Transition: Goethe and His Time (II), (Not offered in 1972-73), lect.: 2 hrs.; D. Steffen.

The writings of the later Goethe and of Romanticism are studied.

The time from about 1800 to 1830 was marked by the Napoleonic era, the forces of restoration, and a society that became increasingly conscious of the discrepancy between reality and the ideals inherited from the revolution. Romantic literature and thought are both an expression of and a reflection on these changes. In this class an attempt will be made to trace the various positions of Romanticism. Romantic conceptions of poesy and reality also played a part in the writings of the later Goethe. The study of Goethe will specially consider the reason for his departure from Classicism, his views on Romanticism, and his relation to the dominant school of German Idealism. An

examination of works by Hölderlin and Kill will add to the student's understanding of nature of the conflicts experienced by all these writers.

401 Literature and Society, 1830-139 seminar: 2 hrs.; K. Fricke.

This class will concentrate on the literature the "age of liberalism", the transition between feudal and industrial society. Summarily acterized as "realistic", its literature reflects: profound social changes which the bourgenie initiated and experienced and the confusion values of this society.

Works by the following authors will be studie Büchner, Heine, Mörike, Droste-Hül-Keller, Storm, Hebbel, and Fontane. A detail reading list is available at the Department. Prerequisite: German 200 or equivalent.

420 Modern German Literature, (Not offered 1973-73), lect.: 2 hrs.; F. Gaede.

A study is made of trends in German literal of the late 19th and the first half of the 20 centuries. The course of Europe's history most sensitively reflected in the development modern German literature. The insufficiency the traditional literary forms to express the experience of a new reality resulted in a new literary language. The class will enable student to understand this language. During the fir term poetry, drama and prose of Naturalis and Expressionism will be studies, particular the writing of Gerhart Hauptmann, Fr. Kafka and Thomas Mann. In the second ten the works of Bertolt Brecht will be discussed Prerequisite: German 200 or equivalent.

451 Goethe's Faust, (Not offered in 1972-73 seminar: 2 hrs.

Goethe worked on his play from his youth until the year of his death, transforming the legen referring to the obscure 16th century magicil Faust into a symbolical account of all starand situations of human life. Goethe's person experiences and views have left their marks [L. D. Stokes this work as well as the literary movement which he saw passing by or which he helped shape - Enlightenment, Storm and St Idealism, Romanticism. Faust does not le itself to a one-sided method of interpretation its complexity demands a variety of

Its dramatical structure, the body of its ide its language and its symbols deserve equal

Discussions will concentrate on the final for of the drama. Various stages in the development ment of the play and the history of the cent motif will also be analyzed.

Prerequisite: German 200 or equivalent, 6 man 303 or 400.

452 German Philosophy: Hegel's Phaenone logie des Geistes, seminar: 2 hrs., D. Steff

imay be taken with consent of the Depart-

The Phenomenology of Mind, published in The The 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.

Hegel's philosophy, the summary of the literary and philosophical concerns of two generations of German writers, is particularly important to the study of Romanticism, its critics such as Kjerkegaard and Marx, and the school of

prerequisite: German 200 or equivalent.

Graduate Studies

The department offers a graduate programme leading to the M.A. degree. Details of the M.A. programme are given in the Calendar of the Faculty of Graduate Studies.

History

Professors

P. Burroughs (Chairman)

1 E. Flint (leave 1972-73)

P Fraser

H S. Granter

G. R. MacLean

I. B. Webster

Associate Professors

R. P. Bonine

D. H. Crook

C. B. Fergusson R. M. Haines

P. D. Pillay M. Reckord

**Assistant Professors** 

J. E. Crowley

J. Fingard

J. F. Godfrey

D. A. Sutherland G. D. Taylor

History as a Subject for Study at University

A sense of history is a primitive need felt by individuals and by groups. Just, as a person needs to know who he is and how he arrived where he is, so human groups, races, classes, states and nations need a sense of their own past as part of their culture. This primitive Sense of history is revealed in myths and legends, when peoples embroider what has come to them from the past to create a comfortable set of beliefs about their own previous exploits and origins. There are still those who wish to use history in this way, as a neans to soothe doubt and demonstrate the issential rightness of their own beliefs.

The academic study of history, however, 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.

History is the study of how and why changes in human life occur, and with what results.

#### Aims of Teaching and Study

Many students entering university history classes have difficulty in adjusting to the university levels of study. The ability to repeat what has been heard in lectures and to memorize events which fall between dates at the end of the class title is of little value. Students should understand the nature of the problems which have been studied; they should also command the knowledge which has been gained, in the sense of being able to arrange it in significant patterns and to allow ideas to be tested against such knowledge.

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; he learns to think for himself.

At all levels of study in history, students are guided through lectures and tutorials and encouraged to read books and articles which consider the same problems from different viewpoints. Dalhousie has an excellent collection of historical literature and the new Killam Library provides students with good conditions for private study and reading. Students are encouraged to acquire gradually a small, wellchosen personal library from the large number of excellent books published in paperback

#### Degree Programmes

Classes in history are set out below. There are several levels of study. 100-level classes are primarily for first-year students; 200-level classes treat broad geographical areas over specified periods; and 300/400-level classes provide opportunity for specialized study and advanced work for the undergraduate.

#### General B.A. in History

For the general B.A. with concentrated study in history, students choose a 100-level class and five upper-level classes, of which at least two should be at the 300-level. Students who wish to build up a greater specialization in history than the minimum requirements may do so by taking classes in ancient history from the Classics Department, in economic history from the Economics Department and in contemporary history from classes offered in Political Science. The Biology Department also offers a class in the history of science. Such classes are listed in the Calendar under the heading of the department concerned. (see also page 60)

The Department delegates supervisors to students concentrating in history in order to assist them in choosing a coherent programme of study. Students should contact the Department as soon as possible for assignment of their

#### B.A. with Honours in History

Students may choose from several honours programmes:

European: A selection of classes in Medieval, Early Modern, and Modern European history with emphasis, if desired, on the national history of a European country.

North American: A concentration of classes in the history of Colonial North America and in Canadian and United States national history.

African: Classes in African, South African and East African history may be combined with classes in British colonial history.

British and British Imperial: A concentration of classes in the history of England and of the British Empire and Commonwealth.

General: A wide selection of classes from North American, British and Imperial, African and European history.

All programmes include related studies in language, literature, philosophy, economics and political science.

Any student contemplating taking a B.A. with honours in history should consult the Department before initial registration.

Classes Offered at the 100 Level

100 This Century Has Ten Decades, lect.: 2 hrs. plus arrangements, D. H. Crook, J. F. Godfrey.

Where have we been for the last 100 years and how did we get here? To resolve these questions, this class offers the possibility of experiencing the events, ideas and colour of the modern world through lectures, video tapes, happenings, and rap sessions. This is history for people who think they hate history.

102 European History and Civilization (not offered 1972-73)

120 History of Canada, lect.: 3 hrs.; P. B. Waite

This class will cover the development of Canada from prehistoric Indian cultures to Pierre Trudeau. It will have a central core of social and political history, but will range across economic history as well as Canadian literature. This is history for people who like Canada.

199 Problems of Historical Study and Writing, seminar 2 hrs.

This class is for students who plan to continue study in history or closely allied subjects. It is intended to introduce the student to the problems of historical study, including the nature of historical evidence, how problems are analyzed, what is meant by such concepts as "causes" and "results", and especially how the student can learn to think for himself about historical problems and to express his thoughts in carefully organized written work. No lectures take place; instead, each student registers for a section dealing with the type of history which interests him. 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. This is history for people who like history.

Some of the sections to be offered:

199/1 Revolutionary America, 1750-1800, J. E. Crowley

199/2 Spain, France and England in America, J. Fingard

199/4 Violence and Social Change: A 19th Century English Experience, H. S. Granter 199/5 Medieval Life and Thought, R. M. Haines 199/6 Blacks and Whites, 1496-1970, M.

Reckord 199/7 Varieties of Fascism, L. D. Stokes 199/9 Piety and Progress in Victorian Canada, D. A. Sutherland

199/10 A Society in Crisis: The United States in the 1930's and the 1960's, G. D. Taylor 199/11 Historical Words and Ideas, P. Fraser

Classes Offered at the 200 Level

History 100, 102, 120, 199 provide appropriate preparation for 200-level classes.

European History

200 Medieval Europe, lecture/discussion/ tutorial sessions; 2 hrs; R. M. Haines

Within a broader framework the class will give particular attention to the Age of Charlemagne, The Twelfth-Century Renaissance, and the concept of decline in the context of The Later Middle Ages.

201 Early Modern Europe, tutorial: 2 hrs; J. E. Crowley

This class involves a survey of European history, roughly from 1500 to 1800. Among the topics treated are the Reformation and Counter-Reformation, economic and cultural expansion overseas, the consolidation of national states and their attendant rebellions, the intellectual history of political and scientific change, and economic and social structure.

205 Modern Europe, R. Bonine, J. Godfrey, L.

Discussion of assigned readings in Modern European History, 1789-1945, at weekly twohour meetings on the basis of questions distributed in advance. Attendance and active participation are required.

British and British Imperial History 210 The History of England, lect.: 2 hrs. plus tutorial sections, H. S. Granter, P. Fraser.

The main features of each recognized division. from Anglo-Saxon times to the twentieth century, are given selective treatment and put in historical focus. The emphasis is on the development of a society and culture which, though similar to Western European, has its own particular and peculiar characteristics.

213 British Empire and Commonwealth, lecture/discussion: 2 hrs.; P. Burroughs, M. Reckord, P. D. Pillay

The class examines a series of topics and themes, chosen principally in the period from the American Revolution to the present, to illustrate the character and motivation of British expansion overseas. Changing British attitudes and policies towards the empire, problems created by the contact of white settlers and indigenous populations, colonial revolts and independence movements will be

North American History

220 The Canadian Mosaic: Themes in Canadian History, informal lecture/discussion: 2 hrs.; J. Fingard, D. Sutherland, P. B. Waite

History 220 explores major themes and problems in Canadian history from the seventeenth to the twentieth centuries. The treatment of events will be topical and concerned with the French Colonial, the British Colonial, and National Periods. Within these periods the emphasis will be upon interest groups and the colonial, regional, and ethnic characteristics of Canadian history. The class is designed to provide the undergraduate with an understanding of the Canadian experience and provide a framework in preparation for more advanced

Prerequisite: A history class at the 100-level.

222 Canadian Economic History, lect.: 3 hrs.; N. H. Morse (for details see Economics 232)

230 American History, lect.: 2 hrs. plus tutorial sections; D. H. Crook, G. D. Taylor

The class acquaints students with the process through which a colonial, then provincial, society became a continental force and finally a world power. Lectures and assigned reading give

the student a comprehension of pattern social, political, economic, and cultural velopment. The writing of essays and tuto sessions encourage the mastery of species knowledge of how those patterns became In this way, general themes of American hist are the means by which students increase the ability for thinking and understanding.

240 History of Tropical Africa in the Ni teenth and Twentieth Centuries, J. B. Webst

In lectures and tutorials students will a enabled to grasp and absorb some of the mail themes of African pre-colonial history his study of the internal politics and developme of African states and societies such as Yoruba empire, Ashanti and Dahomey in Wa Africa, and African states like Buganda aroun the East African great lakes. The theme cultural contact and its effects will be no minent in considering Muslim revolutions West Africa, and Arab penetration in Africa, as well as the impact of Christian missionaries in both areas. The second term w of independent African states.

Classes Offered at the 300 Level

300-level classes in history are intended for third-year students who have completed wo at the 100 and 200 levels. In general, the classes are concentrated in area and time and allow students to pursue interests developed 200-level classes. The Department will probable be offering additional 300-level classes, detail of which will be available at registration.

European History 300 Medieval Civilization, discussion/tutorial: hrs.; R. M. Haines

History 200 provides the appropriate bac ground for this class. Each year a number of topics is chosen, wide enough to be used central themes in the context of which medie al civilization can be studied; for instance monasticism, universities, papal government and architecture. Such topics will be studied depth, with the help of original documents translation) where these are available, and using periodical literature. Students are expected master the basic work in certain areas, but w also be encouraged to develop special interest of their own. Class discussion will be used unravel more difficult aspects, and all student will be expected to contribute in this way at in the writing of a small number of well argu and documented papers. Some general bool should be read before starting the class Suggestions of this kind, with a list of topics and appropriate explanation and biblio graphy will be available well in advance.

303 Modern Political Ideologies, lecture tutorial, 2 hrs.; R. Bonine

A study of the origins and development of A study political ideologies of the extreme right and left political de proper from the break with traditional logic in Europe and literary forms in the eighteenth century to and the appearance of ideologically oriented parties the approximate in the second half of the nineteenth century.

305 Modern Revolutions, lecture/tutorial: 2 hrs., R. Bonine

An analytical and comparative study of revolufion, chiefly in modern Europe, 1789-1952, with special emphasis on the Russian revolu-

Modern France from the Commune of 1248 to the Collapse of 1940, seminar: 2 hrs.; I. F. Godfrey

All my life I have thought of France in a certain way. This is inspired by sentiment as much as by reason . . . . Instinctively I have the feeling that Providence has created her either for complete success or for exemplary misdeal mainly with the impact of Europe fortunes. If, in spite of this, mediocrity shows colonial rule; the partition of Africa, the in her acts and deeds, it strikes me as an absurd establishment of differing types of Europe anomaly, to be imputed to the faults of rule, and African responses by resistance an Frenchmen, not to the genius of the land. But nationalism which culminated in the emergence the positive side of my mind also assures me that France is not really herself unless in the front rank; that only vast enterprises are capable of counterbalancing the ferments of dispersal which are inherent in her people; that our country, as it is, surrounded by the others, as they are, must aim high and hold itself straight, on pain of mortal danger. In short, to my mind. France cannot be France without greatness". (Charles de Gaulle, War Memoirs

> 307 Modern Germany, discussion/tutorial: 2 hrs.; L. D. Stokes

History 205 provides the appropriate background for the class. Selected topics in 19thand 20-century German history, which seek to explain why and to what extent political, intellectual and social developments in Germany differed from those of other western European countries, are examined. Among the topics treated are German nationalism and liberalism, the role of Prussia, industrialization, political parties, and civil-military relations. Extensive reading in primary and secondary sources is required; a list is available in advance from the instructor. In the second term, students will prepare a research paper. A reading knowledge of German is desirable, but not essential.

310 History of Science, lect.: 2 hrs.; tutorial: 1 hr.; J. Farley

This class is designed to accommodate students of the sciences and the arts. There are no <sup>lormal</sup> prerequisites, although all students must have a strong background in either a science, history or philosophy. The class will stress the period from the 16th to the 20th centuries, and will attempt to show how ideas of what constitutes an acceptable scientific explanation have changed. There will be constant emphasis on the social context of science and the interactions between the different sciences. This class is cross-listed in the Biology Department classes as Biology 390, and may thus be taken as a science elective.

English History 316 England in the Nineteenth Century, lecture/tutorial: 2 hrs.; H. S. Granter

The nineteenth century was England's century, the Victorian Age, the time of England's greatness. The class is devoted primarily to the study of the making of Victorian England, examining the impact of new machinery and new ideas on an older agricultural aristocratic

317 Late Victorian and Edwardian England. seminar, 2 hrs.; P. Fraser

The class will examine selected aspects of political, social and intellectual history, such as the transformation of the Liberal party under pressures from Socialist groups, the Labour movement and the varied forces of Imperialism; the ideals and policies of special movements associated with temperance, social reform, imperial federation, tariff reform, women's suffrage, national service and defence; and the methods of political organization (whether of central or local government), parties, electioneering or campaigns in the press.

North American History 325 Canada Within the Empire, 1760-1896, discussion/tutorial: 2 hrs.; P. Burroughs

History 213 or History 220 provide the appropriate background for this class, which examines the political, commercial, and cultural relations of Canada with Britain from the conquest to the eve of nationhood; the changing attitudes of Canadians and Englishmen to the developing empire; and the interplay of imperial policies and colonial conditions.

327 The Nova Scotian Experience, tutorial: 2 hrs.; D. A. Sutherland

Either History 120 or History 220 provides an appropriate background, and admission is restricted to third and fourth year students. This class examines the evolution of Nova Scotian society from the settlement era to the 20th century. Emphasis will be placed on analysis of the internal and metropolitan pressures which together moulded the character of the provincial community. Students are encouraged to use local archival sources in the preparation of their research papers.

328 The Age of Macdonald and Laurier, seminars with some lectures, 2 hrs.; P. B. Waite

This class will deal with the growth and expansion of British North America from 1840 through the Confederation period of 1914. There will be some emphasis on social and political history, but students can expect some substantial excursions into Canadian economic history and Canadian literature. History 120 or 220 is an essential prerequisite, and admission is restricted to third and fourth year students. A reading knowledge of French is not essential, but it is helpful.

329 Religion and Society in Canada, seminar: 2 hrs.; J. Fingard

This class is designed for senior undergraduates who are interested in studying in depth major characteristics of Canadian society since 1760. Students will prepare for discussion papers treating such themes as religious revivalism, privilege in colonial society, European traditions and influences, the age of improvement, nineteenth-century anti-Catholicism, indigenization of churches, social gospel. Registration with permission of the instructor.

335 Colonial America, tutorial: 2 hrs.; J. E.

This class examines the development of American society in the colonial period. Topics include exploration and settlement, political and economic relationships with the British empire, religious thought and organization, economic and political development, the emergence of a provincial culture, and the bearing of the colonial experience on the American Re-

337 Cuba and the Caribbean, seminar: 2 hrs.; M. Reckord

This class will examine the impact of imperialism on the Caribbean: analyze the characteristics of Spain, French and British colonial societies and the nature of the recurrent struggles for independence. Particular attention will be paid in the second term to the origins of the socialist revolution in Cuba and its current

338 Modern America: The Twenties, tutorial: 2 hrs.; D. H. Crook.

339 The United States in the Twentieth Century: The Architecture of Complexity, tutorial: 2 hrs.; G. D. Taylor

This class investigates the response of American political and economic institutions to the problems of industrialization and urbanization. Study focuses on patterns of organization: the growth of public and private corporate forms of bureaucracy; the emergence of new interest groups; and the impact of these developments on the traditional American political and social structure. The class will emphasize discussion and individual research by the student within this general framework.

African History/British Colonial History 344 The Origins of Tribalism and Nationalism in Africa, J. B. Webster

History 240 or History 213 both provide an

appropriate background for this class. Students who do not have this preparation may be admitted, but should consult the instructor before registering.

The class involves the comparative study of various types of nationalism as they developed in Africa during the nineteenth and twentieth centuries. The emphasis will be on tropical Africa, which involves consideration of whether distinctions can be made between "nationalism" and "tribalism", but comparative material from white Afrikaner and Egyptian nationalism will be used. The class will consider such questions as the influence of Christian and Islamic missionaries on nationalism, the extent to which such movement were a reaction against colonial rule, the social context of such movements and the nature of their political, social and economic goals. Students will be expected to use documentary sources.

345 History of South Africa, lecture/tutorial, 2 hrs.; P. D. Pillay

History 213 provides an appropriate background for this class, or History 220 for students wishing to make comparative studies with themes from Canadian history. The class concentrates on the period since the British acquisition of Cape colony, and examines the development of relationships and tensions between the English and Afrikaans speaking groups, and between the white population and other races. The main topics considered are the rise and fall of the Zulu nation, the opening up of the interior, the imperial factor and its effects on Cape and Transvaal politics of the late nineteenth century, South African Union, Afrikaner nationalism and the development of apartheid.

### Classes Offered at the 400 Level

Both 400-level classes are required of fourthyear history honours students; first year M.A. candidates may also attend.

400/1 Colonizers and the Colonized, seminar, staff

This class will examine the effects of the early phases of European colonization on the peoples involved, the indigenous population and the colonizers. Likely topics of inquiry will be the way in which each group viewed the other, their motives in dealing with each other, the economic and social consequences of these dealings for the colonizing nation and the native culture, and the history of relations in the colonies themselves. These topics will be examined in the contexts of Spanish America, Africa, British North America, French Canada, and India.

### 499 Honours Essav

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

will be related to one of their 300 or 400 level classes and will be supervised by the appropriate staff member.

#### **Graduate Studies**

M.A. and Ph.D. programmes in history are offered. For details of classes, 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

#### History of the Sciences

Biology 390/History 310, The History of Science: I. Farley.

Physics 402B; Special Topics in the History and Philosophy of Science.

Psychology 358, History of Psychology, J. W.

#### Philosophy of Science

Philosophy 305, Epistemology, A. Rosenberg.

Philosophy 465, The Philosophy of Science. A. Rosenberg.

#### Sociology of Science

Sociology 209A, Sociology of Science and Ideas, D. H. Elliott.

Details of the above classes will be found under departmental listings.

#### Mathematics

#### **Professors**

J. Ahrens (NSTC)

E. Blum

M. Edelstein

R. L. Jeffery

A. J. Tingley

#### **Associate Professors**

R. P. Gupta

M. J. L. Kirby

K. V. Menon

S. Swaminathan A. C. Thompson

### **Assistant Professors**

I. D. Brown

H. Brunner

J. C. Clements

C. A. Field

C. S. Hartzman E. L. Heighton

R. Holmes

E. B. Mercer

R. Pare F. Servedio

W. R. Smith

K. Tan M. Yasugi

#### Postdoctoral Fellows

M. S. V. Kumar

S. L. Mehndiratta

P. P. Narayanaswami T. W. Rishel

tween stars

As man has viewed his environment, h always tried to find patterns and relation within it. For example, it was discovered centuries ago that the lengths of the sides right angled triangle have a very p relationship to each other: much later it learned that the period of a pendulum proportional (to a fairly high degree curacy) to the square root of the length of pendulum. To aid his senses in the search to such patterns, man has developed all kinds instruments and devices for accurately measure ing all sorts of aspects of the universe from the distance between atoms to the distance

Some of the patterns, for example the to readily measurable.

Mathematics is concerned with this kind a So far we have talked about mathematical

Since so many of the relationships we have been talking about are numerical, a bas concern of mathematics is the structure numbers themselves. We all know that two numbers can be added together to give a thin number but what is "addition"? What bas properties does addition have? Consider the describe "quantum mechanics." following two collections of numbers:  $0, 1, 2, 3, 4, 5, 6, \ldots$ 

 $1, 2, 4, 8, 16, 32, 64, \ldots$ 

If we add 2 and 3 we get 5 while if we multiple 4 and 8 (which are the numbers in the second collection which are directly under 2 and 311 the first) we get 32 (which is the number directly under 5). The laws of "indices" sa that this is true whichever pair of numbers W look at. Why? Is there any real different

More basically still, mathematicians are con-More basically still, mathematicians are  $\log \log (ab) = \log a + \log b$ . ber". Greek mathematicians were greatly difter the university, the emphasis is on what this

already mentioned) led them to the have an to the discovery that  $\sqrt{2}$  is not a "rational number". discovery number which is the ratio of two whole numbers. There were disturbed because they numbers, because they who had thought about (and every about (and every) believed that all lengths should be rational. the first example of mathematics proving intuition to be wrong. Movematter physics could never prove that  $\sqrt{2}$  is over, Parational; even if a "perfect" right angled friangle could be drawn with the two shorter sides of length one, the measurement of the third side would always be approximate, i.e., to a certain number of decimal places.

Even more basic, bordering on philosophy but also a question for mathematics, is what is meant by saying that Pythagoras proved that the square on the hypotenuse is equal to the sum of the squares on the other two sides.

Another set of problems for mathematicians arise from statements of physicists like the velocity of a moving body (such as a spacecraft) varies continuously with time or that the velocity is a function of time. Further, if it is known just how the velocity "varies" with cited above, are concerned with numbers who time, what can be said about the body's others, for example the precise beauty a acceleration or the total distance it travels in a symmetric crystals, are concerned with thing certain time? These are the problems which which are not numbers, and which are no gave rise to that part of mathematics called Calculus.

pattern or structure as an abstract entity which problems which arose directly out of physical can be studied quite apart from the physical investigations. Mathematics, however, in its experiences which give rise to it. For example study of abstract structures, can proceed the knowledge by ancient Egyptian surveyor independently of the other sciences and, inof the fact that the sum of the squares of the deed, advance ahead of them. It was in 1830 lengths of the two shorted sides of a right and that J. F. C. Hessel discovered the 32 "crystal triangle is equal to the square of the length of classes" which describe all the possible ways in the longest side of the triangle inspired the which crystals can be symmetric. It was in the ancient Greek mathematicians to examine right same year (but quite independently) that the angled triangles as Abstract objects and 1 French Mathematician Galois (age 19) defined "prove" that the said relationship always hold the mathematical concept of a "group" of which the crystal classes are good examples. Again, at the beginning of this century the German mathematician David Hilbert investigated the properties of what we now call "Hilbert Space" which is another abstract mathematical structure. It was not for a number of years after that the physicists found that this was precisely what was needed to

> Thus, mathematics is a study of abstract patterns and relationships, many of which have their origins in physical problems although study of them has usually proceeded to such an extent that very little trace of the physical problem is left.

You will probably find university mathematics very different from high school mathematics. In High School, the emphasis is usually on between addition in the first collection are computational skill. For example, a lot of time is usually spent in learning to use "log tables". This really means learning to use the equation:

equation is true, what does log mean? It might be said that university mathematics courses fall into three types, with much overlap and fuzziness at the edges.

1. A deep analysis of a particular kind of mathematical structure. For example, a class with a title like Real Analysis is usually a detailed study of that unique mathematical structure which we call the real numbers.

2. A study of the interrelationships and interplay between various kinds of mathematical structure. A class with a title like abstract algebra might be of this type.

3. A study of how real world problems give rise

to mathematical structures and how a mathematical analysis of these structures sheds new light on (and sometimes solves) the given problems. This type of mathematics is usually called applied and a class with a title like mathematical economics would be of this type. Because mathematical structures have so often arisen from physical experience and this term is used in its widest possible meaning mathematics finds application in all fields of human endeavour from rocketry to economics, from psychology to life insurance. However, the mathematical structures themselves have such a logical beauty that few would claim that mathematics has only a utilitarian value; its study can give great aesthetic pleasure.

You will see that the words for example have been used a great deal in the preceding paragraph. This is because it is extremely difficult to define mathematics. As with art, music and religion, one only begins to get a feeling for what mathematics is after one has practiced it for a while.

#### Degree Programmes

#### Mathematics as an Area of Concentration.

Students who intend to concentrate on mathematics are expected to consult with the Chairman of the Mathematics Department, or his representative, preferably before registering for the second year of the degree programme, but in any case prior to registering for the third

#### **Honours in Mathematics**

Students who wish to take honours in mathematics may not be able to complete their courses in the usual four years if they do not have senior matriculation mathematics, unless they take a "make up" class during the summer immediately preceding or following their first year at the University. Such students should consult the Chairman of the Department when accepted. Other students interested in an honours degree should consult the Chairman of the Department before the end of their first year if possible, but in any case during the second year.

The following programme will normally be followed by students who plan to take Honours in mathematics. Adjustments which do not

conflict with the general regulations may be

#### Year I and Year II

Mathematics 100 (or 110 or 151) will normally be taken in Year I, and 200 (or 250), 2035, (2045) in Year II. Math 2035 and 2045 may be taken in Year I by well-qualified students with the consent of the instructor, in which case another course may be elected in Year II.

#### Year III and IV

Math 300 (or 350) and Math 303 and five additional classes at least two of which will be numbered 400 or above. Of these five classes, normally at least one will be selected from group I or group II below and at least two from the remaining group.

I		II
205*		306
304		3115 and $3125$
305*		320
307*		330
401		402
403		

\*Note: These courses are usually offered only in alternate years.

#### Honours Comprehensive Examination

The Honours Comprehensive examination will be a verbal presentation of an examination on a suitable topic requiring comprehensive knowledge. The topic is to be selected in January of the graduating year for presentation in March.

#### **Combined Honours**

Students interested in taking honours in mathematics and another subject as a combined programme should consult the chairman of the department, through whom a suitable course of study can be arranged.

A combined honours programme may be appropriate for many. Students contemplating a combined honours course in mathematics and another subject should, however, bear in mind that the work in either subject would probably be insufficient for admission to a regular graduate programme. A qualifying year would usually be necessary.

#### Classes Offered

001 Fundamentals of Mathematics, lect.: 3 hrs., E. B. Mercer

This class may be offered in place of senior matriculation mathematics as a prerequisite for first year classes at the University. The student is expected to have taken junior matriculation algebra and geometry, but it should be possible for a good student to make progress in the class with an accurate knowledge of operations with algebraic fractions and of solving linear and quadratic equations including simultaneous linear equations in two unknowns. Students are recommended to consult the text prescribed for Grade XI in Nova Scotia to determine the background needed.

The principle objectives of the class, as taken from the preface to the current text, are:

a) an appreciation of the natural origin and evolutionary growth of the basic mathematical ideas from antiquity to the present;

b) a critical, logical attitude, a wholesome respect for correct reasoning, precise definitions, and a clear grasp of underlying assumptions;

- c) an understanding of the role of mathematics as one of the major branches of human endeavour and its relations with other branches of the accumulated wisdom of the human race;
- d) a discussion of some of the simpler important problems of pure mathematics and its applications, including some which often come to the attention of the educated layman and cause him needless confusion;
- e) an understanding of the nature and practical importance of postulational thinking.

Topics studied include: deductive logic, sets, evolution of the number system, the logic of algebra, analytic geometry, functions, elementary trigonometry, permutations, and combinations, binomial theorem and vectors and matices

100 Differential and Integral Calculus, lect.: 3 hrs., Various members of department.

Probably the best way of conveying some idea of this class is to describe some problems which can be attacked by use of the calculus.

In high school one learns that the distances travelled by a body moving in a straight line at a constant velocity is given by the formula s-vt. A natural question is: What is the situation if the velocity is not a constant, but changes with time: Can the distance be calculated in this case?

As another example, consider finding the areas of figures. In high school one finds that some areas can be easily calculated by formulae. Some of these formulae are easy to see, e.g., that for the area of a rectangle. Others are not at all easy to see, e.g., the area of a circle. One may ask whether it is possible to find a method of calculating area which does not depend on prior knowledge of a specific formula.

Often, though of course not always, such problems can be solved by methods of the calculus. The first of the examples given above involved differentiation, the second integration. Problems which can be attacked by such methods often arise in the natural sciences, the social sciences, and other areas.

Topics studied include: limits, and continuity, differentiation and integration of elementary functions and applications, instruction to solid analytic geometry.

One section of this class, section (14), is offered in which the study of calculus will be combined with an introduction to the use of a computer. Prerequisite: Familiarity with Euclidean geometry, polynomials, elementary trigonometry, and Euclidean plane analytic geometry. In addition to these specific topics, a degree of mathematical maturity is required. A student completing Grade XII in Nova Scotia or a similar course elsewhere should be ready for calculus.

## 110 Mathematics for Commerce and Economics, lect.: 3 hrs.:

This class provides a survey of mathematical techniques which are useful in analyzing mathematical models in the social sciences. The material covered in the class is similar to that presented in Mathematics 100. However, certain topics (such as trigonometric derivatives and integrals) which are included in Mathematics 100 are not covered in Mathematics 110. In their place Mathematics 110 includes an introduction to matrix algebra, differential equations and difference equations.

This class in intended as a survey class for students who are not going to take further work in mathematics. Students who are going to take other mathematics classes should take Mathematics 100 rather than Mathematics 110 as Mathematics 100 uses a more rigorous mathematical approach. Throughout the class, applications of mathematical techniques to social science problems, particularly economic problems, will be stressed.

### Prerequisite: High school mathematics.

Honours Students, lect.: 3 hrs.

This class, to be formed in the second term, is designed for students who after a one term.

151 Differential and Integral Calculus for

This class, to be formed in the second term, is designed for students who, after a one-term exposure to Mathematics 100, have shown the ability and interest for a more rigorous introduction to Analysis.

Syllabus: The real line R (as a complete ordered Archimedean field); basic topology for R; the concept of mappings, in particular those of R into itself. Sequences, convergence and criteria for convergence. Limits and continuity of functions. Properties of continuous functions (like attainment of intermediate values, attainment of lub, etc.) Uniform continuity. Differentiation, Rolle's Theorem, Mean-value Theorem, Taylor's Formula, Taylor's Series. Theorems on uniformly convergent series of functions, Special Functions, Integration, definition and properties of Riemann integral, evaluation. Fundamental Theorem; some techniques of integration; improper integrals.

Prerequisite: First division in Math 100 (December mark) and consent of instructor.

#### 200 Intermediate Calculus, lect.: 3 hrs.

It is assumed that students taking this class have already acquired some knowledge of calculus. Conceptual aspects will be treated, while stress is laid on manipulative techniques which lend themselves readily to applications in physics and engineering.

Topics include: real number systems, on tinuous functions and their fundamental perties, partial derivatives and application convergence and divergence of infinite sense power series, double integrals, functional determinants, geometry of euclidean vector space with emphasis on three dimensions, elemental differential equations.

Prerequisite: Mathematics 100.

### 202 Basic Concepts of Mathematics, $le_{\text{Ct},i}$

Two important concepts in Mathematics definition and proof — form the basis of the class. Symbolic logic is introduced and working knowledge of the logical connective including the universal and existential quantier are studied and used by the student make precise certain statements in mathematicand as aids in proof. A first definition of proof is part of the study of the proposition calculus. This definition is augumented whether the predicate calculus is studied. A final and further augumented definition is given whether the proof of tautologies in proofs is discussed.

The real number systems are constructed us decimal rationals instead of the usual Cantor Dedekind approach. Sufficient elementary theory and abstract algebra is studied to mathis topic self contained.

Prerequisite: Math 100.

## 2035 (A) Matrix Theory, (formerly part a 203), lect.: 3 hrs.

Topics will include the following: solutions systems of linear equations, matrices at matrix operations, equivalence, rank, inversite diagonalization and canonical forms, determinants. This class is designed to serve the needs of social scientists, engineers, and the who require applied linear algebra, as well the needs of mathematics majors.

Prerequisite: Math 100, or 150, or 151, or 11. This requirement may be waived with \$\psi\$ consent of the instructor.

## 2045 (B) Linear Algebra, (formerly part 203), lect.: 3 hrs.

Topics will include the following: vector space bases, dimension linear transformations, representations of linear transformation by matrice Prerequisite: Math 2035.

#### 205 Projective Geometry

We begin with a brief discussion of the role the "postulates" of Euclidean geometry, especially the Parallel Postulate of Euclid, and go to some elementary theorems of Non-Euclide Geometry. Some of the basic properties common to the Euclidean and Non-Euclide geometries are investigated. We introduce axioms for geometry which describe the properties and the axioms are shown to consistent and independent by giving firmodels or finite geometrics. The axioms those for Projective Geometry.

Projective geometry is then studied in detail with topics including duality, Desargues Theorem, the harmonic relation, algebraic models for the projective plane, cross ratios, Pappus Theorem, the Fundamental Theorem of Projective Geometry, conics, Introduction of Coordinates in a projective plane, discussion of Klein's Erlanger Program.

The course is intended for anyone with an interest in Mathematics and geometry, especially for those who enjoy engaging in deductive reasoning. The linear algebra necessary shall be developed in the lectures.

## 2065A Probability and Mathematical Statistics,

There are many phenomena which cannot be predicted with certainty, but which show such regularity that useful predictions can be made. For example, we cannot predict accurately whether or not it will rain on a day on which a pienic is scheduled, but, by studying the records of weather of past years, we can state with some degree of assurance how likely it is that this will, or will not, happen. Such problems lead us to the study of probability and statistics.

In this class the following topics are included: probability and simple applications to distribution, game and decision theory, tabulation and description of data, problems of estimation, tests of hypotheses.

The major objective of this class is to introduce students to statistical techniques required by research workers in many fields.

Prerequisite: A knowledge of high school

## 2075B Probability and Mathematical Statistics, lect.: 3 hrs.

This class is more sophisticated mathematically than is 2065A. Rigorous proofs are given of many of the results introduced heuristically in 2065A. Additional topics, including linear regression, linear correlation, and analysis of variance are introduced. It is expected that a student who completes this class will be able to examine statistical literature effectively in connection with problems in statistics which arise in his work, and that he will have a basis for further work in this field.

Prerequisite: An understanding of the elements of differential and integral calculus to at least the level of Mathematics 100 and Math 2065A.

# 200 Applied Mathematics, lect.: 3 hrs.

This class is designed with the needs of science students in mind. It includes the topics: functions of several variables, vector analysis, line and surface integrals, integral theorems, matrices and determinants, differential equations, sequences and series, complex analytic functions, integration by the method of residues.

Students who intend to do advanced work in mathematics are advised to take Math 200 rather than Math 220. However, students who complete Math 220 with more than the minimum standing may be admitted to classes where Math 200 is the normal prerequisite. Credit will not be given for more than one of Math 200, 220 and 228.

Prerequisite: Math 100.

## 227 Numerical Methods and Fortran Programming, lect.: 3 hrs.

This class provides an elementary introduction to some of the numerical methods used in almost all fields of the sciences. These methods usually require the use of either a desk calculator or a digital computer so that an introduction is given to the FORTRAN computing language.

The numerical techniques studied include those for the solution of nonlinear equations of algebra, the approximation and interpolation of functions, some methods for numerical integration and differentiation as well as for solving systems of linear equations, and differential equations. These techniques are applied to a variety of problems chosen from the social and physical sciences.

Students may offer for credit only one of 227 and 230.

Prerequisite: Mathematics 100 or 110 or 150, or 151.

## 228 Applied Mathematics for Engineers 1, lect.: 3 hrs.

This class discusses various notions which are useful in studying physical phenomena. The prerequisite is a working knowledge of calculus. A major portion of the first term is spent in studying vector algebra and calculus with special emphasis on the usual geometric spaces of two and three dimensions. Afterwards, brief introductions are given to the complete number system and functions of complete variables. Sequences and series (a method of obtaining "infinite sums") are discussed and methods of approximating functions by series are indicated. Finally, a study is made of ordinary differential equations with particular emphasis on linear equations. The intent is to give future engineers some computational skills and knowledge of useful mathematical tools. Care is taken to present definitions, notational systems and statements of theorems with assumptions explicitly stated. Intuitive arguments are presented rather than detailed mathematical form-

Students offering Mathematics 228 will not be given credit for either Mathematics 200 or Mathematics 220.

## 230 Fortran Programming and Operations Research, lect.: 3 hrs.

This class provides an elementary introduction to some of the mathematical methods which are being applied to problems in business, economics and the sciences. Most of the methods studied seek to find a best, or optimal, solution to a model of the original problem. Using modern computers it becomes feasible to consider some of the actual applications of these methods. The course included an introduction to the FORTRAN computing language.

The optimization techniques studied include those for various search methods, the methods of differential (and integral) calculus, solution of linear and nonlinear systems of equations, the simplex method of linear programming and its special versions for the assignment and the transportation problem, as well as methods for dynamic processes. These techniques are applied to a variety of problems chosen from business, government and the sciences. Students may offer for credit only one of 227 and 230. Prerequisite: Math 100 or 110 or 150 or 151.

## 235 Foundations of Mathematical Astronomy, (not offered in 1972-73), lect.: 3 hrs.

This class is designed to give the students the mathematical background for a good understanding of the structure of the universe and a solid foundation for possible further study or admissions to the naval or air forces. It provides up-to-date information about recent achievements in stellar astronomy. The history of the development of astronomical thought from ancient times to the present will be considered in connection with the presented material.

The class starts with geometrical considerations about the sphere, spherical coordinates and some concepts of spherical trigonometry. Then the topics, celestrial sphere, diurnal motion, equatorial co-ordinates, mean time, parallax eclipses, and problems in connection with the stars and stellar motions, are treated.

The mathematical treatment is of an elementary nature; students will require knowledge of trigonometric functions, simple differentiation and polar co-ordinates.

Prerequisite: Mathematics 100, which, with the consent of the instructor, may be taken simultaneously.

### 250 Intermediate Analysis, lect.: 3 hrs.

This class provides a sequel to Mathematics 150 and 151 for those students who are interested in obtaining an understanding of the background on which the techniques of calculus rest. Students who intend to continue their study of mathematics to a higher level are advised to take this class. Mathematics 250 is a parallel class to Mathematics 200 in the sense that the same topics are discussed but from a more theoretical point of view. The main part of the class is concerned with functions which map n-dimensional space into m-dimensional space (with special reference to the cases when n and m are equal to 1, 2, or 3.) For this, an understanding of linear algebra is essential so that concurrent enrolment in Mathematics 203

is necessary. The notions; continuity; integration; differentiation (these three topics refer, as indicated above, to functions of several variables), convergence of sequences and series of real numbers and of functions.

Prerequisite: Math 150 or Math 151 or good standing in Math 100, with the consent of the instructor, and concurrent enrolment in Mathematics 2035.

#### 300 Advanced Calculus, lect.: 3 hrs.

Functions of several variables, continuity, differentation, implicit differentiation techniques. Taylor's expansion; Jacobians (their geometric meaning). Implicit function theorem; extreme values; multiple integration (especially transformation of double and triple integrals) line and surface integrals. Green's and Stokes' theorems; series of functions; uniform convergence; fournier Series (sine and cosine series; convergence theorems). Applications; boundary value problems; partial differential equations. Students who intend to honour in mathematics. or do graduate work in mathematics, should take Math 350, not Math 300.

Prerequisite: Math 200 or consent of instructor.

#### 303 Modern Algebra, lect. 3 hrs.

The existence of parallel theories in different subjects indicates that there is an underlying unified theory. Number theory, group theory and formal algebra have been connected together and abstracted to produce what is now known as abstract algebra. The aim of this class is to provide a gradual introduction to the basic concepts of abstract algebra. In the beginning, basic ideas of sets, relations, mappings and operations are given. From these ideas, groups, rings, integral domains and fields are defined and their properties are given.

Prerequisite: Mathematics 200, Mathematics

#### 304 Foundation of Analysis and Topology, lect : 3 hrs.

The purpose of this class is to try and give an understanding of ideas basic to much of mathematics and essential to analysis. The class is in two parts. The first deals mainly with set theory, the second (dealing with elementary topology) will begin in January.

Class Outline: Sets, operations on sets and a discussion of an axiomatic basis for set theory. Relations with particular attention to functional and order relations. Fixed point theorems for ordered sets. Axiom of choice, Zorn's lemma and other equivalent formulations. Peano's axioms and models for the natural number system. Axioms for and construction of models of other number systems. A study of cardinal and ordinal numbers and their arithmetic.

Metric spaces, examples. A study of bounded, totally bounded compact and complete sets in metric spaces, Lipschitz and contraction map-

Topological spaces, examples. Open and closed sets, bases. A study of the concepts of continuity, compactness, connectedness and various separation axioms.

Prerequisites: The equivalent of Mathematics 200 and 2045, consent of instructor.

#### 305 Differential Geometry and Tensor Analysis, (not offered 1972-73), lect.: 2 hrs.

In differential geometry the properties of curves and surfaces are investigated by means of calculus. The subject has various relations to other fields of pure and applied mathematics; on the one hand differential geometry forms an essential part of physics and geometry (measurements of the earth's surface) and on the other hand it is very much connected with differential equations, the calculus of variation; etc. Its results are of a symmetric form and inspired generations of mathematicians for animated research. There are still sources available, which contain many precious ideas for further thought.

The class treats the topics; theory of curves, theory of surfaces, first and second fundamental form, foundations of tensor calculus, Gaussian and mean curvature, formulae of Weingarten and Gauss, curvature tensors. Christoffel symbols, geodesic curvature, geodesics, mappings, absolute differentiation and the displacement of Levi-Civita.

The class requires knowledge of matrics, determinants, the techniques of calculus, power series, some ordinary and partial differential

Prerequisite: Mathematics 200 and Mathematics

## 306 Probability, lect.: 3 hrs.; (not offered in

The class is intended to assist the student to acquire as thorough an understanding of basic concepts in probability as is compatible with his mathematical background and to illustrate the great variety of practical applications of probability.

The aim is not only to introduce probability and statistics but also to prepare the student for further study in these areas. The class should also serve to promote greater awareness and appreciation of the potential value of probability and statistics to science and industry.

The topics covered will include the following: Fundamentals and axioms, combinatorial probability, conditional probability and independence, binomial, Poisson and normal distributions, laws of large numbers and central limit theorem, generating functions, random walks, and recurrent events. Markov, chains, sampling from a finite population, derivation of X<sup>2</sup>. Students t- and f- distributions, estimation from samples, tests of hypotheses.

Prerequisite: Calculus to at least the level of Mathematics 200.

307 Theory of Numbers, (not offered 1972-73), lect.: 3 hrs.

Congruences and residues; elementary perties of congruences; linear congruen theorems of Fermat, Euler and Wilson; Chi remainder theorem; quadratic residues; la quadratic reciprocity; Legendre, Jacobi Kronecker symbols.

Arithmetic functions; Euler's functions de Möbiue function w(n); the function d(n)

Algebraic fields; algebraic numbers and inter uniqueness of fractorization, definition elementary proporties of ideals; ideal cla and class number.

Properties of binomial and Q - Binom coefficients.

Prerequisite: Consent of instructor.

#### 310 Mathematical Statistics

Random variables, distribution of random variables, discrete distributions, distributions, interval estimation, point e tion, sufficient statistics, maximum likeliho estimation, statistical hypotheses, likeliho ratio tests, regression and correlation, multive ate normal distribution, sequential analysis Prerequisite: Math 2075 (formerly 206B) or the

## 3115A and 3125B Differential Equations, leg

In any scientific or technological field there natural laws expressed by relations functions and their derivatives, such relation are called differential equations, Newton's of universal attraction, Kirchhoff's laws electricity, the law of natural growth and dea are examples of differential equations.

To answer questions of astronomy, p chemistry, engineering, biology, etc. the spel list must know how to obtain those function which satisfy the given natural law an particular requirements of the considered prolem. In this way are found for example. currents in an electrical network, the concent tion of a solution, the resistance of a beam. trajectory of a rocket, the number of bacter in a given culture, etc.

These classes contain a study of the elem theory of ordinary and partial diffe equations. Emphasis is given to basic m such as substitutions, operators, trans problems, the motion of a satellite, etc.

Math 3115A, given in the first term, co the topics differential equations of the order, Lapiace transforms, the second of linear differential equation.

Math 3125B, given in the second term, consists of ordinary differential equations and partial of orunal equations. The part of the class differential equations which the topics solution by series, special includes the topics solution by series, special includes, special of differential equations, functions, systems of differential equations, total differential equations. In the part of the class on partial differential equations the topics class on partial differential equations of the first and second order and problems of mathematical physics solved by Fourier series are included. 3115A is prerequisite for 3125B. Prerequisite: A knowledge of the topics of intermediate calculus as covered in Math 200 or

228. 320 Introduction to Numerical Analysis, lect.:

3 hrs

One aim of this class is to derive efficient methods for the numerical solution of problems from various branches of mathematics. The other, more important aim is to provide an understanding of these methods by using rigerous mathematical analysis: under what conditions does a particular algorithm work, and, perhaps even more essential, when and why does it fail to yield the desired results.

The class will cover the following topics: Iterative solution of nonlinear algebraic equations (and systems of such equations), direct and iterative methods for systems of linear algebraic equations, iterative methods for eigenvalue problems of matrices, linear approximation of functions (interpolation, least-squares approximation, Chebyshev approximation, approximation by spline functions), numerical differentiation and integration, linear difference equations, finite-difference methods for ordinary differential equations (initial-value problems and boundary-value problems).

Prerequisite: Mathematics 200 (or 250) or consent of instructor.

### 328 Applied Mathematics fo Engineers II, lect.:

The following topics will be discussed: First term:

a) Linear algebra: matrix theory, systems of inear algebraic equations (theory and numerical methods for solution), eigenvalue problems for matrices.

b) Linear ordinary differential equations: linear differential equations of order one and two, systems of linear first-order equations, reduction of higher-order equations to systems of first-order equations, applications.

c) Numerical solution of ordinary differential equations: one-step methods for a single equation and for systems of first-order equations, such as substitutions, operators, trans-solution by series. Various applications discussion of stability properties (absolute studied, e.g. most of the above mention stability, A-stability) of these methods, examples of multistep methods for first-order equations.

Second term:

Fourier series and integrals, orthogonal functions.

b) Linear partial differential equations of order two: model problems from mathematical physics (wave equation, heat equation, Laplace's and Poisson's equations).

c) Elementary probability and statistics.

equivalent class.

Students offering Mathematics 328 will not be given credit for Mathematics 300. Prerequisites: Mathematics 228 or 200, or

#### 330 Linear and Integer Programming with Application, lect.: 3 hrs.

Operations Research is the science concerned with the use of mathematical techniques and computers to solve business and economic problems. One of the most widely used of these techniques is called linear programming. It is a technique for helping management make optimal decisions when these decisions involve a large number of variables which are interrelated in variety of ways. In mathematical terms, a linear programming problem can be hrs. expressed as one of finding values for the decision variables which will maximize or minimize a linear function of these variables while, at the same time, satisfying certain technological constraints relating the variables. In the first part of this class, techniques for solving these problems both analytically and on a computer are presented. In addition, computational methods, for example are simplex and the dual method, are examined in detail and their efficiencies are compared.

The second part of the class is devoted to the development of particularly efficient techniques for solving special types of linear programming problems. As in the first part of the class the use of these techniques on the computer is illustrated. The special types of problems considered include transportation models, network models and multiperiod linear programming models. The final one third of the class is devoted to methods for solving the linear programming problem when, in addition to the technological constraint metioned above. the variables are restricted to being integers. As this is currently an area of very active research by many people in the Operations Research field, the techniques presented for solving these problems vary from year to year depending on recent developments.

Throughout the class, application of the various mathematical techniques to problems of finding economic optima in industrial operations will be stressed. Specific topics include applications to production scheduling sequencing, capital budgeting decisions, allocation of resources, and optimization in economics at the levels of the firm and the economy.

The mathematical prerequisites for this class are elementary. They include only a knowledge of basic matrix algebra and an understanding of elementary linear algebra, including the concept of a vector space and of a basis for a vector space. The main prerequisite is an ability to solve mathematical problems, particularly when

the solution requires a novel or ingenious approach.

#### 350 Introductory Analysis, lect.: 3 hrs.

The topology of Cartesian spaces: convergence (including a discussion lim inf, lim sup and summation procedures): continuity: sequences of continuous functions (including the Stone-Weierstrass and the Arzela-Ascoli Theorems): differentiation in  $R^p$ ,  $p \ge 1$ ; mapping theorems and extremum problems; integration; Riemann-Stieltjes integral; main theorems of integral calculus; integration in cartesian spaces; convergence of series of functions.

Students who intend to honour in mathematics or do graduate work in mathematics, should take this class, not math 300. Credit is given for only one of Math 300, and 350. Prerequisite: Math 2045, Math 200 or 250.

## 401 Measure Theory and Integration, lect.: 2

This class is a study of the theory of integration. The integral of elementary calculus turns out to lack certain desirable "continuity" properties which can be obtained by giving a different definition of the integral. An attempt is made to balance the constructive approach which treats the integral as a limit of approximating sums and the linear functional approach, which treat the integral as a generalized averaging process. A rudimentary knowledge of modern algebra, set theory and the theory of metric spaces is presupposed. The theory of integration is a careful blend of these theories and, hopefully, one gains some knowledge of the interplay of various mathematical structures from studying integration theory. The approach is abstract with sufficient examples given to provide motivation. After consideration of the theory of the integral in general, some study of the applications of the theory to other areas of mathematical interest will be made

#### 402 Theory of Functions of a Complex Variable, lect.: 2 hrs.

This is a first class in the theory of functions of a complex variable. In addition to having an elegant logical structure, the subject has many applications both in such fields of pure mathematics as real variable analysis and in such applied fields as physics and engineering, for example in electrical engineering, fluid flow and heat conduction.

The class studies the differential and integral calculus in the complex domain. It starts with the basic definitions and properties of complex numbers and studies the theory of functions of a complex variable as developed by d'Alembert, Euler, Gauss, Cauchy, Riemann, Weierstrass and

Some familiar functions are extended to the complex plane and used to illustrate the properties of more general functions.

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In the more analytic approach of Cauchy and Weierstrass we examine the properties of analytic (i.e. differentiable) functions. In particular we obtain the integral theorem and formulae of Cauchy and Taylor's development of a function as an infinite series (power series).

Also, we consider the approach of Riemann, representing the complex numbers (together with an ideal number ∞) as a sphere, studying the geometric properties of comples functions and generalizing the complex plane to Riemann surfaces to study many-valued functions.

Applications considered include using the theory of residues to evaluate real integrals. The theory is also applied to the study of harmonic functions, or potential functions.

Topics include: topology of the complex plane, integration, analytic functions. Cauchy's theorem, elementary functions, maximum modulus theorem, conformal mappling, power series, analytic continuation, Riemannn surfaces, Laurent series, theory of residues, meromophic functions, normal families, Riemann mapping theorem, harmonic functions.

Prerequisite: A knowledge of real variable analysis, preferably to the level of Mathematics

#### 403 Advanced Modern Algebra, lect.: 2 hrs.

This class will take up topics in modern algebra beyond the level of Mathematics 303; structure of groups, rings, modules, sums, products, tensor products, direct and universe limits of algebraic systems and then universal properties.

#### 405 Introduction to Algebraic Geometry,

Introduction to the basic concepts of algebraic geometry, starting from the classical point of view to the way in which algebraic geometry is done today. Many concrete examples will be studied. Some topics are: irreducible algebraic sets, the Zariski topology, affine varieties, pre varieties, dimension, spec, affine schemes, preschemes.

Text: Mumford's Introduction to Algebraic Geometry.

406 Statistical Inference, (not offered in 1972-73), lect. 2 hrs.

Sampling statistics are generally used to obtain information concerning the known group character of the population. Such generalization from sample to universe is the statistical inference. When we reach a conclusion by inference from sample data, we do so at the risk of being in error. This risk can be calculated numerically. It is the purpose of this class to describe methods which lead to valid inferences and to calculate the risk of error in those inferences. Several tests of hypothesis will also be derived regarding these inferences. Treatment will be of a mathematical nature. Students will be able to apply statistics completently in such fields as the social sciences, biological sciences and medical sciences. After

this class, every branch of statistics will be open for further study.

The topics covered will include the following: point estimation, consistent, sufficient, efficient and unbiased parameters, method of maximum likelihood, method of least square, method of moments, method of minimum x<sup>2</sup>, Minimum variance unbiased estimation, interval estimation, minimax and Bave's estimation, Nevman-Pearson's lemma composite hypotheses, goodness of fit tests, likelihood ratio tests, critical region, locally most powerful tests, nonparametric tests.

Prerequisites: Mathematics 200 and 306.

## 410 Decision Theory and Theory of Games,

In the last few years, statistics have been formulated as the science of decision-making under uncertainty. Decision theory applies to statistical problems the principles that a statistical procedure should be evaluated by its consequences in various circumstances. Wald extended this principle to all statistical prob-

Wald's model for decision theory is a special case of game theory. A game is characterized by a set of rules having certain formal structure, and governing the behaviour of certain groups. Chess and bridge are examples of this.

The central ideas and results of game theory and related decision-making models will be studied in this class: general decision problems, Bayes and minimax solution of decision problems, construction of Bayes decision rules, sequential decision estimation rules, empirical decision rules, and testing as aspects of decision theory, rectangular games, games in extensive forms, games with infinitely many strategies, continuous games, separable and cooperative games, zero sum and non zero sum in person

Prerequisite: Mathematics 306.

#### 412 Ordinary Differential Equations, (not offered 1972-73).

Ordinary differential equations in the real and complex domains. Successive Approximation Ascoli-Arzela Theorem existence and differentiability of solutions. Linear systems with constant and periodic coefficients. Analysis of singular points. Poincaré Bendixson theory perturbation theory, Sturm-Liouville theory and asumptotic expansions. Applications to physical, biological and economic problems. Prerequisite: Consent of the instructor.

#### 414 Functional Analysis, lect.: 2 hrs.

As in the case of linear algebra, the prime object of study is vector spaces but whereas linear algebra is devoted almost entirely to the study of finite dimensional spaces, functional analysis is concerned with infinite dimensional spaces. The chief examples of such spaces are spaces of functions, a typical one being the

space of all continuous functions defined the interval [0, I], and it is from this fact of the name functional analysis comes. Also linear algebra and mappings which importance are the linear ones. Unlike in algebra, however, the notion of distance plan crucial role, for example, in the function specific mentioned above the distance between h functions f and g is given by sup / f(x) - g(x)xe [0, 1], and hence the mappings which studied in functional analysis are the tinuous linear mappings.

Thus, functional analysis brings together gebra, analysis and topology and much of interest lies in the richness of the mathematic structures involved and the interplay between for example, the algebraic and the topologic notions. Though there is a good dea topology in the class, all that is required developed at the beginning.

#### Class Outlines:

- a) Topological introduction mainly devote to metric spaces.
- b) Vector spaces with a distance derived from "norm" inner product, i.e. Hilbert space.
- c) The properties of continuous linear fund tions from a normed vector space to the scalfield. The most important theorem here is the Hahn-Banach theorem.
- d) The geometric nature of some of consequences of the Hahn-Branch theorem.
- e) The properties of continuous linear fu tions from one normed vector space to another (the uniform boundedness principle and close graph theorem).

It should be pointed out that in (c) and (e) m only are continuous linear functions s "individually" but the space of "all" of them also an object of study.

f) Continuous linear functions from a normal vector space into itself are studied in detail This is sometimes given the name "special theory" and contains the theory of eigenvalue and diagonalization of matrices.

Prerequisite: The indispensable requirement for understanding this class are a thorough knowledge of linear algebra and real analysis.

## 421 Introduction to Partial Differential Imp

Classification, study and solution of different equations of applied mathematics. space, separation of variables and Liouville theory. Green's functions, eigenful tion expansions and generalized solution Fourier and Laplace transforms, Application to some problems in physics, chemistry and engineering.

Prerequisites: 2045 and 3125 or the consent the instructor

### 430 Optimal Control: Theory, Methods a Application, lect.: 3 hrs.

This class retraces the historical path in search for optimal solutions using technique from the differential calculus. During the fire

term the calculus of variations will be studied with particular emphasis on the sufficient conditions for optimality. The effects that this conditions that the developments in analysis can be seen by reading some of the earlier papers of this field. During the second term the class will study the modern treatment of optimality using the necessary conditions from optimal control the ory. Finally these theories will be applied to a variety of problems such as economic growth theory, inventory control, regulators in mechanics or electronics, as well as to the classical problems in geometry which gave rise to the whole topic.

prerequisite: Math 300 (or 350) or consent of

Suggested Texts: L. C. Young Calculus of Variations and Optimal Control Theory; R. Rellman and R. Kalaba Trends in Modern Control Theory.

#### Computer Science

I. H. Ahrens, Professor (N.S.T.C.) G. Finke, Assistant Professor (N.S.T.C.) W. Bitterlich, Lecturer (N.S.T.C.)

Classes in Computer Science are offered by personnel of the Nova Scotia Technical College. These classes are accepted for credit by both N.S.T.C. and Dalhousie. The following will be offered in 1972-73 on the Dalhousie Campus.

240 Introduction to Computer Science, lect.: 3

Comprehensive Fortran class with problems and applications. History of computation, number systems, coding. Description of computer systems: general structure, central processor, memory, peripherals. Introduction to machine codes with exercises in assembler programming. Data storage and elementary sorting. Application programs. Introductions to high-level languages: Algol, COBOL, APL, simulation languages. Interactive programming in Basic. Applications in numerical analysis and optimiz-

Prerequisite: Mathematics 100 or 110. An introductory class on the efficient use of digital

### 335 Data Processing, lect.: 3 hrs.

Review of Fortran. Basic concepts of data. Arrays, lists and strings. Storage allocation. Files management, updating, searching, merging and sorting. Report generators. Cobol programming with applications to payrolls, accounting, sales analysis, business statistics and inventory control. Simulation of industrial processes. Management games. Prerequisite: Mathematics 240 or Commerce

340 Computer Science, lect.: 3 hrs.

Algorithms. Basic concepts, single and multi precision arithmetic. Implementation of mathematical functions. Combinatorial and enumerative algorithms. Random number generation and transformations.

Data structures. Lists, strings, arrays and trees. Storage media and allocation. Symbol tables. Up-dating and searching. Core sorting algorithms and external sorting and merging.

Computer architecture. Operating systems. Batch processing, multi-programming and time-

Introduction to selected advanced topics: heuristic programming, learning algorithms, pattern recognition and picture processing. Elements of abstract languages and compilers. Prerequisite: Mathematics 240.

## 421 Introduction to Partial Differential Equa-

Classification, study and solution of differential equations of applied mathematics. Hilbert space, separation of variables and Sturm-Liouville theory. Green's functions, eigenfunction expansions and generalized solutions. Fourier and Laplace transforms. Applications to some problems in physics, chemistry and engineering.

Prerequisites: 2045 and 3125 or the consent of the instructor.

#### 430 Optimal Control: Theory, Methods and Applications, lect.: 3 hrs.

This class retraces the historical path in the search for optimal solutions using techniques from the differential calculus. During the first term the calculus of variations will be studied with particular emphasis on the sufficient conditions for optimality. The effects that this search had on the developments in analysis can be seen by reading some of the earlier papers of this field. During the second term the class will study the modern treatment of optimality using the necessary conditions from optimal control theory. Finally these theories will be applied to a variety of problems such as economic growth theory, inventory control, regulators in mechanics or electronics, as well as to the classical problems in geometry which gave rise to the whole topic.

Prerequisite: Math 300 (or 350) or consent of

Suggested texts: L. C. Young Calculus of Variations and Optimal Control Theory; R. Bellman and R. Kalaba Trends in Modern Control Theory.

#### **Graduate Studies**

Students who wish to work towards a Master's degree in Mathematics may do so in Arts and in Science, it being usually necessary to spend two full years after obtaining a B.A. or B.Sc. degree with a major in mathematics or one year after an honours degree. For details of such courses see the Calendar of the Faculty of Graduate

#### **Associate Professors**

R. D. Byham (Music History; Chairman to June 30, 1972)

V. A. Ellis (Music Education)

G. Karr (Bass)

D. F. Wilson (Music History)

#### **Assistant Professors**

D. M. Farrell (Music Theory)

J. F. Galish (Music Education)

H. P. May (Voice) R. F. Schutt (Piano)

A. G. Scott Savage (Voice)

J. E. Sorenson (Music History)

J. S. Tittle (Music Theory)

#### **Specialist Instructors\***

N. Babineau (String Class)

M. Ball (Percussion)

G. Bornoff (Strings)

I. Burchill (Organ)

C. Doane (Brass Class; Classroom Instruments)

H. Hrestak (Trumpet)

C. Hubley (Piano)

E. May (Piano)

A. Osborn (Music Theory)

S. Pedersen (Flute)

R. Phillips (French Horn)

E. Raum (Oboe)

R. Raum (Trombone) C. Wilcox (Clarinet)

\*Additional Instructors to be appointed.

Music, like science and other areas of learning, has become an immense field of specialized knowledge open only to those who have had a comprehensive musical education.

Similarly, music making in our contemporary society demands more than a mere technical command of voice or an instrument. For this reason, the music curriculum includes all of the essential elements of musical training - music theory, music history, performance.

Included in this curriculum is specialist instruction in all instruments and singing, a comprehensive training in music history and theory, emphasis in the performance of music in ensemble and in recital, and professional training in both instrumental and vocal music in the Bachelor of Music Education programme.

#### Concerts

Halifax is one of the centres of musical activity in Canada and many concerts and recitals are scheduled throughout the vear. Dalhousie University sponsors a series of performances by internationally known artists and ensembles as well as recitals and concerts by the Department of Music faculty, students and ensembles. The Atlantic Symphony presents its Halifax concerts in the New Dalhousie University Arts

The Department of Music sponsors a variety of

large and small ensembles, both vocal and instrumental, that are open to all qualified students in the University. Students wishing to participate in a music ensemble should contact the Department of Music.

#### Admission

Students who wish to enrol in a degree programme in the Department of Music must satisfy the requirements for admission to the Faculty of Arts and Science and must satisfy additional requirements in the Department of Music. Admission to the Department of Music is largely dependent on the results of an audition, with Faculty members of the Department of Music, in which the student is expected to demonstrate proficiency as an instrumental or vocal performer. Information regarding the required levels of proficiency may be obtained from the Department of Music. Early application for an audition is advised.

When making application for admission to the University, music applicants should request the supplementary application form for the Department of Music.

#### Degree Programmes

#### **Bachelor of Music Education**

The Bachelor of Music Education is a four-year programme with emphasis on the highest possible development of musicianship and professional training in the skills of teaching vocal and instrumental music. Students completing the Bachelor of Music Education degree receive a Nova Scotia Teacher's Certificate (Class 5).

The public schools of Halifax-Dartmouth have the largest concentration of music teachers east of Montreal. A close relationship has been established between these schools and Dalhousie which will give students an opportunity to be taught and supervised by music specialists in a variety of general music and instrumental music classes.

In order to ensure an adequate level of specialization within the field of music education, two areas of concentration are offered in the Bachelor of Music Education programme: General Music and Instrumental Music. Students whose background is a keyboard instrument or voice will normally elect the General Music concentration; students whose major instrument is in the area of brass, strings, woodwind, or percussion will normally elect the Instrumental Music concentration. These areas of concentration are not mutually exclusive. Depending on their qualifications and interests, students will be encouraged to participate in both areas of concentration.

#### Year I

- 1. Major Applied Study and Ensembles
- 2. Music 100
- 3. Music 210
- 4-5. Arts electives

- 6. Major Applied Study and Ensembles
- 7. Classroom Observation and Secondary Stu-
- 8. Music 310
- 9. Educational Psychology (Education 406)
- 10. Arts elective

#### Year III

- 11. Major Applied Study and Ensembles
- 12. Music 300
- 13. Music 410
- 14. Music 330 (General Music concentration or Music 332 (Instrumental Music concentration)
- 15. Secondary Studies\* and Music 335

#### Year IV

- 16. Major Applied Study and Ensembles
- 17. Secondary Studies\*
- 18. Music 435 or Music 436
- 19. Music 430 (General Music concentration) or Music 330 or Music 430 (Instrumental Music concentration)
- 20. Music 420A and Music Elective (B)
- 21. General Principles of Education (Education

\*The number, level and content of Secondary Studies are determined by the student's previous training and area of concentration.

#### General B.A. in Music

#### Year I

- 1. Major Applied Study with Ensembles
- 2. Music 100
- 3-5. Arts electives

- 6. Major Applied Study and Ensembles
- 7. Music 210
- 8-10. Arts electives

#### Year III

- 11. Music 310
- 12-13. Music electives (200 level or above)
- 14-15. Arts electives

Students wishing to take music as a secondary area of concentration may elect a minimum of three classes from the following: Music 105, 201, 210, 300, 310.

# B.A. with Honours in Music (major concentra-

#### Year I

Same as for General B.A. in music.

#### Years II, III, IV

Eight classes in music, 200 level or above, including Music 300, 310, 410, and at least two years of major applied study and ensembles: two classes in a minor field; five additional classes, normally in subjects other than the major and minor fields.

Students should consult with the Department of Music for programmes in combined or unconcentrated honours

#### Programmes of Study

### Music History and Literature

#### 100 Introduction to Musical Styles, lect.: 31

A comprehensive view of the present musian the world and of the history of music Western culture, with attention given to velopments in North America. Styles, for and composers are introduced through eleme ary analysis and guided listening to recomand live performances of music. aesthetic and philosophical frames of referen are considered. Open only to students who major field is music.

#### 105 Introduction to Music, lect.: 3 hrs.

Designed for students taking a General dem course in a field other than music introduction to the present musics of world, with emphasis on that of our Wester heritage. Special consideration is given to # listening experience with a view toward dev loping the capacity for understanding what being heard. The development of Western must is traced and attention is given to contemporar musical concerns, including jazz and musics non-Western cultures.

## and Relatives, lect.: 3 hrs.

A study of the music of today, including history of pop music, jazz and blues; evolution of rock; musical syntheses and crocultural influences; some technical, aesthet seminar: 2 hrs. and sociological considerations regarding of temporary music, popular and otherwise. Prerequisite: Music 100 or 105 or permission the instructor.

### 300 History of Music, lect.: 3 hrs.

A detailed study of the history of mu including the analysis of works of all historic periods.

Prerequisite: Music 100 and 310 or permission of the instructor.

#### 400 Music History, seminar: 2 hrs.

A study of selected topics in music history including individual research projects. Prerequisites: Music 300 and 310 or permission (Open only to students in Music Education) of the instructor.

#### Music Theory

#### 210A First-Year Theory (Modal Polyphony) lect.: 2 hrs.; lab.: 3 hrs.

Two- and Three-Part writing in strict Renal sance style correlated with introductory su singing, ear training and exploratory keyboal

Prerequisite: Students whose area of concentration tion is music: Successfully written examination in music rudiments at time of audition. Other Students: Private audition with instructor.

First-Year Theory (Elementary 2Jub Harmony. lect.: 2 hrs.; lab.: 3 hrs.

Four-part writing including the diatonic triads Four-particular reads and introductory modulation; sight-singing, ear training and keyboard. Prerequisite: 210A.

310A Second-Year Theory (Advanced harmony), lect.: 2 hrs.; lab.: 3 hrs.

survey of altered and complex chords, advanced modulation, and idiomatic figurations; thromatic sight-singing, four-part dictation and keyboard harmony for analysis. Prerequisite: 210B.

310B Second-Year Theory (Tonal Counteroint), lect.: 2 hrs.; lab.: 3 hrs.

Examination of traditional contrapuntal techniques applied to 18th and 19th century ounterpoint non-tonal singing, advanced dictation, and score reading at the keyboard. Prerequisite: 310A.

410 Theory of Music III, lect.: 2 hrs.; lab.: 3

A study of twentieth-century compositional techniques, including those of the recent 201 The Contemporary Scene: Rock, Its Room avant-garde; laboratory sessions in keyboard skills, sight-singing and ear training; also includes study in tonal counterpoint. Prerequisite: Music 310.

## 415 Seminar in Theory and Composition,

The study and analysis of representative examples of music of various periods with regard o both form and harmonic and contrapuntal styles. Students will be required to write sample compositions in each of the styles studied. Prerequisite: Music 300 and 310.

#### 420A Orchestration, lect.: 3 hrs.

The study of the properties of the individual instruments of the orchestra and methods of combining instruments in small combinations and full orchestra.

### Music Education

### <sup>235</sup> Classroom Observation

Supervised observation of selected classroom situations (2 credit hours).

330 Elementary Methods, lect.: 3 hrs.

A study of classroom techniques and materials or teaching using the Threshold of Music daptation of the Kodaly approach, the Orff nethod and other systems currently in use at the elementary level; the role of the music consultant in elementary education; profeslonal relationships; programme development.

Prerequisites: Music 100 and 310. Students should be able to deal with the musical problems encountered in vocal music in the public schools. They should also be able to sing in tune, and with good tone, and read vocal music, and should be familiar with the historical periods and styles of music.

#### 332 Instrumental Methods, lect.: 3 hrs.

A study of the techniques for teaching instrumental music, band and orchestra administration, rehearsal and conducting techniques, library management, programme building and class lessons. Students will be expected to compose and arrange music for beginning instrumental ensembles. Prerequisite: Music 310.

#### 335 Practice Teaching (General Music)

Supervised teaching in the public schools. (2 credit hours).

#### 430 Secondary Vocal Methods, lect.: 3 hrs.

An examination of the programme possibilities and teaching techniques for the general music class beyond the elementary level. Special emphasis will be placed on understanding and developing the musical interests and potentials of young adults.

Prerequisites: Same as Music 330.

#### 435 Practice Teaching (General Music)

Supervised teaching in the public schools. (4 credit hours).

#### 436 Practice Teaching (Instrumental Music)

Supervised teaching of instrumental music in the public schools.

#### Applied Music

#### Major Applied Study (5 credit hours)

Open only to students whose area of concentration is music. One hour of private instruction per week on the student's major applied instrument.

Prerequisites: Students will be admitted to the 100 level of applied music study upon successful completion of a performance audition. (Students who fail to meet the entrance requirements to the 100 level may be given the opportunity to make up the deficiency by enrolling in applied music study for no credit for a maximum of one year.) Students will be admitted to the 200, 300 and 400 levels upon successful completion of the next lower level and with the recommendation of the instructor.

All students who enrol in a major applied study are required to perform in student recitals annually.

Piano: 150, 250, 350, 400.

Harpsichord; 151, 251, 351, 451.

Organ; 152, 252, 352, 452.

Voice; 153, 253, 353, 453.

Violin; 155, 255, 355, 455.

Viola; 156, 256, 356, 456.

Cello; 157, 257, 357, 457.

Bass; 158, 258, 358, 458.

Flute: 160, 260, 360, 460. Oboe; 161, 261, 361, 461.

Clarinet: 162, 262, 362, 462.

Saxophone; 163, 263, 363, 463.

Bassoon: 164, 264, 364, 464.

Trumpet; 165, 265, 365, 465.

French Horn; 166, 266, 366, 466.

Trombone: 167, 267, 367, 467.

Percussion; 169, 269, 369, 469. Minor Applied Study (2 credit hours)

One-half hour of private instruction per week. Open only to students whose area of concentration is music.

Prerequisite: Permission of the Department of Music. Depending on the student's programme of study, an additional fee may be assessed.

Piano; 180, 280, 380, 480.

Harpsichord; 181, 281, 381, 481.

Organ; 182, 282, 382, 482.

Voice; 183, 283, 383, 483. Violin; 185, 285, 385, 485.

Viola: 186, 286, 386, 486.

Cello; 187, 287, 387, 487.

Bass; 188, 288, 388, 488. Flute; 190, 290, 390, 490.

Oboe; 191, 291, 391, 491.

Clarinet; 192, 292, 392, 492.

Saxophone; 193, 293, 393, 493.

Bassoon: 194, 294, 394, 494.

Trumpet; 195, 295, 395, 495.

French Horn; 196, 296, 396, 496.

Trombone: 197, 297, 397, 497.

Percussion; 199, 299, 399, 499.

Ensemble (1 credit hour)

Ensemble participation each year is a requirement of all students whose area of concentration is music. In addition to at least one large ensemble (Music 170, 171, 172), students will be expected to enrol in appropriate small ensembles as available.

Chorale; 170, 270.

Band; 171, 271.

Orchestra: 172, 272,

Vocal Ensemble; 175, 275.

Wind Ensemble; 176, 276.

String Ensemble; 177, 277.

Piano Ensemble; 178, 278.

#### **Secondary Studies**

Classes or private instruction for students in the Bachelor of Music Education programme, The specific classes and their sequence will be determined by the student's major applied study and the area of concentration. (2 credit hours each).

240, 340 Voice Class

241, 341, 441 Piano Skills

244, 344, 444 String Class

Class instruction on stringed instruments using the Bornoff method: 244, Violin; 344, Cello; 444, Viola and Bass.

246 Conducting

343 Choral Techniques and Repertoire Prerequisite: Music 153, 183, or 240.

345 Brass Class

346 Instrumental Conducting

348 Classroom Instruments

440B Vocal Pedagogy

May be registered for only with prior consent of the Department of Music.

445B Piano Pedagogy

May be registered for only with prior consent of the Department of Music.

446 Woodwind Class

447 Percussion Class

448 Recorder Class

#### Oceanography

Oceanography is a broad, inter-disciplinary science which 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 presently employed in Canada in a few universities and 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.

A good background in basic science is a necessary prerequisite, followed by specialization in oceanography at the graduate level. Dalhousie is one of three Canadian universities offering M.Sc. and Ph.D. programmes in this subject. However, properly prepared undergraduates are permitted to take one or more of the classes as electives. There are introductory classes which survey the entire field and advanced classes in each of the major specialties - physical and chemical oceanography, marine biology, and marine geology and geophysics. Further details about this programme are given in the Calendar of the Faculty of Graduate

### Philosophy

#### Professors

D. Braybrooke

I. A. Doull (Dept. of Classics)

F. H. Page

R. P. Puccetti (Chairman)

#### **Associate Professors**

R. D. Crouse (Dept. of Classics)

I. A. MacLennan

R. H. Vingoe

#### **Assistant Professors**

S. A. M. Burns

R. M. Campbell

W. F. Hare (Dept. of Education)

R. M. Martin

A. Rosenberg

Unlike some subjects, philosophy is not taught in high school. The new student can therefore safely assume that no previous knowledge is required as a prerequisite for the introductory class, Philosophy 100. Philosophy has concerned itself in the past with a number of traditional questions. For example, are men in any sense free, or are they merely conditioned and determined by their environment, heredity, etc.; Again, have men souls which might conceivably survive death, or is individual life merely an emergent quality of matter doomed to vanish with the dissolution of the body?

Then there are questions about the nature of knowledge. Are there some truths which can be proven to be true without relying on experience? Or is all our knowledge empirical? Does science require certain principles, like causality, which are more than inductive gen alizations from experience? Then there philosophical theology. Can any reasonal proof be given of God's existence? Final there are many problems of an ethical kind example, is there an absolute morality or are ethical standards relative to the society which they are practised, and the time wh they are practised? Related to these question are certain existentialist questions as to a meaning and purpose of life. How does one do with the problematic nature of human

The student may already realize that no fin dogmatic asnwer can be given to the questions. Nor need he be expected to endur set of formal lectures. It is the aim of all class of philosophy to proceed by class discussion As a result of continually discussing the ah questions, and many others like them the student will acquire a certain philosopha technique, which will be of great benefit him, whatever subject he may decide specialize in.

#### The Arrangement of the Classes

Students who are interested in taking a begin ning class in philosophy may take either Philosophy 100 or any class numbered in the 200's. These classes have no prerequisites and are open to freshmen and anyone else, with a without background in philosophy. This far makes it possible for students, including students in the first year of their university study to begin work in philosophy in different ways chosen to suit their present interests. However students intending to take 300-level classes should note that for these classes one or more of Philosophy 100 or Philosophy 200, 201 202 (the classes in logic) are prerequisites. The 400-level classes are normally open only fi advanced students in philosophy.

Of the classes open to beginners, Philosophi 100 gives a comprehensive introduction to philosophy: Several of the main branches philosophy are represented in the topics treated and the class is divided into sections small enough to give a good deal of practice, oral well as written, in basic philosophical skills of analysis and argumentation. Some attention given to important philosophical authors of the past, both ancient and modern; but Philosophi 100 is not a class in the history of philosophy-Philosophy 230 is; and students primarily interested in history and the history of idea may find this class the most inviting way 10 begin philosophy. Philosophy 200, 201, and 202, the classes in logic, are in one sense narrol by comparison, being devoted to one rather sharply defined branch of philosophy; however skill in this branch is an indispensable advantage in all advanced work in philosophy indispensable as, say, the calculus is in physical - so these classes, too, can be looked upon no only as introductions to philosophy, but also a direct entry-routes into the central concerns

dudents in this class will pursue in some detail Our topics, chosen from four of the chief branches of philosophy, and treated so as to the subject. The other 200-level classes are both illustrate basic principles of philosophical anaspecialized and less central. However, they are

addressed to interests that are uppermost in the

adolessor many students: religion, treated in

classes on the philosophy of religion,

philosophy 220 and 225; and questions, very

much like some of those raised by religion,

about the meaning of life and the present

appear and the present condition of man, treated in Philosophy 217

the Continental tradition of philosophy

known as "existentialism") and Philosophy 270

these questions and related ethical ques-

tions as they figure in great literature of the

19th and 20th centuries); and, finally, funda-

mental questions about the meaning and

purpose of education, treated in Philosophy

Degree Programmes

students are strongly urged to take at least one

of Philosophy 200, 201, 202, 305, and at least

one of Philosophy 230, 310, 319, 320, 335. All

students proposing to take a General degree in

philosophy should arrange their course in

consultation with Professor I. A. MacLennan.

Students intending to specialize in Philosophy

should take the honours course. It is the normal

preparation for graduate study in philosophy.

The honours course generally consists of ten

classes in philosophy, two classes in a minor

subject approved by the Department and four

elective classes in at least two subjects other

than philosophy. The ten philosophy classes in

an honours course must include: Philosophy

200 (or 201 or 202), 230, 305, 310, 320 and

one 400-level class. Philosophy 100 may be

included in the ten classes of the honours

course, if it was taken at the beginning of the

course. In addition, students taking honours in

philosophy must satisfy the regulations for the

first year of study for the General B.A. and also

the overall requirements for the General B.A.

Students intending to take honours in philoso-

phy should arrange their course in consultation

There are several combined honours pro-

or other combinations that can be arranged.

Students interested in taking any of these

combined honours programmes should consult

100 An Introduction to Philosophy, 3 discus-

Sion meetings weekly, D. Braybrooke, S. A. M.

Burns, R. M. Campbell, W. F. Hare, R. P. Puc-

with Professor I. A. MacLennan.

Philosophy and Economics

Philosophy and Psychology

Philosophy and Sociology

with Professor I. A. MacLennan.

cetti, A. Rosenberg, R. H. Vingoe.

Philosophy and English

Combined Honours

grammes:

General B.A. in Philosophy

B.A. With Honours in Philosophy

lysis, as well as some of the major historical contributions to philosophy. The four topics, taken up in an order varying with different sections, are:

(1) arguments for and against the existence of God:

(2) ethics and political obligation;

(3) the mind-body problem;

(4) the varieties of explanation.

The professors assigned to the class will specialize on one or another of these topics; and every section will be taught, in turn, by four different professors, as the section changes from one topic to another. Plato, Anselm, Aguinas, Descartes, and Hume are among the historical authors to be studied.

The department of philosophy has assigned an extraordinarily large proportion of faculty time to this class so that it can be carried on wholly in small sections limited each to 30 students; even so, the number of sections, and hence the total enrolment in the class, must be limited. Only students who value the chance of continuous discussion in a small group highly enough to commit themselves to continuous attendance should enrol in Philosophy 100.

Students who do not attend or who attend but indicate that they have not done the assigned reading will be marked absent; any student who is absent more than twice during any six week period without an acceptable excuse will be referred to the Committee on Studies of the Faculty of Arts and Science with the recommendation that he be dropped from the class.

200 Symbolic Logic, lect.: 3 hrs.; I. A.

This class is designed as an introduction to the techniques of symbolic logic. It will not require any previous knowledge of the subject. Although symbolic logic in this class will be related to natural language, the emphasis will be on the systems themselves, each of which will be mastered as though it were a game played with pencil and paper. Because many students find this kind of study to be quite new in their academic career, there will be a great deal of practice until every member of the class can do relatively simple problems. The first term will be devoted to the development of natural deduction, extended to cover the theory of descriptions and identity. In the second term an attempt will be made to relate symbolic logic to the foundations of mathematics. There will be less stress on technique and more time spent on the philosophical implications of symbolic logic and the mathematics of which it is the foundation.

Text: MacLennan, I. A., Structure-generating

201 Logical Forms of Argument, lect. with discussion: 3 hrs.; R. M. Campbell.

This class teaches the application of symbolic logic to arguments expressed in natural language, as in philosophy, science, ethics, law and politics. Its principal aim is to develop the

student's capacity to analyze the logical structure of such arguments so that he can better assess their validity. Unlike Philosophy 202, this class deals extensively with formal manipulations within a logical system. Unlike Philosophy 200, symbolic logic will not be studied for its own sake, or for its relevance to the foundations of mathematics. No previous acquaintance with symbolic logic is presupposed.

202 Basic Principles of Reasoning, discussions:

The issues that the subject of logic raises are for the most part issues that in the end can be decided precisely only by the use of carefully managed symbolisms. But a great deal of applied logic can be mastered without the use of symbolisms. This class will aproach logic mainly through its non-formal applications. It will study the general nature of problemsolving; language and meaning; the theory of terms; the theory of definition; and inference. The last-named subject, too, will be first treated with a minimum use of symbolism; and a good deal of attention will be given throughout the year to informal fallacies. During the last six weeks of the class, however, a brief survey will be made of the techniques of modern symbolic logic, with a view to appreciating the distinction between the predicate calculus and the propositional calculus and the range of both.

Texts: Leonard, Principles of Reasoning, and a brief textbook on symbolic logic.

May be registered for only with the prior consent of the department.

217 Existentialism, lect.: 2 hrs.; I. A. Mac-

The aim of this class is to study the works of four major philosophers in the existentialist tradition. The first term and part of the second will be devoted to the works of Kierkegaard and Nietzsche. The remaining time will then be devoted more or less equally to the works of Sartre and Heidegger.

218 Philosophy of Education, lect.: 2 hrs.; W.

(a) In the first term an attempt is made to analyse some of the crucial concepts in educational theory. What is teaching, and is it distinct from training, conditioning and indoctrination? Certain slogans in educational theory, e.g. "We teach children not subjects", and "there's no teaching without learning" are carefully examined. How is education distinct from teaching, and is it possible to identify criteria which a process must satisfy if it is to be considered educational? Is there any conceptual connection between the idea of teaching and that of

These are the kinds of issues discussed though the specific direction depends a good deal on (b) In the second term the class focuses on philosophical issues concerning curriculum. For example: Is it meaningful/useful to base a curriculum in schools on needs and/or interests? What is involved in the claim that a curriculum should be relevant? Are there any educational arguments in favour of a broad curriculum? How are we to assess curriculum goals such as creativity, mental health? An attempt is made to demonstrate the importance of analysis of the fundamental concepts involved in such issues.

## 220 Philosophy of Religion I, lect.: 2 hrs.; F. H. Page

This class gives an introduction to the philosophy of religion. The identification and classification of religious concepts, and the uses of religious language, are first discussed. The theistic arguments and counter-arguments are examined and the epistemological status of divine revelation, religious experience and religious faith is investigated. Other topics include the problem of evil, immortality, the relation of science to religion and the religious alternatives to theism.

Texts: W. P. Alston, Religious Belief and Philosophical Understanding: Readings in the Philosophy of Religion, (N.Y.: Harcourt, Brace and World, Inc., 1963); N. Pike (ed.), God and Evil: Reading on the Theological Problem of Evil, paperback, Contemporary Perspective in Philosophy Series, (Englewood Cliffs, N.J.: Prentice-Hall Inc. 1964); J. Hick. Philosophy of Religion, paperback, Foundation of Philosophy Series, (Englewood Cliffs, N.J.: Prentice-Hall Inc. 1966); W. C. Smith, The Meaning and End of Religion: A New Approach to the Religious Traditions of Mankind, Mentor paperback, (N.Y.: The Macmillan Company, 1964); N. Smart, Philosophers and Religious Truth, S. C. M. paperback, (London: S. C. M. Press, 1964).

# 225 Philosophy of Religion II, (offered in 1971-72 and alternate years), lect.: 2 hrs.; F. H. Page

An Introduction is given to the contemporary psychology of religion. The class begins with an examination of psychological accounts of religion, particularly the Freudian. The psychology of the moral conscience and the development of religious forms of behaviour through the life-history of the individual are discussed. Conversion, prayer, ritual, worship and mystical experience are considered in the light of current theories of learning, motivation and personality.

Texts: W. H. Clark, The Psychology of Religion: An Introduction to Religious Experience and Behaviour, (N.Y.: The Macmillan Company, 1958); Sigmund Freud; The Future of an Illusion, Anchor Paperback, (Garden City, N.J.: Doubleday and Co., Inc., 1964); Gordon Allport, The Individual and His Religion, Macmillan Paperbacks, (N.Y.: The Macmillan Co., 1960); R. S. Lee; Freud and Christianity, Pelican paperback, (Harmondsworth: Penguin

Books 1967); Michael Argle, Religious Behaviour, (London: Routledge and Kegan Paul, 1961); R. H. Thouless, An Introduction to the Psychology of Religion, C. U. P. paperback (London; Cambridge University Press, 1965); William James, The Varieties of Religious Experience, Collier paperback, (N.Y.; Collier Books).

## 230 General History of Philosophy, lect.: and seminar: 2 hrs.; R. H. Vingoe

The purpose of this class is to help students discover those philosophic traditions which have played a part in moulding western civilisation and still persist in the contemporary world. Since the field of study is large, an attempt will be made to concentrate upon some of the greatest and most influential of western philosophers. Since a general history is apt to degenerate into vague and inaccurate generalisations, students will be asked to present short papers outlining and evaluating some parts of a given philosopher's writings.

Texts: B. Russell, History of Western Philosophy, (Allen and Unwin, Ltd., London, 1961); K. E. Eble, R. E. Helbling (eds.), The Intellectual Tradition of the West, Vols. I and II, (Scott, Foresman and Co., Glenview, Illinois 60025, 1967); D. J. O'Connor (ed.), A Critical History of Western Philosophy, Collier-Macmillan Canada Ltd., Toronto, 1964).

## 270 Philosophy in Literature, lect. and discussion: 2 hrs., R. M. Martin

Many important works of Literature contain much philosophical material. Sometimes, in fact, the reader cannot fully appreciate these works unless he has an understanding of the philosophical traditions and issues involved. This class is designed for two sorts of students: those with literary interests who wish to learn about and discuss the philosophical issues raised in several modern important literary works and those who are students of philosophy and who would like to investigate literary occurences of philosophical ideas. Readings will include short works of Dostoyevski, Sartre, Camus, Conrad, Nietzsche, Peter Weiss, Beckett, Hemingway, Hesse and Brecht.

#### 305 Epistemology, lect. with discussion: 2 hrs.

An introduction to issues in the theory of knowledge, especially those which cast light on the conceptual aspects of the social and natural sciences. Among the issues normally treated are: the philosophical analysis of the concept of knowledge: perception and its relation to knowledge (and especially the claims of empiricism): the logical problem of induction: other minds and the relation between psychological and physical language. Questions to be raised include: Does knowledge have foundations, and if so, is the basis of knowledge to be found exlusively in perceptual experience? Are any non-deductive inferences justified, and more particularly what ground is there to believe the claims of science if the evidence for these claims is always formally incomple. What evidential relation obtains between claimabout persons' behavior and claims about the beliefs, emotions, and other mental state Readings will consist mainly of the work contemporary authors.

Prerequisite: Philosophy 100 or 200 or 201 202 and consent of the Department.

## 310 Ethics, lect. with discussion: 2 hrs.; R. Campbell

A systematic discussion of traditional topics moral philosophy: the nature of pleasure a happiness, psychological and ethical egois Kant's Categorical Imperative, Hume on me belief and argument, utilitarianism, moral rule and justice. The class will consider the relation of these topics to some contemporary prelems, such as pacifism and the morality induced abortion.

Prerequisite: Philosophy 100 or 200 or 201 202.

## 319 Descartes and the Search for Indubital Knowledge, seminar: 2 hrs.; R. H. Vingoe

This seminar will highlight one extreme influential line of thought: philosophers has often sought indubitable knowledge. In the search Descartes is quite important because a position marks a radical break with anciental medieval thought and because this break made epistemology the main preoccupation modern philosophy. The first half of the day will consequently be devoted to Descartes. The second half will range beyond Descartes (e.e. Hume, Moore, and Ryle) to consider alternative sources of indubitable knowledge, e.g., sense experience, self-awareness, logic, and commissense. Students will be expected to present short papers.

Prerequisite: Philosophy 100 or 200 or 201 202.

Texts: R. M. Eaton (ed.), Descartes, Selection (Charles Scribner's Sons, 1969); J. R. Weinbe and K. E. Yandell, Theory of Knowleds (Holt, Rinehart and Winston, 1971).

# 320 The Philosophy of Hume and Kal (offered 1972-73 and alternate years), seminal 2 hrs.; A. Rosenberg.

A close study of Hume's Treatise of Hume Nature, Book 1, and Kant's Criticue of Pun Reason, disclosing parallel problems and ternative responses to them in these works. The class will also consider the accounts of some contemporary commentators, and the relevant of these two classics to present philosophic concerns.

Prerequisite: Philosophy 100 or 200 or  $201^{\circ}$  202

# 332 Twentieth-Century British Philosophi (not given in 1972-73), lect. and seminations.; S. A. M. Burns.

This class surveys the development of "Anglo-Saxon Tradition" in metaphysics

epistemology from the influence of Frege on Russell and Wittgenstein to recent conceptual analysis.

Philosophy 100 or 200 or 201 or prerequisite:

335 Greek Philosophy from Thales to Aristotle, lect. and discussion: 2 hrs.; S. A. M. Burns

The beginning of Western philosophy is studied in the Presocratic fragments, major works of Plate and Aristotle's Organon.

Plato and Alistote's Organon.

Prerequisite: Philosophy 100 or 200 or 201 or

336 Ancient Philosophy from Aristotle to St. Augustine. lect.: 2 hrs.; R. D. Crouse/J. A.

This class studies the development of Classical and Patristic thought from Aristotle to St. Augustine, with concern to explore the manner in which the philosophical achievement of ancient Greece came to form, in the thought of the Church Fathers, the intellectual foundation of European culture. Works most closely considered will be Plato's Timaeus, parts of Aristotle's Metaphysics, parts of Plotinus' Enneads, and St. Augustine's City of God and De Trinitate.

Prerequisite: Philosophy 100 or 200 or 201 or 202.

## 338 History of Medieval Philosophy, lect.: 2 hrs.; R. D. Crouse.

A study is made of the development of philosophy in the formative age of European civilization, with attention given to related political, institutional, literary and theological concerns. The authors studied most closely will be Boethius, Anselm of Canterbury, Thomas Aquinas, some thirteenth-century Augustinians and Averroists, Ockham, and one or more of the Late Medieval Mystics. The class will be conducted partly as a seminar, partly as a course of lectures.

Prerequisite: Philosophy 100 or 200 or 201 or 202

## 346 Problems of Mind, seminar: 2 hrs.; R. P. Puccetti

These traditional problems of mind will be explored; (1) How are a person's corresponding mental and physical states related? Is the concept of a person, and particularly of his mental states, exhaused by descriptions of his behaviour? Or by descriptions of changes in certain parts of his nervous system? Or does the oncept of a person require reference to a third ntity, over and above his mental and physical lates? (2) What kinds of entities might possibly ount as persons other than human persons? ould machines do so? Could organic artifacts? <sup>ould</sup> non-material entities? How are we to nake decisions about the application of mental personal concepts to non-human entities? In view of and depending upon our answers the above questions, what chance is there of personal survival of bodily death either in desembodied or resurrected form?

Prerequisite Philosophy 100 or 200 or 201 or 202.

## 347B Freedom and Responsibility, lect. and discussion: 2 hrs.; W. F. Hare.

The purpose of this class is to examine philosophically issues which are significant in many disciplines, such as psychology, law and education. For example, what is meant by saying that a person has a responsibility to do something? And what is a person requiring when he asks to be given more responsibility? If there is a difference here, is it to be explained in terms of the freedom the agent has in acting? But perhaps the possibility is undermined by arguments which purport to show that a person has no freedom to choose his actions? And then in what sense can a person be held responsible for his actions?

Readings will include recent articles by such authors and Pennock, Frankena and Hart, and certain papers in Sidney Hook, ed. *Determinism and Freedom* ed. Sidney Hook (Collier Books, New York, 1961), B. Berofsky, ed. *Free Will and Determinism* (Harper and Row, New York, 1966).

Prerequisite: Philosophy 100 or 200 or 201 or 202.

## 351A Philosophy of the Social Sciences, seminar: 2 hrs.; A. Rosenberg.

The chief topics to be treated in this class are the nature of explanation according to Popper and Hempel; the problem (or so-called problem) of induction; the hypothetico-deductive method; the nature of axiomatized theories; the differences between behaviour(al)ism and theories of action; the fact/value distinction; and *Ideologiekritik*. Illustrations will be drawn chiefly from political science and the course will be conducted jointly with Political Science 351A.

Prerequisite: Philosophy 100 or 200 or 201 or 202. A previous class in epistemology (Philosophy 305) would be helpful.

# Philosophy 355B Marxism Theory and its Upshot in the World Today, discussion twice weekly: 2 hrs.; D. Braybrooke.

The philosophical origins of Marx's thought and his nature economic doctrines will be explored with the effect of demonstrating the determinative role of his concept of alienation, the basis not only of his concept of ideology and theory of class confluct, but also of his attitude toward comprehensive participant planning. The class will also consider the fate of Marx's doctrines in the face of the apparent failure of his leading predictions about the future career of the economic system and liberal government in advance capitalist countries.

Prerequisite: Philosophy 100 or 200 or 201 or 202.

385 Metaphysics, lect. and seminar: 2 hrs.; S. A. M. Burns

This class will study some primary philosophical questions about the nature of substance and change, space and time, cause and effect, and (self-)identity.

Prerequisite: Philosophy 100 or 200 or 201 or 202.

## 403 Advanced Symbolic Logic, lect.: 3 hrs. I. A. MacLennan.

This class is a continuation of the work done in Philosophy 200 or 201. The main purpose of the class is to show how modern symbolic logic enables us to provide formal proofs of the fundamental formulas of classical mathematics. It will be helpful (though not necessary), if students have not only a background in high school algebra and the elementary functions, but also some understanding of the differential and integral calculus. Among the topics covered will be general set theory, the theory of cardinal numbers, the real number system, limits and the differential and integral calculus. A great deal of the time will be used to develop skill in the formal manipulation of logical and mathematical structures. As stated above, the aim is to apply symbolic logic to those branches of mathematics which are of immediate practical use in physics and engineering. However, in the second term some lectures will be devoted to philosophical aspects of logic and mathematics.

Prerequisite: Philosophy 200 or 201.

## Text: I. A. MacLennan, Structure-generating Games

431A Introduction to the Philosophy of Wittgenstein (not given in 1972-73), seminar: 2 hrs.; S. A. M. Burns

Central topics in the *Tractatus Logico-Philoso*phicus and the *Philosophical Investigations* will be examined. The relationship between the earlier and the later work, and Wittgenstein's influence on contemporary philosophy will also be discussed.

Prerequisite: normally a class in logic, and some work beyond the 200 level in philosophy of language, language, philosophy of mind, epistemology or metaphysics (in, e.g., Plato, Aristotle, Leibniz or Kant).

# 445 Philosophy, Politics, and Economics, seminar 2 hrs., See also Political Science 449 and Economics 445.

The central concern of this class is the application to political choices of economic reasoning, taken as a source of both descriptive and normative theory. Dahl and Lindblom's well-known book, *Politics, Economics, and Welfare*, will be discussed as an illustration of complementarity between the concepts and concerns of economics and those of other social sciences; and also as a means of defining the present position of the issue between socialism and capitalism. The class will study the formal theory of voting as treated by such economists as Arrow, Black, Buchanan and Tullock, as well as by Riker, Murakami and Farquharson. It will

give some attention to Downs' economic theory of party competition and to the theory of games (as applied to voting and to party competition). A number of important Philosophical lessons for the analysis of concepts as important to ethics as self-interest, rationality (personal and collective), human welfare, utilitarianism, and justice can be drawn from this discussion; and several philosophical authors will be studied among them Baier, Rawls, Rescher, and possibly Braybrooke.

In 1972-73, the class will be preoccupied with Rawls' recent book A Theory of Justice.

Prerequisites: Students taking this class should ideally have had previous classes in all three subjects; but it will suffice for them to have worked to 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 (200 or 201 or 202) and one in ethics (310); students taking the class for a credit in Political Science should have had at least one 300-level class in Political Science (315A and 355B are recommended); students taking the class for credit in economics should have had at least one 300-level class in that

450 Philosophy of Language, seminar: 2 hrs.; R. M. Martin.

Questions such as the following will be discussed, What is a language? Is having a language essential to being rational? Is language necessarily a public phenomenon? The elements of language have meaning, but what is the meaning of meaning? Various theories of meaning will be considered.

Prerequisite: Philosophy 100 or a logic class (200 or 201 or 202) and at least one class in Ethics, Epistemology, or Twentieth-Century philosophy; or by permission of instructor.

#### 460 Contemporary Philosophy of Religion, seminar: 2 hrs.; F. H. Page

Topics discussed in recent years include: the verifiability question, the uses of religious language, analogical predication, revelation and epistemology, mysticism and philosophy, existentialism and faith, process-philosophy and theism, secular and sacred myths. Variations from year to year are customary in line with the interests of the participants.

Prerequisite: Primarily for graduate students but seniors concentrating on philosophy may be admitted at the discretion of the instructor. A considerable background in philosophy is presupposed.

Texts: The reading consists mainly of journal articles, but a few very recent books are often included. The selection varies with the interests expressed by the participants and is agreed upon after the first meeting or two of the

465B Philosophy of Science, seminar 2 hrs.; A. Rosenberg.

An analysis of concepts which apply to scientific practice generally. The class considers alternative accounts of such concepts as explanation theory, model, law and confirmation, which are important for an understanding of both the natural and social sciences. The views of Carnap, Hempel, Nagel, Braithwaite, Feyerabend, Hanson, Dray, and Kuhn will be can-

Prerequisite: Normally Philosophy 305 and 200 or 201 or 202.

### Physics

#### **Professors**

W. J. Archibald

E. W. Guptill

C. K. Hoyt (Acting Chairman, 1971-72)

M. J. Keen (Oceanography and Chairman of Department of Geology)

G. F. O. Langstroth (Dean of Faculty of Graduate Studies)

#### **Associate Professors**

M. G. Calkin

D. J. W. Geldart

M. H. Jericho

R. D. Hyndman (Oceanography)

D. B. I. Kiang

C. R. Mann (Oceanography)

R. H. March (Chairman) (on leave 1971-72)

G. T. Meaden

R. Ravindra

#### **Assistant Professors**

B. L. Blackford

I. G. Cordes

D. F. Goble

W. Leiper

R. Overstreet (Oceanography)

B. E. Paton

P. H. Reynolds

A. M. Simpson

C. G. White

#### Killam Postdoctoral Fellow D. A. Tindall

### **Postdoctoral Fellows**

P. Jena

T. Kawai

K. Morita

B. Pass

### **MacGregor Teaching Fellow**

J. C. H. Chiu

Physics in the broadest sense concerns itself with the way in which matter behaves and with the interaction between matter and energy in its different forms. It is an experimental science, which implies that the ultimate truth or falseness of a physical theory is to be determined by whether the theory is in agreement with experimental facts. The language in which these theories are expressed is 1. Chemistry 110. mathematics. Students wishing to become pro- 2. Mathematics 100. fessional physicists engaged in original research 3. Physics 110. or in university teaching will normally undertake further study leading to the advanced 5. Arts elective.

degrees of M.Sc. and Ph.D. upon complex the honours B.Sc. course.

In order to study the different interact which occur between matter and energy subject is conventionally divided into topics as mechanics, heat, light, electricity magnetism. But these are not mutually clusive categories. The fundamental ph processes occurring are common to several topics, particularly when viewed in the lied our modern understanding of physical proces at the atomic level. The first year n classes at Dalhousie are designed to g introduction to the subject which in these modern ideas and brings out the up lying unity of approach to seemingly dis physical situations. Students not concentrate in a physical science and who do not intentake further classes in physics will norm take Physics 100. Those who are concentrate in a physical science or who intend to further physics classes will usually take Physics 110. The subject matter of the two classes essentially the same, but Physics 110 emple more sophisticated mathematical technique thereby laying the foundations for mo advanced study.

topics mentioned above within the framework of modern ideas of the nature of physic establishes a connection between the them unless exceptional circumstances arise. tical and mathematical ideas of the lectures at fourth years the student is encouraged to selecting suitable classes from amongst the electives available.

#### Degree Programmes

#### General B.Sc. in Physics

A candidate for this degree must satisfy all the general requirements. He will take Physic 110 in the first year, in the subsequent two years, he may take as many as five class chosen from Physics 221, 222, 230, 250, 315 320 and 335. It is recommended that # second subject be mathematics because man physics classes have mathematics classes 48 prerequisite. Details of these prerequisites at given under the individual class listings.

#### B.Sc. with Honours in Physics

All students who intend to take a B.Sc. Honours in Physics are encouraged to d their programme with staff members of department and to consult with the Chairman of the Department at the beginning of the second year.

4. Arts or Science elective.

Science elective. o. State of the Two mathematics classes. 7-8. Physics 211 and 231.

11. Arts or Science elective. 12. Class in Mathematics. 12. Physics 300 and two other physics

16. Arts, science or mathematics elective. 17.20. Four physics classes at the 400 level, one of which will normally be Physics 400.

### Combined Honours

Students may take a combined honours course in physics and another subject. They should, however, bear in mind that the work in either subject would probably be insufficient for admission to a regular graduate programme. A qualifying year would usually be necessary.

#### Classes Offered

100 General Physics, lect.: 3 hrs.; problem session: 3 hrs.; C. G. White, W. J. Archibald

In later years students proceed to develop to This is a survey class requiring no previous preparation in physics, and offered primarily for students in arts, pre-medicine, pre-dentistry, reality. An important part of the course ear and pharmacy. It will not normally be accepted year after the first is the laboratory work which as a prerequisite to advanced classes in physics

the world of physical reality. In the third and The class surveys physics from its beginnings to the present day. The four major topics are: follow his own interests as much as possible Newtonian mechanics (motion, force, mass, both by designing and carrying out experiment momentum, energy); electromagnetism (charge, of his own choosing in the laboratory and be electric and magnetic forces and fields); relativity (space, time, mass, energy); quantum theory (elementary particles, atoms, causality and chance).

> The major topics are dealt with mainly in historical sequence. To a large extent the ideas in later topics are built on the ideas presented in earlier topics. This means that the understanding of later topics depends on the understanding of earlier topics. Thus, the four major topics mentioned are not at all isolated from each other, but are rather closely inter-related.

Throughout the class, mathematics is used as a language for expressing the basic ideas of hysics and also for deductive reasoning from these basic ideas. The mathematics used is not advance of high school algebra and trigonomentry, but some time is spent in the class developing greater facility with high school mathematics. It must be stressed that mathenatical formulae are not used simply for plugging in" numbers; rather, the emphasis is aced on a thorough understanding of the meaning and range of applicability of the ormulae.

A large part of the class consists of developing understanding of physical principles through specific problems. For this reason, there is a 3 hour session each week during which students to problems with the assistance, when required, do problems with the assistance, when required, problems are linked closely to the lecture material, and sometimes extend the subject matter of the lectures. The problem sessions are conducted informally and students are free to discuss the problems with each other as they work. There are no laboratory experiments in this class.

Text: K. R. Atkins, Physics, 2nd, ed., Wiley,

110 General Physics, lect.: 3 hrs. (2 sections); tutorial: 3 hrs.; E. W. Guptill, D. Kiang

This class introduces the student to the elementary physical laws of our universe and the way in which these laws are used to forecast such natural events as the flight of a projectile, the relativistic variation of mass, the flow of electrical current in a circuit, etc. Newton's laws, for example, are stated and then one proceeds by asking "what do these laws say about the position of a projectile after a certain time has elapsed?" Intuitive reasoning or educated guessing is eliminated. Reasoning of this kind requires more sophisticated mathematics than one normally uses in high school and consequently a considerable fraction of the first few weeks of lectures is used introducing such topics as differential and integral calculus.

Throughout the year students will have an opportunity to assess their progress by the results of weekly quizzes which are given during afternoon tutorials. These tutorials replace the conventional laboratory work and give the student ample time to discuss his problems with the tutor. Most of the experimental work is confined to lecture room demonstrations.

Students beginning this class should be familiar with trigonometry, the solution of quadratic equations, binomial expansions and should now be prepared to start differential and integral calculus. Previous work in physics is not

Text: F. Beuche, Introduction to Physics for Scientists and Engineers, McGraw-Hill, 1969.

211 Mechanics. lect.: 3 hrs; lab.: 3 hours.; C. G.

The class is divided into 2 parts: mechanics and wave motion. The first part deals with: basic vector mathematics and its application to physics, Newton's laws of motion and the description of motion in unaccelerated reference frames; the two principles of special relativity and their use in describing space and time intervals in unaccelerated reference and Modern Physics, McGraw-Hill, 1968. frames; conservation of energy and momentum from both the classical and relativistic view point. The last topic in the first part of the class is harmonic oscillation, which provides an introduction to the second part, wave motion. In the study of wave motion, examples are taken from many branches of physics: mechanics, electro-magnetism, quantum theory. Fourier analysis of wave packets and pulse's will and nuclear radiations are explained and the

be included. The laboratory work for Physics 211 is run jointly with that for Physics 231.

Prerequisite: This class is restricted to those intending to work towards an Honours degree in Physics or towards a B.Sc. in Engineering Physics. To this end, the approval of the Chairman of the Department, and of the instructor, must be obtained.

Students must have taken Physics 110 and Mathematics 100. This class will normally be taken concurrently with Physics 231. It is assumed that students are familiar with elementary mechanics and the concepts of work, energy and momentum as developed in Physics 110; and with the application of simple integral and differential calculus to the solution of physical problems.

Text: Berkeley Physics Course, Vol. 1 Mechanics, McGraw-Hill, 1965; Berkeley Physics Course, Vol. 3 Waves and Oscillations, McGraw-

221 Waves and Modern Physics, lect.: 3 hrs.; lab.: 3 hrs.; C. K. Hoyt

This class is intended mainly for those who do not plan to take honours physics but who wish to learn more about 20th century physics than is possible at the first year level.

Waves are studied first, since their properties and the terminology used in connection with them have an important relationship to much of modern physics. Wave equations are deduced both for mechanical and for light waves, and it is shown how all the various wave properties can be derived and used.

The central role played by light in forcing a revision of 19th century ideas is brought out. The resulting relativity and quantum theories are applied first to simple idealized situations, and then to more realistic ones in discussions of the hydrogen atom, the structure of atoms and molecules, and the statistical properties of large assemblies of molecules. The necessity of using the newer theories will be apparent by the existence of phenomena which cannot be explained by the older ones.

Finally, the world of sub-atomic particles will be explored to show how the experimental facts are still compelling physicists to revise their conception of nature.

Prerequisite: Physics 110, Mathematics 100. Students are expected to be familiar with calculus, complex exponential functions, simple harmonic motion, and the simpler aspects of special relativity.

Text: H. D. Young, Fundamentals of Optics

222 Radiation and Environmental Physics, lect.: 2 hrs.; lab.: 3 hrs. per week for a maximum of 10 weeks; plus demonstrations, visits and films as arranged. W. Leiper.

This is a physics class which does not involve the use of calculus. The properties of atomic

class also covers radiation detectors, applications of radiation in health physics, pollution monitoring, agriculture, rock-dating, etc.

The major radiation hazards to the environment are nuclear reactors and H-bombs, and their construction, properties and effects will be discussed.

Prerequisites: Any first year physics or chemistry class. Other students will have to seek approval of instructor.

Text: Hurst and Turner, Elementary Radiation Physics, Wiley, 1970.

#### 230 Mechanics, Electricity and Magnetism, lect.: 3 hrs.; G. T. Meaden.

This class is designed for second year science and engineering students who wish to take a second class in physics, in addition to Physics 221, or who for some reason are unable to take that class. Students may take third year physics classes if they have taken this class and Physics 221. The class will include discussion of the essence of classical mechanics, with an introduction to relativistic mechanics, and the essence of classical electricity and magnetism. Substantial emphasis will be placed upon the important ideas which arise from these fields of physics, and upon their present relevance. Prerequisite: Physics 110, Mathematics 100,

Text: Berkeley Physics Course, Vol. 1 Mechanics, McGraw-Hill, 1965; Berkeley Physics Course, Vol. II Electricity and Magnetism, McGraw-Hill, 1965.

## 231 Electricity, lect.: 3 hrs.; lab.: 3 hrs.; M. G.

The material discussed in this class forms part of the Berkelev Physics Course. The class begins by studying electrostatics, distributions of static charges, and the concepts of electric field and electric potential as physical quantities. Next, the motion of charge in conducting materials is discussed up 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. The relationships between electric and magnetic fields are then studied and it is shown how these relationships imply the existence of electromagnetic radiation. 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.

Prerequisite: This class is restricted to those intending to work towards an Honours degree in Physics or towards a B.Sc. in Engineering Physics. To this end, the approval of the Chairman of the Department, and of the instructor, must be obtained. Physics 110 and Mathematics 100. This class will usually be taken concurrently with Physics 211. Students are expected to have an introductory know-

ledge of the nature of electric charge, electric field, magnetic field, and of electrical current as developed in Physics 110. Familiarity with the application of simple integral and differential calculus to the solution of physical problems is

Text: Berkeley Physics Course, Vol. 2 Electricity and Magnetism, McGraw-Hill, 1965.

#### 250 Astronomy, lect.: 3 hrs.; P. H. Reynolds

I. Aspects of the Sky: The celestial sphere; the constellations; motions of celestial bodies.

II. The Solar System: The planets and asteroids; the Earth and the Moon; comets, meteors, and meteorites; the Sun as a star; the origin and age of the system.

III. The Galaxy: The distances and motions of stars; magnitudes, luminosities and stellar spectra; building stellar models; variable stars; binary stars; clusters of stars; interstellar gas and dust; structural features and rotation of the galaxy; particular features of the exterior galaxies.

IV. Astronomy Today: Pulsars; quasi-stellar objects (quasars); neutron stars; black holes; cosmological implications.

Prerequisite: Physics 110 or Physics 100 Text: Abell, Exploration of the Universe (Second Edition), Holt, Rinehart and Winston,

#### 300 Intermediate Physics Laboratory, lab.: 6 hrs.; B. E. Paton

This laboratory class of six hours per week is intended to be taken concurrently with other third year physics classes. The class has two main aims. Firstly, it gives students a chance to do non-set experiments and thereby encounter and solve on their own the problems of experimentation. Secondly, as the number of experiments done is small (four to six), students should achieve a real understanding of a few physical phenomena. A measurement of one of the fundamental constants such as c, G or e is required and other than this a variety of topics appropriate to the third year level are available. Students are not discouraged from doing experiments or areas of experiments Helium-Neon laser, holography, etc. If the which have not been done by other Physics 300

Prerequisite: The class is designed for honours and engineering-physics students and has Physics 231 as a prerequisite. In addition, two other physics classes must be taken concurrently. Exceptions have been made.

#### 315 Modern Physics, lect.: 3 hrs.; W. Leiper.

This is an introductory class in quantum mechanics and atomic spectroscopy. Wherever possible quantum mechanical concepts and quantities will be discussed in terms of research projects going on in the Physics Department. Text: R. Eisberg, Fundamentals of Modern

### 320 Thermodynamics, lect.; 3 hrs.; D. F. Goble.

This class studies the basic principles of

Physics, Wiley & Sons.

statistical mechanics and the relation that a have to thermodynamics together with application of these principles to the study ideal gases and certain physical systems, Prerequisite: Some knowledge of partial de-

tives; Mathematics 200, which may be concurrently with the class.

Text: Reif, Principles of Statistical and Thos Physics, McGraw-Hill, 1965.

#### 335 Electronics, lect.: 3 hrs.; A. Levin.

The class covers advanced circuit analysis linear and non-linear systems, the physic resulting properties of solid state devices concepts of information and noise and to mission lines and filters.

Topics treated: network reduction, t terminal network and solutions by methods, non-linear systems, modulation modulation and rectification, carrier transp in semi-conductors, properties of diodes transistors; electromechanical analogues analogue computation methods, feedback control systems, stability criteria, nature information and noise, properties of distribute constant lines and filters.

Prerequisite: Physics 230 or Physics 23 Mathematics 220 or 228 to be taken cone

Text: Milman and Halkias, Electronic Device and Circuits, McGraw-Hill, 1967.

#### 400 Advanced Physics Laboratory, lab.: 6 hrs A. Levin, S. T. Nugent.

This is a physics and engineering-physics labor tory class in which students in groups of two work largely on their own initiative. The 'experimental work covers nuclear disintegration, gamma and beta spectroscopy and absorp tion measurements, proton spin quantitative measurements and Planck's constant determination tion; thermionic emission and ionization expenments using a vacuum pumping and instrument Physics, (Freeman). ation system; properties of solid state semicor ductors and devices; experiments on spectral noise distribution of transistors and the use of analysis systems; experiments with wish, students may do experiments in other areas, such as acoustics, optics, fluid dynamic A report, on a topic to be agreed with instructor, is required as part of this class. Prerequisite: Fourth-year standing in physics engineering-physics or permission from instructor.

### 402B Special Topics in the History Philosophy of Science, seminar 3 hrs.;

The intention in this class is to discuss in detail some specific issues concerning the develop ment of scientific knowledge and its impact of society. The proposed topic for 1971-72 "The Scientific Revolution of the 16th 17th Centuries". The topic for 1972-73 will announced in September.

Prerequisites: At least two classes in natural sciences and two in history or philosophy

others may be admitted by permission of the Others had some acquaintance with history of instruction instory of science will be presumed. Registration requires prior departmental consent.

Prof. Readings will be taken from a variety of Texts. with emphasis on primary sources.

Advanced Classical Mechanics and Elecrodynamics, lect.: 3 hrs.; J. G. Cordes.

The class will study in the first term Lagrangian Hamiltonian mechanics, covering, for example, the material in Goldstein, Chapters 1, 2, 3, 7, 8, 9, 10: Lagrange's equation, Hamilton's principle, the two body central force problem, Hamilton's equation of motion, transformations, the Hamilton-Jacobi equation, and small oscillations.

The following topics will be discussed in the second term: classical electrodynamics, covering, for example, the wave equation and soutions, special relativity, electromagnetic radiation and absorption, energy loss by fast moving charged particles.

Prerequisite: Physics 211, 231, 315, or the permission of the instructor.

Texts: Goldstein, Classical Mechanics, Addison-Wesley, 1950; Jackson, Classical Electrodynamics, Wiley, 1962.

## 411B Special Relativity, lect.: 3 hrs.; D. F.

Topics discussed include: experimental basis of the Lorentz transformations relativistic kinematics: space-time; introduction to tensor calculus, relativistic dynamics; relativistic electro dynamics.

Prerequisite: Physics 211, 231 and 315 or the permission of the instructor.

Text: Rindler, Special Relativity, 2nd ed., (Oliver and Boyd).

Reference: Taylor & Wheeler, Spacetime

#### 415 Quantum Mechanics. lect.: 2 hrs.; D. Kiang

Popies discussed include: concepts and formulation of quantum mechanics, harmonic oscillator, potential well and barrier angular nomentum and the central force problem, perturbation methods, scattering theory.

Prerequisite: Physics 315. Students should be lamiliar with elementary wave mechanics and with the mathematics necessary to discuss the Schrodinger wave equation. Text: TBA.

# <sup>416</sup> Mathematical Methods of Physics, S. T.

Opics discussed include: ordinary differential quations, complex variables, integral transorms, special functions, partial differential equations, eigenfunctions, eigenvalues, Green's unctions, perturbation theory, integral equalons, calculus of variations and tensor analysis. ferequisite: Registration requires prior departnental consent.

lexts: Arfken, Mathematical Methods for Phy-

sicists (2nd ed.), Mathews and Walker, Mathematical Methods of Physics (2nd ed.).

#### 421B Nuclear Physics, lect.: 3 hrs.; D. Kiang.

This is an introductory class in nuclear physics. Topics discussed include: nucleon-nucleon interactions, nuclear structure, gamma transitions, alpha decay, beta decay, nuclear reactions, Mossbauer effect, counting statistics, and nuclear detectors.

Prerequisite: Physics 315 and permission from the instructor. Registration requires prior departmental consent. Text: TBA.

#### 423A Introduction to Solid State Physics, lect.: 3 hrs.; B. Pass

This class introduces the basic concepts of solid state physics which are related to the periodic nature of the crystalline lattice. Topics will include crystal structure, X-ray diffraction, phonons and lattice vibrations, the free electron theory of metals, and energy bands.

Prerequisite: Physics 315. Registration requires prior departmental consent.

Text: Kittel, Introduction to Solid State Physics, 3rd. ed., Chapters 1-9, Wiley, 1966.

## 433A Advanced Electronics, lect.: 3 hrs.; A.

Properties of intrinsic and doped semiconductors. Carrier generation and transport, Hall effect, Photo effects and Schockley Haynes experiment. Semiconductor diodes; field and carrier densities, transport equations, special diodes. Transient behaviour in diodes. Bipolar transistors; properties, limitations, failure mechanisms. The F.E.T. unijunctions, multilayer diodes, tunnel diodes, thermistors, noise mechanisms in solid state devices.

Prerequisite: 4th-year standing and permission of instructor.

Text: Millman and Halkias, Electronic Devices and Circuits.

### 433B Materials Science, lect.: 3 hrs.; H. W. King

The physical properties of engineering materials

are discussed in terms of their crystal structure and microstructure, using the principles of modern physics as a basis. The properties are first formulated systematically in tensor notation and shown to possess an intrinsic symmetry which must be related to the crystal symmetry of the material. Many useful properties, such as electron transport and plastic deformation, are shown to be strongly dependent on defects in the crystal structure. The nature of such defects, and the methods available for their creation, control or elimination, are considered in relation to the optimization of these properties. This approach is further extended in a discussion of the effects of microstructure on the properties of polycrystalline and polyphase materials.

Prerequisite: Fourth year standing, and permission of instructor.

Text: Hutchinson & Baird, Physics and Engineering Solids, (Wiley, 1968). Reference: Nye, Physical Properties of Crystals, (Oxford University Press, 1969).

### 444A Optics, lect.: 3 hrs.; C. K. Hoyt

Topics include a detailed study of the radiation from accelerated charges, the statistical properties of the fields from assemblies of radiators, interference, diffraction, with attention to the approximations of the Kirchhoff theory, and the application of Fourier transforms to the structure of images, the resolving power of instruments and the characterization of coherence.

A few topics in geometrical optics may be included to assist in understanding the behaviour of optical instruments and to provide a background for the better appreciation of some of the topics in physical optics.

Prerequisite: Physics 230, or Physics 231, or Physics 221 and Mathematics 220. The student should be familiar with vector analysis, Maxwell's equations and the use of complex exponential functions. Registration requires prior departmental consent.

Text: Stone, Radiation and Optics, McGraw-Hill, 1963.

### 444B Optics, lect.: 3 hrs.; C. K. Hoyt

This class is a continuation of Physics 444A and deals with coherence, polarization, scattering by matter, the electromagnetic properties of matter, including crystals, reflection, refraction and double refraction.

Prerequisite: Physics 444A. Registration requires prior departmental consent.

Text: Stone, Radiation and Optics, McGraw-Hill, 1963 and assigned readings on related

#### 445 Physics of the Earth, lect.: 3 hrs.; P. H. Reynolds

This is a class in solid-earth geophysics. Topics discussed include: the figure of the Earth and gravity, seismology and the internal structure of the Earth, the geomagnetic field, paleomagnetism - the prehistory of the geomagnetic field, heat flow and the Earth's thermal history, electrical conduction in the Earth, radioactive processes and the age of the Earth.

Taught concurrently with Geology 445. See also Geology 405A, B; 306A, B; Oceanography

Prerequisite: Registration requires the prior consent of the Department.

Texts: Stacey, Physics of the Earth, (Wiley, 1969); Garland, Introduction to Geophysics, (Mantle, Core, and Crust, Saunders, 1971).

#### **Graduate Studies**

The Department of Physics provides courses of study leading to the advanced degrees of M.Sc. and Ph.D. Areas of research undertaken at Dalhousie include: solid state, geophysics, low energy nuclear physics, low temperature,

theoretical physics, and oceanography. Further details are given in the Calendar of the Faculty of Graduate Studies.

#### Political Science

#### Professors

J. H. Aitchison (Chairman)

I. M. Beck

D. Braybrooke

K. A. Heard

M. K. MccGwire

#### **Associate Professors**

A. P. Pross (Coordinator, Public Administration Programmes)

D. W. Stairs (Director, Centre for Foreign Policy Studies) (Sabbatical Leave 1972-73)

#### **Assistant Professors**

P. C. Aucoin

R. Boardman

D. M. Cameron (On Leave 1972-73)

R. L. Dial

W. R. Mathie

D. H. Poel

I. A. Wouk

Foreign Service Officer in Residence D. M. Munro

#### Special Lecturers

K. Antoft

R. K. Dalev

C. J. Gardner

#### Foreign Policy Research Fellows

G. R. S. Hawkins (Associate Director, Centre for Foreign Policy Studies)

K. M. Sharma

T. M. Shaw

Government is as old as human society. Even the family has some form of government, whether the husband and father is absolute master, whether husband and wife share in the making of decisions, or whether the children also share in the decision-making process. One of the most important differences between Plato and Aristotle is that Plato believed and Aristotle did not, that the government of the state is essentially the same as the government of the family.

Some political scientists define political science as the study of decision-making. With some important exceptions, they are not interested in studying how private individuals reach decisions: rather, they are concerned with how groups of human beings come to decisions about matters of common interest. Some political scientists would include all groups such as the family, the business corporation, the business office, the university, the trade union, the tennis club, and their "governments", as well as the state and its government.

One of the obvious exceptions referred to above is the case of the absolute dictator of the state who, because he is an absolute dictator,

makes his decision as an individual acting alone. In this case the political scientist is interested in the things he has to take into consideration in coming to his decision. Some political scientists would also include the absolute rules of other groups, the patriarch of the old-fashioned family, for example. But all political scientists would agree that political science includes the study of the reasons why individuals come to decisions on matters relating to the government of the state. The political scientist is very interested, for example, in why the voter comes to his lonely, private decision when he marks his ballot in a polling booth. Some political scientists would include within the subject the private decisions people make concerning the "government" of other groups to which they belong, such as the family. But it is obvious that there are some private decisions which are of no interest to the political scientist.

When a group has to come to a decision on a question of common concern, the outcome often depends on the power which different members of the group have over one another. Much has been written recently, for instance, on the greatly increased power a prime minister now normally has over the other members of his cabinet. Consequently, some political scientists consider that "power" is the key concept that distinguishes political science from other subjects. Again, some political scientists would include within the subject the study of the resolution of power conflicts within groups other than the state.

When we look at what political scientists actually do, we find that they almost wholly confine themselves to the study of the state and its government. Some of them believe, therefore, that the old-fashioned definition that "political science is the study of the state" is still the best, it being understood that the study of the decision-making and the exercise of power with respect to the affairs of the state is included. There are good reasons for this concentration on the affairs of state. One is that in our time the state plays a constantly expanding role in economic and social life; the Job opportunities for specialists in politi great dangers inherent in modern inter-state relations constitute another. But an even more important one is the fact that the state claims supremacy over all other groups within its boundaries and normally possesses enough coercive power to make its claim good. It is the great preponderance of coercive power at the disposal of the state that more than anything else marks off the study of the state as one of special importance.

A recent development in political science has been the recognition that there are many important problems that can be adequately explored only by new and rather difficult techniques. Those political scientists who develop and apply these techniques are known as "political behaviouralists" and those who apply the older methods as "traditionalists". The methods of both are needed for a comprehensive study of two of the principal areas into which the department divides the

subject: political institutions and behave and international politics.

If political science is the study of the state study of the relations between states international politics) falls squarely within domain of political science. Decision-makin the formation of the foreign policy of state and in the many international organic tions that exist today) is part of this s That power relationships are involved

The state has been the subject of serious at least since the time of the ancient Co Many of the greatest thinkers of the past devoted much attention to it. To follow finally to understand their thought stimulate one's own thinking about the and to guard against the peril of thinking original when one is not. Consequently, p al philosophy, which includes the study history of political thought, is the third of department's principal areas.

Students who wish merely to attain a dee understanding of democratic government a politics in general and of Canadian Government 5 An elective, e.g., a class in English or a and politics in particular will be most interest in Political Science 100 and 202. The scope the subject, however, is so large that students the general course are advised, and those taking honours in it are required, to concentrate one of the three principal areas. While it impossible in an undergraduate programme three or four years to become a comple political scientist, it is the aim of the depart ment to present undergraduate students as far as possible with a unified central view of t full range of political science in its present development. Consequently, students in the general course are advised, and those taking combined honours programme are required, II take at least one class outside their principal area. Students taking the major honours pr gramme are required to take three cla outside their principal area.

science are steadily increasing. Univers political science departments continue expand and many students who have c centrated on political science are now to found teaching in high schools. Specializati in political science affords an excellent prepar tion for many positions in the public serv and for the study of law.

#### Principal Areas

1. Political Institutions and Behaviour Political Science 100, 200, 202, 205, 209A, 210, 235, 311A, 311B, 312B, 314A, 315, 316, 317B, 318, 319B, 326A, 326B, 330B, 331A, 332A, 333C, 3 337A, 338B, 339A.

#### 2. Political Philosophy

Political Science 201, 207, 336A, 336B, 341 343A, 345B, 348B, 351A, 352B, 353B, 353

International Politics 3. Internal Science 223, 225, 228, 320, 321, 322, Political Science 365R 366 327, 364, 365B, 366.

#### Degree Programmes

General B.A. in Political Science General Science Students intending to choose Political Science Smarrier area of concentration are advised to as the advised to as a advised to consult a member of the staff. The Department recommends the following programme:

Year I (All Students) Political Science 100

(Students without Science matriculation) 2. A science or mathematics class

14. Two of Philosophy 100, a class in economics, and a class in history

5. An elective, e.g., a class in English or a foreign language

(Students with science matriculation)

2.4. Three of Philosophy 100, a class in economics, a class in history, and Sociology 100

foreign language

6-7. Two political science classes at the 200

8.9 Two of Philosophy 100, a class in economics, a class in history, Sociology 100, and a class at the 200 level in any one of these four disciplines. 10. An elective.

11-13. Three political science classes above the 100 level, one of which should be at the 300 level

14. A class above the 100 level in philosophy, economics, history or sociology 15. an elective

#### B.A. with Honours in Political Science (Major Programme)

Students taking a major or combined honours programme are required to obtain the approval of the Chairman of the Department or his deputy for their programmes. Those taking a major honours programme must take at least two classes at the 300 level, and those taking a combined honours programme must take at least one class at the 300 level.

### Years I, II, and III

The class requirements for an Honours B.A. in Political Science for the first three years are those recommended above for a General B.A. in Political Science. It is recommended that students not needing a class in English take a class in a foreign language.

### Year IV

16.19. Four classes in political science at the 200 or 300 level 20. An elective

#### **Combined Honours**

There are several combined honours programmes:

Political Science and Philosophy Political Science and History Political Science and Economics Political Science and Sociology

Students interested in taking any of these combined honours programmes should consult with the Chairman of the Department or his deputy.

#### Undergraduate Programme in Public Administration

The Certificate in Public Administration requires the completion of six classes which may be taken on a part-time basis. Further information may be obtained from the Co-ordinator of the Programmes in Public Administration, Department of Political Science.

#### Classes Offered

(A supplement to this list of classes containing additions and possibly minor changes will be issued by the Department in the summer of 1972. Students in their second and subsequent years are advised to obtain a copy of the supplement from the Department.)

100 Democratic Government and Politics, lect.: 3 hrs.; Section 1, J. M. Beck/Section II P. C. Aucoin/Section III (evening) J. H. Aitchison.

This class may be pursued successfully by any senior matriculant. It is designed not only for the student who desires to continue in political science, but also for the student who will take no other classes in political science: as such, it is not particularly concerned with methodo-

During a short introductory section such questions as the following will be posed: Can there be a genuine science of politics? What approaches may be adopted in a study of political phenomena? Next, there will be an examination of the operative ideals of liberal democracy, fascism and communism, and a discussion of the conditions which are likely to be a prerequisite for the successful working of liberal democracy.

The basic part of the class will be a comparative study of the governmental institutions of three liberal democracies: Great Britain, Canada, and the United States. This study will lead to the posing of general questions such as: What difficulties stand in the way of making constitutions relevant to new needs? (In this regard there will be an extensive examination of the development of the Canadian constitution through formal amendment and judicial review, and of the problem of re-writing the written constitution to accord with contemporary needs.) Can second chambers be justified in liberal democracy? Have British-type cabinets become veritable despotisms? What is the proper role of elective chambers in a time of increasing executive ascendancy? How effective

are the devices designed to make elective houses more genuinely representative?

How successful are democratic political parties in maintaining effective contact between the "Brass" and the "grass"? Does the exploitation of the irrational by the mass media vitiate the ends of liberal democracy? Is an entrenched bill of rights the best device for protecting fundamental civil liberties? Is the ombudsman the most suitable remedy for ills resulting from the abuse of quasijudicial authority?

In short, this class will acquaint the student with some of the basic problems in the practical working of today's liberal democracy.

It is intended for one month in the Spring term to divide Section II into small discussion groups to be led by several members of the staff and by graduate students. During the month the meetings of these groups will replace lectures.

200 Britain and the Commonwealth, lect.: and seminar 3 hrs.; K. A. Heard (Not given in

201 Justice, Law and Morality, seminar: 3 hrs.; W. R. Mathie.

The aim of the class is to engage students in a direct examination of a major problem in political philosophy. Specifically, we will consider the discussion of justice in Plato's Republic. Aristotle's Ethics and Politics, Hobbes' Leviathan, Rousseau's Social Contract, and Mill's Utilitarianism as well as such contemporary contributions to the question as those of Hart, Rawls, and Kelsen. The class will proceed through the careful reading and collective discussion of these texts, seeking thereby to clarify the relations between justice, law, and morality and to demarcate justice as a political concept. If necessary, the class will be divided into smaller groups to facilitate such discussion. Prerequisites: Political Science 100, or an introductory course in Philosophy, or in the absence of either of these the consent of the

202/502C The Canadian Political System, lect.: 3 hrs.; P. C. Aucoin.

The class will be divided into three major topic areas of approximately equal length. Part one will examine the environment of the Canadian political system, including external factors (ethnicity and religion, socio-economics stratification, regionalism and nationalism, and urbanization). Part two will examine political communications and representation in Canada, including a discussion of politics as a communication system, the instruments of communication (political parties, pressure groups, mass media), public opinion, and the selection of participants in the political system. Part three will deal with Canadian government and policy making, including the constitution and structure of government and the structure of the policy-making process at the federal, provincial, local, and intergovernmental levels.

Prerequisite: Political Science 100 or an equivalent introductory class.

205 The Political System of the United States, lect, and discussion: 2 hrs.; D. H. Poel.

This class is intended primarily for second and third-year students who have successfully completed Political Science 100. Some prior familiarity with the institutional arrangements of American government will be beneficial though not essential.

The emphasis will be on familiarizing the student with the empirical generalizations concerning American political behaviour as supported by recent research. The text will set the traditional structures of American government (e.g. the Presidency, Congress and political parties) within the conceptual framework of systems analysis. In lieu of the third lecture hour, students will be expected to carry on independent work in an area of their choice.

207 Mediaeval Political Philosophy, lect.: 2 hrs.; J. H. Aitchison.

The class will survey the development of political thought from the Greek and Roman Stoics to the end of the sixteenth century. It will focus principally on the teachings of the Stoics, the early Christian Fathers, the Roman Lawyers, Augustine, Aquinas, Marsilius, Machiavelli, More, Hooker and Bodin, and of those who participated in the controversies between the Papacy and secular authorities and in the Conciliar Movement.

208/508 Government and Politics of the Far East, lect.: 2 hrs.; (once per week), R. L. Dial.

This class will deal with the socio-political development of modern East Asia. The survey will include China (since 1840), Japan (since 1860), Korea (since 1895), and Vietnam (since 1945).

It is open to students at all levels, without prerequisite. Graduate students will be required, however, to pursue an expanded reading list and will be assessed primarily on the basis of critical writing performance.

209A Modern Nationalist Movements, lect.: 3 hrs.; J. A. Wouk.

For this class, a nationalist movement is any political group which seeks the sovereign independence of a territory or which labels itself nationalist. Nationalist movements much like present-day ones have appeared many time during this century, and apparent patterns in membership, programmes, political strategies and tactics, involvement of foreign powers, and correlates of success or failure have emerged.

This class will consider the political dynamics of contemporary nationalist movements through detailed examination of:

i) Sinn Fein and Irish independence (1905-23),

ii) Zionism and the establishment of Israel (1881-1948),

iii) The rise to power of the Nazi movement (1921-1935).

Conclusions about the characteristics of nationalist movements will then be examined in relation to the contemporary phenomena of Canadian Nationalism and Quebec Separatism. Prerequisites: Political Science 100 or an equivalent class.

210 Comparative Government, lect.: 2 hrs.; (Not given in 1972-73).

223 Techniques of Statecraft and Problems of Order in International Politics, lect.: 2 hrs.; D. W. Stairs. (Not given in 1972-73).

225 Introduction to International Politics, lect. and discussion: 3 hrs.; J. A. Wouk.

This class is intended for the student who is new to the systematic study of international politics. Its aim is to provide a basic acquaintance with the main techniques and institutions of international politics since 1945. The subjects to be covered are:

- i) An overview of the history of the outstanding issues in international politics since World War II, especially the "Cold War";
- ii) The agencies through which foreign policies are formulated and relations among states conducted: diplomatic missions, defence establishments, foreign affairs departments, "unofficial" international organizations, diplomats; and so forth;
- iii) The principal activities with which international politics is concerned: trade and monetary relations, foreign aid programmes, intelligence gathering and evaluation, propaganda, military aid and operations.

Throughout the class emphasis will be laid on evaluating the information sources (newspapers, radio and T.V., books and journal articles, "inside information") on which the person outside the "policy machine" must rely in attempting to follow international politics.

Although this is not a class in theories of international politics, certain subjects will be treated from more than one approach. In particular, an effort will be made to show that the facts of recent international politics can fit equally well into a number of "analytical perspectives" including the official USSR and US views of the origins and course of the "Cold

Prerequisites: Political Science 100 or an equivalent class.

228 Comparative Foreign Policy, lect. and seminar: 2-3 hrs.; R. Boardman (Coordinator).

This class will attempt to analyse in a comparative framework the foreign policies of a number of countries. Discussion of a particular State's foreign policy will be the responsibility of a member of the Department having a detailed

and expert knowledge of that country of these countries will, however, be on around a central common framework will emphasize such factors as the political parties and interest groups formulation of foreign policy, the impa broader considerations such as geogralocation or history or economic growt demands made by other governments liance-systems, the part played by ideolog military capability, the central organizati top-level decision-makers, and so on examined will include Canada, the States, the USSR, China, and Britain, and foreign policies of African States. Prerequisite: Political Science 100.

235 Public Opinion and Voting Behaviour and discussion: 3 hrs.; D. H. Poel.

This class will deal with the developmen interplay of public opinions within the no system. To the extent that social scientist opposed to journalists) have examined n opinion and voting behaviour within the ( dian political system, Canadian material w used. Since much of the literature in this are quantitative in nature, considerable attenti will be given to quantitative methods Political Science. This considerable atten will, however, not be at such a sophisti level to scare off students who can add 2 an together. This class is not a substitute for a class in statistics.

306A/506A Comparative State and Province Political Systems, seminar: 2 hrs.; D. H. Poel

Until recently very little works has systematical ally compared phenomena across all the Candian provinces or compared Canadian provin political systems with American state systems There are both legitimate epistemological very real practical reasons for this. The aim the seminar will be to compare aspects of the political systems, i.e. inter-state, inter-province and state-provincial comparisons. The the tical focus of this seminar may vary accord to student interest and may include such top as political participation, legislative proce interest groups, policy outputs, party system and political culture.

Prerequisite: Political Science 100 and 2001

311A/511A Introduction to Public Administra tion, lect.: 2 or 3 hrs.; A. P. Pross.

Although an introduction to Public Admi tion, this class requires a high level of k ledge of political systems and of the Car political system in particular. (Students if M.B.A. programme can substitute for the familiarity with administrative theory.) class concentrates on an examination of behavioral aspects of administration, par larly the relationship between bureaucracy society and the development of organization

311B/511B Canadian Federal Public Admini-311b/322 or 3 hrs.; A. P. Pross.

an examination of Canada's federal bureau-An examination of the context of modern cracy of modern modern theories of public administration. The central theories will be to analyze the service as an concern part of the policy making process. A previous class in public administration is a prerequisite.

312B/512B Provincial Public Administration, seminar: 2 hrs.; A. P. Pross.

This is an advanced research class designed for those who have taken at least one previous class in Public Administration and a class in Canadian Government. The content of the class will be developed to meet the interests of the instructor and the members of the class.

313/513 Intergovernmental Relations in Canada, seminar: 2 hrs.; D. M. Cameron. (Not given

314A/514A The Policy Process in Canada. eminar: 2 hrs.; A. P. Pross.

A study of the fashion in which policies are evolved and applied in the Canadian political system. Various models of the policy making process will be discussed and their applicability to the Canadian setting will be considered. The functions of all participants in the process will be examined, but particular attention will be paid to the role of administrative structures. Admission with the permission of the in-

315/515 The Politics, Government and Constitution of Canada, seminar: 2 hrs.; J. M. Beck.

This class is open to those students who have demonstrated competence in Canadian politics and government by attaining at least secondclass standing in Political Science 202 or its equivalent and in exceptional circumstances to those students who have obtained high standing in Political Science 100. It takes the form of a seminar class in which the students' papers will explore the background, nature and significance of current problems in the politics, government and constitution of Canada. The relation of the political culture, and especially environmental, institutional and personal factors to these problems will be examined in detail by posing such questions as: Is there a Canadian political culture or simply a number of regional subcultures? Is the Canadian brand of consensus Polities a unifying device in contemporary Canada? Can participatory democracy be a Practicable concept in Canadian federal Politics? Do the Trudeau reforms permit the executive branch to meet the demands of contemporary society? Have the changes in the procedures of the House of Commons since 1968 finally taken that body out of the horse and buggy era? How well do the Canadian mass media and pressure groups perform the functions which liberal democratic theory contemplates? Should a charter of human rights be

entrenched in the Canadian constitution? Is an entrenched linguistic bill of rights based on Book I of the Report of the Royal Commission on Bilingualism and Biculturalism feasible or desirable? What is and ought to be the competence of the provinces in external affairs? Que veut le Québec, and are classical federalism and separatism the only alternatives? Is the B.N.A. Act good enough or is a completely new written constitution desirable?

316/516 The Politics and Government of Nova Scotia, seminar: 2 hrs.; J. M. Beck.

The class will examine first the evolution of Nova Scotian political and governmental institutions. It will then analyze and appraise the functioning of the cabinet, House of Assembly, civil service, political parties, pressure groups, and municipal institutions in contemporary Nova Scotia. It will also devote some time to federal-Nova Scotian relations. Special attention will be paid to the political culture of the province and its effect on the general character of Nova Scotian politics.

The class is open to graduates, and to undergraduates with the permission of the instructor.

317B/517B Approaches to Nation-Building in Africa, seminar: 2 hrs.; K. A. Heard.

A comparative approach to the study, with special reference to the cases of Nigeria, Kenya, Zambia and South Africa. Particular attention will be paid to the strategies of political participation on the one hand and political exclusion on the other.

318/518 The Politics of South Africa, seminar: 2 hrs.; K. A. Heard. (Not given in 1972-73).

319B/519B The Budgetary Process, seminar: 2 hrs.; D. M. Cameron. (Not given in 1972-73).

320/520 Conceptual Development in the Study of International Politics, seminar: 2 hrs.; R. L. Dial (Coordinator).

This class will treat in a survey fashion the variety of conceptual approaches to the study of: 1) foreign policy behavior of states; 2) relations among states in the international system. It will be, in other words, a class dealing primarily with the abstract models, conceptual frameworks, and theories that underlie our present and future understanding of international politics. It will, however, stop short of any extensive dealings with the explicit methodological techniques, which are often enlisted in the service of research within given schools. (e.g., field theorists may use factor analysis techniques in their empirical research, in this class we shall explore the conceptual parameters of field theories, but not the applied methodological designs for factor analysis.) Such methodological questions are focused on elsewhere in the curriculum.

Some of the analytical schools to be studied

theory, integration theory, field theory, learning and perception approaches, organization and decision making approaches, linkage politics, interest group theory, game theory, communications theory, crisis behavior models,

The instruction of this class will be a group exercise. Explication of each approach to the study of international politics will be undertaken by instructors knowledgeable about, or experienced in, that given school. In addition to Centre staff members, the services of outside authorities may be enlisted.

321/521 International Organization, lect. and seminar: 2-3 hrs.; R. Boardman.

This class will focus primarily on the workings and effectiveness of the United Nations in the context of international politics. We will also be looking at other international organizations, such as the EEC or NATO. Three major areas will be covered: (1) the UN and international politics: sovereignty and the limits of the UN's powers; foreign policies and the work of the organs of the UN; the UN and the interplay of national self-interests; (2) the UN and the politics of peace and security: the problems of disarmament and arms control; the concept of collective security and the Korean War; peacekeeping in Suez, the Congo, Cyprus and other situations; and (3) the UN and the politics of welfare: the functionalist theory of international organization and the work of the UN Specialized agencies; some contemporary global issues such as depletion of natural resources, space exploration, the sea-bed.

322/522 The History of Canadian External Relations, (Same as History 425/525), seminar: 2 hrs. (Not given in 1972-73).

324B/524B Problems of Development: The Politics of New States, lect., discussion and seminar: 2 hrs, K. A. Heard.

This class deals with the internal problems and theories of development. It will cover such subjects as concepts of development and underdevelopment; cultural patterns in developing nations; the impact of colonial regimes on political and economic development; industralization; urbanization and socialization; communication; ideology and nation-building; economic problems and policies; the role of the military; stability and instability of political

It is intended primarily for graduate students, but senior undergraduates may be admitted on application to the instructor.

326A/526A The Politics of the Chinese Revolution and its Study, (Sinology), seminar: 2 hrs.; R. L. Dial.

This class will treat the Chinese revolutionary period (1840-1950) at a fairly high level of sophistication. We will focus on readings of and assessed are: systems analysis and alliance several schools of Sinology, clarifying the underlying conceptual frameworks of the authors and assessing the explanatory value of the various conceptual approaches. A subsidiary objective of the class will be to compare the various utilities of four mediums: the biography, the monographic study, the novel, and the chronological text. The primary concern of the class is thus theoretical and epistemological rather than descriptive. Students preferring the latter should look to Political Science 208/508.

## 326B/526B Contemporary Chinese Politics, 1950-Present, seminar: 2 hrs.; R. L. Dial.

This seminar will seek to untangle the various dimensions of "building socialism" in present-day China. Concepts such as ideology, government, party, economic development, management, and organization will be discussed at both the theoretical and applied planes. Considerable energy will be expended on how to analyze Chinese politics (Sinology) as well as on the substantive details of contemporary China. Political Science 326A/526A is not a strict prerequisite for 326B/526B, except for graduates planning thesis work on China.

# 327/527 The Formulation and Content of U.S. Foreign Policy, lect. and discussion: 2-3 hrs.; J. A. Wouk,

The central focus of this class is the process by which U.S. foreign policy has been formulated in the years since the end of the Second World War. The subject will be approached through examination of the history of agencies concerned with such activities as diplomatic relations, military affairs, intelligence work, propaganda, economic aid, commercial policy, scientific and cultural relations. In the course of these discussions, the content of U.S. foreign policy since 1945 will also be considered in some detail. Special attention will be paid to the development of the National Security Council since 1947 and its emergence as the centre of the US foreign policy "machine" under the Nixon administration.

In the second term, the class will examine the way in which all the component elements of the US Government and polity have interacted in the formulation and conduct of policy in Indochina and on the Palestine/Israel question since 1945.

Prerequisite: Political Science 100 or an equivalent class.

330B/530B Canadian Political Parties, lect.: 3 hrs.; J. M. Beck. (Not given in 1972-73).

## 331A/531A Public Administrative Practices, seminar: 2 hrs.; C. J. Gardner.

The aim of this seminar is to highlight and explore ways in which the practice of public administration has been and can be improved. While examples will be taken from the national and international fields, the basic issues involved will be applicable in provincial and local government administration, and, to some extent, in the administration of non-government

enterprise. It will supplement the various classes related to public administration by the discussion of difficulties in harmonizing theory and practice. These discussions should be particularly useful to students contemplating administrative careers in the public service.

The substance of the seminar will consist of illustrative examples covering a wide range of administrative practices falling under the following general heading:

- (1) The Planning Process
- (2) Clarification of Work Objective
- (3) Organization
- (4) Staffing Practices
- (5) Financial Practices
- (6) Procedure and Method

The seminar is designed mainly for graduate students who have taken, or are in the process of taking, the Graduate Diploma or Master's degree in Public Administration.

332A/532A Science and Government, lect.: 2 hrs.; P. C. Aucoin.

This class examines the role of science and scientists in modern society, and more especially in modern political systems. Science and its offspring, technology, are not only a major concern of developed and developing nations in themselves (as policies for scientific research and development illustrate) but they also contribute a significant (some say, dominant) input in other policy fields, e.g., industrial, economic, health, environmental, and military policies fields to list the most obvious. The class, therefore, will analyse such topics as: the norms and values of science and technology; the organization and structure of scientific/ technological communities; the administration of science especially in the governmental sector, in the making of policies for science.

The class is for students who have taken the introductory political science class plus one class dealing with a modern political system (e.g. Canadian or American government). Science students would be welcome with the permission of the instructor.

333C/533C Research Seminar: Maritime Political Systems. A. P. Pross. (Not given in 1972-73).

334A/534A Local and Regional Government in Canada, seminar: 2 hrs.; K. Antoft.

This class will deal with the origins, development, and present legal and fiscal positions of various forms of local and regional government in Canada. Special attention will be paid to three problem areas; the territorial extent of local government, policy formulation in a fractionalized political system, and the unique dimensions of urban government.

It is open to graduate and senior undergraduate students. Participants must have completed Political Science 202 or an equivalent class in the Canadian Political system.

336A/536A Theories of Political Change Revolution, Part I, seminar: 2 hrs.; W. Mathie. (Not given in 1972-73).

336B/536B Theories of Political Change Revolution, Part II, seminar: 2 hrs.; R. L. D. (Not given in 1972-73).

337A/537A Comparative Political Sociological (Same as Sociology 317A), D. Grady.

338B/538B The Politics of the Environme lect.: 2 or 3 hrs. To be announced.

A discussion of the policy process as it relator issues in the "environmental crisis". Specattention will be directed to the evolution socio-cultural values (e.g., the recent growth importance of wilderness areas) and thin pact on the policy process as a dynaminteraction of media, political parties, press groups (including spontaneous protest group socialization processes and administrative ganizations.

339A/539A Public Administration Techniques eminar: 2 hrs.; C. J. Gardner.

This class is designed to introduce students of group of administrative techniques which a being used increasingly in the public sector which in themselves are becoming subjects specialization. It is important that the public administrator should know:

- (a) the principal characteristics of these to
- (b) the areas of possible application in public service; and
- (c) the circumstances in which the application can be most effective.

The techniques are such as the following: Operations Research (OR) Programme Evaluation and Review Technic (PERT)

Critical Path Planning (CPP)
Data Processing
Procedures and Methods Analysis
Work Measurement and Standards
Administrative Communication and Col
Techniques

The class will be conducted with continemphasis on the use of these techniques with the public service. Instruction may be given various specialists, but the general pater followed for each technique will be:

- (a) introductory lecture(s) in which read assignments will be given;
- (b) discussion sessions based upon read assignments; and
- (c) the allocation of practice assignments.

341A/541A The Political Philosophy of Plulect, and discussion: 2 hrs.; W. R. Mathie, (N) given in 1972-73).

343A/543A Foundations of Contempositions in the Social Sciences, seminar: 2 W. R. Mathie.

class will focus upon a number of the characteristic field issues of general importance to the inter-remarkable and philosophy of the social methodosis including the extent to which the natural sciences can provide a model for inquiry natural diffeory construction in the social sciences, the nature of explanation in the social sciences, the role of theory in the social sciences, the meaning of and reasons for the demand for meaning neutrality" in political science, and the possibility and consequences of satisfying that possible. These issues will be considered by the class, mainly through an examination of their treatment in the methodological writings of Max Weber. This procedure is not adopted because of Weber's influence upon the subsequent development of the social sciences though that influence has been considerable, but because of the belief that Weber's investigation of the questions that must still concern us as social scientists was pursued in a spirit of seriousness and carried to a depth of analysis not since matched. Subsequent contributions to the further clarification of these issues will also he considered whether arising out of explicit comments on Weber's views or more general discussions in the philosophy and methodology of the social sciences.

The class will be open to graduate student and to senior undergraduates only with the explicit agreement of the instructor.

345B/545B The Question of Regimes in the Study of Politics, lect. and seminar: 2 hrs.; W. R. Mathie. (Not given in 1972-73).

348B/548B Problems in Political Philosophy: Rosseau's Analysis of Modernity, seminar: 2 hrs.; W. R. Mathie.

In his discussions of the basis of political society, of the relation between politics and morality, of representation, to cite but a few instances, Rousseau seems to depart radically from the spirit and letter of the classical liberal understanding of the nature of state, society, and individual set out, e.g., by Hobbes and Locke. It is hoped, therefore, that a careful reading together of certain of Rousseau's writings may contribute to our own understanding of the assumption underlying the liberal state and society. Specifically, we will read The First and Second Discourses, The Social Contract, Politics and the Arts, and parts of Emile and Considerations on the Government of Poland. While French will not be required we will try to make use of that ability to the extent that it is represented in the class.

350/5:0 Statistics and Research Methods, (Same as Sociology 301), lect.: 3 hrs.

351A/551A The Nature of Findings, Explanations, and Theories in Political Science, seminar: 2 hrs.; D. Braybrooke.

The chief topic to be treated in this class (which is identical with Philosophy 351A except for prerequisites) are the nature of explanation according to Popper and Hampel;

the problem (or so-called problem) of induction; the hypothetico-deductive method; the nature of an axiomatized theory; the differences between behaviour(al)ism and theories of action; the fact/value distinction; and Ideologiekritik. Illustrations will be drawn chiefly from Political Science.

Prerequisites: Normally Political Science 100 and one other class in political science. A previous class in logic (Philosophy 200 or 201 or 202) or in epistemology (Philosophy 305) would be helpful.

Students taking 351A/551A the first term should take either 352B/552B or 353B/553B the second term, or both.

352B/552B Research Methods in Political Science, seminar: 2 hrs.; (to be announced).

This seminar is an integral part of the "scope and methods" series and will allow students to bring their consideration of the philosophy of social science to bear upon methodological questions of conceptualization, measurement and inference in political science. The end product of this study will be the development of a workable research design in a substantive area of the student's choice.

Political Science 351A/551A will normally be considered a prerequisite for this seminar. A class in statistics would be useful but is not a prerequisite. Students not having a class in statistics should not be discouraged from taking this seminar.

353B/553B Contemporary Empirical Theory: A Survey, seminar: 2 hrs.; (tentative), P. C. Aucoin, W. R. Mathie,

The objective of the seminar is to examine the major empirical theories in contemporary political science. In turn we will examine the attempts to conceive of political life in terms of groups (Bentley and Truman); structural functionalism (Radcliffe-Brown, Levy, Merton, Almond); power (Lasswell and Merriam); organizations (Barnard, Selznick, and Simon); communications (Ashby and Deutsch); systems (Easton and Kaplan); and decision-making (Dahl and Polsby). Throughout the class we will be concerned to consider the following questions:

- 1. What will it mean for us as political scientists to view political phenomena in the manner suggested by the theory under examination? How would we proceed? What sort of questions would we tend to ignore? What are the advantages and costs of such a focus?
- 2. What is the theoretical justification for viewing political phenomena in this as against any other way? Is it adequate?
- 3. What if anything can one conclude from an examination of this theoretical approach as to the general prospects for a scientific analysis of political life?
- 4. What distinction does the theorist make

between description and appraisal? How is this reflected explicitly or implicitly in the theoretical framework recommended? What are the consequences of this?

The seminar is open to undergraduates in the third and fourth years, and to graduate students. Political Science 351A/551A will normally be prerequisite.

355B/555B Marxist Theory and Its Upshot in the World Today, seminar: 2 hrs.; (Spring term only), D. Braybrooke.

Social objectives inherited from earlier socialist thinkers, especially Saint-Simon, inspired Karl Marx's life work and thought; general philosophical ideas imparted by Hegel contributed some crucial features of overall framework and inclination; the analytic apparatus developed by classical economists of the British school, especially Ricarto, gave the thought its cutting edge as a critique of standing social arrangements. The class will spend some time identifying each of these influences. Original texts by Saint-Simon and Hegel will be compared (in translation) with writings by Marx and his long-time collaborator Engels. It will be shown how the idea of alienation governed Marx's attitudes toward social reform and planning even after he ceased to use the term or write in a philosophical manner; it will also be shown how the idea of alienation gave rise to Marx's concept of ideology, which occupied a leading place in his dialectic of the class struggle. The class will then examine the economic analysis that Marx applied to capitalism as he knew it and the economic grounds on which he thought both that the system was due to be transformed and that it was hastening its own transformation. From Marx, the class will turn to some of Marx's followers, and will consider the very different reactions of Bernstein and Sorel to the apparent failure of Marx's predictions, the uses made of Marx's doctrine by Lenin and Trotsky in fomenting, justifying and interpreting the Bolshevik Revolution in Russia, and finally some manifestations of Marxism today. Among the latter, the petrified official ideology of the Soviet Union will figure alongside the attempts of Yugoslav Communists and of some people in Poland to find new beginnings by returning to Marx's original thought. Some attention will be given also to Marxist doctrines in China and Cuba; and to the sweeping critique of industrial bureaucratic culture, currently fashionable among students, that Marcuse has drawn in part from Marx.

No prerequisites are stipulated for this class.

Textbooks will include the Anchor books Writings of the Young Marx on Philosophy and Society, and Marx and Engels, Basic Writings on Politics and Philosophy, and Robert Freedman, ed., Marx on Economics.

364/564 Military and Strategic Studies, seminar: 2 or 3 hrs.; M. K. MccGwire.

Strategic studies are concerned with military

power, and consider four aspects of international relations: the causes and prevention of war, methods of insuring national (or international) security, the national pursuit of acquisitive goals, and the insurgent promotion of political change. This seminar (which can only serve as an introduction to the subject) seeks to develop judgment about the uses of military power in international politics, and an awareness of the many different (and frequently conflicting) approaches to the underlying problems. To achieve this understanding it is necessary to devote some time to studying the historical development of warfare and strategic theory prior to the nuclear age, before moving to a more detailed consideration of contemporary problems and doctrines. There are no simple text-books in this area, and the seminar requires a substantial amount of selective reading.

Open to graduates, to undergraduates with the permission of the instructor. Some understanding of international politics as a prerequisite.

365B/565B The Study of Chinese Foreign Policy, seminar: 2 hrs.; R. L. Dial.

In this class we shall survey the literature on Chinese foreign policy and the patterns of causation (ideology, national interest, heritage, satellitism, etc.) attributed to Chinese behavior. However, the thrust of the class will be to identify and make epistemological evaluations and assessments of the utility of the various conceptual approaches to the subject.

366/566 The Analysis of International Conflict, lect, and seminar: 2-3 hrs.; R. Boardman.

In this class we shall be tackling the problem of conflict, broadly defined, in the modern world, The focus will be on situations of conflict having significant international aspects. The class will combine study of the theoretical literature of political science and other social sciences — on social conflict, the origins of civil war, psychological theories of international conflict, revolution, intervention in civil war, and so on - with empirical evidence drawn from a number of selected case studies studied intensively during the course of the year. The choice of these cases will be the subject of discussion at the start of the class, but will include such situations as India-Pakistan relations, Greek-Turkish communal conflict in Cyprus, the Middle East, Ulster, and various territorial and other conflicts in Africa. Prerequisites: Political Science 100.

449/549 Philosophy, Politics and Economics, (Same as Philosophy 445/545 and Economics 427/507), seminar: 2 hrs.; D. Braybrooke.

The central concern of this class is the application to political choices of economic reasoning, taken as a source of both descriptive and normative theory. Dahl and Lindblom's well-known book, Politics, Economics and Welfare, will be discussed as an illustration of complementarity between the concepts and concerns of economics and those of other social sciences; and also as a means of defining the present position of the issue between socialism and capitalism. The class will study the formal theory of voting as treated by such economists as Arrow, Black, Buchanan and Tullock, as well as Riker, Murakami, and Farquharson. It will give some attention to Down's economic theory of party competition and to the theory of games (as applied to voting and to party competition). A number of important philosophical lessons for the analysis of concepts as important to ethics as self-interest, rationality (personal and collective), human welfare, utilitarianism, and justice can be drawn from this discussion; and several philosophical authors will be studied, among them Bairer, Rawls, Rescher, and possibly Braybrooke.

Prerequisites: Students taking this class should ideally have had previous classes in all three subjects; but it will suffice for them to have worked to an advanced undergraduate level in at least one of them. Students taking the class for a philosophy credit should have had at least one class in logic (200 or 201 or 202) and one in ethics (310); students taking the class for a credit in political science should have had at least one 300-level class in political science (351A and 355B are recommended) students taking the class for a credit in economics should have had at least one 300-level class in that

#### **Graduate Studies**

The Department offers M.A. and Ph.D. programmes in Political Science, details of which are given in the Calendar of the Faculty of Graduate Studies. Programmes leading to a Graduate Diploma in Public Administration and to the degree of Master of Public Administration are also available through the Department.

#### Psychology

### **Professors**

W. K. Caird

W. K. Honig

J. A. McNulty (Acting Chairman)

R. S. Rodger

H. O. Schwassman

**Izaak Walton Killam Research Professors** 

P. H. R. James N. I. Mackintosh

**Associate Professors** I. W. Clark

P. J. Dunham

B. Earhard

M. Earhard

G. V. Goddard B. R. Moore

S. Nakajima

#### **Assistant Professors**

T. R. Anders E. O. Bovanowsky

I. M. Fearon

D. E. Mitchell

F. J. Mortenson

Research Associates and Postdoctoral Fello D. N. W. Doig

Men see and hear, get hungry and fall a and for an instant remember in great d events which have just happened to Sometimes they hear but do not listen. they remember only a fraction of what pened five minutes previously. They make and play dangerous games, solve problem go mad, drink far more than they n quench their thirst; and they fight. behave in the same way; if we knew the re why they did so we would have gone way towards understanding ourselves.

Psychology is an experimental science almost all the work which is done in the s is done in the laboratory; its purpose discover the conditions which control activities of animals and men, to measure conditions and the responses they produce to use this knowledge to invent way predicting behaviour and changing it. I subject for inventive rather than imitative m better suited to those who want to find our themselves than to those who want to be what to believe. Although it has been the man achievement of psychology in the past two three decades to discover the remarka precision with which the behaviour of anim and men is controlled by their internal a external environments, - and as a student was will be expected to master the technol which has made these discoveries possible this achievement has increased, not diminis the challenge. We know for certain that the are at least two memory systems in the brai of vertebrates, but we do not know how the systems are linked together; we know (cor to common sense) that things look larger further away they seem to be, but n understands why the moon on the looks larger and closer than it does in the s there is reason to believe that at least some the mental diseases are not diseases at all forms of behaviour which are learned habits - yet we do not understand why so people learn these disordered behaviours wh others escape scot-free.

The laboratory facilities of the department amongst the best in Canada, and students are willing to learn the necessary tech skills, and whose initiative is tempered only a sense of compassion for other creatures be given the opportunity to use these facilities to the full.

#### Degree Programmes

### General B.A. or B.Sc. in Psychology

Students enrolled in the general (i.e., year) degree programme must take a minimul of six classes beyond the introductory level of six classes beyond the introductory level their areas of concentration. In addition by their areas of concentration. In addition by the psychology 304; Psychology 357; one of meeting the university requirements for by the sychology 308, 309, 310, or 312.

General B.A. or B.Sc., students in psychology hould take at least four classes beyond should take at least four classes beyond psychology 100. Required classes are listed psychology together with one additional class which below, to students in their final year. All is open who intend to major in psychology should consult with Dr. R. L. Rudolph.

Psychology 100.

Psychology 200, Psychology 201.

One of Psychology 304, 305, 307, or 313; one of Psychology 308, 309, 310, or 312; Psychology 300 (Optional).

R.A. or B.Sc. with Honours in Psychology (Major Programme)

In the major honours programme students must take the nine psychology classes beyond Inroductory Psychology that are listed below. all students who intend to take an honours degree in psychology should consult with Dr. R. L. Rudolph.

Psychology 100.

Psychology 304; Psychology 357; one of Psychology 308, 309, 310, or 312.

Psychology 305, Psychology 307; one of Psychology 300, 308, 309, 310, 312, 313, 356, 358, 450, or 464.

Psychology 465; Psychology 470; one of Psychology 300, 308, 309, 310, 312, 313, 356, 358, 450, or 464.

### 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 programme the student must take eleven classes beyond the 100 level in his two areas of specialization, with not less than four classes in either area. The student in the combined honours programme will normally write a thesis (or the equivalent) in the area that he elects as his major and in which he takes the majority of his classes. The following Programme is based on the assumption that the student is taking the maximum number of lasses in psychology. Any student intending to lake a combined honours degree should consult the two respective departments to arrange the details of his programme.

Psychology 305, one of Psychology 307, 308, 309, 310, 312, 313, 356, 358, 450 or 464.

Psychology 465; Psychology 470.

#### Junior Research Assistantships

A number of Junior Research Assistantships will be 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 attached to them may be obtained from Dr. B.

#### Classes Offered

100 Introduction to Psychology, lect.: 3 hrs; tutorials, demonstrations, films and labs may be arranged as required, J. W. Clark/ and other numbers of the department.

Many people confuse psychology with either common sense or psychoanalysis, and most of them believe that human behaviour is unpredictable in principle, or so complex that we can have no hope of understanding it. The lectures and demonstrations which are given in this class should disabuse you of these ideas, and at the same time achieve something more constructive and useful; they will provide you with an understanding of the ways in which an individual's environment, his past experience and his heredity control the working of his brain and the choices and decisions which he makes.

The class will be taught in a number of sections. Each section will have a number of instructors who will deal with topics basic to an understanding of psychology. The topics vary from year to year and may vary somewhat in the different sections of the class, but the four described below are representative of the kinds of topics which will be covered.

## 1. The evolution and development of be-

The idea that the behaviour of animals is controlled by instincts, and the behaviour of man by innate intelligence, is dead. So is the contending idea that man's behaviour is solely determined by his environment. We now have a clear understanding of the fact that the behaviour of man and animals depends upon both heredity and environment in much the same way as the area of a room depends upon both its length and its width. Our intelligence, for example, is a product of a complex and continuous interaction between our genetic endowment and the environments in which we exist from conception to death.

Like that of all other species, the genetic endowment of man has been shaped by biological evolution. Unlike other species, man has progressively modified his environment. Thus we are creatures both of biological evolution and of our cultural heritage. A proper understanding of the nature of our aggression. sexual behaviour, intelligence, and other chara-

cteristics must take into account our evolutionary history, our cultural history, and the often subtle interactions between heredity and environment in the course of our development.

#### 2. Learning and motivation

What one learns obviously varies from one circumstance to another. Whether one learns depends upon a much more restricted set of conditions, and it is now possible to describe these in considerable detail, and the measure many of them with great accuracy. This part of the class will give you an understanding of how two fundamental forms of learning have been isolated and studied, as well as provide you with a knowledge of the laws which govern these two kinds of learning. We will also study the motivational conditions - the physiological drives, the emotional states, the acquired needs - that determine whether and when an individual will learn and make use of what he has learned. In addition, you will be asked to think about some of the problems in this area which are still unsolved: for instance, how do we learn to avoid (as opposed to escape from) pain, does punishment erase learning or simply suppress it, is learning a gradual process, or an all-or-none one?

#### 3. Sensory processes and perception

We experience colour, form, movement, sound, odour, warmth, and so on in the world about us. The brain receives information from this world in the form of coded messages transmitted through sensory systems. Psychologists are concerned not only to measure perception but also to explain why we experience things as we do. In considering such questions as why some parts of the skin are more sensitive to cold than warm objects, or why things normally look single even though we view them with two eyes, psychologists have developed theories about the means used by the nervous system to signal information. These theories have often been successful in predicting which conditions affect perception.

Detailed attention will also be given to the way experience influences perception. Do animals reared without the opportunity of pattern vision tumble over 'cliffs' when first permitted to see; are normally sighted people able to avoid obstacles in the dark as easily as blind people; why do young children often confuse "b" and "d"? Questions like these have been studies experimentally, partly because of their practical implications but also to satisfy man's curiosity about the way we know the world about us.

#### 4. Human Performance

This part of the class is concerned with the general characteristics of human performance in a variety of situations. The discussion will hinge mainly on the idea that the mind (or the brain) acts as a device which processes and stores information. A memory is not, in any sense, a literal picture of what actually happened; it is the end product of number of complex steps in which the evidence of our senses is sorted and encoded, rejected or amplified, and integrated with other memories which are already in store.

When a child learns to talk, he does not simply parrot all the sounds which are spoken to him by his elders. The structure of his nervous system, the limitations of his ability to attend and remember, and his past experience all force him to select and process only part of what he hears. How he does so, and how he manages to construct for himself an intuitive understanding of the grammatical rules of his native language, will serve as one of the examples in this class of the interplay of heredity, perception and learning.

Finally, some emphasis will be given to the practical implications of the research discussed in this section for education and teaching, industrial design, and the adaptations of men to new environments.

200 Problems in Experimental Psychology, lect.: 2 hrs; lab.: 2 hrs.; P. Dunham/and other members of the department.

This class has two basic goals: (a) to teach you something about science in general and experimental methodology in particular; and (b) to give you some idea of the content of that business which we call experimental psychology.

The class is divided into two major components which are to some extent independent: the lecture and the laboratory. They are independent in the sense that: (a) there is little attempt to coordinate the topics which are covered from week to week in the lecture with those covered in the laboratory; and (b) there are different people involved in the teaching and grading of the lecture and laboratory material.

The general sequence of events in the laboratory is the following. Early in the fall and early in Ianuary you will find yourself running experiments which we have planned in order to give you some orientation to the apparatus and procedures you will need to know in order to plan your own experiments later. Following the procedural experiments in the fall, you will design, conduct, and report an independent research project which meets your own interests. These experiments - in fact, all of your lab work in the fall term - are restricted to problems using animal subjects (other than humans). Following the procedural experiments conducted early in January, you will design, conduct, and report on another independent research project. These later projects are restricted to using humans as subjects.

As you might imagine, you will make extensive use of primary source material in the library in formulating your own independent research projects. In addition to this journal reading, two textbooks are used in the class. One is Robert Plutchik's Foundations of Experimental Research; the other is Statistical Concepts by McCollough and Van Atta.

The lecture section of the class will be devoted to a discussion of experimental psychology in general. This includes reference to the specialized methodologies which have been developed by experimental psychologists and the research problems which are thought to be important in contemporary experimental psychology.

Prerequisite: Psychology 100.

201 Applied Psychology, lect.: 3 hrs.

Psychology 201 shall be taught as four autonomous sections of six weeks duration each.

#### 1. Tests and Measurment, R. S. Rodger

The psychometric properties of test scores, i.e. their true and error components, score reliability, score validity, item characteristics, distribution forms, the effect on distributions of using scores which are the averages over a number of tests taken, and the process of scaling scores, will be studied. It is hoped that conditions will allow students to participate in constructing then evaluating a multiple-choice test. If time allows it, the variety of possible tests (projective and psychometric, essay, free response and multiple-choice, intelligence, personality, aptitude, attainment and interest tests) will be reviewed and some history of the testing movement in Psychology will be outlined. There is no set testbook: class notes will be prepared by the instructor.

#### 2. Psychology applied to the modification of problems in human behavior, J. P. Wincze.

This section of the class will examine behavior therapy procedures applied to the modification of problems in human behavior. The emphasis of the class will not be on abnormal behavior but rather on techniques derived from the principles of learning theory which may be used to modify problem behavior. Discussion will cover the historical roots of behavior therapy and will compare the behavioral model of therapy to the medical model. In addition, the following topics will be covered: classical and operant conditioning, systematic desensitization, token economy therapy, aversion therapy, modeling, implosion therapy, and contingency contract therapy for family problems such as marital conflict.

#### 3. Psychological Study of Social Issues, E. O. Bovanowsky

The section on social issues will survey research findings of social psychology directly applicable to everyday life. The social performance involved in human interaction will be examined that is, how we create an image for others with our mannerisms, speech, dress and the use of such nonverbal cues as posture, eye contact, and expressions. How the environment affects human relations in diverse settings ranging from abortion clinics, convents and beer halls to airports will be discussed, as well as such social behaviors as aggression, learning and altruism, Topics will vary according to current issues and may include social psychological analyses of pornography and drugs, religion, and other supernatural phenomena.

4. Educational Psychology, Marcia Earhan A wide range of topics describing psychological research findings which have been or could applied to education will be covered in section. For example, sample experiment. cerning reading processes, learning disabile teaching machines, behavior modification classroom, stages of cognitive development language acquisition, and verbal learning memory will be described and application education discussed.

This description refers to the currently offer class. Although class content and instruc may change in 1972-73, the topics descent are representative of those covered in this Prerequisite: Psychology 100.

#### 300 Selected Research in Modern Psychological seminar and lab.: 4 hrs; R. L. Rudolph

This class is designed primarily for stu who wish to gain further experience understanding of contemporary psychoresearch. A student who enrolls in the assigned to a member of staff who will sen his class advisor throughout the academic Contemporary research will be discussed evaluated, and the student will be expected conduct independent research of his own in the supervision of his class advisor.

Prerequisites: Previous or concurrent en ment in two other 300-level classes; and may registered for only with the prior consent of

#### 304 Learning and Motivation, lect.: 2 hrs:la 2 hrs. R. L. Rudolph

Psychology 304 deals with the fundamental - in addition to more general phenomena such ing. as transfer and forgetting. Motivation is studied as a separate topic but is discussed. Iwo types of background knowledge are

ciples to everyday behavior, and (c) and experimental psychology.

Prerequisite: Psychology 100 (honours so Psychology 307 is recommended for anyone dents); Psychology 200 or 201 (general still

305 Perception, lect.: 2 hrs.; lab.: 3 hrs. J.

Psychology 305 considers the way in information about the world is provided by senses and how we use this information in behaviour. The material covered in the falls into four sections:

The methodological and theoretical prob-1. The study of sensation and lens peculiar to the study of sensation and

transformation of physical stimulus into neural energy, and the processing of information achieved by the nervous

4 The psychological analysis of sensations and 3. The Francisco of the known facts of sensory physiology;

The effects of higher processes, such as recognition, attention, and memory, on the way m which sensations determine how we perceive the world.

The majority of the class will be devoted to vision and hearing in human beings.

the experimental work to be presented has been selected for its importance in the theoretical understanding of perceptual processes, and the student will be expected to organize his work around theoretical rather than factual questions.

The lab work will consist of a general introduction to the apparatus and methods used in perceptual research, followed by experimental studies designed and carried out by each student individually.

Prerequisite: Psychology 100 (honours students); Psychology 200 or 201 (general stu-

### 307 Physiological Psychology, lect.: 2 hrs; lab.: 3 hrs. S. Nakajima.

principles of learning derived from research Physiological psychology is an attempt to with animal and human subjects. Since most explain behaviour from a biological point of these principles have been discovered at view. The class begins with a review of the investigated in experiments using animal solutions and functions of the central nervous jects, primary emphasis is placed on anim system, and of the sensory and motor systems. learning. The discussion of human learning It continues with an analysis of anatomical, emphasizes those aspects of behavior that physiological, and biochemical mechanisms unique to man - language and abstract thinks underlying perception, motivation, and learn-

terms of its effect on learning and performant necessary to understand physiological psychology. First, students should have general know-Laboratory sessions involve (a) experiment ledge in biology, which can be obtained by with animals and human subjects, (b) taking Biology 101. Second, they should be cussions of the applicability of learning prolamiliar with the concepts and methods of

> planning to do graduate study in psychology, and for students intending to study biology and

Prerequisite: Psychology 100 (honours students); Psychology 200 and Biology 101 or 201 (general students).

308 Social Psychology, lect.: 2 hrs; lab.: 1 hr. E. O. Boyanowsky

class concerns the study of individual behavior 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 behavior within groups and the relations between them. What determines the impressions we have of people, how we evaluate our abilities and emotions, how others influence our beliefs and opinions, how decisions are made, and why people discriminate against members of other ethnic groups are all topics which will be considered.

Prerequisites: Psychology 100 (honours students); Psychology 200 or 201 (general stu-

#### 309 Developmental Psychology, lect.: 2 hrs; dents). lab. 1 hr. T. R. Anders.

The developmental psychologist is concerned with the questions of how behaviour is acguired, sustained and altered over time. The answers to these questions have practical importance in child rearing, education and guidance, but the interest of the psychologist is directed first at determining the conditions under which behaviour begins and the conditions under which changes take place. This leads some psychologists to basic studies about activity and quiescence, attentiveness, and indifference, and reactions to positive and negative consequences. It leads others to questions about the development of intelligence, what sensory experiences influence perception, and how the child acquires such immensely complicated behaviours as those involved in speech and concept formation.

The class is experimentally oriented. Throughout, the emphasis is on learning and transfer operations with less stress on physiological and maturational processes. Because the class is intended for students with some background in experimental psychology, it deals in depth with such topics as paired associate learning, imagery, selective attention, transfer, and behaviour modification in addition to more traditional topics such as language acquisition, perceptual and cognitive development, and intellectual and social processes.

Prerequisites: Psychology 100 (honours students); Psychology 200 or 201 (general stu-

#### 310 Theories of Personality, (Not Offered 1972-73), lect.: 2 hrs; lab.: 2 hrs.

A theory of personality can be viewed as an attempt to integrate observations about human behaviour into a meaningful framework that allows the theorist to make predictions. As yet, however, no individual theorist has been able to build a model that accounts for all of human nature. The reason for the great variety of personality theories now in existence must be sought not only in the inherent complexity of human beings, but also in the individual theorist's own biases, professional interests, and methods of observation. Thus one finds theories based primarily on medical interpreta-

tions and others that stress social and developmental factors. Within some theories, behaviour is viewed solely in terms of environmental consequences, and in others the phenomenal field or cognitive processes are stressed.

In Psychology 310 the student will compare and evaluate different personality theories. A thorough coverage will also be given to the various clinical, statistical, or laboratory procedures used by different theorists. In addition, each student will carry out practical projects designed to show how some personality traits can be isolated, observed, described and modified.

Prerequisites: Psychology 100 (honours students); Psychology 200 or 201 (general stu-

312 Experimental Analysis of Behaviour Disorders, lect.: 1½ hrs; tutorial 1½ hrs; W. K. Caird, J. P. Wincze

Psychology 312 is concerned with an examination of neurotic and psychotic disorders from an experimental psychological point of view. The general purpose of the class is to present to the students current psychological thinking regarding behaviour disorders; what the major problems are and the ways in which attempts are being made to solve them. It is primarily intended for honours students and those intending to do advanced work in psychology.

This class is largely descriptive and of a fairly broad nature. The concern is with topics such as: the hypothesized biological and psychological bases of neurosis and psychosis and the various models for the study of these; the rationale and utility of diagnosis and classification; experimental methods of research into behaviour disorders; behavioural descriptions of neurotic, psychotic and character disorders and the psychological concepts used in understanding and explaining these patterns of behaviour.

There are detailed discussions of the manipulative aspects of abnormal psychology — by drugs and various types of reinforcers. The major interest is the modification of behaviour by the use of learning theory principles, such as: operant conditioning techniques with schizophrenic patients; desensitization with phobic patients; aversion-type procedures with obsessive-compulsive disorders; modeling techniques with childhood behaviour problems; and conditioning procedures with alcoholism, drug addiction and similar disorders.

The tutorial will consist of weekly meetings where current and/or contentions issues will be discussed. To facilitate an exchange of ideas, each tutorial session will be limited to 10

Students intending to enrol in Psychology 312 should have a clear understanding of some of the fundamental concepts of psychology and human physiology. In particular, they should be familiar with the basic notions of conditioning and learning, motivation and perception.

They should also understand the fundamentals of autonomic and central nervous system processes. In short, a thorough knowledge of a good introductory psychology text (e.g., G. A. Kimble and N. Garmezy: Principles of General Psychology, 3rd ed. 1968) is necessary if the student is to derive benefit from the class.

Prerequisite: Honours students or general students who have credit for Psychology 200 and 201.

#### 313 Cognitive Processes, lect.: 3 hrs; B. Earhard

A child enters this world without a memory, thought or language - with only the requirement that certain basic needs be satisfied. Within two years, a child has a well-developed memory for people, events, and words, as well as the capacity to communicate verbally with others. Cognitive psychology is not concerned with providing a description of the developmental process, but rather with ascertaining the character of mechanisms that must underly such human abilities. Cognitive psychologists ask such questions as: How does an individual recognize an object when it is in different contexts or orientations, when each shift in position or orientation produces a different pattern of stimuation on the eye? How much of daily experience is committed to permanent memory, and by what processes is it memorized? How is information stored in memory, and how is information lost from memory? In general, it can be said that cognitive psychology is concerned with developing explanations and mechanisms to account for thought and language in the human organism.

Prerequisite: Psychology 100 (honours students); Psychology 200 or 201 (general stu-

#### 353 History of Psychology, lect.: 3 hrs; J. W. Clark

This class deals with how experimental psychology came to be what it is today. The emphasis is on the evolution of thought about a number of psychological issues which have been of central concern throughout the history of psychology. Speculation on these issues is traced from antiquity to the emergence of experimental psychology in the nineteenth century. Then their development is examined in the writings of the major psychologists representatives of the prominent systematic viewpoints of psychology's first century: structuralism, behaviourism, Freudianism, Gestalt psychology. Finally, the diversification and theoretical upheavals of contemporary psychology are considered with a view toward the future of the science.

Prerequisite: This class is primarily intended for of psychological issues which have been of honours students, but other students will be central concern throughout the history of admitted with consent of the instructor.

#### 356 Advanced Motivation, lect.: 2 hrs; lab.: 2 hrs. P. J. Dunham.

The topic of motivation is one of the most difficult to describe in psychology. The material which appears in the standard textbooks on

motivation could easily have been placed in a textbook on learning, on perception, on personality theory, or on physiological psychology. Because of the breadth of the subject matter, Psychology 356 is taught as a seminar dealing with selected topics in the area of advanced motivation. In addition to these special topics discussed in class, outside readings are assigned to familiarize the student with the various classic issues which have persisted in the history of thought about

Prerequisite: This class is primarily intended for honours students, but other students will be admited with the consent of the instructor.

#### 357 Statistical Methods in Psychology, lect.: 2 hrs; lab.: 2 hrs; M. Earhard

The object of this class is to familiarize the student with the logic and application of the descriptive and inductive statistical methods that are commonly used in the analysis of data in experimental psychology. The material covered begins with the topic of frequency distributions and their characteristics, and progresses through parametric and non-parametric tests of significance, correlation and regression techniques, analysis of variance and covariance. The general approach is to introduce each of a variety of statistical methods by reasoning through the ideas underlying the topic under consideration, then discussing the general method of attacking the questions asked of the data, and finally working through specific problems in class. The classes are conducted as a combination of lectures and labs, and students are encouraged to participate actively and question often.

Psychology 357 is required for honours psychology students and qualifying graduate students. Other students may be admitted with the consent of the instructor. Although mathematical sophistication beyond the principles of elementary algebra is not required for successful completion of this class, students who are weak in arithmetic and basic algebra are encouraged to consult the instructor during the summer preceding their enrolment for assistance in preparing for the class.

Prerequisite: This class is primarily intended for honours students, but other students will be admitted with the consent of the instructor.

#### 358 History of Psychology, lect.: 3 hrs.; J. W. Clark.

This class deals with how experimental psychology came to be what it is today. The emphasis is on the evolution of thought about a number psychology. Speculation on these issues is traced from antiquity to the emergence of experimental psychology in the nineteenth century. Then their development is examined in the writings of the major psychologists representatives of the prominent systematic viewpoints of psychology's first century: structuralism, behaviourism, Freudianism, Gestalt

psychology. Finally, the diversification theoretical upheavals of contemporary ps logy are considered with a view town future of the science.

Prerequisite: This class is primarily intended honours students, but other students, admitted with the consent of the instructor

450 Physiological Mechanisms in Animal haviour (Sensory Physiology), lect.: 1 hm 4 hrs, H. O. Schwassmann.

This laboratory class provides first-hand to ledge of sensory mechanisms in perception in nervous control of behavior. Emphasi understanding of fundamental neuron logical principles and application of me electrophysiological techniques to the studsensory system.

Prerequisites: Consent of instructor.

464 Ethology, lect.: 2 hrs; lab.: or field work hrs, H. O. Schwassman/F. J. Mortenson

The behaviour of animals is studied in the fall and in the laboratory. These observations other presented material will be discussed in context of modern ethological theory. Prerequisites: Honours and qualifying students, or consent of instructor.

## 465 Honours Thesis, Members of the Dense

Psychology 465 is designed to acquaint student with current experimental problem and research procedures in experimental chology. Each student is assigned to a str member who advises the student about research in his major area of interest, and close supervises an original research project which carried out by the student. Each student required to submit a formal report of completed research before the first of May. final grade is based upon the originality skill displayed by the student in designing project and upon the submitted report. Prerequisite: Restricted to honours students

their graduating year.

#### 470 Animal and Human Learning, lect.: 2 B. R. Moore.

This class deals with selected aspects Pavlovian and operant conditioning, avoidal conditioning and punishment, discriminal learning, short-term memory, interferen effects and forgetting. The techniques control problems of the various areas examined in sufficient detail to allow student to evaluate critically the experiment of the experiment student to evaluate critically the experimental student to evaluate critically the experimental student to evaluate critically the experimental students. The state of the Bible: R. W. Anderson, Understanding the Old Testament: T. Henshaw, New Testament Literature.

The format of the class varies, Lectures, Di student presentations, extended presentations and group discussion are intermixed accorto the nature of the material to be covered. formal text is used; all of the readings are from primary sources.

eminar is required of all senior honours The semantifying-year graduate students, and is and quantity not open to others. The enrolling ordinately who has not taken a previous class in learning and conditioning should prepare by reading The Psychology of Learning by J. Deese readiles, H. Hulse (McGraw-Hill, 1967), or a and of the work. A detailed knowledge of comparate text is not assumed, but the student such a be familiar with the technical vocabulary and the major techniques and phenomena

Prerequisite: The class is primarily intended for honours students, but other students may be admitted with the consent of the instructor.

### 500 Research Assignment, Members of the Department

The student is assigned to an on-going research project and works under the direction of a staff member. The student is required to submit a report, written in thesis form, of the work completed during the year.

Prerequisite: Restricted to qualifying-year stu-

#### Graduate Studies

Courses leading to the M.A. and Ph.D. degrees in psychology are offered. Further details on graduate courses and general requirements for admission to graduate study may be found in the Calendar of the Faculty of Graduate

#### Religious Studies

A number of classes relating to religious studies, other than Religious Studies 100 will be found among the offerings of several departments. Classes in the philosophy, psychology, and sociology of religion, for example, are offered by the Departments of Philosophy and Sociology, while classes bearing on the historical development of religious thought are offered in the Departments of History, Classics and English. Interested students may consult Professor Page, Department of Philosophy.

### 100 The English Bible, lect.: 2 hrs.

The class attempts to expand the student with the whole field of Bibbical literature. The rise and development of the literature of the Old Testiment is studied against its historical background. The New Testament writings are considered in relation to the life of the early Christian community with particular reference their chief literary characteristics and their historical and religious significance.

#### French

B. H. Rasmussen (Chairman)

### Associate Professor

D. W. Lawrence

#### **Assistant Professors**

E. Royd

T. P. Carter

B. E. Gesner

S. Journoud

R. Kocourek

F. A. Kretschmer

H. R. Runte M. Sandhu

C. J. Simon

### Lecturers

M. Bishop

I. P. Gaillard de Semainville

R. Ginsberg

W. T. Gordon

K. Haberl M. Leal

E. Messinger

R. W. Ryan (on leave 1972-73)

#### Spanish

### Associate Professor

V. Romano

#### **Assistant Professors**

S. Jones M. S. Mounib

P. Turton

#### Lecturers

I. A. Luraschi

I. Pittas

H Williams

The Romance Languages are the modern forms of Latin as spoken in various parts of the Roman Empire. They include Italian, Spanish. Portuguese, French and Rumanian, as well as several other less important tongues. In modern times, some of these languages have been carried from Europe to other parts of the world, including Canada and Central and South America. Two of the most important of these, French and Spanish are offered by the Department of Romance Languages.

#### French

People choose to study French for a variety of reasons - desire to gain understanding of one of the world's richest cultures, interest in the language for its own sake, preparation for certain careers (teaching, translating, etc.), or serving the cause of Canadian unity. The Department offers an excellent opportunity for pursuing such study to those whose interest is strong enough to make them willing to devote a good deal of their time and energy to it.

In general, students are expected to acquire a good knowledge of spoken as well as written French. As students' skill grows, French is used more and more in classes. The accent aimed at

is "international"; that is, recognized as standard both in France and in French Canada, Much use is made of the language laboratory in the acquisition of oral skills. The object of our language instruction is to provide, through the judicious use of modern methods, a solid basic training that will enable students who spend a few months consolidating their knowledge in a French-speaking community to develop fluency rapidly and with precision. Students in our major honours programme are normally expected to spend at least one summer in a place where French is the language of communication.

Some students wish or are required only to gain a reading knowledge of French, Provision is also made for their needs.

If your tastes and abilities lie in the direction of French studies, you should consider the possibility of taking a bachelor's degree with Honours in French, or with Honours in French and another subject combined. Those who wish to do so, or to take French as an area of concentration in a General Bachelor's degree course, are encouraged to discuss the matter at any time (but the earlier the better) with a member of the Department. An Honours degree is usually required for or facilitates access to graduate studies.

#### French Degree Programmes

#### General Bachelor's Degree

With French as the Major area of concentration, course should include:

French 102, 202

Two, three or four of French 204, 230, 231, 240, 304; other classes by arrangement with the Department.

#### Bachelor of Arts with Honours in French Course should include:

1-2. French 102 or 104, 130.

3. A class in the minor subject or French 202. 4-5. Two other classes.

Should a student take only 102 in his first year and subsequently be accepted for Honours, he would normally take 130 in his second year. An appropriate programme would be drawn up in consultation with the Department.

6-8. French 250 and 251 and, normally, either French 202 (if not taken in Year I) or French 204, but see Year I regarding French 130.

9. A class in the minor subject.

10. One other class.

#### Year III and IV

Details of the Honours programme in French in Years III and IV are to be arranged by consultation with the Department.

Students in the Honours programme with French as major subject are normally required before graduation to:

(a) write an Honours essay under the supervision of a member of the Department; and

(b) spend at least one summer in a Frenchspeaking community to consolidate their knowledge of the language.

#### Bachelor of Arts with Combined Honours in French and Another Subject

Programmes may be arranged by consultation (as early as possible) with the departments concerned. Students planning a combined Honours course should consider, however, that the number of classes taken in either subject might be insufficient for admission to many graduate programmes without at least an extra year's work.

#### Notes

- (1) Combinations of classes other than those set forth above should not be chosen to fulfil degree requirements without the express approval of the Department.
- (2) A student may, with the permission of the Department, be admitted to a French 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.
- (3) A student admitted to a French course at an advanced level who obtains credit for a class at that level, may not later take a French class at a lower level for credit except with the express permission of the Department.
- (4) No more than two classes in French may be taken for credit at the 100 level; and no more than three at the 200 level, except with the express permission of the Department.
- (5) Enquiries concerning prescribed texts should be made at the end of the preceding academic vear.

#### French Classes Offered

102 Spoken and Written French, intensive (Part I), lect.: 3 hrs.; language lab.: 5 hrs. per week.

French 102 and 202 may be taken in the same year. Students willing and able to cover this material by attending classes 5 hours a week and working in the Language Laboratory 10 hours a week are invited to apply to do so.

#### 104 Composition, lect.: 3 hrs.

An introduction to the reading and writing of French designed to help students wishing to embark on a literature course. Non-laboratory oriented language study essentially for those taking French 130. Students hoping to take this class are required to consult with a member of the Department before registration.

106 Proficiency in Reading, lect.: 3 hrs.

For students wishing to acquire or improve skill

in comprehending written French, without extensive training in the spoken language or in the active use of the written language. Although designed primarily for undergraduates, this class can also accommodate and meet the needs of graduate students required to show evidence of a basic reading knowledge of French.

130 Introduction to French Literature, lect.: 3

A general introduction through the study of a small number of texts of varied nature; analysis, appreciation, criticism, discussion.

Comparative Literature 100, (see Comparative Literature page 32).

202 Spoken and Written French, intensive (Part II), lect.: 3 hrs.; language lab.: 4-5 hrs. per

This class continues and completes the work begun in French 102.

Prerequisite: French 102.

Note: French 102 and 202 may be taken in the same year. See note following French 102.

204 Composition, lect.: 3 hrs. per week.

Training towards accuracy in reading and writing French. Exercises in translation from French to English and from English to French; grammar, vocabulary building, free composi-

206 Proficiency in Reading, lect.: 3 hrs.

For students wishing to increase their skills in the comprehension of French texts. Suitable for students having reached the appropriate linguistic level, including those who have taken French 106

230 Survey of French Literature (Part I), lect.: 1 hr.; study group: 2 hrs. per week.

Study of a selection of the most outstanding works of French Literature from its beginnings to the time of the French Revolution. Not for Honours students.

231 Survey of French Literature (Part II), lect.: 1 hr.; study group: 2 hrs. per week.

Study of a selection of the most outstanding works of French Literature since the time of the French Revolution. Not for Honours

250 Theatre and Poetry in the 17th and 18th Centuries, lect.: 3 hrs.

For Honours students. Prerequisite: French 130.

251 Novel and Other Genres in the 17th and 18th Centuries, lect.: 3 hrs.

For Honours students. Prerequisite: French 130. 304 Composition, lect.: 3 hrs.

Continues the work of French 204 at a his

Prerequisite: French 204.

352 Theatre and Poetry in the 19th and 20. Centuries, lect.: 3 hrs.

For Honours students. Prerequisite: French 250.

353 Novel in the 19th and 20th Centuri lect.: 3 hrs.

For Honour students. Prerequisite: French 251.

404 Composition, lect.: 3 hrs.

Continues the work of 304 at a higher level Prerequisite: French 304.

420 History of the French Language, lect.

Study of the development of the French language from its origins in spoken Latin to the present day. Particular attention is paid to he period from the 16th to the 20th century. Prerequisite: A knowledge of Latin is require

421 General Phonetics, lect.: 3 hrs.

French.

422 General Linguistics, lect.: 3 hrs.

inclusion in various study programmes.

423 Evolution of Linguistics, lect.: 3 hrs.

The development of language study from ear times to the present day. Special attention w be paid to the linguistic ideas of the twentie century.

430 Introduction to Literature of the Mid Ages, lect.: 3 hrs.

431 Literature of the 16th Century, lect.: 3

432 Literature of the 17th Century, lect.: 3

134 Literature of the 19th Century, lect.: 3 hrs.

135 Literature of the 20th Century, lect.: 3 hrs.

10 French-Canadian Literature, lect.: 3 hrs.

460 Special Honours Subject, lect.: 3 hrs.

Not only is Spanish, like French, the language of one of Europe's great cultures, but it is also one of the most widely used languages in the world (being the official language not only of Spain but of most of the countries of South and Central America as well) and therefore, of tremendous social, political, and economic importance. Students interested enough in Spanish to be willing to devote a good deal of their time and energy to its serious study have an excellent opportunity to do so at Dalhousie.

In general, students are expected to acquire a good knowledge of spoken as well as written Spanish. As students' skill grows, Spanish is used more and more in classes. Both the "Castilian" and the "American" accents are used and considered of equal standing. Much use is made of the language laboratory in the acquisition of oral skills. In addition, students are encouraged to attend a conversation group at the appropriate level.

Study of the sounds of language, in particula. The object of our language instruction is to those of English, French, and other language provide through the judicious use of modern familiar to students; how these sounds at methods, a solid basic training that will enable produced, how they may be classified; how students who spend a few months consolidating they may be taught; practice in the use their knowledge in a Spanish-speaking comphonetic script; introduction to principles munity to develop fluency rapidly and with phonetics. Not a class in remedial pronuncial precision. Students in our major Honours programme are normally expected to spend at Prerequisite: Good knowledge of English at least one summer in a place where Spanish is the language of communication.

If your tastes and abilities lie in the direction of Spanish studies, you should consider the possi-Study of the nature of language: elements bility of taking a Bachelor's degree with phonetics and phonology; writing; gramma Honours in Spanish, or with Honours in Spanish (units, categories, functions); words and mess and another subject combined. Those who wish ing (lexicon, semantics); summary of historical to do so, or to take Spanish as an area of comparative and contrastive linguistics; sure concentration in a General Bachelor's degree of major world languages; chief events course, are encouraged to discuss the matter at the history of linguistics; practical application any time (but the earlier the better) with a of linguistics. In view of the essential role member of the Department. An Honours degree language in human life, this class is suitable is usually required for or facilitates access to graduate studies.

Spanish Degree Programmes

General Bachelor's Degree Course should include:

Spanish 102 and 202. Two, three or four of Spanish 210, 230, 240, and 300 or 400 -level class.

Bachelor of Arts with Honours in Spanish Course should include:

Spanish 102

2. A class in the minor subject

Literature of the 18th Century, lect.: 3 hrs. 3-5. Three other classes (one of which could be Spanish 202).

#### Year II

6-8. Spanish 210, 202 (if not taken in Year I) and either 230 or 240.

9. A class in the minor subject.

10. One other class.

#### Years III and IV

Details of the Honours programme in Years III and IV are to be arranged by consultation with the Department.

Students in the Honours programme with Spanish as major subject are normally required before graduation to:

(a) write an Honours essay under the supervision of a member of the Department; and

(b) spend at least one summer in a Spanishspeaking community to consolidate their knowledge of the language.

#### Bachelor of Arts with Combined Honours in Spanish and Another Subject

Programmes may be arranged by consultation (as early as possible) with the departments concerned. Students planning a combined Honours course should consider, however, that the number of classes taken in either subject might be insufficient for admission to many graduate programmes without at least an extra year's work.

#### Notes:

- (1) The "other" classes chosen as electives in the programmes outlined above must satisfy general degree requirements (see page 11).
- (2) Combinations of classes other than those set forth above should not be chosen to fulfil degree requirements without the express permission of the Department.
- (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.
- (4) A student admitted to a Spanish course at an advanced level, who obtains credit for a Spanish class at that level, may not later take a Spanish class at a lower level for credit except with the express permission of the Department.
- (5) Enquiries concerning prescribed texts should be directed to the Secretary of the Department.

### Spanish Classes Offered

102 Spoken and Written Spanish, (Part I), lect.: 3 hrs.; language lab.: 5 hrs. per week.

For beginners or students with only a slight knowledge of Spanish.

Spanish 102 is normally followed in the second year by Spanish 202, which completes it. Students willing and able to cover the material more quickly through concentrated effort are invited to apply (to a Spanish instructor at registration or in the first class) to take Spanish 102 and 202 in the same year. See Spanish 102/202 listed below.

Comparative Literature 100 (see Comparative Literature page 32).

200 Spoken and Written Spanish, (Part II), lect.: 3 hrs.; language lab.: 3-4 hrs. per week.

This class continues and completes the work begun in Spanish 102. Prerequisite: Spanish 102.

102/202 Spoken and Written Spanish, (Part I & II), lect.: 5 hrs.; language lab.: 9 hrs. per week.

Able first year students are invited to apply (to any Spanish instructor at registration or in the first Spanish 102 class) to take Spanish 102 and 202 in the same year. Students who take these two classes in the same year will attend classes 5 hours a week and work 9 hours a week in the language laboratory. Upon successful completion of this work, two credits are granted.

210 Hispanic Civilization, Lect.: 3 hrs.

Prerequisite: Spanish 102.

Survey of the main aspects of Spanish and Latin-American culture (e.g. living habits, politics, art, etc., in the various parts of the Spanish-speaking world). The class will be conducted mainly in Spanish, but readings will be in both Spanish and English.

230 Survey of Spanish Literature, lect.: 3 hrs.

Introduction to the main works and trends in Spanish literature from the 10th century to the present day; aims at developing a critical point

Prerequisite: Spanish 202 (which may be taken at the same time).

240 Survey of Latin-American Literature, lect.: 3 hrs.

History of the development of Latin-American literature from pre-Columbian times to the present. Study of illustrative works.

Prerequisite: Spanish 202 (which may be taken at the same time).

304 Composition, lect.: 3 hrs.

Training towards accuracy in reading and writing Spanish. Exercises in translation from Spanish to English and from English to Spanish: grammar, vocabulary building, free composit-

Prerequisite: Spanish 202.

334 Literature of the 19th Century in Spain Prerequisite: Spanish 202.

336 Literature of the 20th Century in Spain,

Prerequisite: Spanish 202 (Spanish 304, which may be taken at the same time, is strongly recommended).

341 Latin American Literature of the 19th Century, lect.: 3 hrs.

Prerequisite: Spanish 202 (Spanish 304, which may be taken at the same time is also strongly recommended).

420 History of the Spanish Language, lect.: 3

Study of the development of the Spanish language from its origins to the present day.

421 General Phonetics, (see under French Classes offered).

422 General Linguistics, (see under French Classes offered).

423 Evolution of Linguistics, (see under French Classes offered).

432 The Golden Age, lect.: 3 hrs.

441 Latin American Literature of the 20th Century, lect.: 3 hrs.

Russian

Associate Professor Irene Coffin, Chairman

**Assistant Professor** Nicholas Maloff Natan Nevo

The Russian language has the same origins as English, French and German, and it is, in general, neither easier nor more difficult for the foreigner to than the other languages which are commonly taught in university. Students who take the introductory class at Dalhousie become sufficiently conversant with the language to be able to make themselves understood in countries where Russian is the first or second language and, with occasional assistance from a dictionary, they can read most of the editorials in Pravda and appreciate some of the satire in Krokodil. By taking the more advanced classes, one can become fluent in the language, and thus have direct access to Russian literary, political and scientific thought. The advantages of being able to find out for oneself what the representatives of some 200 million people say, rather than having to rely on the wire services and other secondary sources, does not need to be laboured in a university calendar.

### Degree Programmes

#### **Combined Honours**

Russian may be taken in a modern languages combined programme with French, German or

The language laboratory is open more than 50

hours a week (including some evenings) and students have a wide selection of times at which their oral assignments can be completed. Additional conversation classes are offered for students who wish to speak Russian fluently.

One of the features of the second and third year class is the participation in a Russian play. This is not compulsory, and most students find it not only helpful, but entertaining as well.

#### Classes Offered

100 Elementary Russian, lect.: 3 hrs.; Irene Coffin/Natan Nevo/Nicholas Maloff

This class is designed for students who have no previous knowledge of the Russian language. Since Russian is an inflected language, the study of grammar is introduced along with oral work so that the student begins to speak right away. Reading Russian does not create any difficulty since the alphabet is phonetic.

The class is a credit class, and since Russian is not taught in Nova Scotia high schools, it is often taken by students who have not acquired a sufficient knowledge of other modern languages taught at the University.

200 Second Year Russian, lect.: 3 hrs.; Natan

This is a continuation of Russian 100. The study of Russian grammar is completed and emphasis is placed on oral work. Additional conversation classes are given by the instructors for students who wish to acquire competence in speaking Russian.

201 Scientific Russian, lect.: 3 hrs.; Natan Nevo

This class is designed for science students. The study of Russian grammar is continued but emphasis is now placed on the reading of scientific texts. At the completion of the class a science student should be able to translate scientific texts with the aid of a dictionary. Prerequisite: Russian 100.

300 Area Studies, seminar; Irene Coffin

This class is a study of the geography and history of Russia from its beginning to the present time. The class is conducted as a seminar and the students are encouraged to express their thoughts in Russian. Prerequisite: Russian 200 or 210.

301 Conversational Russian, lect.: 3 hrs.; Irene D. Q. Brodie Coffin.

This class is designed to develop the student's speaking ability about commonplace subjects and situations. The students are required to read articles in Russian papers and magazines R. Schliewen which enlarges their vocabulary. Prerequisite: Russian 200 or 201, or by arrange-

ment with the instructor.

302 and 303 Russian Literature, (offered alternate years), lect.: 2 hrs.; Natan Nevo

This is a general class in Russian prose, poet, and literary criticism, whose purpose is to ha the student who has mastered the fundamen structure of the Russian language to deepen knowledge of it and its literature a strengthen his audiolingual skill.

The class will acquaint the student will biographical sketches and selected works well known Russian authors of the 19th 20th centuries. Discussions will be held in hor the year. Each student will be required prepare a paper on a literary topic. Prerequisite: Russian 200 or 201 or equivalent achieved at any other university as

Nicholas Maloff

recognized by Dalhousie University.

This class traces the development of Russ culture and folklore from their earliest and to the present day and their influence on a architecture and music. Numerous masternie will be illustrated with slides, film strips an

305 Soviet Literature, (offered in 1973-74) hrs.; Nicholas Maloff.

This class is designed to acquaint the stude with the best works of the Soviet authors to the

400 Advanced Russian Conversation and Conposition, 3 hrs.; Nicholas Maloff.

This class is conducted as a seminar and is continuation of the Russian 301. Prerequisite: a class of 300 level.

#### Sociology and Anthropology

### **Professors**

L. Kasdan J. J. Mangalam W. N. Stephens

#### **Associate Professors**

D. H. Clairmont (Chairman) H. V. Gamberg J. G. Morgan V. Thiessen

#### **Assistant Professors**

J. Barkow G. D. Bouma

P. G. Clark D. H. Elliott

J. L. Elliott D. J. Grady

N. W. Poushinsky

J. D. Stolzman

The sociologist is concerned in general with

and development of societies to govern, complex industrial units. Within any and any society, sociologists may analyze the parlicular of wealth, power and prestige, distributed of conformity and non-conformity, problems such as crime, racism, and bottom, or the development of alicide, overpopulation, or the development of

As part of a liberal arts education, sociology As Price the student to think critically about problems which are part of his own society. His or het willingness to think about the reasons for or nei prejudice, poverty, or war, should be Russian and English. Essays will be given durin increased by exposure to this field. The career possibilities in sociology include research in government, industry, or university and teaching at the university level.

Sociology 100, as a general introduction, is normally a prerequisite for all advanced classes 304 Russian Culture and Civilization, 2 bn in the department. The content of this class is especially designed to provide students contemplating concentration in sociology with a solid foundation for subsequent study in the field, Multiple sections will be offered and each section will include lectures plus discussion in small tutorials. Sociology 105 and 110 are also introductory in character, but their content is railored for students who do not intend to concentrate in sociology. Enrollment in one of these latter classes does not necessarily preclude ater entry into advanced classes, although admission may in some cases be contingent upon departmental and/or the instructor's consent. 200-level classes include all the classes normally taken by students concentrating in sociology. 300-level classes are structured primarily as seminar courses and ordinarily presume a fair degree of familiarity with the discipline, 400-level classes are restricted to honours students and qualifying graduate stu-

> Anthropology consists of four subfields: archaeology, anthropological linguistics, physical anthropology, and social/cultural inthopology. Most of the class offerings in Anthropology in the department fall into the fourth subfield, social/cultural anthropology (though the student will be introduced to all of the subfields in Anthropology 100). Social/ cultural anthropology is the study of culture and social organization. It has affinities with everal other social science disciplines, including economics, history, political science and sociology. Formerly, social-cultural anthropologists were interested primarily in small-scale, mostly non-literate societies, studying them by "parlicipant observation" and comparing aspects of and social structure. In recent years, anthropology has applied its methodological theoretical perspectives to such diverse as mental institutions, urban life, and governmental regulatory agencies.

> A background in anthropology provides a broad of the human animal, his diverse cultures his biological background. Such an orientaan antidote to provincialism and an hadiable perspective for interests and studies

in the other social sciences, the humanities, psychology, and the biological, medical and legal disciplines.

Anthropology 100 is normally a prerequisite for 200 and 300-level classes in the department. Exceptions to this general rule are noted in the class descriptions below.

#### Degree Programmes

Sociology and anthropology are both approved fields for concentration. As this calendar goes to press, however, it remains to be determined whether or not a student may legitimately present a combination of sociology and anthropology classes to fulfill the entire concentration requirement. Consult with the department or registrar's office in the fall to be apprised of university policy on this matter.

At present the department offers an honours programme in sociology only. However, a proposal for an honours programme in anthropology is currently under review. If approved, this programme may or may not be sufficiently developed to become operative in 1972-73.

#### B.A. with Honours in Sociology

Nine classes in sociology above the introductory level. Sociology 301, 310, 401A, 405A, 405B, and 450 are compulsory while the others are at the discretion of the students.

#### **Combined Honours**

Students wishing to take sociology as the major or minor field in a combined honours programme should consult the department. Combined honours can be taken with economics, political science, philosophy, and psychology.

#### Sociology Classes Offered

100 Introduction to Sociology, lect.: 2 hrs.; tutorial: 1 hr.; J. J. Mangalam, N. W. Poushinsky, G. D. Bouma, D. Q. Brodie.

Sociology 100 is designed to provide both a general introduction to the discipline of sociology as well as a foundation for more specialized study in the field. Emphasis in this class will be placed on basic sociological concepts, the nature of the sociological perspective, the logic of social inquiry, and recurrent theoretical and methodological problems of the discipline. In addition, students will be exposed to a survey of some of the major fields within the general province of sociology. Students who plan to concentrate in sociology are required to complete this class before entering upper-year classes. Students who are uncertain about their long-range interest in sociology are also advised to enroll in this class rather than 105 or 110.

105 Human Societies, lect.: 3 hrs.; W. N. Stephens, P. G. Clark.

This class will provide an introduction to both sociology and cultural anthropology. The first half of the class traces cultural evolution from hunting bands, through tribes, kingdoms and agrarian civilizations, to modern industrialized states. A series of example societies is viewed, in readings and in ethnographic films. The primary mode of analysis will be ecological, i.e., how the development of these societies has been partially determined and limited by the environment and their food-getting adaptation to it. The second half of the class will place greater emphasis on the sociological interpretation of modern industrial societies in terms of their technologies, systems of stratification, and political institutions. This class is offered for arts and science students who do not intend to pursue further study in sociology or anthropology. The class is not open to students who have previously taken Sociology or Anthropology 100.

110 Principles of Sociology, lect.: 3 hrs.; Staff.

A class designed exclusively for non-arts and science students. The first part of the class will attempt to convey a general appreciation of the sociological approach to human behavior. The remaining portion of the class will then endeavor to apply this approach to areas of human activity that are of special interest to members of the class. This class is not open to students who have previously taken Sociology or Anthropology 100.

202A Comparative Analysis of Social Systems, lect.: 3 hrs.; D. J. Grady.

This class will consider the literature on the structural and functional aspects of "social system," for the inclusive societal social system to the exclusive boundaries of role associated with small groups. Effort will be made to integrate analysis with praxis by "creating" social systems within the group, as well as by participant observation of local and regional and "cross-cultural" perspectives.

203 Deviance and Social Control, lect.: 2 hrs.; tutorial: 1 hr.; Staff. (Not offered in 1972-73).

Groups make formal and informal rules in an attempt to regulate and make predictable the behavior of their members. Violations of these rules occur in many different ways and stem from various causes. The purpose of the class is to examine 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 contest.

204 Social Stratification, lect.: 2 hrs.; discussion: 1 hr.; J. D. Stolzman.

This class analyzes the principal aspects of social inequality in modern, industrial society. The formation of classes, status groups and the organized political expressions are 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, problems of the mobility of individuals and groups through the stratification system and the impact on social structure are dealt with. 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.

205 Sociology of Religion, lect.: 2 hrs.; tutorial 1 hr.; G. D. Bouma.

This class analyzes the relations between religious beliefs and human behavior 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 behavior; the formal organization of the religious institution, social psychological considerations of religious behavior. The primary focus is on religion in western society. A major paper is required.

206A Social Change and Modernization, lect.: 2 hrs.; tutorial: 1 hr.; H. V. Gamberg.

This class is primarily concerned with social and economic problems of underdevelopment in the Third World, with emphasis on the political and economic relations between industrially advanced and backward countries, and the forms which these relations have taken since political independence. An attempt is made to identify the economic and social causes of underdevelopment in this relationship. Critical attention is also paid to the traditional nature of pre-industrial societies and values as obstacles to industrialization and social change.

207A Socialization, lect.: 2 hrs.; seminar 1 hr.; P. G. Clark

This class deals with the processes by which individuals become members of groups. The lectures focus on such substantive processes as child-rearing, age grading, sex typing, initiations, re-socialization of adults, conformity, internalization of norms, and expectation formation. Although theoretical issues are examined, primary emphasis is placed on empirical research findings in the area of experimental social psychology. An empirical research project will be required.

208 Communities, lect.: 2 hrs.; seminar: 1 hr.; This class deals with the origin of modern. P. G. Clark.

Sociology 208 examines a wide variety of territorially based residential groupings. The emphasis in the first term is on such features of natural communities as the ecology, neighborhood social networks, the power structure, and behavior in public settings. Both the rural village and the metropolis is dealt with, in addition to such sub-communities as ethnic ghettos, slums, suburbia, and bohemia. Emphasis in the second term is on intentional communities such as utopian colonies, communes, company towns, and religious communities. Students are expected to design a model of an intentional community.

211B Canadian Society, lect.: 3 hrs.; D. H. Clairmont.

The social significance of such population processes as immigration and migration will be considered in an attempt to develop a general perspective on the Canadian society. Social systems within Canada will be analyzed with respect to the social determinants of class, status and power.

212 Minority Groups, lect.: 2 hrs.; tutorial: 1 hr.; J. L. Elliott.

The social status of minority groups will be examined in the light of contemporary theories of prejudice and discrimination. The societal consequences of discrimination will be considered with respect to their effect on both minority and majority groups. Special emphasis will be placed upon an analysis of Canadian minorities.

213A Complex Organizations, lect.: 2 hrs.; tutorial: 1 hr.; R. Schliewen.

This class makes a critical study, from the comparative point of view, of theoretical models for the analysis of complex organizations. Students will examine the classical. structural-functionalist, and managementscience approaches to organizations. The class will entail a systematic survey of the sociological literature on this subject, with special concentration on organizational structure, strategy and decision-making.

214B Industrial Sociology, lect.: 2 hrs.; tutorial: 1 hr.; R. Schliewen.

Recommended preparation: Complex Organizations. This class will take the organizational structure and the economic system as given. It will focus on low-level personnel in industry and administration, will cover scientific mangement, Human Relations and newer approaches, with emphasis on technology and alienation. Students will do a project on social structure in industry, gathering their own data.

215 Mass Society, lect.: 2 hrs.; lab.: 1 hr.; D. H.

post-industrial "mass society." Problems associated with industrialization, cybernation, leisure, technology, and environmental degredation 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. The grade for the class will be based upon two examinations and several papers. This course is not open to students who have previously taken Sociology 215A or 215B.

216B Sociology of Occupations, lect.: 2 hrs.; tutorial: 1 hr.; G. D. Bouma.

This class analyzes several social processes to occupational careers, professionalization formal organization of occupations processes are treated in the context of implications for the relations between on tions and both social structure and he behavior. A term paper is required.

220 Sociology of the Family

Not offered in 1972-73.

301 Statistics, lect.: 3 hrs.; N. W. Pouski

This class is designed to give the student. experience at an elementary level with branches of statistics which are most freque used in the social sciences. In particula student will learn when and how to non-parametric tests. He will also be mi general introduction to factor analysis.

306B Sociocultural Change, Modernization Development, lect.: 2 hrs.; seminar: 1 hrs.

The class will treat change, modernization development as distinct but related no Beyond examining the meanings and im tions of these terms, an attempt will be in outline some of the complex processes inv in planning for national development of tional societies. For purposes of illustrations, the class will focus on the lems of South Asia. Besides Sociology either Sociology 206 or consent of the structor is required.

308A Experimental Analysis of Social

Not offered in 1972-73.

310 Research Methods, lect.: 3 hrs.; I Brodie.

This class is concerned with the constru and testing of "grounded theory." A de survey of the basic methods explored at stages of social research is presented. The t discussed in the class include the constru of theory, the formulation of a res problem, research designs, measured methods of data collection, and analytic th testing. Special attention is given to the 32 survey as one of the main methods o science research. Practical experience in methods is proved through a class Class organization: During the first half class material is presented in two sessions and then discussed in a labor session. During the second half of the participants participate in research team proach to a problem, Method of eval First term; two examinations and laberal assignments. Second term; participation discussion and a final research paper.

311A Sociology of Leisure

Not offered in 1972-73.

313B Social Conflict Theories, seminar: 3 hrs.; H. Gamberg, J. Stolzman.

313A Sociology of Health and Illness, seminar: 3 hrs.; J. L. Elliott.

geliefs and attitudes surrounding disease concepts and treatment will be examined in primitive and contemporary societies. In addiprimition, the social organization of medicine will be malyzed with respect to the following: the health professions, the hospital as a complex organization, and the larger society.

315A Urban Sociology, (Not offered in

316 Sociology of Higher Education, seminar: 3 hr.; W. N. Stephens.

A seminar in which the student will participate in a stady of Dalhousie student life, and will write two term papers, each based on at least thirty references, which review research in a problem area such as the following: value change in university; career choice; student protest and political activism; student mental health; evaluation studies of courses and curricula. There will be no tests; the class grade will be based on the two papers and on the student's research contribution. Enrollment only by permission of the instructor.

317A Comparative Political Sociology, seminar: 3 hrs.; D. J. Grady.

This seminar reviews the findings of social science on the issues of political systems, and seeks to account for the uses and abuses of influence and social control in societies. Emphasis is upon comparative study from the level provided by the species as a system to the base-line present in individual experience, especially in Nova Scotia and the Atlantic

318A Issues in the Theory of Society, seminar: 3 hrs. J. D. Stolzman.

This seminar will be primarily concerned with a number of metatheoretical problems which have persistently animated the history of social thought. Particular attention will be devoted to the various ways in which social thinkers have conceived the relationship between man and society. Likely topics for discussion include human nature, alienation, reification, and exploitation. Evaluation will be based entirely on either a major paper or a portfolio of several short papers.

319B Social Movements, seminar: 3 hrs.; D. J.

eminar examines both conventional formal) and contemporary (action) approaches social movements - viewed as efforts by individuals and groups to challenge culturevalues, social institutions and/or a political order. Focus is upon participant observation,

with particular attention to developments in 452B Readings in Sociology, Staff. Nova Scotia and the Atlantic Region.

320A Seminar in Social Change. (Not offered in

325 Sociology of Science and Ideas, lect.: 2 hrs.; tutorial: 1 hr.; D. H. Elliott.

The study of the social origins and organization of knowledge is an important aspect of contemporary sociology. This class introduces the student to the major elements of the sociology of knowledge. The class is particularly concerned with the examination of the body of knowledge known as modern science. The historical origins of science will be discussed. The social organization of contemporary scientific research will be examined using empirical data. The interaction between the scientific community and society-at-large will be analyzed; particular attention shall be paid to questions of science policy. The relationship between modern technology and contemporary scientific research will be studied with particular reference to the impact of modern information processing technology upon the development of social science. The class evaluation will depend upon both papers and examinations. This class is not open to students who have previously taken Sociology 209A or

330 Seminar on Family and Socialization, seminar: 3 hrs.; W. N. Stephens.

(Same as Anthropology 330; consult the latter for class description.)

401A History of Sociological Thought, seminar: 3 hrs.; J. G. Morgan.

This class is designed to introduce the student to some of the main concerns of major contributors to theoretical sociology. Writers considered will include Marx, Weber, Durkheim, Simmel, and Pareto.

405A Contemporary Sociological Theory I, seminar: 3 hrs.; H. V. Gamberg.

405B Contemporary Sociological Theory II, seminar: 3 hrs.; D. H. Clairmont.

450 Honours Seminar in Sociology, seminar: 3 hrs.; R. Schliewen.

The class has two parts; part one covers basic concepts of philosophy of science, such as testability and meaning of propositions in a social science. Part two applies these concepts in a concrete research project of the student's choice. The emphasis will be on oral presentation of assignments and repeated mutual review of proposals and papers.

451A Readings in Sociology

451B Readings in Sociology

The student is assigned to a member of staff for regular meetings to discuss readings in a selected area. Papers and research projects will

Anthropology Classes Offered

100 Introduction to General Anthropology, lect.: 3 hrs.; Staff.

This class introduces the student to all subfields of anthropology and is intended for those planning to take additional classes in this subject. The class will provide the student with an understanding of the complex nature of human behavior, including the analysis of man's physical structure, social organization, and art

222 Psychological Anthropology, lect.: 3 hrs.; Staff.

This class deals with the relationship between psychological and cultural variables. Topics discussed include culture and personality, socialization, motivation and culture, cognition and culture, transcultural psychiatry, and the psychology of culture change.

Prerequisite: Anthropology 100 or permission of instructor.

225 Anthropological Theory, (Not offered in

This class introduces the student to basic concepts in anthropological theory.

Prerequisite: Anthropology 100 or consent of instructor.

231B North American Indians, lect.: 3 hrs.; W. N. Stephens.

The class will move through three parts. 1) New World prehistory, demography, language groups; 2) A review of the North American culture areas: Eskimo, Canadian Indians, Eastern Woodlands, Northwest Coast, California, Basin-Plateau, Southwest, and Plains; 3) Modern Indian problems. The class grade will be based on several quizzes, and on two term

Prerequisite: Anthropology 100 or Sociology 105.

301 Peasant Society and Culture, lect.: 3 hrs.; L. Kasdan.

This class deals with aspects of several of the world's peasant societies.

Prerequisite: Anthropology 100 or permission of instructor. Consult with department to see if offered in 1972-73.

306 The Social Organization of Pre-Literate Societies, lect.: 3 hrs.; L. Kasdan.

This class gives a systematic and detailed description and analysis of the social organization of non-industrial societies where men earn

their living by gathering, hunting, herding, or agricultural activities, and whose economy differs from that found in industrial systems.

Prerequisite: Anthropology 100 or permission

Prerequisite: Anthropology 100 or permission of instructor. Consult with department to see if offered in 1972-73.

307 Biosocial Anthropology, lect.: 3 hrs.; Staff.

This class covers the areas of overlap among physical, psychological, and cultural anthropology. Its perspective is that of the synthetic theory of evolution, its theme is that our individual and social characteristics, our species' traits, are products of natural selection. Topics to be discussed include Darwinism and the social sciences, the nature of biological evolution; animal ethology; the evolution of Homo sapiens; nonhuman primate behaviour; wolf behavior; human ethology; early learning and development; social bonding and dominance; language and communication; relationship between biological and sociocultural evolution; and aggression and territoriality. A paper will be required.

Prerequisite: Anthropology 100 or permission of instructor.

316A African Ethnography, lect.: 3 hrs.; J. Barkow.

This class introduces the student to the anthropological study of the peoples of Africa. The class is organized in terms of subject areas, rather than in terms of ethnic units or geography. Topics to be discussed include general background, family and social organization, economics and livelihood, politics and government, and personality and socialization. *Prerequisite:* Consent of instructor.

**316B Modernization in Africa,** seminar: 3 hrs.; J. Barkow.

This class deals with the anthropological study of contemporary, rather than pre-colonial, Africa. Foci will be urbanization and the effects of modernization of rural life. A paper will be required.

Prerequisite: Anthropology 316A or consent of instructor.

320A Readings in Anthropology, Staff.

320B Readings in Anthropology, Staff.

330 The Family and Socialization in Crosscultural Perspective, seminar: 3 hrs.; W. N. Stephens.

An intensive study of three structural variables — father-absence, household size (nuclear versus extended family), and patriarchality as it occurs in peasant societies and their effects on family and sex roles, socialization, and personality development. Readings will be cross-cultural and field studies by anthropologists, child development studies and personality theory bearing on issues of identification, sex identity and moral development. Two major papers, no

tests. Enrollment by permission of instructor only.

#### Theatre

#### **Associate Professors**

A. R. Andrews (Chairman)

L. H. Lawrence

R. G. Merritt

#### **Assistant Professors**

D. Farnsworth D. R. Overton

W. A. Reznicek

O. W. Schaub

Theatre is a living art. As such it is constantly changing and the theatre programme aims at remaining flexible and responsive to those changes. Students who intend to study theatre should be prepared to look at the future as well as the past. For though the department is not directly engaged in training personnel for the existing commercial theatre, it does expect its students to take an active interest in the relationship of theatre to life.

The history of theatre forms a part of the curriculum in order that the student may gain a firm understanding and clear vision of the various established conventions and possibilities. Plays are studied as performed events since it is only in performance that a play is fully realized. In all classes, practical exploration of problems is regarded as fundamental to their solution.

The new arts centre at Dalhousie provides appropriate teaching areas and laboratory facilities for students in the theatre programme. The spaces in the theatre wing of the building have been designed with the specific intention of meeting these needs, and include a master classroom, two studio classrooms, design and seminar rooms, and ancillary workrooms. The offices of the department, are also located in the arts centre, which is on the north side of University Avenue, between Henry Street and Seymour Street.

No class offered by the department of theatre will be permitted to exceed twenty in number because of the nature of the work involved. Any student who wishes to take a class in theatre must therefore first consult with the department.

In conjunction with the programme, experiments, public exercises and formal productions are presented throughout the year.

#### Degree Programme

#### B.A. with Honours in Theatre

The classes in theatre beyond the introductory level are designed as a coherent programme of study leading to an Honours B.A. in Theatre. The full course should comprise the following classes:

#### Year I:

- 1. Theatre 100
- 2. A class from Group A.
- 3. A class from Group C.
- 4. A class in a fourth subject from any
- 5. A class in a fifth subject from any ground

#### Year II:

- 6. Theatre 250: The Classic Theatres their Origins.
- 7. Theatre 270: Design in the Theatre
- 8. A class in art history.
- 9. A class in the student's minor subject
- 10. An elective class.

#### Year III:

- 11. Theatre 350: The Theatre from the naissance to the Nineteenth Century.
- 12. Theatre 360 (formerly 480): The wright in the Theatre.
- 13. Theatre 380: The Actor in the Theatre 14. A second class in the student's nubiect.
- 15. An elective class.

#### Year IV:

- 16. Theatre 450: The Modern Theatre.
- 17. Theatre 470: Special Topics.
- 18. Theatre 460 (formerly 370): Theories Play Production.
- 19. Theatre 490: Dramatic Criticism and Aesthetics of the Theatre.
- 20. An elective class.

#### **Combined Honours**

Combined honours programmes of study which theatre is related to some other disciplinated at Dalhousie also exist. Interestudents should apply to the department further information.

#### Classes Offered

100 Introduction to Theatre Class meets hours

There are many ways of approaching the art the theatre and different sections of this can be expected to take different following the particular interests and curios of the members of the group. Common [10] sections, however, will be the assumption the theatre is everywhere and always a limit art. In the theatre, human beings communication with one another by sights and sounds; exist to be seen and heard. The practical which goes on in all theatre classes emphasized this fact. The student can expect that some the traditional concepts of the theatre will critically examined, for example; the notion the theatre as a collaborative venture to various specialists, playwright, actor, direct and designer, contribute their skills. The of various possible relationships between a and an audience falls within the scope class, as does the re-examination in theal terms of plays which have become lit heirlooms. The chief aim of the class enable students to discover the thealth exercise their curiosity in a creative ent ment and to decide whether they wish to more advanced classes in the subject.

There is no prescribed textbook and no formal prerequisite for the class. Individual instructors recommend outside readings where apartiate.

# 250 The Classic Theatres and their Origins Class

This class begins by examining the possible origins of the theatre in prehistoric times. It then considers what we know of the scripts, theatre buildings, acting and general staging conventions of Greek, Roman and Eastern theatres. In addition to this exploration of original performance conditions, which will include practical work, students will be asked to consider the philosophical and social implications of these theatres and their relevance to contemporary societies. Particular areas of emphasis will be determined by the students and the instructor.

\*Prerequisite: Theatre 100.

#### 270 Design in the Theatre Class meets 6 hours

This class is specifically concerned with visual aspects of the theatre. Its terms of reference include any visual stimulus in the environment that may affect the theatrical event. Everything in the theatre that is seen, from its basic architecture to the organization of bodies in space at a particular moment, has been subject to a process of design. Areas of particular study, to be determined by the students and instructor, may be drawn from scenic, lighting, costume, and architectural design. Students will be expected to devote time to the practical exploration of questions and problems as well as the theoretical discussion of them. Thus they will be given an opportunity to develop their visual awareness of theatres and what happens in them.

Prerequisite: Theatre 100.

# 359 The Theatre from the Renaissance to the Nineteenth Century Class meets 4 hours

This class examines the theatre forms which evolved during the processes of secularization and mechanization which dominated the Western world from the early Renaissance to the nineteenth century, with its primary focus on the theatre in Europe. The development of

the theatre in North America and Asia may also be included. Areas 'of particular study may focus upon the actor, playwright, audience or upon the physical structure of the theatre. The practical exploration of the theatre of this period will be directed towards realizing the possibilities of different theatrical conventions.

## 360 The Playwright in the Theatre (formerly 480) Class meets 6 hours

This class is concerned with the creation of theatrical events, usually, but not necessarily, on the basis of a formal written script. It does not deal with the printed or spoken word exclusively but rather with the total language of the theatre, as incorpoarted into a script. It may further involve a study of the playwright's sources for a theatrical event, a structural analysis of existing scripts and practical explorations of the ways in which a script can be prepared.

## $380\ The\ Actor$ in the Theatre Class meets $6\ hours$

This class examines the nature of acting. Students will be given an opportunity to explore the function of the actor in the theatre, his relationship to other theatre artists, and his several possible relationships to the audience. The scope of the class includes such topics as the externalization of character, the concept of impersonation, analysis of a particular role, improvisional techniques, particular theories of acting, and the study of specific forms or styles of acting, both historical and contemporary. Areas of special emphasis will be determined by the students and instructor.

#### 450 The Modern Theatre Class meets 4 hours

The modern theatre has been characterized by successive bursts of creative energy and experiment. This class gives students an opportunity to study these developments in detail and to examine several important theatrical theories. Their implementation in particular plays and in theatrical practice will also be examined.

## 460 Theories of Play Production (formerly 370) Class meets 6 hours

The procedures that lead to theatrical events

are analysed in detail in this class. Depending on the interests of the students in the group, specific theories are explored so that their practicality may be tested in experimental conditions. Principles implicit in theories of the past are examined and their relevance to the theatre of today is evaluated. Students are encouraged to forward and test new theories for the theatre of tomorrow. Those taking this class are expected to have a firm understanding of the theatre as it exists in performance.

#### 470 Special Topics

This class allows the student to explore in detail particular areas of the theatre which are of special interest, with the guidance of members of the faculty. Frequency and length of meetings will be decided to meet the needs of the particular topic or project under study.

## 490 Dramatic Theory and the Aesthetics of the Theatre Class meets 3 hours

All the arts face a profound problem in the attempt to establish criteria which will enable creative activity to be evaluated. This class sets out to tackle that problem as far as the theatre is concerned. 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. Practical work will form a part of the work of the group when it becomes necessary to test theories in practice.

#### Drama in Education

The department of theatre is also responsible for Education 411 and partly for Education 414, classes offered in the B.Ed. programme to help future teachers understand how drama can encourage the imaginative development of children in elementary and secondary schools. These classes are not available to undergraduate students.

#### **Graduate Studies**

Graduate studies in theatre are not at present available at Dalhousie. Members of the department will be glad to help students with advice about opportunities for graduate study at other universities.

# FACULTY OF ARTS AND SCIENCE FOUNDATION YEAR PROGRAMME (K100)

The Faculty of Arts and Science is offering an alternative first year programme for undergraduates. The Foundation Year Programme consists of only two courses but provides the necessary five credits the complete first year of the Dalhousie-King's B.A. degree. The for the course is fully integrated into the Dalhousie Faculty of Arts and Science course is taught at King's College by faculty appointed at King's or cross but is taught at King's College by faculty appointed at King's or cross but is taught from Dalhousie. Students taking the Programme must register appointed from Dalhousie. The admission requirements are those of the Faculty of Arts and Science.

The Foundation Year is designed as an integrated programme of studies focusing attention on the development of institutions and ideas in the Western world which have been crucial for the development of the present day world views prevailing in western societies. It is intended that students will derive from the course a general but comprehensive pieture of the events and movements leading up to the present day, such that they are better able to understand their own heritages and positions. This course of studies will give students a general introduction to the social sciences and humanities.

The instructors in the programme are specialists in a wide variety of university subjects. All take the view, however, that first year study at university can profitably be devoted to attempts to integrate knowledge and understanding rather than to premature specialization in particular subjects. On the basis of the integrated view which a student can develop in the Foundation Programme, choice of greater specialization for subsequent years at university may be more reasonably made.

The Programme is particularly suitable for students who wish an intense, demanding and carefully directed first year. There are more than eleven faculty members for an enrolment restricted to 100 students. Students will spend approximately equal time in lectures and in small group tutorial sessions. Each student's work will be supervised by a tutor who will meet with him individually from time to time as well as leading the tutorial seminars.

The Programme is to be regarded as a complete unit. It will not be possible for students to enroll in only part of the course. Evaluation of students' performances will be by means of continuous evaluation throught the course of essays and any other devices, the final grade to be given being a composite of all evaluations. Final grading will be the result of discussion among all those teachers who have had grading responsibilities throughout the year. There will be no examinations. Grading will be done in terms of the letter grade system of the Faculty of Arts and Science.

Successful completion of the Programme will result in the student attaining four credits towards the degree for which he is enrolled. In addition to enrolment in the Foundation Year Programme the student will enrol in one introductory level course drawn from those listed in the departments of the Faculty of Arts and Science thus adding the fifth credit for a full first year.

Upon successful completion of the Programme the normal departmental requirement of passing an introductory course in the discipline concerned is waived by the following departments:

> Classics (except in the case of courses in the classical languages English Language and Literature German (except in the case of courses in language) History Political Science Sociology (except for courses in Anthropology)

In addition the following departmental provisions have been established:

- Economics: (a) successful completion of the Foundation Programme is regarded as adequate prerequisite for upper year courses in Economics for which Economics 100 is not a prerequisite
  - (b) students intending to enrol in Economics courses for which Economics 100 is a prerequisite must have passed Economics 100A, (the requirement of Economics 100B being waived) successful completion of the Foundation Programme

Philosophy:

German:

may be regarded as a substitute for German 221 successful completion of the Foundation Programme may be regarded as a substitute for Philosophy 230.

For general regulations relating to degrees and courses other than those specifically related to the Foundation Year Programme see the relevant sections of this Calendar.

### Outline of the Foundation Year Programme

The course is to be seen as an integrated rather than interdisciplinary one. The attempt to achieve integration is made in two major respects: by the fact that it treats matters in a historically developments fashion, and by the consideration of similar institutions, ideas and movements in each of the historical periods.

The following are the "teaching units" of the course:

- 1. The Ancient World: The origin of the primary institutions and beliefs of the western world in Greece, Rome and Israel. Co-ordinator: Mr. Atherton.
- 2. The Medieval World: the formation of Christendom and the modern European tradition. Co-ordinator: Mr. Hankey.
- 3. The Reformation and Renaissance: beginnings of the modern world and the emergence of the nations. Co-ordinator: Mr. Hankey.
- 4. The Age of Reason: the enlightenment, romanticism and revolution. Co-ordinator: Mr. Steffen.

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- 5. The Triumph of the Bourgeoisie: Bourgeois culture from Mark to the collapse in World War I.

  Co-ordinator: Mr. Morgan.
- 5. The Contemporary World: from the decline of the European order to contemporary industrial culture.

  Co-ordinator: Mr. Gamberg.

The following are the recurring general topics which are discussed in each of the "units" as outlined above:

- a) Outline of historical events.
- b) Political institutions and the modes of authority.
- c) Predominant theological and philosophical positions.
  - d) Scientific thinking and the age.
- e) Economic institutions.
  - f) The structure of society.
- g) Literary, musical and artistic expression and the age.

Gramophone recitals and film showings will be an integral feature of the course to demonstrate changes in musical and artistic expression.

### Teaching Staff

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- J.P. Atherton, M.A. (Oxen).
  Associate Professor of Classics.
- R.D. Crouse, B.A. (Vind.), M.Th. (Trinity), S.T.B., Ph.D. (Harvard).
  Associate Professor of Classics.
  - J. Farley, B.Sc. (Sheffield), M.Sc. (West.), Ph.D. (Man.) Associate Professor of Biology.
- H.V. Gamberg, B.A. (Brandeis), Ph.D. (Princeton).
- W.J. Hankey, B.A. (Dalhousie), M.A. (Toronto).
- Director, Foundation Year Programme.
- - M. Reckord, B.A., M.A. (Manchester), Ph.D. (London).
    Associate Professor of History.
- D.H. Steffen, Ph.D. (Goettingen). Associate Professor of German.
  - J. Stolzman, B.A. (Oregon), M.S. (Florida), Ph.D. (Oregon).
    Associate Professor of Sociology.

### Junior Fellows

- L.J. Knight, B.A. (Hons.) (McMaster).
- C.J. Starnes, B.A. (Bishop's), S.T.B. (Harvard), M.A. (McGill).
- H.G. Yesus, B.A. (Addis Ababa), M.A. (Brandeis and Illinois).

In addition occasional lectures will be given by invited speakers. Most seminars and discussion groups will be led by junior fellows of the University.

### KING'S FOUNDATION YEAR PROGRAMME

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### Kl00 SYLLABUS

We have come to a certain end of our civilization. This appears not only to popular consciousness in the so called generation gap but it also shows itself in that the individual European national cultures have lost their absoluteness for the product of the American melting pot and also in the intermingling of East and West. Western ideas move things in Asia whether it be Marxism in China, social democracy in India or Capitalism in Japan just as the religiously advanced of our youth are moved by Zen or Islam and the politically progressive place their hope in the "third world". What makes itself known in these forms has been known to the reflective for more than 100 years. The philosophers of the nineteenth century felt this end of things sufficiently that they believed themselves able to look over the whole of our civilization and judge it. Most saw our culture as bringing to fruition the struggles of human history; the question was whether the future would be in essential continuity with that history or whether something radically new must be the result. This is our question. We are endeavouring to understand the roots of our culture, to see how it produced what it did and to judge given that what it has produced is dying - whether we wish to return to those roots to build again or if we must renounce all and give ourselves over to the whirlwind.

Our examination will be conducted by means of lectures, tutorials, the reading of primary and secondary sources, films, records, slides, tours, and the writing of papers. Each student will attend 5 hours of lectures each week at Monday, Wednesday and Friday at 9:30 a.m. and Tuesday and Thursday at 10:30 a.m. An outline of the first term's lectures

hours of tutorials each week with one of the following tutors:

Mr. Hankey Middle Bay: 425-3005 Miss Knight #324, Alexandra Hall: 422-3552 Mr. Starnes Office: First Floor

Gymnasium: 425-3005

Home: 1576 Vernon St. 429-5308 Mr. Yesus North Pole Bay: 429-0052

The tutors will be responsible for supervision of your progress and they will mark your papers. You should feel free to arrange individual meetings with your tutor to discuss any question or problem you may have which you think inappropriate to discuss in the tutorial group. The tutors in general are in residence so as to provide this service and will welcome being called upon. Each tutor will arrange to meet his students individually at least twice each term. Problems with tutors should be brought to Mr. Hankey.

Students will be required to write several papers for each of the six sections of the course. These will be divided between short papers of 3 to 5 pages and 8 to 10 pages and research papers of about 20 pages. It is crucial that students not get behind in the short papers and therefore extensions of deadlines will be given infrequently. Students will however be able to rewrite papers and are encouraged to rethink their efforts following receipt of the marker's comments. Students are also encouraged to discuss their papers with their tutors. While topics will vary from tutor to tutor, all tutors will require the same quantity of work and marking will be standardized. As the mark for the course is based on papers and class performance, no student will be able to pass the course without completing the written requirements. We will use the Letter grade system of the Faculty of Arts & Science which has the bracketed percentage equivalents, A+ (97%), A (90%), A- (82%), B+ (77%), B (72%), B- (67%), C (60%), D (52%), F/M (45%), F (35%)..... The final mark for the course will be determined by the Staff teaching

in the Programme.

## Section I: The Ancient World: Lecture Schedule

### Co-ordinator Mr. Atherton

Reading week I

Lectures 1 & 2: General Introduction to September 18

Programme

Chester Starr W. Hankey Rise & Fall of 80

H. Gamberg

the Ancient World

Lectures 3-5: The Oriental Background, Iliad and the Orient, the place of the Iliad in Greek

culture.

J.P. Atherton

Begin The Iliad

Week II

Lecture 6: Homer's theology J.P. Atherton September 25

Lecture 7: The Iliad as tragedy W. Hankey

Lectures 8-10: Tragedy & the Polis

J.P. Atherton Antigone &

Oedipous Rex

Week III

The Republic Lectures 11-14: The Republic: October 2

The relation of the religion art and politics of the Greeks

to thought. W. Hankey

Lecture 15: The Collapse of the Greek World

J.P. Atherton

Week IV

Lectures 16 & 17: Judaism and the Orient, "Genesis" October 10

Judaism and Hellenism 1-111

J.P. Atherton & W. Hankey "Exodus" 1-20

Lecture 18: Jewish Cult: the Exodus

W. Hankey

Lecture 19: Roman Imperial Theology

Aeneid

J.P. Atherton

Section I: The Ancient World: Lecture Schedule (cont'd.)

Week V

Reading

October 16 Lecture 20: Aeneid continued J.P. Atherton

Lectures 21 & 22: Basic Christianity "The Epistle to the W. Hankey Romans"

Lectures 23 & 24: Christianity in the Ancient World The Ancient City
J.P. Atherton