UNIVERSITY OF KING'S COLLEGE

CALENDAR 1973/74





CALENDAR **197**3-**197**4

University of King's College

FOUNDED A.D. 1789

HALIFAX, NOVA SCOTIA 185th SESSION



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Registration Procedure

During the appropriate registration period specified in the Academic Calendar, 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.)



Registration of students, full time or part time, in the School of Theology is done first at the Atlantic School of Theology, 640 Francklyn St., Halifax, after which those who are registering through King's should bring their approved course lists to the Registrar's Office at King's for notation, payment of fees, and room assignment if resident.

Academic Calendar 1973-74

July, 1973

6

Monday, 2 University holiday.

Tuesday, 3

Last day for receiving applications for admission to the Faculty of Arts and Science from transfer students and those who do not meet the normal admission requirements.

Summer School registration (2nd session).

Wednesday, 4 Summer School classes begin.

Wednesday, 18 Halifax Natal Day (University holiday).

August, 1973

- Wednesday, 1 12 noon. Dartmouth Natal Day (University holiday).
- Tuesday, 14 Last day for receiving applications for admission to full-time study in the Faculty of Arts and Science.

Friday, 17 Final day of classes, Summer School.

September, 1973

Monday, 3 University holiday.

Tuesday, 4 Last day for receiving applications for admission to part-time study in the Faculty of Arts and Science.

Monday, 10 Class and course approval, registration and payment of fees for new full-time students admitted to the Faculty of Arts and Science.

- Tuesday, 11 Class and course approval, registration and payment of fees for new full-time students admitted to the Faculty of Arts and Science.
- Wednesday, 12
- Registration and payment of fees for returning full-time students and part-time students in the Faculty of Arts and Science.

Registration in School of Theology.

Thursday, 13

Registration and payment of fees for returning full-time students and part-time students in the Faculty of Arts and Science.

Registration in School of Theology.

Classes begin Foundation Year Programme. Friday, 14

Retreat for Theology Students.

Saturday, 15 Registration and payment of fees for parttime and special students in the Faculty of Arts and Science.

Sunday, 16 Retreat for Theology Students.

Retreat for Theology Students.

Monday, 17 Classes begin in Arts and Science and in Atlantic School of Theology.

Sunday, 23 University Church Service – Chapel - 11 a.m.

Monday, 24 First day for change of class or course.

Friday, 28 Last day for withdrawing from course in the School of Theology.

October, 1973

Monday, 1 Last day for adding classes (except "B" classes).

Monday, 8 University holiday.

November, 1973

Monday, 12 University holiday.

Friday, 16 Last day for withdrawing from "A" classes without penalty.

December, 1973 Wednesday, 12 Last day of classes (regular and Foundation Year Programme).

Thursday, 13 Examinations begin.

Monday, 17 Evaluation day in Atlantic School of Theology.

Tuesday, 18 Evaluation day in Atlantic School of Theology. Wednesday, 19 First day of Atlantic School of Theo Recess.

Saturday, 22 Student holidays begin.

Monday, 24 University holiday.

Tuesday, 25 University holiday.

Wednesday, 26 University holiday.

Monday, 31 University holiday.

January, 1974

Tuesday, 1 University holiday.

Thursday, 3 Classes resume (regular and Foundation Year Programme).

Friday, 4 Registration of new students.

Monday, 7 Classes resume in Atlantic School Theology.

Friday, 18 Last day for withdrawing from courses the School of Theology.

Monday, 21 Last day for adding "B" classes.

Last day for withdrawing from full-year "C" classes.

February, 1974

Thursday, 31

Friday, 1 Munro Day (University holiday).

Saturday, 2 Dalhousie Winter Carnival (Unive holiday).

Wednesday, 13 Meeting of Convocation 8:00 p.m.

Monday, 25 Study break begins.

March, 1974

Study break for Divinity students. Dau be announced. Monday, 4 Classes resume.

Nonday, 11 Last day for withdrawing from "B" classes without penalty.

(pril. 1974

Last day of lectures. (Arts & Science).

Tuesday, 9 Last day of classes Foundation Year Programme.

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

Friday, 12 Good Friday (University holiday).

Tuesday, 16 Examinations begin.

Officers of the University: 1973-74

Patron 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 Ecclesistical Province of Canada.

Chancellor

Vacant

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 Street, Fredericton, N.B. The Rt. Rev. G. F. Arnold, M.A., B.D., D.D., Suffragan Bishop of Nova Scotia, 5732 College Street, Halifax, N.S. Dr. J. Graham Morgan, B.A., M.A., D.Phil., 6360 Coburg Rd., Halifax, N.S. (President). Tuesday, 30 Last day for submission of wo tion Year Programme.

May, 1974

Wednesday, 1 Last day for receiving appli admission from foreign students Americans).

Convocation of Atlantic Theology.

Sunday, 12 11:00 a.m. Baccalaureate Servic

Wednesday, 15 Encaenia Day — King's Convoc and Science and Divinity.

Thursday, 16 Dalhousie University Convocati

Professor H. S. Granter, B.A., A.M., (Vice-President), 1171 Cartaret Street, Halifax, N.S.
T. R. Francis, Esq., (Treasurer), Halifax Herald
The Venerable L. F. Hatfield, M.A., D.D., P.O. Box 83, Truro, N.S. (1974).
The Rev. W. A. Trueman, B.A., B.S

Ltd., P.O. Box 610, Halifax, N.S.

Diocese of Fredericton

The Ven. A. E. L. Caulfeild, B.A., 50 Orange St., Saint John, N.B. (19) H. V. Frear, Esq., 116 Princess St. N.B. (1975). The Rev. R. B. Stockall, L.Th., N.B. (1973). The Rev. Canon W. E. Hart, B.A., No. 1, Bloomfield Station, N.B. (19) The Ven. Raymond H. Murphy, King Ave., Bathurst, N.B. (1975). Rev. F. H. Hazen, B.A., L.Th. Sussex, N.B. (1973).

Diocese of Nova Scotia

His Honour Judge J. E. Hudson,
D.C.L., Family Court, P.O. Box 1
North P.O., Halifax, N.S. (1973).
The Venerable H. B. Wainwright,
St. James Rectory, Herring Cove,
N.S. (1973).
E. W. Balcom, D.C.L., Port Du (1974).
Harold Vincent, B.C.L., 830 M Halifax, N.S. (1974).

	Friday, 17
ork, Founda-	Regular session ends.
	Monday, 20 Victoria Day (University holiday).
instions for	Tuesday, 21 Summer School Registration (1st session).
s (other than	Wednesday, 22 Summer School classes begin (1st session).
School of	June, 1974
e.	Friday, 28 First Summer School session ends.
ation – Arts	Office Hours Week days (Monday-Friday), 9:00 a.m5:00 p.m.
on.	June, July, August (Monday-Friday), 9:00 a.m4:30 p.m.

Halifax, N.S. alifax Herald	P.O. Box 83, Truro, N.S. (1974). The Rev. W. A. Trueman, B.A., B.S.Litt., Charlottetown, P.E.I. (1973).
	Alumni Association
L.S.T., D.D., 975). ., Saint John, Saint John, , L.Th., R.R. 973). , B.Th., 426 ., Box 227, B.A., LL.B.,	 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). Rev. E. G. Harris, B.A., B.S.Litt., B.D., 21 Lynn Drive, Dartmouth, N.S. (1975). R. V. Swetnam, Esq., 6897 Tupper Grove, Halifax, N.S. (1975). Her Honour Judge Sandra E. Oxner, B.A., LL.B., 1354 Robie St., Halifax, N.S. (1975). The Rev. D. F. L. Trivett, B.A., L.Th., B.D., 1665 Oxford St., Halifax, N.S. (1975).
473, Halifax	
B.A., L.Th., Halifax Co.,	Faculty Representatives
ufferin, N.S.	F. H. Page, M.A., D.D., 1835 Rockcliffe St., Halifax N.S. (1973).

Harold Vincent, B.C.L., 830 McLean St., The Rev. F. G. Krieger, B.A., B.D., 630 Halifax, N.S. (1974). Francklyn St., Halifax, N.S. (1974).

8

Professor J. P. Atherton, M.A., Ph.D., 227 Purcell's Cove Rd., Boulderwood, Halifax, N.S. (1974).

The Rev. Dr. J. B. Hibbitts, M.A., B.S.Litt., The Very Rev. E. B. N. Cochran D.Phil., D.D., M.Div., STM., 1625 Preston St., Halifax, N.S. (1973).

Student Union Representatives

Blair Mitchell, James Fraser, David Nauss, Anne Harris.

Co-opted Members

G. R. K. Lynch, B.A., LL.B., Room 210, 5600 Sackville St., Halifax, N.S. (1973). R. G. Smith, Esq., P.O. Box 2130, Halifax, N.S. (1973).The Very Rev. E. B. N. Cochran, B.A., L.Th., D.D., 5732 College St., Halifax, N.S. (1972). Ralph V. Creighton, Esq., Rothesay, N.B. (1974).

Executive Committee

The Archbishop of Nova Scotia The Bishop of Fredericton The President The Vice-President The Treasurer The Rt. Rev. G. F. Arnold The Ven. A. E. L. Caulfeild E. W. Balcom G. R. K. Lynch R. G. Smith **Blair Mitchell** R. V. A. Swetnam H. V. Frear The Rev. R. B. Stockall Prof. J. P. Atherton

Representatives on Dalhousie University **Board of Governors**

G. R. K. Lynch R. G. Smith

Representatives on the Governing Body of King's College School

Prof. J. P. Atherton

Governors Emeriti

D. S. Fisher, D.C.L., Rectory Lane, Sackville, N.B. The Rev. Dr. D. F. Forrester, "Corstorphine",

Weymouth, N.S. H. Ray Milner, O.C., D.Cn.L., D.C.L., LL.D., 1230-10040-104th Street, Edmonton, Alberta.

Secretary to the Board of Governors

Miss E. D. Horlock, M.A., 6411 South St., Apt. 32, Halifax, N.S.

Officers of Administration

President J. Graham Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.), Vice-President H. S. Granter, B.A. (Dal.), A.M. (Harvard). **Chairman of Divinity Faculty** The Rev. Prof. R. J. R. Stokoe, B.Sc., B.A., Dip.Th., Th.M. **Director, Foundation Year Programme** W. J. Hankey, B.A. (Vind.), M.A. (Tor.). Bursar Miss Allison Conrod Registrar Mrs. G. S. Clark Librarian Mrs. J. E. Lane, B.A. **Executive Secretary Alumni Association** Mrs. I. Desrosiers **Dean of Residence** David Jones, B.A., M.A. Dean of Women Mrs. Ena Gwen Jones, R.N. **Director of Athletics** R. Shoveller.

Officers of Convocation

Chancellor Vacant.

Clerk

Vice-Chancellor J. Graham Morgan, B.A. (Nott.), M.A. (M. D.Phil.(Oxon.).

The Rev. R. D. Crouse, B.A. (Vind.) (Harv.), M.Th. (Trin.), Ph.D. (Harv.).

Chancellors of the University

The Very Rev. Edwin Gilpin, D.D., h 1891-1897. Edward Jarvis Hodgson, D.C.L., 1897-1911 Sir Charles J. Townshend, D.C.L., 1919. The Most Rev. John HacKenley, 1937-1943. Hon. Ray Lawson, O.B.E., LL.D., D.C. D.C.L., 1948-1956. Lionel Avard Forsyth, Q.C., 1956-1958. H. Ray Milner, Q.C., D.Cn.L., D.C.L., I 1958-1963. Robert H. Morris, M.C., B.A., M.D., F.A.G 1964-1969. Norman H. Gosse, M.D., C.M., D.Sc., DCI

LL.D., F.A.C.S., F.R.C.S.(C), 1971-1972.

President and Vice-Presidents of University.

The Rev. Dr. William Cochran, 1789-1804. The Rev. Thomas Cox. 1804-1805. Rev. Dr. Charles Porter, 1805-1836. The Rev. Dr. George McCawley, 1836-1875. 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.

Academic Staff

N.S. w. J. Hankey, B.A. (Vind.), M.A. (Tor.),

F. Hilton Page, M.A. (Tor.), D.D. (Pine Hill), Professor of Philosophy, 1135 Rockcliffe St., Halifax, N.S.

Faculty of Divinity (1973-74)

The Rev. Canon J. H. Graven, M.A. (Dal.), L.Th. (Vind.), Graduate of Department of Religion and Psychiatry, Menninger Foundation, Topeka, Kansas, Alexandra Special Lecturer in Pastordia (Director of Parish Field Work), 8 Parkhill Dr., Jollimore, Halifax, N.S.

(Vind.), M.Div., S.T.M. (Gen. Theol. Sem., N.Y.), D.Phil. (Oxon.), D.D. (Pine Hill), Professor of Biblical Studies, 1625 Preston St., Halifax, N.S.

The Rev. F. G. Krieger, B.A. (Hobart), B.D. (Epis. Theol. Sch.), Assistant Professor of Systematic Theology. Secretary to the Faculty.

I. G. Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.), President, 6360 Coburg Road, Halifax, N.S.

Pastoralia, and Chairman of the Fa Regina Terrace, Halifax, N.S. The Rev. B. C. Strople, S.Th., A.K. Special Lecturer in Prayer Boo

The Rev. J. B. Hibbitts, M.A., (Dal.), B.S.Litt. Rector of the Parish of St. J Sackville, N.S.

Director Foundation Year Programme, Universty of King's College, Halifax, N.S.

Acade		
King's Faculty of Arts and Science (1973-74) P. Atherton, M.A. (Oxon.), Ph.D. (Liver-	E. L. Heighton, B.Sc., M.A. (Dal.), Ed.D. (Virginia), Assistant Professor of Mathematics, 6270 Jubilee Rd., Halifax, N.S.	J. Stolzman, B.A. (Oreg.), M.S. (Fla. St.), Ph.D. (Oreg.), Assistant Professor of Sociology and Anthropology, 6889 Quinpool Rd., Halifax, N.S.
poll, poll, Associate Professor of Classics, 277 Purcell's Associate Rd., Boulderwood, Halifax, N.S. Cove Rd., Boulderwood, Halifax, N.S.	J. G. Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.), President of the University, Associate Professor of Sociology and Anthropology, 6360 Coburg	
R. MacGregor Dawson, B.A. (Irinity), M.A.	Rd., Halifax, N.S.	Junior Fellows
Associate Professor of English, 941 Greenwood Ave., Halifax, N.S. (Sabbatical 1973/74).	C. M. Ouellette, B.A. (Maine), M.A., Ph.D. (Clark),	Lennon, J.A., B.A., M.A. (Tor.).
H.S. Granter, B.A. (Dal.), A.M. (Harvard), Professor of History, 1171 Cartaret St., Halifax, N.S.	Assistant Professor of Economics, 6 Sybyl Court, Apt. 15, Halifax, N.S. (Sabbatical 1973/74).	Starnes, C. J., B.A. (Bishops), S.T.B. (Harv.), M.A. (McG.),

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

The Rev. R. J. R. Stokoe, B.Sc., B.A., Dip.Th.	The Rev. L. Avery Kempton, B.A., B.D.,									
(Durh.), Th.M. (Crozer),	S.T.M.,									
Certified Chaplain Supervisor, Professor of	Chaplain at the Victoria General Hospital,									
Pastoralia, and Chairman of the Faculty, 6189	Halifax, N.S. and certified Chaplain Supervisor.									
Regina Terrace, Halifax, N.S.										
	The Rev. E. T. McKnight, B.A., B.D., (Acadia),									
The Rev. B. C. Strople, S.Th., A.K.C.,	Chaplain at the Nova Scotia Hospital, Dart-									
Special Lecturer in Prayer Book Liturgics,	mouth, N.S. and certified Chaplain Supervisor.									
Rector of the Parish of St. John, Lower										
Sackville, N.S.	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.									
Associates in Supervised Pastoral										
	The Rev. H. H. Taylor, B.A., B.D. (Acadia),									
Education (1973-74)	The Institute of Pastoral Training, King's									
	College, Halifax, N.S. and certified Chaplain									
	Supervisor.									
The Rev. Canon F. M. French, B.A. (Vind.),										
M.A. (Dal.), LL.D. (St. Mary's),	The Rev. K. H. Tutts, B.A., L.Th. (vind.),									
Rector of the Parish of St. Mark's, Halifax, N.S.	Hospital Chaplain, Halifax, N.S.									

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 II 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 III 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 Prince 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 examinations.

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. "bays"). The bays are named Chapel Bay, 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, four members elected by the Faculty, together with eight members elected by the Alumni Association, 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 the University; Members of the Board of G_{00} . and of the Faculty of Arts and Science hold the degree of Master or Doctor free recognized University; members of the F. of Divinity; Fellows of the Universite Bachelors of the University of five standing who are recognized by the Cla Convocation. All degrees are conferral Convocation.

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

Faculties

Faculty of Arts and Science The University of King's College having entry an association with Dalhousie University students registered in Arts and Science attent classes jointly with Dalhousie students. The classes are given by Dalhousie professors or la same academic standard. The University King's College Foundation Year Programm

with the University of King's College.

Faculty of Divinity

Studies in Theology are under the surveillant of the Divinity School Council which responsible to the Board of Governors, by most of the work is done in the Atlantic School of Theology under the direction of the Box of Governors and the Senate of that school, ecumenical partnership institution of the Uni ersity of King's College, Pine Hill Divinity (United Church) and the Roman Archdiocese of Halifax. Degrees and diplom in Theology are awarded to candidates fulfiller the necessary academic requirements, regardless of religious denomination or sex. Students also prepared to meet ordination requiren in the Anglican Church of Canada. The Course of Study for these candidates is subject to b Bishops in the Dioceses of Nova Scotia Fredericton.

Exemptions Granted to King College by Other Institutions

The University of Oxford exempts Responsions an undergraduate in Arts o University who has passed in the subjects second or a higher year. A Bachelor of with Honours is further exempted from terms of residence. The Trustees of Rho the arships exempt from the qualifying exholarsing candidates who are exempt from minations by the University of Oxford.



Regular chapel services are an integral part of ommunity life afforded by the University, the comments are invited to attend them. The und an of service are announced at the beginning each session and, while the Book of of each Prayer is used in the services in the dapel, students of all denominations are release and encouraged to attend. There is a morning and evening service every week day and a morning service on Sunday. The service the evening meal on Wednesdays is a communion Service with music, and is regarded something of "a College Corporate Communion.

The University Chaplain is available to all sudents 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 Stuprofessors on the King's Foundation, dependent dents' Union, Chairman of the Men's Residence on the course taken. The students of be Council, Women's House President, two proinstitutions follow the same curriculum, the fessors on the King's Foundation chosen the same examinations, and must attain the annually by the Faculty, one member of the Faculty of Divinity chosen annually by the Faculty. The students exercise a large measure however, is available only to students register of self-government in maintaining good order and discipline in the residences. Students 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.

> 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 aboratories regularly and punctually and to perform all exercises assigned by the Faculty.

Rules governing residence life are contained in 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 Chaplain, 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. Students are given the privilege of borrowing Just after the Royal Charter was granted to the books for the summer. 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. **Degrees and Courses** From Mr. Akins the library received most of its rare collection of some 40 incunabula (books The degrees of Doctor of Divinity and Doctor printed before 1500, that is, during the first of Civil Law, may be conferred honoris causa in fifty years since the invention of printing with recognition of eminent literary, scientific, promovable type). This is a remarkable number of fessional or public service. these very rare books to be found in such a small library.

King's Library is very rich in the field of English literature. Much of the credit for the development of 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 this field

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 books.

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 a Bachelor of Divinity and Associate of Theology (on recommendation of the Board of Examiners of the General Synod of the Anglican Church of Canada), the Master of Divinity and Bachelor of Theology on recommendation of the Senate of the Atlantic School of Theology, and the Master of Sacred Theology in Pastoral Care on recommendation of the Graduate Studies Committee of the Institute of Pastoral Training. Convocation also awards the diploma of Associate of King's College (Nova Scotia) and may, in applicable cases, award a Testamur.

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.

King's College Residences 1973-74

Dean of Residence

Mr. David Jones

Dean of Women

Mrs. Ena Gwen Jones

Dons

Judith Campbell Mark DeWolf John Godfrey Wayne Hankey

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.

All students registered at King's College are guaranteed residence accommodation should they wish it, on completion of the form for application for accommodation, and subject to the approval of the application by the Dean of Residence (for men) and the Dean of Women (for women).

Male students live in the men's bays (Chapel, Middle, Radical, North Pole, Cochran and The Roost), 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 of Women.

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 common room and lounge is open to all residents, 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 1962

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. All residents will be charged with room for complete session and will be liable charge unless or until a substitute has a obligation to the University for the balance student may withdraw from the re without notice to the Dean.

It should be noted that the University as no liability for personal property in the case theft or damage.

The residence will be open for new stude from the evening of September 9, 1973, and returning students September 11, 1973, the January 2, 1974, to the morning of May will be expected to vacate the residence etc. are as follows: hours following their last examination). sident students in faculties whose terms extreme these periods may reside in the College Nomen's Residence permission of the Dean on payment of men's Residence (Suite) and, when Prince Hall is open, meals may eaten by arrangement with the Steward

the University for the coming session and during this time. \$50.00 residence deposit has been received by the Business Office. Deposits for all applies in exceptional circumstances a student may tions made prior to July 15th must be received seek permission of the Dean of Residence to by that date. Applications for residence accupy a room at times other than those modation made after July 15 must be access specified above. For charges and conditions panied by the \$50.00 deposit. Cancellation students should consult with the Dean of application received by the Registrar or the Deans prior to August 15th will entitle the student to a refund of the \$50.00 deposit.

Payment must be made in Canadian funds by homene negotiable cheque. Please make cheques ash or negotiate cheques, i wase make cheques phyable to the University of King's College for phyable isod amount. the required amount.

Residences

Fees

a complete session is defined for students A compared in the faculty of Arts and Science and for students registered for the Atlantic school of Theology as being from the first day school regular registration (including Sunday, Septof regular, 9) until the day following the last regularly scheduled examination in the Faculty of Aris and Science (for students in this December 22, 1973, and from the evening and in the Atlantic School of Theology (for students in this School). The annual 1974. (Students not in their graduating you darges for these periods for board, light, meals,

> Double Single \$1010.00 \$1085.00 Men's Residence 1010.00 1085.00 1160.00

A graduating resident student may stay in residence without charge after these periods up Confirmation of accommodation will not to and including the last day of Encaenia made until the student has been accepted activities, but will be expected to pay for meals,

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 July 15. The room deposit will be refunded only when notice of cancellation of accommodation has been received by the Registrar or the Deans before 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.)

Surcharger

deposit is not paid within 21 days of rgistration day a surcharge of 3% will be harged and a further 2% for each additional omplete month until paid. The same applies to marges payable by non-resident students.

Second Term residence fees are due in January and surcharges as above will be levied after January 25.

Caution Deposit

On enrolment each resident student is required ¹⁰ 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

Faculty of Arts and Science

King's Students \$680.00. 1st instalment \$445.00. 2nd instalment \$240.00.

The above charge includes class fees, laboratory fees, library fees, examination, diploma and registration fees, instrument rental and hospital clinics where applicable. Incidental Fees are collected for the Students' Union.

Part time students (These charges include incidental fees of registration and library only):

Students registering for three credits or less, one full credit 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)

Faculty of Theology

Full-time students, basic course \$350.00 Full-time students, M.S.T. \$575.00

Alexandra Hall in a Winter Setting

Allan Lennon Jo Ann Radbourne Hagos Yesus

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 preceeding December 1, and non-refundable\$ 5.00

Regulations for Payment of 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 three credits.

Payment

Fees are payable in full on registration or in two instalments. The first, payable at registration, including incidental expenses, the second instalment, on or before January 25.

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 paid

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.

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

Students unable to pay the first instalment due 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 will be added.

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 25. 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 26 will not be included in graduation lists.

PART-TIME STUDENTS – Students registered for three credit classes or less. Fee must be paid at registration.

AUDIT STUDENTS - Students auditing a lecture class for interest only with no credit to be issued. Fee must be paid at registration.

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.

Late Registration

Students are required to register on the regular registration dates as shown in the Academic Schedule. Late registration requires the approval of the Registrar, and payment of an extra fee not to exceed \$5.00 per day, to a maximum of \$20.00.

Diplomas

Diploma Fees are payable at registration in the	
final year of the course,	
A.K.C., Testamur \$12.00	
M Div MST B Th 20.00	

M.Div., M.S.T., B.Tr	1	 	• •				•	,		20.00
B.D., A.Th	• • •	•	•	•	• •	ł	•	•	•	40.00

Additional fee for any degree in absentia at the Parking on the Campus

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.

Degree in Absentia

A graduating student must notify the Registrar prior to May 10 if not planning to be present to receive a degree. If this notification is not given and the student does not attend the graduation ceremony, a charge of \$10.00 is required to be paid to the University (to Dalhousie for Arts and Science students) to cover additional costs before the degree is released.

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.

Transcripts

A student may receive only an unofficial transcript. Official transcripts will be sent at a student's request to other universities or to business organizations. 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 pictures.

Laboratory Charge

No laboratory deposit is charged. Individual students will be charged for careless or wilful damage.

obtain a parking permit from t Office upon the presentation of in license number, for a charge of \$10,00

Students with motorbicycles may on ing permits under the same condition charge of \$2.50, and will be required them in a designated area.

Refund of Fees

A student who has completed registration wishes to withdraw must obtain proval from the Registrars of Dalho King's.

A student withdrawing after two weeks a the date of commencement of classes w charged in full for the incidental fees and receive a refund of the balance on a protional basis, calculated in monthly units charge will be made for the month in which withdrawal is approved, including the month December. A student withdrawing in Jam will be charged the full first instalment of in-A student changing before February 1 to full-time to part-time status, with the approximation of the Registrar, will be eligible for adjustment in fees for the remainder of session.

A student who is dismissed from the University for any reason will not be entitled to a relation of fees, either academic or residence.

Applications for a refund or adjustment sho be made to the Business Office at Dalhow after the approval of the proper authority been obtained. N.B. - King's College stude must report AS WELL to the Bursar, King College.

Fee For Student Organizations

At the request of the King's student body.at of \$40.00 is collected on enrolment from at student who takes more than one class. This is various students' organizations and clubs, and those offered by Dalhousie-King's. copy of the King's College RECORD.

Iniversity Regulations

I students are required to report their local deress while attending the University, to the the of the Registrar, on or before October Subsequent changes must be reported

Place of Residence of Students:

For the purpose of admission to the University the place of residence of a student is the place the place of domiciled. This is normally preand to be the place (country, province, etc.) there the home of his parents or guardian is wated. That place remains unchanged unless takes steps that satisfy the Registrar that he us established a place of residence elsewhere.

No person under sixteen years of age is admitted to any class except by special permision of the Senate.

merial Cases: The University will consider for imission students who are lacking the normal heh school preparation, provided that the applicant can show (by record, interviews, or possibly by taking additional tests) that his mulifications in other respects are acceptable.

Occasional students are those who wish to take are university class because of their interest in No class may be offered as a credit towards a degree or diploma, and no official transcript will be issued.

A student taking more than one class without credit towards a degree or diploma at Dalhousie-King's may be admitted, if qualified, as a special student

Admission Ad Eundem Status: Students from other universities desiring to study at King's University may, on producing satisfactory ertificates, be admitted with advanced standentitles the student to the privileges of the ing and given credit for classes equivalent to

> No student shall be admitted to a degree in a tourse 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 tear 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 they all the regulations of the University tready made or to be made, and to pay the nquired fees and deposits before entering any days or taking any examination.

nder no circumstances may a student register mless all previous accounts, including fees, thrary fines, and other fines, to the university have been paid.

Late Registration

Late registration in the Faculty of Arts and Science requires the approval of the Registrar.

Withdrawal

See the individual faculty regulations, and the Fee Section.

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, residence, or from the University.

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 Registrars of Dalhousie and King's before May 10.

STUDENT SERVICES AND STUDENT AFFAIRS

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 Centre at Dalhousie, fourth floor of the Student Union Building. Counsellors with broad experience in assisting with problems offer a free confidential service to students.

Tutors

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

University Health Service

The university (Dalhousie) 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 by him/herself or family.

In 1972 regulations were changed regarding eligibility for persons entering Nova Scotia. It is essential that all such persons contact the Health Service for advice as to their insurance status as the University cannot assume responsibility for accounts accrued for services to uninsured parties.

Registration Requirements

1. All students registering for the first time at the University may be 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 may be 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 King's 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-

conduct. (f) Eyeglasses and examinations for same.

(g) Pre-existing diseases.

Note:

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.

Non-Academic Student Activities

Students representing the College in nonacademic 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 til lectures per week, a period of two lai hours being regarded for this purpo equivalent to one lecture. (c) Students who have more than t_{WO} fa in college subjects.

These regulations do not apply to the D. Society.

Subsidization Plans

Canadian Armed Forces

The Regular Officer Training Plan (F Medical Officer Training Plan (MOTP) tuition, books, medical services, monthly and summer employment for up to four ve of undergraduate study. Successful application serve as commissioned officers in the Canad after graduation.

For further information on above plans dents should contact the

Canadian Forces Recruiting and Selection Sir John Thompson Building, 1256 Barrington Street, Halifax, Nova Scotia. Phone: 422-5956 or 423-6945.

Children of War Dead (Education 4 sistance).

Children of War Dead (Education Assistant Act) provides fees and monthly allowances children of veterans whose death was attribuable to military service. Enquiries should a directed to the nearest District office of the Department of Veterans' Affairs.



Admissions

dmission from High Schools in Nova

College is completing to King's College is completion of Province Nova Scotia Grade XII examinations in the of Nova of Preparatory Programme, or the University in past years an average of 60% in and Grade XII high school examinations, or Prov-Dental Officer Training Plan (DOTP) and a Grade XII inguinations, or pletely subsidized university ple pletely subsidized university plans course of Nova sequired. The same standard tuition, books, medical services apply in the current year. However, the dmissions Office does not apply criteria nechanically. It has discretionary power to dmit students who do not meet the normal Armed Forces for varying compulsory per requirements, but who appear acceptable on after graduation other grounds. Any student who submits the necessary documents will be considered for admission.

Early Admission

sudents who have been receiving good marks a general average of 65% or more) may be considered for admission while still in their Senior Matriculation year. Such students are encouraged to apply early in their last year at school.

Application Procedure

andidates for admission to the Faculty of Arts and Science must submit a completed Application Form (available from the Admissions Office, or from most high schools) to the Registrar, King's College, as soon as possible after January 1st, and normally not later than August 15th. To complete the application, a candidate must provide:

a) evidence of successful completion of Grades XI and XII in the University Preparatory Programme (Senior Matriculation standing) from a public high school in Nova Scotia, or the equivalent, as shown in a certified high-school record-transcript, Provincial Examination Certificate, or Principal's report;

(b) recommendations from teachers and principal

(c) a copy of scores in either the SACU or CEEB test. No applicant whose credentials are disfactory in other respects will be refused dmission because his or her SACU or CEEB scores are low. On the other hand, high scores " those tests may be taken as a factor in an opplicant's favor.

Decisions on admission will be made known to applicants through our joint admissions office Dalhousie-King's) as soon as possible after their credentials have been received and

Preparation for Admission

Students wishing to study at King's College

University Preparatory Programme. They should read the sections of the Calendar headed Degree Programmes and Programmes of Study, and in particular, the description of the first-year programmes. Many departments make suggestions about high school preparation in the descriptions of their own introductory programmes. (These are found in the section entitled Programmes of Study). Students who lack preparation (in Grade XI and Grade XII) in Mathematics, English, and at least one other language may find themselves initially cut off from certain programmes. Guidance counsellors in high schools can also offer advice on the suitability of individual high school programmes. Another source of advice is the Registrar's Office, which will arrange interviews, whenever possible, between prospective students and members of the Faculty.

Admission from Outside Nova Scotia at Senior Matriculation Level

Deadlines for Receipt of Applications Applications for admission from any part of Canada or the USA must be received by the Registrar's Office by August 15.

Applications from all other countries must be received by May 1 (Students from Great Britain or the West Indies who write GCE qualifying examinations in June may request an extension of this deadline if they can ensure that their examination results will be available to the Admissions Office by August 21; otherwise the May 1 deadline must apply.)

Application procedure and ways of appraising applications: as for students from Nova Scotia.

Equivalences

The following levels are considered equivalent to Senior Matriculation (Grade XII) in Nova Scotia:

Other Provinces of Canada (a) Newfoundland: first year Memorial University.

(b) New Brunswick: the former Grade XIII; or first year at a recognized university or junior college which admits students from Grade XII in New Brunswick public high schools.*

(c) Prince Edward Island: first year at the University of Prince Edward Island.*

*Note: Students from New Brunswick and Prince Edward Island who have high marks (i.e. averages of 80% and above in five subjects including English) in Grade XII in those Provinces may apply and be considered for admission to King's College.

(d) Quebec: Senior High School Leaving dould choose their high-school subjects from a Certificate; or first year of CEGEP General

programme; or first year of university Collegial programme.

(e) Ontario: Grade XIII (Secondary School Honour Graduation Diploma).

(f) Manitoba, Saskatchewan, Alberta: Grade XII

(g) British Columbia: the former Grade XIII; or first year at a recognized university or junior college which admits students from Grade XII in British Columbia public high schools.

Other Countries

(h) USA: first year at a recognized university similar institution of higher learning or (minimum: 30 semester hours). Students of lesser standing will be considered if they appear exceptionally well qualified, for example on the basis of CEEB scores or advanced placement work.

(i) Great Britain, West Indies, West Africa: General Certificate of Education with pass standing in at least five subjects of which at least two must be at Advanced level, and one must be English.

(j) Hong Kong: GCE as for Great Britain; or University of Hong Kong Matriculation Certificate under same conditions as for GCE.

(k) India, Pakistan: Bachelor's degree with first- or second-class standing from a recognized university; or in certain circumstances, firstclass standing in the Intermediate examinations in Arts and Science, provided the candidate has passes at the university level in English, Mathematics and a language other than English.

(1) Countries not mentioned above: Write to the Registrar's Office.

Transfer	from	other	Colleges	and
Universitie	s		0	

Deadlines for Receipt of Applications Canada and the USA: August 14 Other countries: May 1

Documents to be Submitted (a) Completed Application form (available from Registrar's Office);

(b) Official academic transcripts (or certified copies) from all colleges and universities attended:

(c) Copies of calendars (or similar publications) of all colleges and universities attended;

(d) Certification of proficiency in English if the native language of the applicant is another language:

(e) SACU or CEEB scores.

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

Transfer of Credits

Students who have attended a recognized junior college, or in Quebec a CEGEP or a two-year university Collegial Programme, and can present satisfactory certificates may be granted Senior Matriculation standing. For work completed beyond the Senior Matriculation level, credit may be granted on admission for a maximum of five equivalent classes. Students who are admitted under these conditions can complete the requirements for a general degree in two years, or for an honours degree in three years. Such transfer is regularly accepted from the Convent of the Sacred Heart in Halifax, or the Nova Scotia Teachers' College, or Nova Scotia Agricultural College in Truro.

Students who have attended another recognized university to which they were admitted from a level below that of Senior Matriculation (Nova

Scotia) may with satisfactory documents present five appropriate university credits in lieu of Senior Matriculation subjects in order to meet King's entrance requirements. Students from such a university who produce satisfactory certificates for more than five subjects, may be granted five credits for matriculation purposes and other credits for appropriate classes, within the limits of the Regulations set out below. Students who have attended another recognized university to which they were admitted from a level equivalent to that of Senior Matriculation (Nova Scotia) may, on presentation of satisfactory documentary evidence, be granted credits for appropriate classes, within the limits of the *Regulations* set out below.

General Regulations Concerning Transfer (See also General Faculty Regulations)

(a) A student from another college or university who is not eligible for re-admission to that college or university on academic grounds will not be admitted to King's.

(b) No transfer credit will be granted for any class in which a final mark of less than C (or the

equivalent) was obtained, or for an which a final mark was granted condition

(c) To graduate from King's, all or a important part of a student's acaden must be done here. This is interpreted to at least five full classes, of which at least are in the candidate's area of special (normally classes taken at second-year) higher)

(d) A student in a King's honours progra must attend King's as a full-time student last two years unless special permission contrary is obtained from the Committee Studies

(e) No classes taken at another institution be counted towards fulfilling the concentration requirement of the general Bachelor's den the principal subject requirement of an h programme without specific approval from departments concerned at Dalhousie.

(f) Transfer credits may be granted only classes equivalent to classes offered at Kin and only in subjects recognized as h standing in a faculty of Arts and Science

programmes of Study

FACULTY OF ARTS AND SCIENCE

King's offers 4 Programmes of Study leading to Anne in Arts and Science.

8A (General) three years A. (Honours) four years se (General) three years Sc. (Honours) four years

King's provides an alternative to the ordinary B.A. and B.Sc. first year programmes.

The ordinary first year programme consists of five classes.

The King's alternative first year programme, the Foundation Year Programme, is a first year programme for both general and honours students. Bachelor of Arts students enrolled in the Foundation Year Programme do one class in addition to the Foundation Course. Bachelor of Science students in the Programme do two additional classes. Thus for B.A. students the Foundation Year Programme is equivalent to 4 classes, for B.Sc. students it is equivalent to 3 classes.

Foundation Year Programme

Introduction

The University of King's College, in association with Dalhousie University, offers a special Foundation Year Programme in the first year of the Bachelor of Arts and Bachelor of Science. First offered in 1972-73, the Programme has proved a successful way of providing an integrated and interdisciplinary course for first year students. A part of the offerings of the Dalhousie-King's Faculty of Arts and Science, the Programme is open only to students registered at King's.

The Foundation Year Programme is a new approach to the first year of University. Literature, philosophy, political and social nstitutions, the history of science, economic forms, religion, art and music are studied logether in one course in an integrated manner which sees them as interdependent elements in the development of Western culture. This movement is understood through the examination of some of the most basic works in our history. To learn to deal with these works is to aquire a foundation for studies in the humanilies and social sciences, just as to have a conception of the nature of our society and alture is to have a basis for thoughtful living. ¹⁰ Provide these is the aim of this new programme

Many scientists are acutely aware of the need to understand the relation of science to other

aspects of culture and to social life; a stream of the Programme will provide a general view of our culture for science students interested in these questions.

Associate Professor of Classics. The form of the teaching is designed to meet R. D. Crouse, B.A. (Vind.), S.T.B. (Harvard), the special problems of first year students. M.Th. (Trinity), Ph.D. (Harvard), Students spend about equal time in lectures and Associate Professor of Classics. tutorial groups. Enrolment in the Programme is H. V. Gamberg, B.A. (Brandeis), Ph.D. (Princelimited to 100 Arts students and 25 Science students. The very favourable ratio of staff to ton), students and the concentration of the student's Associate Professor of Sociology. W. J. Hankey, B.A. (Vind.), M.A. (Toronto), work within one course both permits the course Director, Foundation Year Programme. to offer a wide variety of experiences and J. G. Morgan, B.A. (Nottingham), M.A. allows it to help students analyze, focus, and evaluate their experiences. The amount of time (McMaster), D.Phil. (Oxford), spent in small group tutorials permits close Associate Professor of Sociology, President, University of King's College. attention to be paid to each student's develop-M. Reckord, B.A., M.A. (Manchester), Ph.D. ment. A large number of departments recognize (London), the Programme as a substitute for their in-Associate Professor of History. troductory class; this gives Foundation Year D. H. Steffen, Ph.D. (Goettingen), students wider options for second year study. Associate Professor of German. J. Stolzman, B.A. (Oregon), M.S. (Florida), The instructors in the programme are specialists Ph.D. (Oregon), in a wide variety of university subjects. All take the view, however, that first year study at Assistant Professor of Sociology. university can profitably be devoted to at-J. A. Lennon, B.A., M.A. (Tor.), tempts to integrate knowledge and understand-Junior Fellow. ing rather than to premature specialization in C. J. Starnes, B.A. (Bishops), S.T.B. (Harvard), particular subjects. On the basis of the in- M.A. (McGill), tegrated view which a student can develop in Junior Fellow. the Foundation Programme, choice of greater H. G. Yesus, B.A. (Haile Selassie), M.A. (Illinois specialization for subsequent years at university et Brandeis), Junior Fellow. may be more reasonably made.

Diploma for Studies in the Humanities and Social Sciences.

Students who do not intend to proceed to graduation may be admitted as Special Students into the Foundation Year Programme (equivalent to four credits), successful completion of which will result in the obtaining of the Diploma for Studies in the Humanities and Social Sciences. Permission to enrol as a Diploma student must be sought through the Director of the Foundation Year Programme. Evidence of genuine interest in pursuing such studies will be considered in the admittance decision, together with high school record.

J. P. Atherton, M.A. (Oxon), Ph.D. (Liverpool),

Teaching Staff

Occasional Lecturers (1972-73)

J. Farley, B.Sc. (Sheffield), M.Sc. (West. Ont.), Ph.D. (Man.), Associate Professor of Biology. B. E. Gesner, B.A., B.Ed., M.A. (Dal.), Assistant Professor of French. J. F. Godfrey, B.Phil. (Oxon.). Assistant Professor of History. O. Sewell, Assistant Professor of Art History, Nova Scotia College of Art and Design. R. E. Schliewen, B.A. (Free U.), M.A. (Vanderbilt). Assistant Professor of Sociology.

Admission Requirements

The admission requirements are those pertaining to the Faculty of Arts and Science in general. The course is designed to be useful to students of every level of attainment. However, applications are invited from students completing junior matriculation (N.S. Grade XI); these students will be individually considered for admission without senior matriculation (N.S. Grade XII). All students are admitted to the three year general or four year honours degrees.

Scholarships

Students of the Programme are eligible for the scholarships open to entering students. In addition, the Henry S. Cousins Scholarships of \$1,000. and \$750. per year are open only to students entering this Programme.

Grading and Credit

The Programme is to be regarded as a complete unit. It is not possible for students to enrol in only part of the course. Evaluation of the students' performances will be continuous and made on the basis of tutorial participation and essays. There are no examinations. The final grade is to be a composite of all evaluations. Final grading will be the result of discussion among all those teachers who have had grading responsibilities. Grades are given in terms of the letter grade system of the Faculty of Arts and Science.

Successful completion of the Programme will give students in the Bachelor of Arts course twenty-four credit hours or four class credits toward the Bachelor of Arts degree. These students do one other class besides the Foundation Year course to achieve a complete first year. Bachelor of Science students will do two science classes in addition to their work in the Foundation Year Programme. The course for science students carries eighteen credit hours, i.e. three class credits.

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:

classical languages). English Language and Literature. German (except in the case of courses in language). History.

Political Science.

pology).

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). 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.

The Department of Education of Dalhousie University waives its requirement of English 100 for students enrolled in the B.Ed. Integrated Courses who have successfully completed the Foundation Year Programme.

Pre-Professional Training

The Faculties of Medicine and Dentistry of Dalhousie University have approved the Foundation Year Programme as part of the pre-professional work they require for admission to their respective faculties. Students may substitute the Programme for the appropriate requirements laid down by these faculties.

Course Designation, Lecture and Tutorial Hours.

The formal designation of the Programme courses is as follows:

King's Interdisciplinary Studies

K100 (Arts): Foundation in Social Science and Humanities; Lectures M. W. Th. F. 9:30 a.m. -11:30 a.m.; Four hours of tutorials to be arranged.

K110 (Science): Foundation in Social Science and Humanities; Lectures M. W. F. 9:30 a.m. -11:30 a.m.; Two to four hours of tutorials to be arranged.

Outline of the Foundation Year Programme

The course has its own logic; it is not just a collection of diverse materials but integrates them in accord with the interpretation of our culture which it develops. As we work out this

Classics (except in the case of courses in the interpretation, we consider works okinds, some of the most crucial work culture. These we consider no mat discipline ordinarily studies them look, for example, at Mozart's Don early Greek urns, Michelangelo's " and Brooklyn bridge; these are usu-Sociology (except for courses in Anthro- stood to belong to the disciplines archaeology, art history and archited read Homer's Iliad, Shakespeare's K: Robert Penn Warren's All the King works usually studied by the depart classics, theatre, and English literation analyse St. Anselm's Proslogion, De Meditations, and Luther's The Freedo Christian, which are usually studied by ments of philosophy, theology and rel study Huizinga's The Waning of the Ages, Rousseau's Social Contract Capital, Mill's White Collar; works the belong to history, political theory, e and sociology. We read selections from (nicus' On the Celestial Spheres, V Optics, Darwin's On the Origin of the Sa texts taken from the history of ast physics and biology.

> The logic we develop to integrate the diffe stances of these various works is of two kind On the one hand, we see how each of the works shows the nature of the different epos or stages of our culture and how each of the civilizations break up to form the one succes ing. On the other hand, we trace some institutions, ideas and movements through an of the historical periods.

The following are the teaching units of the course. One or more of the aspects of cult mentioned above tends to be stressed in ead unit in accord with the difference between the general character of each.

1. The Ancient World: The origin of # primary institutions and beliefs of the wester world in Greece, Rome, and Israel. Religion manifesting itself in art, myth and institution provides a focus for our approach to this epod. Co-ordinator: Mr. Atherton.

2. The Medieval World: The formation Christendom. The forms of the City of God developed in the assimilation of ancient cultur to Christianity provide the elements for be consideration of this period. We attempt " grasp their unity, as the medievals saw through the Divine Comedy of Dante. W ordinator: Mr. Crouse.

3. The Reformation and Renaissance: break up of the medieval world in opposition of faith and nature. We begin consider philosophy, science, politics: secular arts in general, as self-conscion independent of the Church and attempting achieve secularly what it proclaimed religiou Co-ordinator: Mr. Hankey.

4. The Age of Reason: The enlighten romanticism, and revolution. The develop of secularization to the religion of na



Awarding the Governor General's Medal, Encaenia 1973

special attention is paid to political theory in this section. Co-ordinator: Mr. Steffen.

The Triumph of the Bourgeoisie: Bourgeois culture from its triumph in the French Revolution to its collapse in World War I. The nineteenth century is mainly treated in terms of the revolutions: political and industrial. Marx provides a crucial analytical focus; novels provide a new form of literary experience. Co-ordinator: Mr. Morgan.

6. The Contemporary World: From the decline of the European empires to contemporary adustrial society. The focus is the point of new of the new social sciences which came into in our investigation of the nineteenth rentury. The revolutions of the twentieth intury are considered central. Co-ordinator: Mr. Gamberg.

One major paper will be required of both Arts and Science students during each unit. In addition, Arts students will write a number of smaller papers relating to the work of their Thursday lecture. This additional lecture will consider one text or topic in detail during the whole unit. A different kind of work will be considered in each period so that instruction is given in the different techniques appropriate to literature, philosophy, history, etc. 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.

The following are the recurring general topics which are discussed in each of the units outlined above.

(a) Political institutions, the modes of authority, conceptions of law and the person, the political ideal.

(b) Theological and philosophical positions and forms.

(c) The conception of nature and forms of natural science.

(d) Economic institutions.

(e) The structure of society.

(f) Literary, musical and artistic expression.

A classroom with facilities for slides, films and musical reproduction is used so that the presentation of these aspects of culture can be an integral part of the teaching.

There follows a synopsis of the course showing the relation of the above general topics and the various units.

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	Unit 1	2	3	4	5	6
Historical 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 Institutions	The City State, The Roman Empire; The Golden Age, The legal person.	Christendom, Marauding imperialism, The Holy Roman Empire; feudal kingdoms, Decline of the Papacy.	Rise of central- ized territorial states, Absolute Monarchies	Absolute Mon- archy, en- lightened des- potism, The English parlia- ment, French Revolution	Revolutions, liberalism, con- servatism, demo- cracy. National- ism.	Liberal Democracy, Fascism, Socialism. Welfare States. Left and Right.
Philosophy and Theology	The rise of "reason"; The Gods in human form, God beyond Nature, The Trinity.	Theology "queen of the sciences." Reason and Faith. Realism and Nominalism. The Absolute System.	Secularism; mysticism; Christian humanism; The Reformation and Protestantism. The Counter Reformation.	Revealed religion criticized; Deism. Empiric- ism and rational- ism; idealism.	Revival of religion; Sectarianism. Reactions to rationalism. Positivism. Materialism. Evolutionary thought, Social Darwinism.	Existentialism; individualism. Atheism, Nontheism. Neo Orthodoxy. The Philosophy of History.
Scientific Fhinking	Man against nature, Reason in nature.	Abstract Speculation and deductive logic; Nature and the Divine Ideas.	Modern con- ception of sci- ence begins: Cartesianism; astronomy. Mathematics and Science.	The public ac- ceptance of Sci- ence. The growth of the natural sciences.	Scientific ad- vance and tech- nology. The social "sci- ences", evolu- tion. Advances on all fronts.	New directions in Physics: the atomic age. Technocracy, The Computer.
Economic 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 feudali- sm.	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	Family, Tribe and State.	Monasticism. Feudalism: peasants and nobles. The beginnings of the "middle classes". The Church and Society.	Monarchism; the mercantile society and its structure. De- cline of mon- archical system.	Criticism of divine right; republicanism; Class societies; State and Society.	Parliamentary democracy; the entrenchment of the bourgeoisie. Social classes.	Class Societies, and Socialist Societies, Pro- blems of race. Bureaucracy.
Literature and Music and Art	Epic and Tragic drama, Myth; the Ideal and the realistic.	Romanesque: Gothic, Plainsong, Polyphony. The beginning of "modern" literature.	The Renaissance and its products; Baroque art and music.	The "neo- classical" era. Rococo and Baroque, Early phases of Romanticism.	Romanticism, nationalism in art. Naturalism. Impressionism.	"Alienation" and the Arts; The Waste Land Experimentation and fragmentation, The problem of form.

eneral Faculty Regulations

den's are subject to changes in regulations udents and after their first registration specifically excused by the Faculty. All about the regulations hereunder d be made to the Registrar. Any student fering undue hardship from application of of the regulations may appeal for relief of the Registrar to the Committee on

General

mission to Classes

student shall be admitted to a class until he satisfied the regulations regarding entrance complied with the General University alations.

ration of Undergraduate Studies

student is normally required to complete his dergraduate studies within ten years of his rst registration.

full-time student registered in this University w, with the permission of the instructor neerned, audit any class in the Faculty of ts and Science, provided that it is clearly derstood that he will not be eligible to write minations in the class and will not in any cumstances be granted credit for it.

dvanced Placement

student possessing advanced knowledge of a bject, which he has acquired otherwise than a university, will be encouraged to begin his udies in that subject at a level appropriate to s knowledge, as determined by the departnent concerned, and will be exempted from y classes which are normally prerequisities or the one to which he is admitted. However, e student must substitute for the exempted asses an equal number of other classes, not cessarily in the same subjects (i.e., he must omplete at the University the full number of asses required for a general or an honours egree).

ounting of Classes toward Two Undergraduate legrees

student who holds one undergraduate degree A., B.Sc., or B.Com.) and who wishes to gain second undergraduate degree must fulfil the quirements of the second degree and meet the ollowing stipulations:

only classes that are applicable to the urse for the second degree may be counted r credit.

b) each class carried forward must bear a made of C or higher;

a minimum of six new classes must be aken, of which four must be in a declared lajor subject.

ole: Conversion of a General degree to an ^{Jnours} degree (Degree Programmes section)

does not involve the award of a second degree; hence it is not subject to this regulation.

Concurrent Registration at King's and Another **Educational Institution**

Ordinarily no student may register at King's if concurrently taking work in another educational institution. Regulation 8 below outlines procedures to be followed to secure waiver of this general regulation. Regular exceptions are made with respect to registration at affiliated institutions.

Forced Withdrawal Consequent on Unsatisfactory Performance

When the work of a student becomes unsatisfactory 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 examinations, or may advise him to withdraw temporarily from the University or to reduce his class load

2. Credit and Assessment

A credit toward a degree is earned in a full-credit class, a class in which typically there are two to three lecture hours weekly for the regular (September to May) academic year. Credits may be obtained for university-level studies

(a) normally during the regular academic year; or exceptionally

(b) during a summer session or by correspondence.

(c) by transfer from other universities attended prior to entrance to King's,

(d) at other institutions while registered at King's.

Regulations governing each of these ways of earning credit are presented below in sections 4 through 8.

Gaining Credit

To gain credit toward a degree or diploma, a student must meet the requirements relevant to that degree or diploma and must appear at all examinations, prepare such essays, exercises, reports, etc. as may be prescribed and, in a class involving field or laboratory work, complete such work satisfactorily.

Credit Contingent on Settling Debts to the University

To gain credit, a student must settle all obligations to the University with respect to tuition and residence fees, bookstore debts, library fines, etc. (not later than April 30 for

In determining pass lists, the standings attained in prescribed class exercises, in field or labora-

Spring Convocations). **Method of Assessment**

tory work, and in the various examinations, may be taken into consideration by an instructor. Each instructor must ensure that students are informed of the method of evaluation to be used in a class within two weeks of the first meeting of the class; within four weeks after the beginning of each term the departmental chairmen must report to the Dean the method of evaluation to be used by each instructor in each class.

Grades

The passing grades are A+, A, A-, B+, B, B-, C, and D. The failing grades are F/M and F.

Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar, such grades to be based on the instructor's evaluation of the academic performance of the students in the class in question. Christmas grades must be submitted to the Registrar in 100-level full-year classes with enrolments in excess of 25 (on October 1); Christmas grades are normally submitted in other full-year classes.

Incomplete

Each student is expected to complete class work by the prescribed deadlines. Ordinarily there is no obligation for any instructor to extend such deadlines. Incomplete work in a class may not be completed for credit after September 1 following the academic year in which the class was taken, and no incomplete notation will be changed by the Registrar after that date.

Change of Grade

Correction of errors in the recording of a grade may be made at any time. The final date for grade changes for other reasons is September 1 following the academic year; such changes to be made only after the procedures for reassessment of a grade have been complied with.

Examinations and Tests

A period of roughly two weeks in the spring and one week in December will be set aside for the scheduling by the Registrar of formal written examinations. An instructor who wants an examination scheduled by the Registrar for his class must so inform the Registrar by October 15 for the Christmas period and February 15 for the Spring period. An instructor may also arrange his own examinations at a time and place of his choosing (including the formal examination periods), but with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority. Instructors should avoid scheduling hour tests covering the work of the entire term during the last week of classes in the term.

Reassessment of a Grade

On payment of a fee, a student may appeal to the Registrar for reassessment of a grade in a class. The Registrar will direct the request to the Chairman of the Department concerned, who will ensure that the reassessment is carried out and reported to the Registrar.

Special Examinations

Special examinations may be granted to students in case of genuine illness, supported by a 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 one week from the date of the examination. A student wishing to appear as a candidate at a special examination shall be required to give notice of his intention to the Registrar's Office on or before July 10. Students wishing to write at outside centres must apply by July 10.

Supplemental Examinations

A student is permitted to write a supplemental examination in one class which he failed provided that:

(a) he obtained a final grade of F/M;

(b) he has satisfied the requirements for the class (see Regulations);

(c) a final examination or test in the class in question accounted for at least forty percent of the final grade (the supplemental examination should – at the discretion of the department – constitute the same proportion of the final grade as did the final examination during the regular session);

(d) he has not failed his year.

The supplemental examination must be written in August immediately following the failure. It may not be deferred. Notice of intention to write, together with the required fee, must be presented to the Registrar's Office no later than July 10.

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

No more than one supplemental examination may be written by any student on the work of any one year.

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.

No supplemental examinations are allowed for classes taken at Summer School.

No more than five passes obtained as a result of supplemental examinations may be counted toward a degree.

Repetition of Classes not Passed

Except as provided in Regulation above, a student can gain credit only by repeating a class which he has not passed.

3. Merit Points and Minimum Standing

Merit points are awarded for each class as follows:

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

Note that although D is a passing grade, no points are awarded. For fractional credit classes, corresponding fractional merit points are awarded. (e.g. in a half-credit class, an A would yield 11/2 points). Students receiving credit for classes taken at another institution are not awarded points for those classes; the minima stated in the rules below are adjusted in proportion to the number of King's credits received relative to the number required.

Minimum Standing for a General Degree

In order to qualify for the award of a general degree, candidates must have obtained a minimum of ten merit points on the fifteen classes required. For all students graduating in 1976 and subsequently, a minimum of twelve merit points on the fifteen classes required must be obtained. (Note that the rule on minimum standing stated in the 1972-1973 Calendar was not approved by Senate; if applied it would be more stringent than the regulation stated above.)

General Degree with Distinction

A general degree will be awarded "With Distinction" to a student who has achieved an aggregate of 40 points in the 15 classes taken for his degree (or a proportional figure if he has taken more than 15 classes).

Minimum Standing for an Honours Degree

Students in honours courses are expected to maintain an overall standing of at least C in each year of study; if they fail to do so, they may be required by the Committee on Studies to transfer to a general degree course.

4. Regular Academic Year

Workload

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 of less than C.

Failed Year

A student is considered to have failed his year if he passes fewer than three of the full classes (or their equivalent) for which he is registered, unless:

(i) the year is the first he has spent at any university, when passes in only two classes are required:

(ii) he is a part-time student, when he pass at least one half-class. The results reported in the pass lists.

academic year determine whether a stude

Penalty for Failed Year

passed or failed his year.

(a) A student who has failed his year for first occasion is required to reapply to Faculty for consideration for readmission (b) A student who fails a year on occasions will be ineligible to return to University as either a full-time or a part in student. Ordinarily an appeal will be all only if illness has seriously interrusted student's studies and this is established submission of a medical certificate from physician attending the student to the Rem at the time of the illness.

5. Summer School and Correspondence Classes

Limits on Credits

Up to five credits from Summer School and correspondence classes may be accepted to wards the requirements for a degree, not more than two of them by correspondence, Such classes must have been passed at an adequate level and can be accepted only if they are closely equivalent in content to classes nor

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 d attendance at a university which operates trimester system or its equivalent.

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

Credit for Summer School Classes at Other Institutions

A student wishing to take, at a university other than Dalhousie, a Summer School class to b counted for credit towards a Dalhousie-King degree must:

(a) obtain an application form from the Ollof the Registrar at Dalhousie University. (b) obtain from the university he propose attend a full description of the Summer Scher classes (or alternative classes) he wishes to tak usually the Summer School calendar suffice;

(c) make application to the Registrat Dalhousie University and submit the description of the class he wishes to (alternatives should be indicated possible).

then a decision has been reached, the student when a decision reacting, the student will be notified directly by the Registrar. If the is favourable, the receiving di be notified by the Parister in a notification is favourable, the receiving university decision 15 advised by the Registrar's Office.

Correspondence Classes regulation similar to the above relates to A regulation classes and, at the present time, ourespondence classes offered by ouly the University, Kingston, Ontario will be onsidered.

sudents should make application for Summer school as early as possible in order that they source matter necessary arrangements and obtain a ist of the text-books required.

6 Transfer Credits

Ipon receipt of an application for admission to this University, and an official transcript, sudents will be advised of the number of erdits which may be transferred from another miversity. However, provisional assessment can be made on interim transcripts.

A student taking classes in another Faculty as part of an affiliated course must conform to the regulations of that Faculty with respect to

8. Credits from Other Universities under

A student, while registered at King's, wishing to take classes at another institution, must make an application to the Registrar at Dalhousie and provide a description of the classes offered at the other institution. A letter of permission will be provided if approval for the classes is given by the appropriate department. Assistant Dean of Student Services.

10. Experimental Classes

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.

9. Change of Registration **Changing a Class**

Class changes will not be permitted during the first week after commencement of classes in September. Students should decide during the first week of classes what changes they wish to make and make these changes during the second week of classes (see below).

Adding Classes

The last date for adding classes is two weeks from the commencement of the term in which that class begins. Students must complete the appropriate registration change form which must be approved by the instructor concerned and by the Registrar.

Withdrawing from Classes

(a) The last day for withdrawing from a class without penalty is: for A classes: 16 November, for B classes: 1 week after study break, for C classes: 31 January, for full year classes: 31 January. Classes dropped after these dates are recorded as W (withdrawal). Students must complete the appropriate registration change form which must be approved by the instructor concerned and by the Registrar. (b) No class may be dropped after the last day of classes in the term in which that class ends. (c) Classes may not be added to replace withdrawn classes after the second week of the term in which that class begins (see Regulation).

(d) A student may not transfer from full to part-time status by withdrawing from classes after the deadlines listed. (see Regulation).

Withdrawing from the University or Changing to Part-time Status

7. Credits from Other Faculties

these classes.

Concurrent Registration

The class fee will be paid by Dalhousie if:

student at Dalhousie-King's.

b) the classes are approved.

King's.

(a) the student is registered as a full-time

The class fee will be paid by the student if

gistered as a part-time student at Dalhousie-

mally given at King's. Maximum Workload No student may take classes totalling more that

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

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

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

A class shall be held to be formed when at least one faculty member and at least eight students have committed themselves to taking part in it for its full length, and in the case of one half-year classes when a class in the other one-half year is available.

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.

One faculty member taking part in each experimental class shall be designated the rapporteur of the class. It shall be his responsibility (a) to advise the Curriculum Committee of the formation and content of the class; (b) 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; (c) to report to the Registrar on the performance of students in the class; and (d) 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).

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.

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 designed for those who already hold a bachelor's degree on entering Divinity studies. The course consists of the basic programme of the Atlantic School of Theology, the choice of electives being approved by the Faculty upon advice (in the case of Anglican Ordinands) from the Anglican professors.

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.

The Testamur

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 Registrar.

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. (No new registrations after November 30, 1973).

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. (No new registrations after November 30, 1973).

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 supplemental examinations in one year, the recorded past mark for which is 50%.

The Divinity Curriculum

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

In most cases, the curriculum followed hu individual student will be mapped our result of consultation between that student and King's Divinity Faculty. It will draw in g main on the resources of the Atlantic School Theology, supplementing these as and in quired for specific goals of the student to example full-time ministry, ordained or other wise, in the Anglican Church of Canada, Sudsupplementary studies or training will normal be recognized for credit by the Atlantic School of Theology and not constitute an addition burden on top of the requirements of the School

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

PARISH TRAINING

All students who are candidates for ordination are expected to undertake some Sunday responsibilities, and may participate in the annual "Parish Training School" arranged by the Pastoral Committee of the Diocese of Nova Scotia as a help for students going to summer work in rural or mission parishes. The Professor of Pastoralia shares in the overall direction of this Parish Training Programme which is graded to the student's capabilities and is not onerous The School takes place between the end of Spring Examinations and graduation week.

Institute of Pastoral Training

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

The organization of the Institute in collaborathe organized Hill Divinity Hall, the Divinity of Acadia University, Presbyterian School Montreal, Medical Faculty of Dal-University, pioneered this modern College, development in Theological education on the anadian scene. It is the objective of the institute to bring pastors and theological undents face to face with human misery as it exists both in and out of institutions, through courses in Clinical Pastoral Education in both central and mental hospitals, reformatories and wrenile courts, homes for the aged, alcoholism treatment centres, and other social agencies. In this connection, the Institute now sponsors sx-week courses in Clinical Pastoral Education, usually commencing mid May, at the Nova scotia Hosptial, Dartmouth (mental), the Nova Scotia Sanatorium, Kentville, the Victoria General Hospital, Halifax, the New Brunswick Provincial Hospital in Lancaster, King's County Hospital, Waterville, and Springhill Medium Correctional Center, Springhill.

while the above mentioned courses aim

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.

1973-74 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 publicity.

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 the mentally ill or alcholics, where the church may have a significant role to play in partnership with other helping professions.

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 to the Executive Secretary of the Institute of Pastoral Training, 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.

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 news.

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 arrange ment 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, a B average 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.

Henry S. Cousins Scholarships - (a) \$1000 a year, maximum \$4000 for four years, (b) \$750 a year; maximum \$3000 for four years. Both scholarships open to students entering the Foundation Year Programme only.

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.

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 years. The holders of Chancellors Scholarships will normally be required to live in residence.

Board of Governors Scholarships - \$350 a year. Established by the Board of Governors, these scholarships are tenable for four years.

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

King's College Bursaries – The University offers the Registrar.

a limited number of small bursaries 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 residence

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. 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. Failing any qualified applicants from this county in any one year, the bursary for that year only will become available to a student resident anywhere outside the Maritime Provinces of Canada. Holder must live in residence.

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. J. 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 a year, tenable for three or four years, providing the student maintains an average of 65% and has no failure in any subject.

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 King's College Naval Bursary - \$300 a year order to commemorate the unique and relationship between the University of College and the Royal Canadian Nav the Second World War, ships and establish of the Atlantic Command have set up a B to enable a student to attend King's

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

The Bursary is awarded annually but in intended to be tenable by the same student the completion of his course at King's College provided that he makes acceptable progress The Bursary will be withdrawn in the event academic failure or withdrawal from King College for any reason.

Deihl Bridgewater Bursary - \$250. To assist needy students of suitable standing, residents the town of Bridgewater, or within six miles of the town. Bequeathed by the Late Lena Rute Deihl.

Walter Lawson Muir Bursary - \$175. To be awarded at the discretion of the Scholarship Committee either to a student entering college for the first time or to a student returning to college who won high scholastic standing in the previous year. Endowed by Mrs. W. L. Muin

The United States Scholarship - \$500. Award ed annually by Friends of New York State Corporation, to a student resident in the United States, who in the judgment of the Directors the Corporation best exemplifies an appreciation of the importance of good relationship between the people of the United States and Canada

In any year the scholarship may be divide among two or more students.

Imperial Oil Higher Education Awards. Imperia Oil Limited offers annually free tuition and other compulsory fees to all children or ward of employees and annuitants who proceed higher education courses. The awards tenable for a maximum of four years, or equivalent, at the undergraduate or hachele degree level. For particulars apply to Registrar.

I.O.D.E. Bursaries, value \$100 to \$200. Awa ed to entering students who show acad ability and financial need. Address application to Provincial Education Secretary, Provinci Chapter, I.O.D.E., 5677 Victoria Road, Habia N.S.

cholarships, Bursaries and Prizes warded in Course

the President's Scholarship – \$250. Three the pressure of \$250 will be awarded to the cholarships makes the highest addent who makes the highest average at the addent who first, second and third year and of the second secon examinations who hold no other scholarship.

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

the Scholarship will be credited in half-yearly the sentences, provided always that the scholastic dandard is maintained.

Alexandra Society Scholarship - \$300. An unual award offered by the Alexandra Society of King's College to a woman student who stands highest in the second or third year examinations, provided that she live in residence. If the student who stands highest is otherwise ineligible, the award shall be left to the diserction of the Scholarship Committee.

the Claire Strickland Vair Scholarship - \$300. An annual award to be offered a student beyond the first year who displays excellence in English, an English Major or English Honours student preferred.

Saint John University Women's Club Scholarship - \$100 (Undergraduate). The Saint John University Women's Club awards a scholarship of \$100 each year to a woman student entering her senior year in a Maritime University. The 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 Registrar, before March 1.

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

Dr. M. A. B. Smith Prize - \$25. Established by ^{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 classes.

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

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 Literature.

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 loyal 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 first year.

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 year 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.

This scholarship is intended to aid students who 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.

The award is made for the best original study in 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 Prizes

> 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 Students.

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, B.A., '15, M.A., '16
- 1919 William Gordon Ernst, B.A., '17
- 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 Registrar

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 of their father Daniel Hodgson, who died about that time. This Scholarship of an annual value of \$60, tenable for four years, is for the purpose of encouraging students to take an Arts Degree before entering upon the study prescribed for Holy Orders. Candidates, who must be residents of Prince Edward Island, shall file their applications and certificates of having passed the full Arts matriculation requirements before August 15th, and must not be over 24 years of age at that time. They must also satisfy the Diocesan Committee for Holy Orders as to their aptitude for the Ministry of the Church. At the end of each academic year the Scholar shall file with the Trustees a certificate from

the President or Secretary of the III "that during the past year he has re-College (or has been excused from residence) and has attended the full Arts in the College", together with a certifical his moral conduct, his attention to his a and his general conduct have been satisfa to the Board of Governors.

Scholars who fail to comply with the for conditions automatically forfeit the c ship, but in special cases the Bishop, on representations of the Trustees, may real terminated Scholarship in whole or in part

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

The Mabel Rudolf Messias Divinity Bursary-\$120. The interest on an endowment \$2,000, the gift of Mrs. M. R. Messias Wolfville, Nova Scotia, is to be used to prove an annual bursary for a needy and deservine Divinity student studying at the University King's College, on the nomination of the Faculty of Divinity.

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

The H. Terry Creighton Scholarship -- \$13 approximately. The annual income from endowment of \$2,000, established by famile and friends to honour the memory of H. Ter Creighton of Halifax, Nova Scotia, who was a active Lay Reader and prominent Layman the Diocese of Nova Scotia for many years.

The award is to be made to a des Anglican Divinity Student in his final yea training who is intending to enter the m in the Diocese of Nova Scotia. Should the no suitable candidate for the schola training in Nova Scotia, the award ma made, in consultation with the Bishop o Scotia, to one studying elsewhere, Fr

the student intends to return to Nova sectia for ministry in that Diocese.

How Donaldson and Cornwallis W. A. How Donates and Cornwallis W. A. 8400. This Bursary was established Bursary - \$400. Cornwallis, N.S.), Anglican by St. John's (Cornwallis, N.S.), Anglican Women to provide a living memorial to there would be the second the second the life and connections with King's, and of had family W. A., of which she was a charter converses it is to be awarded on the recommendation of the Divinity Faculty to a demember of the Divinity School at king's, male or female, preferably a Nova king s, who is prepared for full-time service in scottand is in need of financial assistance.

The George M. Ambrose Proficiency Prize. 300. Approx.) The income from a trust fund st up in memory of Canon G. M. Ambrose, MA, 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 andent takes the regular full course in theo-

The Margaret Draper Gabriel Bursary - \$450. fund has been established in memory of Margaret Draper Gabriel by her son, Rev. A. E. Gabriel, M.A., an alumnus of King's, the yield from which is to be used to give financial aid to Nova Scotian Divinity Student entering King's 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. Kaiser, in memory of John Clark Wilson. Two bursaries of \$100 each, tenable for one year. Awarded to Divinity students deemed worthy of financial help.

Organ Fellowship A stipend is awarded to a student qualified and willing to play the organ In the College Chapel (Casavant-2 manual pipe organ) at services throughout the year. The mount set in negotiation with the Divinity Faculty.

Glebe Scholarship. A scholarship of approximately \$250 is offered annually to Anglican being given to Divinity students.

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 1975).

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 Hebrew.

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 Pastoralia.

Laurie Memorial Scholarship. One or more scholarships of about \$250 each, founded in

students of Prince Edward Island, preference 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 West.

> 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 Faculty.

> 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 the 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

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 vear 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 ministry.

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 R.C.A.F.

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 Me. Bursary - \$100. This bursary, the gift Parish of Granville, N.S., is establish memory of Reverend W. E. Jefferson an alumnus of King's and a graduate who was ordained late in life and yet. to give nearly twenty years of devoted to the ordained ministry. Preference given to older men pursuing post gr studies or to older men preparing for tion. The award is to be made by the n Faculty.

The Archdeacon Harrison Memorial Burger \$20. Established by Miss Elaine Harrison memory of her father. To be awarded deserving and needy Divinity student, and discretion of the Faculty.

St. Paul's Garrison Chapel Memorial Prize \$20. To be awarded to the Divinity student chosen by the Faculty to attend a Christian Conference

The Clarke Exhibition. An endowment w established by the late Reverend Canon W Clarke of Kingston, New Brunswick, the in charge upon which shall be the provision copies of "The Imitation of Christ" to member of each year's graduating Class in Divinity. balance of the income each year is to be awarded by decision of the Divinity Faculty in a deserving Divinity Student for the comisyear.

Halifax Deanery Laymen's Association Bursan

A bursary in the amount of \$100. or more awarded to a deserving Divinity student nominated by the Divinity Faculty.

Loan Funds

Edith Mabel Mason Memorial Students Loui Fund

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

Canada Student Loans

1. All Canadian students are eligible to be con sidered for Canada Student Loans which, # most provinces, are administered in conjunction with provincial bursary plans.

2. Students should apply as early as possible b requesting application forms from the prov cial authority in order to have the mone! available for registration.

student Organizations

The University of King's College Stu-lents Union

the University of King's College Students' The University of self and students union their right of self government. The constitution revised in 1964, provides for a constitution of the participademocrate of student is expected. The students ton or creating a determining role in every spect of university life. The Union's main organs are the Student Assembly, the Executive organs are union, the Students' Council. the power of self discipline is exercised the Union's Male and Female Residence Councils and the Campus Police.

The Union operates through a number of permanent committees, e.g.: the Academic Committee, the Social Committee, committees on the constitution, elections, finances, Dalhousie relations, awards, etc.

King's College Women's Amateur Athletic Association

The object of this association is the promotion of women's amateur sports at the College. The KCGAAA, is a member of the Atlantic Women's Intercollegiate Athletic Association and competes in the Intermediate section of this Association, field hockey, volleyball, and hasketball are played at the Intercollegiate level, and floor hockey, badminton, table tennis, and swimming are available on a regularly scheduled basis in the University Gymnasium.

King's College Amateur Athletic Association

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 students

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 vear's activities and awards.

The Quintilian Debating Society

This Society was founded in 1845. Ouintilian 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

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

The Haliburton was founded and incorporated

students have been afforded the opportunity of studying Theology at King's. The status of this Society is at present under review in the light of King's participation in the Atlantic School of Theology.

The King's College Theological Community

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 meetings from time to time. 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.

Societies Connected With The 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 1973-74. President,

The Rev. D. F. L. Trivett, 1665 Oxford St., Halifax, N.S.

Vice-President,

Ms. Mary L. Barker, 5685 Inglis St., Halifax, N.S.

Treasurer,

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 1973-74

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,

Truro, N.S.

Miss Miriam Morris, 2438 Gottingen Halifax, N.S.

Vice-Presidents.

Mrs. A. MacKeigan, 68 Reserve St., Glace H Mrs. P. N. McIvor, 8 Lakeview Point, h mouth, N.S. Mrs. J. E. Lane, 91 Hazelholme Drive, Hal N.S. Mrs. C. A. Orford, 86 Kent St., Charlottet P.E.I. Mrs. E. R. McCordick, 237 Brookside Dr. A 9B, Nashwaaksis, N.B.

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

Corresponding Secretary, Mrs. D. L. Walker, 92 Crichton Ave., Day mouth, N.S.

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

President.

Recording Secretary,

Treasurer. N.S.



Convocation 1972

Graduating Class

Honorary Life President, Mrs. G. S. Clark

Life President, Robert Walker Howe

Life Vice-President, Judith Ann McPhee

Life Secretary, Patricia Louise Rowat

Life Treasurer, Judith Suzanne Blakeney

Valedictorian, Douglas George Ruck

Doctor of Civil Law (honoris causa) Leonard Philip Edwards Thomas Head Raddall

Doctor of Divinity (honoris causa) Harry Rhodes Cooper

Bachelor of Divinity

Harris, The Reverend Ronald Edward, L.Th., B.A., Bridgewater, N.S. Hodder, The Reverend Hayward, S.Th., B.A.,

Allan, Stuart Wayne, B.A., Oromocto, N.B.

laster of Sacred Letters

Harris, The Reverend Peter Wright, B.A., Maxwell, Malcolm Garth, B.A., Saint John, Tattrie, The Reverend John William, B.A.,

Banks, Peter Edward, Halifax, N.S. Blakeney, Judith Suzanne, Dartmouth, N.S. Bulley, Wilma Frances Grace, Sydney, N.S. Burchell, William Wilfred, New Glasgow, N.S. Butts, Jane Florence Isabel, Pierrefonds, P.Q. Carr, John Allison, Harrington, P.E.I. Chabassol, Ronald Bernard, Westville, N.S. Driscoll, Sharon Elizabeth, St. John's, Nfld. Fairn, Carol Gertrude, Dartmouth, N.S. Ferguson, Frances Shirley, Bedford N.S. Francis, Maureena Mae, Weymouth Falls,

Fryday, James George, Black Point, N.S. Harding, George Ross, Lockeport, N.S. Hoegs, Robert MacDonald, New Glasgow,

Howland, Thomas Harold Lucien, Norfolk, Va., U.S.A

Huntington, Annie Ruth, Truro, N.S. Hutchins, Edgar Brian, Digby, N.S. Jamieson, John Wayne, Halifax, N.S. Johnson, Ian Douglas (First Class Honours and the University Medal in Sociology), Halifax, N.S.

Leggett, Wayne Harold John, Dartmouth, N.S.

MacDonald, Mary Catherine Sharleen, Halifax, N.S.

Arts and Science The Governor General's Medal, Ian Johnson April Fund Scholarship, Cathy Meisner President's Scholarship (Third Year), Tricia Murwin President's Scholarship (second Year), Judith Tomlin President's Scholarship (First Year), Alexis Inkpen Alexandra Society Scholarship, Cathy Meisner Stevenson Scholarship, Joseph Atkinson, Irene Hall Lawson Price, Carolyn Campbell Dr. M. A. B. Smith Prize, Cathy Meisner Bishop Binney Prize, Cathy Meisner Beatrice E. Fry Memorial Prize, Deborah Martin, Particia Mossman Zaidee Horsfall Prize in Mathematics, Alistair Dow, Edna Todd Almon-Welsford Testimonial Prize, Alexis Inkpen, Victoria Pitt McCawley Classical Price, Joseph Atkinson Binney Bursary, Paul Smith Charles Cogswell Bursary, Carolyn Campbell Jackson Bursary, Paul Smith Harry Crawford Memorial Prize, Carolyn Campbell Claire Strickland Vair Scholarship, Susan Harris Divinity The Canon W. S. H. Morris Scholarship, The Reverend Henry John Sharam (1971), The Reverend Donald Arthur Neish (1972) The George Sherman Richards Proficiency Prize, Lloyd Harold Ripley The McCawley Senior Hebrew Prize, The Reverend John William Tattrie The Archdeacon Forsyth Prize, The Reverend Peter Wright Harris The Shatford Pastoral Theology Prize, Stuart Wavne Allan The Kenelm Eaton Memorial Scholarship, The **Reverend John William Tattrie** The Ott Reading Prize, John Herbert Swain The Ott Preaching Prize, Barkat Masih Khokhar The Canadian Bible Society Book for the Reading of the Holy Scripture, Stuart Wayne Allan The George M. Ambrose Proficiency Prize, John Victor Cavill Pitt The Prince Prize in Apologetics, Malcolm Garth Maxwell The Dr. C. Pennyman Worsley Prize, The Reverend John William Tattrie

Mader, Margaret Ethel, Barss Corner, N.S. Mason, Juliana Louise, Tangier, N.S. Matthews, Linda Elizabeth, Dartmouth, N.S. McAlden, Judith Elizabeth, Dartmouth, N.S. McPhee, Judith Ann, Halifax, N.S. Miles, John Alfred, North Sydney, N.S. Morine, Valerie Jeanne, Dartmouth, N.S. Musial, Frederick Anthony, River Ryan, N.S. O'Neil, Charles Lawrence, Bridgewater, N.S. Ostler, Kenneth George, Moncton, N.B. Power, Robert Lloyd, Dartmouth, N.S. Rowat, Patricia Louise, Dartmouth, N.S. Ruck, Douglas George, Dartmouth, N.S. Shears, Linda Noreen, Glace Bay, N.S. Tedford, Lorna Mary, Sydney, N.S. Tha Din, John William, (Honours in Political Science), Truro, N.S. Wainwright, Esther Jean, Halifax, N.S. Zinn, Elizabeth Anne, Don Mills, Ont. Bond, Eleanor Jane, Rawdon Gold Mines, N.S. Chaldecott, Anne Elizabeth, Chester Basin, N.S. Christiansen, Karl Kenneth, Saint John, N.B. Harfield, Lynda Avril, Dartmouth, N.S. Ingram, David Allan, Dartmouth, N.S. Marriner, Margaret Jean, Riverview, N.B. Matthews, Mary Lou, Fredericton, N.B. McKay, Melvin Gregory, New Glasgow, N.S. Murray, Heather Louise, Stellarton, N.S. Nowlan, Barbara Marion, Halifax, N.S. Tutty, Kenneth William, (Distinction), Louisbourg, N.S. S.Th., Fredericton, N.B. Fudge, The Reverend Alton William, Falmouth, N.S.

*MacDonald, Valerie Anne, Stellarton, N.S. MacLeod, Lorne Wayne, Glace Bay, N.S. *MacLean, David Charles, Sydney, N.S. MacPhee, Barbara Jane, Truro, N.S. *McClare, Judith Marie, Weymouth, N.S. *Sawyer, William Barry, Halifax, N.S. *Thomson, Glenda Louise, Halifax, N.S. *Whitzman, Raymond Elliot, Chomedey, P.Q. **Bachelor of Science** **Sheppard, George Graham, Mt. Stewart, P.E.I. Tutty, Carolyn Ann, Louisbourg, N.S. **Diplomas in Divinity** Title of Associate in Theology Eaton, The Reverend Edwin Francis, C.D.,

Alumni Association of King's College

Certificate in Clinical Pastoral Education Allan, Stuart Wayne, B.A., Oromocto, N.B. *Conferred during the session **Encaenia Awards**

**Murray, The Reverend Ivan Cameron, Saint

John West, N.B.

**In absentia

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Entrance Scholarships and Bursaries Awarded May, 1972 (Arts and Science)

Dr. W. Bruce Almon Scholarship

George M. Burden

Chancellors' Scholarship

Barbara Meier

King's Foundation Scholarship

Martin Adelaar Geoffrey Henderson George Lewis Geoffrey Strople

Halifax-Dartmouth Scholarship

Avard Bishop Mary Bremner Nadine Cooper Kim Henneberry Carolyn Johnson Lynn Mitchell Patricia Otto Deborah Robichaud Wendy Roos Deborah Ryder Cathy Sullivan John Wright

Alumni "Annual Giving" Scholarship

Sherri Aulenback Donna MacAulay Marlene Mulley

Margaret and Wallace Towers Bursary

Brent F. Halford

Nova Scotia Teachers College Bursary

Gregory Dean Gidney

Alumni Scholarship

Deborah Halliday Christy-Ann Lomas

Walter Lawson Muir Bursary

Beverly Green

Keating Trust Scholarship

David Richey John Sperry

University Bursaries

Paul Burton Beverly Green Deborah Halliday Christy-Ann Lomas Mary MacDonell David Richey John Sperry

NOTE 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.

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Degree Programmes

1. Courses of Study

Bachelor of Arts/Bachelor of Science General Honours

Uniform Bachelor of Science for Engineering

Bachelor of Science in Engineering Physics

Bachelor of Commerce General Honours

Bachelor of Education Sequential Integrated

Bachelor of Music Education

Certificate in Public Administration

2. Subject Grouping

A. Languages	B. Humanities
French	Classics
German	Comparative Literature
Greek	English
Hebrew	History
Latin	Mediaeval Studies
Russian	Music
Spanish	Philosophy
	Religious Studies
	Theatre
C. Social Sciences	D. Sciences
Anthropology	Biochemistry
Economics	Biology
Political Science	Chemistry
Psychology	Geology
Sociology	Mathematics
	Physics

Classes are offered also in other subjects: Architecture, Art History, Commerce, Computer Science, Education, Engineering, Oceanography, and Humanistic Studies in Science.

3. Numbering of Classes

The Faculty is in the process of reviewing its system of numbering classes. Most classes are numbered with a three digit number; others, however, are numbered with a four digit number. The following general criteria apply to both kinds of numbering. Students are urged to

¹Application of Regulations to students who entered in 1972 or earlier.

All students who entered a General B.A. or General B.Sc. degree programme prior to 1973 must meet the requirements as outlined in Sections 5.2 and 5.1.1(a) above; if beyond the first year they will be considered to have been in an Ordinary Programme.

consult the relevant departments if they are confused by any specific numbering system.

Classes are numbered to indicate their general level and the year of study in which they may first be taken. The first digit in either a three or four digit number normally indicates the year of study. Thus, classes in the 100 + series are introductory and can normally be taken by fully matriculated students without any special prerequisites. Completion of a 100-level class is normally a prerequisite for admission to further classes in the subject. Classes in the 200 + series, 300 + series and 400 + series are normally taken in the second, third, and fourth years respectively.

Certain classes in the 200, 300, or 400 series are restricted to Honours students and may not be taken by students in the General Degree programmes, except with special permission of the instructor.

Classes in the 500 + and 600 + series are normally regarded as graduate classes; however, some may be open to senior undergraduates with the permission of the department or instructor concerned.

The letters A, B and C suffixed to a three-digit class number indicate a half-credit class, i.e., a class having one-half the value of a full class in determining the standing of students. The letters indicate the terms during which the classes are offered as follows: A: First term, classes end in December. B: Second term, classes end in April. A/B: Given in the first term and repeated in the second term. Classes end in December or April according to the term in which the class is taken.

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

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.

4. Programme Advice

4.1 Entering Students

Any student who wishes to declare his major at initial registration must consult with the department concerned regarding his first-year programme.

Students entering the King's Foundation Year Programme should consult the Director of the Programme before registration.

4.2 Students who have Completed the First Year

Every student entering the second year is assigned a Faculty advisor with whom he must consult regarding his programme. Normally the department concerned assigns an advisor to a registration. Such a student must consult w

student once he has declared his major sui Students seeking to enter an Individual gramme (section 5.2.3 below) or an centrated Honours Programme (section 3 below) must approach the Chairman Programme Advisory Committee which assign an advisor or advisors and which h give approval to programmes of these types

4.3 Prospective Teachers

Students considering teaching as a profes should before registering consult the Chain of the Department of Education regarding the programme of study. Those considering must teaching should consult the Chairman of Department of Music.

5. Bachelor of Arts/Bachelor of Science

General: three years -15 classes required¹ Honours: four years -20 classes required

5.1 The First Year

5.1.1 Requirements

(a) Each full-time student planning to take B.A. or a B.Sc. will in the first year normalise take five classes or the equivalent, chosen from groups A, B, C, and D. (The King's Foundation Year Programme is equivalent to four class for B.A. candidates or three classes for B.S. candidates.)

(b) No student may in his first year take for credit more than the equivalent of two fulcredit classes in a single department.

(c) One of the five classes chosen must be selected from a list of classes in which written work in considered frequently and in detail These classes are approved by the Curriculum Committee and listed in the Programme Planning Guide.

5.1.2 Recommendations

These recommendations do not apply to sludents entering the King's Foundation Year Programme.

(a) Students should seriously consider choosing a class from a list of classes which deal with a formal subject. This list is in the Programme Planning Guide and has been approved by the Curriculum Committee.

(b) Students should consider becoming fluent in French.

(c) It is recommended that one class be chose from each of the groups A, B, C, and D.

5.1.3 Special Options

(a) A first-year student may (but need declare his intended major department and be accepted by the chosen department at

the department concerned regarding his firstrear programme.

b) The King's Foundation Year Programme (b) the first-year student in Arts and Science offers une and introduction to the University. To the advantage of this Programme the student ust be enrolled at King's. Details are to be ound in the Calendar of the University of King's College, and advice may be obtained from the Director of the Programme.

5.2 General B.A. and B.Sc. - Requirements for the Second and Third Years

student who has successfully completed the ist year may pursue a programme toward a erneral degree or – if qualified – enter an bonours programme. (Honours programmes are outlined in section 5.3 below.) In the second and third years, three types of options are open to the candidate for a General B.A. or General R Sc:

Ordinary Programmes, which may be pursued in any department in which it is posible to obtain a General B.A. or B.Sc. In such a programme, the student must select a major subject, but the structure of study in the major and elective classes may be relatively lanse!

(h) Co-ordinated Programmes, offered by some departments or groups of related departments, each programme requiring either one or two years of relatively concentrated study in the departmental or interdepartmental area of specialization; and

(c) Individual Programmes, for students whose academic needs are not met by the foregoing options

The rules governing each of these options are outlined below.

5.2.1 Ordinary Programmes (B.A./B.Sc. General)

5.2.1.1 The ten classes making up the course for the second and third years must meet the following requirements:

(a) at least seven classes shall be beyond the 100 level;

(b) at least one class shall be in each of at least three subjects:

(i) at least four and no more than eight dasses shall be in a single area of concentration (the major).

(ii) up to two of the classes in the major subject must be selected in accordance with departmental or interdepartmental requirements outlined in the Calendar under Programmes of Study. These requirements may aso designate particular offerings of the department (e.g. service classes) as unacceptable in constituting a part of the major specialization.

student must declare his major and have it approved by the department concerned.

5.2.1.3 For the B.A., the major may be chosen from French, German, Greek, Latin, Russian, Spanish, classics, English, history, philosophy, music, anthropology, economics, political science, sociology, or from any of the B.Sc. subjects except engineering.

5.2.1.4 For the B.Sc. the major subject must be chosen from biology, chemistry, engineering, geology, mathematics, physics, or psychology.

5.2.1.5 Electives may be chosen from any of the subjects listed in the preceding two paragraphs, Architecture 100, Art History, Biochemistry, not more than three classes in Commerce, Comparative Literature, Computer Science, Education 401 or 402, Hebrew, Humanistic Studies in Science, Mediaeval Studies, Religious Studies, and Theatre 100.

5.2.2 Co-ordinated Programmes (B.A./B.Sc. General)

A student may in his second and third years follow a two-year - or two one-year integrated programme(s) of study. If two one-year programmes are chosen, they may be in different departments. All such co-ordinated programmes have been explicitly approved by the Curriculum Committee. A department or group of departments offering co-ordinated programmes may structure them as it wishes, consistent with sound academic practice and subject to the following guidelines:

(a) that the equivalent of five class units constitute a normal year;

(b) that the function of each programme form part of the Calendar description of each programme;

(c) that each two-year programme permit the student at least one class of his own choice in each of the second and third years;

(d) that two-year programmes normally not be exclusively in a single discipline.

(e) that the normal prerequisite for entry into a departmental one-year or two-year programme be the introductory class of the department in question, or an equivalent that the department considers acceptable, and not more than one introductory class in a related subject.

A student considering a Co-ordinated Programme should consult as early as possible with the departments concerned.

5.2.3 Individual Programmes (B.A./B.Sc. General)

A student whose academic needs are not met by the programmes offered under paragraphs 5.2.1 and 5.2.2 may present two one-year or a two-year programme of his own choice to the

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5.2.1.2 On registration in his second year the and approval; it being understood that the Committee and/or Faculty advisor provide assistance in constructing and revising such programmes.

5.2.4 Transfer Between Programmes

A student who transfers at the beginning of his third year from or into an Ordinary Programme must either meet the requirements under paragraphs 5.2.1 or 5.2.3, and may declare a new major subject.

5.3 Honours Programmes

Able and ambitious students are urged to enter an Honours Programme. These programmes entail a higher quality of work than that required for the general bachelor's degree. 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 breadth of study in several related disciplines. 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 maywish to do their advanced work.

5.3.1 Acceptance

Honours students in a concentrated programme must be accepted by the major department concerned, which will supervise their whole programme of study. Honours students in an unconcentrated programme must be accepted by the Programme Advisory Committee, which will appoint an interdisciplinary advisory committee of two or more Faculty members to supervise the programme of study.

5.3.2 Application for Admission

Application for admission to an honours 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.

5.3.3 Conversion to Honours of a General B.A., B.Sc., or B.Comm, Degree

A student who has received a General B.A., B.Sc., or B.Comm. degree from Dalhousie and who is not enrolled in a programme of study in another Faculty, may apply for admission into an Honours B.A., B.Sc., or B.Comm. programme, or the B.Sc. in Engineering Physics programme. Regulations in paragraphs 5.3.1 and 5.3.5 (or the regulations regarding the B.Sc. in Engineering Physics) must be met. On satisfying the requirements of the Honours degree programme of B.Sc. (Engineering Physics), the student will receive a certificate which converts his General degree to an Honours degree or B.Sc. (Engineering Physics).

5.3.4 Joint Honours: Dalhousie-Mount Saint Vincent

Special arrangements exist under which students may be permitted to pursue an honours Programme Advisory Committee for scrutiny programme jointly at Dalhousie and Mount Saint Vincent. Interested applicants should consult the appropriate department of their own university and must be accepted by the major departments concerned at both institutions. These departments will supervise the entire programme of study of accepted applicants. Paragraph 5.3.5.1 applies fully to such joint programmes.

5.3.5 Requirements for the Second, Third, and Fourth Years

5.3.5.1 Concentrated Honours Programmes

(a) Honours in a major programme are based on the general requirement 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 requirements 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 the requirement in the preceding clause.

(c) 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 Honours.

Details of specific departmental honours programmes will be found under departmental listings of Programmes of Study.

5.3.5.2 Unconcentrated Honours Programmes (a) Honours in the unconcentrated programmes are based on the general requirement that the fifteen classes beyond the first year of study comprise:

(i) twelve classes beyond the 100 level in three or more subjects. No more than five of these may be in a single subject; no less than six and no more than nine may be in two subjects. (ii) three other classes.

(b) Requirements for an Unconcentrated B.A. (Honours)

At least ten classes of the twenty required must be selected from groups A, B, and C.

(c) Requirements for an Unconcentrated B.Sc. (Honours)

At least eight classes of the twenty required must be selected from biology, chemistry, geology, mathematics, physics, and psychology, and at least six additional classes must be selected from groups C and D.

(d) 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

6. Uniform Bachelor of Science for Engineering

Three Years – 16 classes required.

On successful completion of this course, the student receives a General Bachelor of Science Degree from Dalhousie and qualifies for admission to the junior year of the Nova Scotia Technical College. Students who plan to study further at a college other than the Nova Scotia Technical College should consult the Department of Engineering and Engineering-Physics on initial registration. See also Architecture below.

Details of the curriculum are given under Engineering and Engineering-Physics in Programmes of Study.

7. Bachelor of Science in Engineering-**Physics**

Four years - 21 classes required.

This special course is based on a study of physics oriented towards its application to engineering problems. It is designed to give students more applied mathematics than is contained in the ordinary physics course. Students are also given an opportunity to specialize in such fields as electronic systems engineering, semiconductor engineering, underwater acoustics and materials science. Completion of the course is excellent preparation for a career in industrial research or for graduate study in applied sciences.

Details of the curriculum for the course are given under Engineering and Engineering-Physics in Programmes of Study.

8. Bachelor of Commerce

General: Three years - 15 classes required. Honours: Four years -20 classes required.

For 1970 and subsequent years new students will enter a revised programme which may permit some concentration in one of several fields of business studies. Students planning to follow a concentration programme should consult the Department of Commerce prior to registration.

(a) The Institute of Chartered Accountants in most provinces in Canada offers exemptions to graduates in commerce of Dalhousie who candidates for the Diploma in Chartered countancy.

(b) The Scoiety of Industrial and C_{OSI} (D) The score, contained to graduate commerce of Dalhousie who are candidates the Diploma in Registered Industrial Acc ancy.

Details of the curriculum for the General and for the Honours degree courses are given under Commerce in Programmes of Study,

9. Bachelor of Education

years – 21 classes, plus field experience required.

years – 26 classes, plus field experience required.

(Secondary) 6 classes plus field experience

In the integrated course, classes in education are taken concurrently with classes in arts and science; two degrees are awarded on comple-

In the sequential course, classes in education purpose.

ment 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.

10. Bachelor of Music Education

Four years - 20 classes plus practice teaching reauired.

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 and given under Music in Programmes of Study.

11. Certificate in Public Administration

One year - five classes plus standing in Politic Science 100 or its equivalent.

A programme leading to the Certificate Public Administration is available to persu who meet the admission requirements Dalhousie University and who neither hold

si degree nor are enrolled in a programme and a programme degree. Those not meeting the admission requirements may apply for mission as a Special Case (see Admissions, edmission 1.3). The Department of Political schon will review applications for admission science this provision and make recommendations thereon.

11.1 Prerequisite Requirement

standing in Political Science 100 or its equival-

12 Programme Requirements

Government of Canada (Political Science

a class in economics;

a Public Administration (Political Science

a) and (e) two other classes in the social ciences chosen in consultation with the Deartment

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

Classes taken for the Certificate may be redited 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.

A 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

12. Dentistry

Detailed requirements for admission are set forth in the Calendar of the Dalhousie Univeraty Faculty of Dentistry. Candidates are theouraged to proceed to a Bachelor's degree before seeking admission.

12.1 Entrance Requirements

At a minimum, applicants pursuing a pre-dental course in the Faculty of Arts and Science are required to have completed ten classes during regular attendance at a university acceptable to the Faculty of Dentistry.

(a) Five of these ten classes are imperative, namely: English 100; Physics 100; Biology 1000 or 200; Chemistry 110 and 241.

(b) Credit for the remaining five classes may be obtained in either of the following ways: (i) by the successful completion of three classes chosen from the humanities and the social sciences plus two other elective classes. (ii) by Bachelor's degree.

12.2 Dental Aptitude Tests

All Canadian applicants must submit test results from the Canadian Dental Association Dental Aptitude Testing Programme. Applicants from other countries may submit the American Dental Association Dental Aptitude Testing Programme results.

13. Medicine

Detailed requirements for admission are set forth in the Calendar of the Dalhousie University Faculty of Medicine. The majority of students accepted for admission to that Faculty have a bachelor's degree, but this is not a requirement.

13.1 Entrance Requirements

At a minimum, applicants pursuing a premedical course in the Faculty of Arts and Science to which they have been admitted on the basis of Nova Scotia Senior Matriculation (or the equivalent) including credits in English and mathematics, are required to have completed ten classes in a regular degree programme prior to June 10 of the year of expected entrance.

(a) Five of these classes are imperative. namely: English 100, Biology 1000 or 2000, Chemistry 110 and 241, and Physics 100 or 110.

(b) The remaining five classes must include at least two in a single subject. Ordinarily these five electives should be chosen from the following: anthropology, biology, chemistry, classics or classical languages, economics,

Integrated (with General B.A. or B.Sc.): for Integrated (with Honours B.A. or B.Sc.): fin

Sequential: one year -

(Elementary) 7 classes plus field experience

required.

required.

tion, the B.Ed. and the B.A. or B.Sc

are taken only after completion of all classes m arts and science. Candidates for 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 Depart

English, history, mathematics, modern languages, philosophy, physics, political science, psychology or sociology.

In choosing electives pre-medical students are generally well-advised not to anticipate medical school subjects such as bacteriology, biochemistry, histology, and physiology at the expense of fundamental training, but for students intending to specialize within the medical sciences, an honours degree in one of these fields or in biology, chemistry or physics may prove advantageous.

13.2 Medical College Admission Test Results of this test must be submitted by all applicants.

14. 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.

15. Design

Students successfully completing one year of a B.A. programme in the Humanities at Dalhousie 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

African Studies

Professors I. E. Flint (History) K. A. Heard (Political Science) Z. A. Konczacki (Economics) J. B. Webster (History)

Associate Professors P. D. Pillay (History) R. J. Smith (English)

Assistant Professors J. Barkow (Anthropology) T. M. Shaw (Political Science) J. E. Sorenson (Music)

The programme in African Studies offers students an opportunity to integrate classes from a number of disciplines around the focus of one major world region. Students wishing to read towards a B.A. with a concentration on African Studies should note the following recommendations and regulations.

I It is strongly recommended that in the first vear students should read three of Anthropology 100, Economics 100, English 100, History 199, Political Science 100 or Sociology 100.

II In the second and third years at least seven of the ten classes required for a degree must be chosen according to the following regulations: (a) African Studies 200 (compulsory)

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

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

(d) Two of the ten classes must be at the 300 level.

200 African Studies

This class is intended to provide a detailed study of one African region. During the 1973/74 academic year East Africa will be studied. The study will involve several disciplines. The class will consist of two lectures per week plus one evening session per month. Students will be graded on the basis of three essays written during the course of the year and chosen from at least two of the disciplinary sections plus satisfactory attendance. The class will consist of approximately six lectures in each of the following:

1. Ethnography of East Africa; J. Barkow (Anthropology)

2. Pre-Colonial History with Special Emphasis on Uganda, J. B. Webster (History)

3. Imperial Intrusion & Impact on East Africa; J. E. Flint (History)

4. Economic change from 1890 to the Present, Z. A. Konczacki (Economics)

5. Contemporary Politics of East Africa; K. A. Heard (Political Science)

6. East Africa and the International System; T. M. Shaw (Political Science)

7. The East African Novel; R. J. Smith (English)

8. Varieties of East African Music; J. Sorenson (Music)

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

Anthropology 316, Africa: Ethnography & Modernization, J. H. Barkow.

Economics 234A, Pre-Colonial History of Sub-Saharan Africa, Z. A. Konczacki.

Economics 235A, Economic History of Tropical Africa: Colonial Period, Z. A. Konczacki.

Economics 236B, Recent Economic Development in Sub-Saharan Africa, Z. A. Konczacki.

English 217, African Literature in English, R. J. Smith.

History 240, Tropical Africa in the Nineteenth & Twentieth Centuries, J. B. Webster & J. E. Flint.

History 344, Origins of Tribalism and Nationalism in Africa, J. B. Webster.

History 345, History of South Africa, P. D. Pillay.

Political Science 317A, Foreign Policies of African States, T. M. Shaw.

Political Science 317B, Politics in Africa South of the Sahara, K. A. Heard.

Political Science 318, The Politics of South Africa, K. A. Heard, (Not offered in 1973/74).

Political Science 324, Problems of Development, K. A. Heard and T. M. Shaw.

LIST II Anthropology 301, Peasant Society and Culture, L. Kasdan.

Anthropology 306, Social Organizations of Pre-Literate Societies, L. Kasdan.

Economics 333A, Theories of Economic Development, Z. A. Konczacki.

Economics 423A, International Economi Development, C. M. Ouellette.

Economics 424B, Economic Development Ecology, Z. A. Konczacki.

History 213, British Commonwealth Empire, P. Burroughs, M. Reckord, P. D. B.

History 337, Cuba and the Caribbean Reckord

Music 301, Music Outside the Western Train tion. I. Sorenson.

Political Science 321, International, Regional and Trans-National Organization, T. M. She

Political Science 372A, Comparative Public Administration, J. D. McNiven.

Sociology 206A, Social Change and Moderniza tion, H. V. Gamberg.

Sociology 306B, Socio-Cultural Change: Mod ernization and Development, J. J. Mangalam

Anthropology see Sociology and

Anthropology

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 he E. Smith

The 19th and 20th centuries: A survey painting, sculpture, architecture and allied arts

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

J. A. Verpoorte

ussistant Professors F. Doolittle B. Lazier Mezei Stewart W. Gray

Lecturer. W.S. DeWolfe S. MacFarlane

M. Smith

W. Spence

momentary, the study of the structure and hothermos , is a shariour of the molecules of living things, is a w science: most of what we know has been scovered since 1945, so that even elementary astoverses are changed and added to constantly.

structure can be investigated in various degrees detail. Scientists have progressed from study with the naked eye (gross anatomy) to examintion of the whole specimen or parts of it with ight and, in recent years, electron microscopes microscopic anatomy). These optical methods ed to the discovery of such minute particles hat it became necessary to apply methods of demistry and physics. Thus, the biochemist of today studies the structure of small molecules by the well-known methods of organic chemstry. Study of the larger molecules which are duracteristic of living organisms and the measurement of their physical properties reguires 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.

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

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

plicable 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 food processing 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 4. Chemistry 110. psychiatric conditions in biochemical terms.

Where are biochemically trained people em- 5. Biology 2000. ployed? In Canada, most of them work in universities, in agricultural research, or in government or hospital laboratories; some are 5. Physics 110. employed in industry. Training to the B.Sc. level enables one to work as a technician or Minor in Mathematics research assistant; more responsible positions usually require a higher degree. Graduates in biochemistry can go on to further training in Year II medicine, pharmacology, physiology, and various other branches of the biological 7. Chemistry 241. sciences.

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

Degree Programmes

The study of biochemistry requires a prior knowledge of elementary biology, mathematics and physics, and a good grounding in organic and physical chemistry. Accordingly, the honours programme in biochemistry is planned in such a way that these subjects are covered in an orderly fashion before students begin the study of biochemistry proper. Students who are not concentrating in biochemistry, but who wish to include a class in biochemistry in their programmes, should plan to do so in their third or fourth year. They should ensure that the necessary background is provided in their earlier years. The outline of the honours programmes will serve as a guide in this respect. It should be noted particularly that a class in organic chemistry is a prerequisite for the elementary class in biochemistry, and that one in physical chemistry is strongly recommended.

B.Sc. with Honours in Biochemistry The honours programme in biochemistry aims to provide the student with the background necessary for graduate work in biochemistry class.

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The results of biochemical research are ap-

and allied fields. It is also a suitable preparation for the study of medicine or dentistry. Because the chemical content of all branches of biology is rapidly increasing, biochemistry can be recommended as a starting point for a career in many fields of biology.

Three major programmes in biochemistry are outlined below, with minors in biology, physics and mathematics. Honours students must pass a comprehensive examination in biochemistry at the conclusion of their period of study.

Year I

1-2. Two electives from groups A, B or C, but not both from the same group. 3. Mathematics 100.

Minor in Biology

Minor in Physics

5. Biology 2000.

6. Chemistry 230.

Minor in Biology 8. Elective

9. Physics 110.

10. Two Biology half classes (2020, 2030, 2040, or 2050) or one Microbiology class.

Minor in Physics 8. Biology 2000. 9. Physics 230. 10. Physics 221 or 222.

Minor in Mathematics

- 8. Elective.
- 9. Physics 110.
- 10. Mathematics 200.

Year III

- 11. Biochemistry 302.
- 12. Chemistry 210.
- 13. Additional Chemistry class.

Minor in Biology 14. Elective 15. Additional Microbiology or Biology class.

Minor in Physics 14. Elective.

15. Additional physics class.

Minor in Mathematics

- 14. Elective.
- 15. Additional mathematics class.

Year IV

16. Biochemistry 403A and 403B. 17. Biochemistry 406A and 406B. 18. Biochemistry 407A and 407B. 19. Additional Biochemistry or Chemistry

Minor in Biology

20. Additional mathematics or physics class. Minor in Physics

20. Additional biology or microbiology class. Minor in Mathematics

20. Additional biology or microbiology class.

Classes Offered

302 Introductory Biochemistry, lect.: 2 hrs.; lab.: 3 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.

403A Intermediary Metabolism I, lect.: 2 hrs.; M. S. DeWolfe/C. Mezei/F. B. Palmer.

This class is intended to expand and complement the study of 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. 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 material is taken from the recent scientific literature and is principally concerned with aspects of carbohydrate and lipid metabolism in animals, plants, and micro-organisms. Also discussed are the biochemical aspects of synaptic transmission in nerves.

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

403B Intermediary Metabolism II, lect.: 2 hrs.; M. S. DeWolfe/F. I. Maclean/C. Mezei.

The intent of this class is the same as that for 403A; however it may be taken independently. Two broad subject areas are covered. The metabolism of amino acids is described in some detail and is followed by a consideration of protein synthesis. Controlling factors at all stages are emphasized. The second portion of the course is devoted to a study of energy generating systems and the metabolism of their important components. A consideration of the diversity of different energy yielding systems which occur throughout nature is presented which includes the details of the oxidative and photosynthetic phosphorylation systems as well as some fermentative pathways. Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

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

Instruction is provided for advanced students in the use of instrumentation. The principles and operation of the equipment will be discussed. The class includes discussion of spectrophotometers, a spectrofluorimeter, atomic absorption spectrophotometer, spectropolarimeter, automatic titration equipment as well as ultracentrifuges.

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

406B Experiments in Metabolism, Lab.: 6 hrs.; M. S. DeWolfe/F. I. Maclean/C. Mezei/F. B. Palmer.

This laboratory class is designed principally to B. K. Hall provide some practical experience with subjects developed theoretically in Biochemistry 403. However, it may be taken by anyone with a good basic knowledge of biochemistry. Experiments are chosen to illustrate the mechanisms of metabolic control at the molecular level in systems of varying complexity from the whole animal to isolated enzymes. In the course of these experiments the student will be expected to become familiar with the principles under- G. S. Hicks lying the methodology employed and to participate in the design of the experiments. Prerequisite: Biochemistry 302 or an equivalent

class in basic biochemistry.

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

Selected aspects of the chemistry of biological macromolecules, mainly proteins. Topics include: discussions of the relationship between structure and biological activity, the stabilizing forces in maintaining structure as well as chemical and physical methods for studying nolymers

Prerequisites: A basic class in biochemistre in physical chemistry.

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

The first part of this class deals in a general with the binding of small molecules, include hydrogen ions, to proteins. The second par devoted to a study of the kinetic properties enzymes and how the binding of regulatory substances influences kinetic haviour. Such interactions are important for the control of cellular metabolism. The relationship between the structure of catalytic and gulatory sites and their function will 2/30 considered for selected enzymes. Prerequisite: A basic class in biochemistry

Biology

Professors C. M. Boyd (Oceanography) M. L. Cameron F. R. Hayes (Killam Senior Fellow) O. P. Kamra K. E. von Maltzahn K. H. Mann (Chairman) I. A. McLaren E. L. Mills (Oceanography) I. G. Ogden E. C. Pielou (Killam Research Professor) G. A. Riley (Oceanography) L. C. Vining **Associate Professors**

R. G. Brown R. W. Dovle J. Farley E. G. Garside L. E. Halev

Assistant Professors A. R. O. Chapman

D. Brewer

J. S. Craigie

Research Fellows J. Wright M. Brylinsky

Postdoctoral Fellows R. Cella McLelland 0, Prasad R. J. Thompson

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

The programme offered by the Department ives 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 Honours 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.

Honours in Biology and Preparation for Graduate Study.

For entrance to graduate school an Honours degree or equivalent four-year background is required. Some graduate schools require a reading knowledge of French, German or Russian. A thorough grounding in mathematics and physical sciences is as important as advanced undergraduate training in biology.

Students reading for a Bachelor of Science degree with honours in biology must satisfy the general requirements for honours degrees and arrar ge their course programme as early as possible in consultation with the Department. During the first three years of a programme of

will be selected to meet the honours requirements and will normally include Biology 4900.

For some graduate programmes, a combined or unconcentrated honours programme may be the best preparation. Advice on this matter may be obtained in the Department.

Students having a special interest in Marine Ecology are advised to obtain a good undergraduate training in general biology, mathematics and physical sciences, and specialize in marine work in graduate school.

Honours students must pass a comprehensive examination at the conclusion of their period of study.

General B.S. or B.Sc. Programme The Biology department offers 1, 2 and 3 year programmes of directed study. The prerequisite for entry to these programmes is 75% in Grade 12 Biology (or equivalent). Those who have not met this requirement must first take Biology 1000. There are 3 possibilities (see table following).

(i) A gualified student who elects to concentrate in Biology from time of entry to the University will take 3 years of the programme. In the second and third years this involves either choosing an area of specialization (molecular, developmental, environmental or microbiology) or designing a general biology programme with the help of a counsellor.

(ii) A student may take a general course distribution in the first year of university, and then take Years I and II of the Biology Programme.

(iii) A student may take Year I of the Biology Programme in second or third year in the University.

There are additional possibilities. A student may elect to follow a general degree with

M. J. Harvey W. C. Kimmins Associate Professor (Part-time)

I. V. Collins R. P. McBride

L. M. Dickie

Research Associates

T. Platt D. P. Pielou S. Russell

A. Taylor

M. Yoon

L. Mortenson

E. W. Angelopoulos

concentrated honours, students are advised to concentration in biology, under the general follow one of the programmes shown in the faculty regulations, or may design a special table following. In the fourth year a programme programme and submit it for approval to the Committee on Studies.

Classes Offered

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

Biology class offerings may be grouped into five general types:

1. Introductory biological principles - Biology 1000. This class is designed for students with no previous biology or for students in the health sciences or other sciences who require an overview of biology.

2. Classes for those students who do not intend to take biology as their area of concentration -Biology 1060A and 1400B. These classes do not serve as a prerequisite to other biology classes.

3. Core classes - These consist of a full-year class Biology 2000 and six half-year classes 2010A/B-2060A/B. Collectively these classes form the basis of Biology class offerings. It is recommended that a student who takes biology as his area of concentration complete as many of these classes as possible.

4. 3000-level classes - Intermediate classes are mainly for second and third year students. The classes Biology 3110A-3324 represent studies of the biology of the groups of organisms specified. The other 3000-level classes are concerned particularly with principles in molecular, developmental and environmental biology.

5. 4000-level classes - These classes are primarily for honours and graduate students. They are open to others with permission of the instructor.

Year I

Biology - 3 year programme of guided study

Prerequisite: 75% in Grade 12 Biology or Biology 1000 2 or 3* credits chosen from: Biology 2000 and Biology 2010 to 2060 (half classes) 1 or 2 credits chosen from: Math 100, Chemistry 110, Physics 110 or other science by agreement 1 elective

	General Biology Counsellors – A. R. O. Chapman L. E. Haley	Molecular Biology Counsellors – W. C. Kimmins L. C. Vining	Developmental Biology Counsellors – B. K. Hall G. S. Hicks	Environmental Biology Counsellors – J. G. Ogden R. W. Doyle	Microbiology Counsellors – R. G. Brown D. E. Mahoney
		Bio. 2010A or B; Chem. 110	2030A or B; 2050A or B; Chem. 110	2040A or B; 2060A or B; Math. 100.	Bio. 2010A or B; 2030A or B; Chem. 110
Year II	1 credit from: Bio. 2010-2060	3 credits from: Bio. 3010A, 3011B 3012A, 3013B, 3030B, 3110A	Bio. 3050A, 3031B	Bio. 3061 or 3063	Bio. 3110A + 3111B (= Micro. 302)
	1-2 credits from 3000 level classes	Chem. 241	1½ credits from biology electives	1 credit from Bio. 2010 - 2060	Bio. 3010
	1-2 other sciences 1 elective	1 elective	Chem. 241 1 elective	2 credits from Ocean. 200 Geology Math 106 (½ credit 203 (½ credit), another science.	½ credit from Bio. 2010- 2060 Chem. 241 Physics 110
				1 elective	1 elective
Year III	2 credits from Bio. 3000 or 4000 level	2 or 3 classes from Bio. 3031B, 3050A,	Bio. 3012A or 3213B	Bio. 3061 or 3063 1 credit from	Bio. 3011B
	2 analite from Dia	3213B, 4010, 4115, 4214.	Seminar in Devel. 1½ Bio. electives	Bio. 2010-2060 or 1 other Bio. or	Bio. 4033A Bio. 4113 or 4114 Bio. 4115 or 4010
	or other sciences	Biochem. 504, 508	1 science elective	Ocean. or Geology 1 Mathematics	l credit from Bio. 3112B, 3322B
	1 elective	1-2 electives as needed	1 elective	l elective	4116A, or Math. 106 (½ credit). 1 elective

*A maximum of 2 for first year students.

Introductory Classes Offered

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

(a) Course 1000 is designed for, and must be taken by, those who did not take, or scored less than 75% in, Grade 12 Biology. It thus serves as an introduction to biology and enables students to progress to other offerings in the Biology Department.

(b) Students who have achieved 75% or over in Grade 12 Biology will take Biology 2000 or two of: 2010A or B; 2020A or B; 2030A or B; 2040A or B; 2050A or B; 2060A or B.

(c) Students who receive credits for 2010A or B, 2020A or B, 2030A or B, 2040A or B, 2050A or B, or 2060A or B in their first year cannot take Biology 1000 for credit in a later vear.

1000 Principles of General Biology, Study Centre 3 hrs.; Tutorial Quiz 1/2 hr.; Lecture Assembly 1 hr.; M. L. Cameron, L. E. Haley, M. J. Harvey, R. P. McBride.

Biology 1000 is now given in an audio-tutorial format with a study centre open on a comeany-time basis from 8:30 a.m. to 5:30 p.m. and evenings depending on demand. In addition regular tutorial quiz sessions are held but the traditional lecture no longer has any great importance in the system; this latter time slot is used for question-and-answer session, class tests and the occasional lecture.

The subject matter puts emphasis on those features common to all or large groups of organisms. It thus contrasts with Biology 2000 in searching for unity among organisms rather than the major differences between groups. The course starts by considering the basic functions of whole organisms, studying a typical plant and a typical animal. Then the organism is examined in finer and finer detail considering

the structure of cells, cell chemistry, energy needs, the coding system and protein synthesis This leads to the topics of genetics, evolution. ecology and systematics.

The following two classes are for students who do not take biology as their area of concentre tion.

1060A Environment and Man, Lecture 2 hrs. Tutorial 1 hr.: K. H. Mann.

Human modifications of natural life processes have now reached a point where effects can be seen on a worldwide scale. The course begin with a consideration of global environmenta problems and of the ecological processes which must be understood before better management of the biosphere can be achieved. Local examples of environmental problems will be discussed. Seminars are used to review the detailed evidence for the board generalization and to discuss changes in social and economic attitudes which may be required before human

wiety can live in equilibrium with the living

W. W. Murdoch, Environment, Sinauer environ 1971. Anon, Man in the Living Environ-Texts: Assoc. Univ. Wisconsin 1971.

140013 Inheritance, Evolution and Man, lect. 1 14000 min, lect. 1 Internal 3 hrs.; J. V. Collins, A. R. O. Chapman.

this class introduces basic concepts in genetics this trace in genetics and uses these to examine the and crown living organisms and how they matthe incline. 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 essions 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.

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

2000 Diversity of Organisns, lect. 3 hrs.; Lab. 3 hrs.; K. E. von Maltzahn, J. Farley, E. T. Garside, A. R. O. Chapman.

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.

2010A/B Molecular Biology, Lect. 3 hrs.; Lab. ³ hrs.; W. C. Kimmins, L. C. Vinning, S. L. Russell

this class forms a bridge between biology and chemistry. Beginning with the structure and properties of the elements it explores the molecular organization of the living world in terms of physical and chemical laws. Students will acquire an introductory knowledge of the chemistry of cell constituents, and of the biochemical basis of life, growth and heredity. The structure and function of proteins and their role as enzymes catalysing essential rellular processes is developed in greater depth.

Molecular biology seeks to explain the complexity of living systems as a logical conequence of the fundamental properties of toms. The laboratory section will introduce

students to some of the equipment, techniques, and deductive reasoning used to explain biological phenomena at the molecular level.

Background in chemistry is essential. Texts: Loewy and Siekevitz, Cell Structure and Function 2nd edition, 1969. Kimmins, Vining and Russell, Practical Biological Chemistry, 1972.

2020A/B Cell Biology Form and Function, Lect. 2 hrs.; Discussion 1 hr.; Lab. 3 hrs.; M. L. Cameron, 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.

2030A/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.

2040A/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.

2050A/B Developmental Biology, Lect. 2 hrs.; Lab. 3 hrs.; B. K. Hall.

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).

2060A/B Ecology, lect. 2 hrs.; Lab. 3 hrs.; J. G. Ogden III.

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 of thought used by ecologists, and include independent projects by students.

Text: Kormondy, Concepts of Ecology; Odum Ecology.

Intermediate Classes Offered

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

3010A Metabolism I. Lect. 2 hrs.; Lab. or Tutorials: 1-3 hrs.; W. C. Kimmins, R. G. Brown

The pathways of degradation and synthesis of molecules within the cell and the transformation of energy. Prerequisite: Biology 201A or B.

Text: Lehniger, Biochemistry, 1970.

3011B Metabolism II, Lect. 2 hrs.; Lab. or Tutorials: 1-3 hrs.; L. C. Vining, R. G. Brown.

Information transfered and control of metabolism within the cell. The mechanism of gene action; role of nucleic acids and proteins. Prerequisite: Biology 201A or B. Text: Lehniger, Biochemistry, 1970.

3012A Animal Physiology, Lect. 2 hrs.; Discussion 1 hr.; Lab. 3 hrs.; J. V. Collins.

The theme of the course is regulation of the internal environment of cells and organisms. The control of intracellular and extracellular constituents of animals and of events in their normal functions are considered. The approach is comparative, equal emphasis being given to animals at all levels of complexity. Laboratory classes are designed to demonstrate experimental approaches to problems discussed in lectures.

Prerequisites: Biology 200, 202A/B.

seminars 3 hrs.; G. S. Hicks, W. C. Kimmins, S. L. Russell.

Lectures and discussion groups will deal in depth with some of the physiological functions of plants and of their growth and development in relation to the environment.

Course Outline:

1. Exchange of materials between plants and the environment and distribution through the plant.

2. The effects of external and internal factors on growth. Prerequisite: Biology 200.

3030B Molecular Genetics, (74-75), Lect. 2 hrs.; Lab. 3 hrs.; L. E. Haley.

The replication, transmission and control of genetic information in various organisms from viruses to higher cells. Prerequisite: Biology 203A or B.

3031B Developmental Genetics, 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. Prerequisite: Biology 203A or B, 205A or B.

3050A Development and Morphogenesis in Animals, Lect. 2 hrs.; Lab. 3 hrs.; B. K. Hall.

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 of 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 or B.

3061B Structure and Function of Ecosystems I, lect. 2 hrs.; seminar 1 hr.; M. J. Harvey, R. P. McBride, K. H. Mann, J. G. Ogden III.

Utilizing a systems approach to production, decomposition, respiration, and nutrient cycling in terrestrial and aquatic ecosystems, this course surveys both methods and results of studies in a variety of ecosystems. Seminars will be devoted to a review of specific investigations reported in the literature, emphasizing techniques and data manipulation.

Prerequisites: Biology 204A or B and 206A or B. Math 100 or 150.

3062A Structure and Function of Ecosystems II. 2-week field course prior to beginning of

3013B Plant Physiology, Lect. 2 hrs.; Lab. or classes; lab. 3 hrs. during Fall Term. M. J. A comparative study. Harvey, R. P. McBride, K. H. Mann, J. G. Ogden III.

> Intensive two-week field study (Labour Day to beginning of term) emphasizing sampling techniques and data collection in a selected habitat. Field work includes surveying and mapping of topography, soils, vegetation, and bathymetry of lakes or ponds; stream flow measurement, characterization and analysis of plant and animal communities, microclimatology, chemical and calorific measurement of biotic and abiotic components. Laboratory work during the fall term is continued on samples collected during the field work and leads to a paper on some aspects of community analysis. Prerequisite: Biology 361.

3064B Seminar in Population Biology, seminar 2 hrs.; R. W. Doyle.

Controversial topics in the general areas of population ecology, population genetics and evolutionary theory. Topics will vary from year to year but cover a broad range extending, for example, from competition among phytoplankton species in tropical oceans to the "biological species" problem to the genetics of human racial differences. Suitable for 3rd and 4th year undergraduates and graduate students who have obtained a grade of B or better in Biology 2040A or B, Biology 2060A or B and Math 100 as essential prerequisites (others with equivalent or special qualifications should see the instructor). The research literature is the only text. Seminars every week or two plus about five essays.

Prerequisites: Biology 204A or B, 206A or B, Math 100 or 150.

3063 Theoretical Ecology, lect. 2 hrs.; lab. 3 hrs.; E. C. Pielou.

This class considers ecological problems whose solution entails mathematical reasoning. Discussion 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 formulating a problem and deciding what observations would lead to a solution; then follows the planning, performing and analysing of the observations and finally the drawing of conclusions. Emphasis is given to the overriding importance of judging how much (or how little) a particular set of field observations can contribute to general ecological theory.

Prerequisites: The class is intended for honours students who have done Mathematics 100 or 151. 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. I. Bailey's Statistical Methods in Biology is required reading. Biology 206A or B.

3110A Bacteria, Viruses and Fungi I, lect. 2 hrs.; lab. 3 hrs.; R. Brown.

A comparative start, Prerequisites: Normally 201A or B, 202A or B 203A or B.

3111B Bacteria, Viruses and Fungi II, leel hrs.; lab. 3 hrs.; R. Brown, R. P. McBride

Study of their physiological and ecologies characteristics. Admission to 3111B require the completion of 3110A. The object Biology 3111B is to acquaint students with the "microbial world". In so doing, the following three questions are considered:

What are micro-organisms? In deciding what microbes are one must compare them with other living organisms and with each other Consequently, a comparative study of micro organisms based on morphological, physiola 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 microbial ecology. Microbial interaction with other or ganisms is important because of their same phytic and/or parastic nature. To demonstrate this interaction, topics such as symbiolis nitrogen fixation, ruminant digestion, and disease are discussed.

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

Students entering this class should have taken classes in organic chemistry and cell physiology. although students taking these subjects concurrently will be admitted. Prerequisite: Biology 311A.

3112B Microbial Ultrastructure, (1973-74): K. Easterbrook.

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.

3212A Algology, lect. 2 hrs.; lab. 3 hrs.; A. B. 0. Chapman.

This class is designed to introduce a broad spectrum of topics which may be included in the field of algal biology. These will include morphological diversity presented from a dr velopmental viewpoint, some aspects of ultra structure, marine benthic ecology, phyle plankton ecology and economic importance. Prerequisite: Biology 200.

Texts: E. Y. Dawson, Marine Botany, (Hol Reinhardt and Wilson, 1966); Reference text G. E. Fogg, Algal Cultures and Phytoplanking Ecology; J. Lewis, Ecology of Rocky Shores.

213B Plant Development, lecture/discussion 3 3213D lab. 3 hrs.; G. S. Hicks, K. E. von

class attempts to provide greater underthe crass of the regulation of differentiation and unding of the regulation of differentiation and morphogenesis in plants. Emphasis is placed on worpings evaluating concepts derived from appriments with a wide variety of experiexperimental systems, sample topic areas: differential rent activation, induction, polarity, determinanon, totipotency, photomorphogenesis.

the laboratory sessions emphasize application sterile culture technique to developmental probleras. property isites: Biology 200 and 205.

3215A Systematics of Higher Plants, lect. 2 hts.; lab. 3 hrs.; M. J. Harvey.

This class has two main aims; first, to give consideration to current speculation on the volution 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 m experimental stage here and will involve some study of numerical taxonomy, automated identification and key construction. Prerequisite: Biology 200.

Text: A. Takhtajan, Flowering Plants: their Origin and Dispersal. Reference text: P. H. Davis and V. H. Heywood, Principles of Angiosperm Taxonomy.

3216B Adaptation and Speciation in Higher Plants, lect. 2 hrs.; lab/seminar 2 hrs.; M. J. Harvey.

This course deals with the discipline known as biosystematics or, alternatively, experimental taxonomy. The approach taken is the analytic one of considering particular examples and rying to deduce which peculiarities of their biology have contributed to their relative access. In this way the mechanisms which have caused particular species pairs to diverge are udied Examples considered are many and range from evening primroses and irises, mough bananas and maize, down to the humble, but complex, dandelion. Prerequisite: Biology 200.

Texts: D. Briggs and S. M. Walters, Plant ariation and Evolution; G. L. Stebbins, romosomal Evolution in Higher Plants; Reence text: O. T. Solbrig, Principles and lethods of Plant Biosystematics.

218B Plant Geography – on a physiological asis, leet. 2 hrs.; lab. projects.; M. J. Harvey, K.E. von Maltzahn.

vide a of vegetational types and their worldde distribution as related to environmental

forms as adaptations to stresses. Prerequisite: Biology 200.

3321 Invertebrates, lect. 2 hrs.; lab. 3 hrs.; C. M. Boyd, J. Farley, K. H. Mann, E. L. Mills.

An attempt will be made to understand how different groups of invertebrate animals live what modifications have they incorporated that allow them to survive in environments or to assume a manner of life alien to their evolutionary predecessors. Because there are so many kinds of invertebrate animals, certain morphological and functional changes will be considered in those animals where they are most pronounced or where they first occur. The course will progress chronologically through the phylogenetic series; the characteristics of the animals in a group will be considered and new physiological systems and morphological peculiarities will be emphasized.

A laboratory session each week will give students an opportunity to examine the morphology and life traits of live invertebrate animals based on observation of feeding, respiration, locomotion, etc.

3322B Animal Parasitology, (1974-75), 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 parastic 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 parastic 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.

3323 Vertebrates, lect. 2 hrs.; lab. 3 hrs.; E. T. Garside.

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

stresses. Analysis of the strategy of plant life 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 vertehrates

> 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 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.

> 3324 Entomology, lect. 2 hrs.; lab. 3 hrs.; D. P. Pielou

> 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 insects.

> (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.

3400 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 honours and graduate students. They are open to others with permission of the instructor.

4010 Advanced Molecular Biology, (1973-74), lect. and tutorials 2 hrs.; R. G. Brown, W. C. Kimmins, L. C. Vining.

The main objective of the class will be to explain the biochemical basis of structure and function in biological systems. Lectures and discussion groups will deal in depth with a limited number of topics, chosen for their regional interest or because they represent rapidly advancing areas of general importance in biology. A proportion of the course material will be presented by guest lecturers from other departments or from outside the university. Examples of the topics selected are; cell walls, cell membranes and transport, enzyme catalysis, antibiotics, photosynthesis, seaweed products.

Prerequisite: Biology 330A or 330B or Biochemistry 302.

4032B Cytogenetics, (1973-74), lect. 2 hrs.; lab. 3 hrs.; O. P. Kamra.

Detailed consideration of certain genetical and cytological mechanisms in relation to chromosomal modifications, gene mutations and evolution.

Prerequisites: Biology 202A or B and 203A or B.

4033A Microbial Genetics, C. Stutard.

A half-class for advanced students in microbial genetics.

Prerequisites: Biology 203A or B, 311A.

4034B Biological Effects of Radiation, (1974-75), lect. 2 hrs.; lab. 3 hrs.; O. P. Kamra.

The class consists of a survey of the current knowledge of the effects of ionizing radiation on biological materials on the three levels: physical, chemical and biological. In addition, methods of dosimetry, autoradiography, somatic and genetic effects, radiomimetic chemicals and biolasers are discussed.

4050 Seminar in Development, seminar 2 hrs.; lab. projects; L. E. Haley, B. K. Hall, G. S. Hicks, K. E. von Maltzahn.

Advanced reading and project study in development, morphogenesis, differentiation, regeneration, growth and genetics.

Prerequisites: Biology 205A or B, and 350A or

351B, and 340B or 343B, and permission of the instructor.

4064C Pleistocene Biogeography, lab. 3 hrs.; H. B. S. Cooke, J. G. Ogden, III.

Lecture, discussion, and laboratory experience in the reconstruction of environmental change during the Pleistocene epoch. Laboratory and field experience will pay particular attention to the environmental history of the Maritime region, including environmental changes caused by man. Techniques of pollen analysis, plant and animal macrofossil study, dendrochronology, geochemical and isotopic dating methods will be explored. Field and laboratory work include a class problem in an area in the Halifax region.

Prerequisites: At least two credits in Biology or Geology. This course is to be taken in conjunction with Geology 457 Pleistocene Geology. Permission of the instructors. May be counted as Biology or Geology half-credit.

4066B 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.

4067B Introduction to Biological Oceanography, lect. 2 hrs.; E. L. Mills.

A survey of marine populations and their relationships with their physical environment and with each other. Permission of the instructor is required.

4068 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.

4113 Bacteriology, (1974-75); R. Brown, L. C. Vining, R. P. McBride, D. Mahonev, R. Martin,

A class for advanced students in bacteriology. Two of three topics will be chosen and covered in depth.

Prerequisites: Biology 311A or 311B or Microbiology 302 and permission of the instructor is required.

4114 Virology, (1973-74); K. Easterbrook, K. Rozee, S. Lee, P. Dobos.

A class for advanced students in virology types of viruses will be considered insect, plant and bacterial. Structure, replic tion, natural history and classification will he included in the class coverage. Prerequisite: Permission of the instructor required.

4115 Immunology, (1974-75); L. Kind

A class for advanced students in immunglo This class is limited to 12 students. Prerequisite: Permission of the instructor required.

4116A Mycology, (1973-74); R. Brown

A half-class in mycology. Prerequisites: Biology 311A or 311B or Micro biology 302.

4214 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 carbo hydrates, proteins, fats, pigments and nutrition Prerequisites: Biology 201A or B, 301A.

4379B Ichthyology, lect. 3 hrs.; E. T. Garside

Evolution, systematics and structure, embryology, life history and distribution of fishes. Prerequisite: Biology 323.

4400 Ethology, lect. 2 hrs.; lab. or field work 3 hrs.; J. F. 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.

4401 Pharmacology: Influence of Chemical Agents on Living Organisms, lect.: Mon. Wed. Fri. 1:30; lab: Wed. 2:30-5:00 p.m.; D. J. Echobichon.

This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions of man and lower animals. The basic mechanisms of action and structure-activity relationships of various groups of pharmacological agents will be stressed and, wherever possible, discussed at the molecular and macromolecular level of cell organization. Factors influencing the absorption, distribution, biotransformation, and evcretion of drugs will be discussed, as will potential uses.

The lecture course will be augmented by practical laboratory course designed for student participation in the demonstration of basic principles of pharmacology.

4402 Functions and Structures of the Nervol System, M. Yoon. Prerequisite: Permission of the instructor.

403 Human Physiology, lect. 3 hrs.; lab. 3 hrs.; B. Issekutz.

dass dealing with the physio-chemical basis of the physiological processes in man.

of the parter Introductory classes in Chemistry refrequestion of the instructor is required.

404A History of Biology, (1974-75), seminar hrs., K. E. Von Maltzahn, J. Farley.

This class will deal exclusively with the "Biological Revolution" of the 19th Century.

1800 Special Topics.

1000 Honours Research and Thesis.

5900 M.Sc. Thesis.

6900 Ph.D. Thesis.

Chemistry

Professors D. E. Ryan (Chairman of Department) W. J. Chute K. E. Hayes 0. Knop K. T. Leffek Associate Professors G. A. Dauphinee T. P. Forrest R. W. Frei W.E. Jones L. Ramaley Assistant Professors G. D. Abrams J. B. Faught J.E. Greedan J.S. Grossert

D.L. Hooper J.C.T. Kwak P. D. Pacey R. Stephens C. H. Warren

Special Lecturers C. A. Armour G. D. Lutwick

Research Associate R. Cassidy

Demonstrators M. L. Heit P. Renault R. Young

Postdoctoral Fellows J. S. Carlow K. E. Curtis M. Janmohamed J-H. Kim K. Koh D. Kunzru H.P. Longerich

A. Mishra D. A. Othen T. L. Pollock R. Prime

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 requirement for a chemist - the general B.Sc. with a major in chemistry has no professional standing. Most students with an honours degree in chemistry will undertake further studies in the subject, working towards the degrees of M.Sc. and Ph.D. A postgraduate degree is essential for those who wish to engage in independent original research or in university teaching.

The first class in chemistry is an introduction to be secured as a prerequisite to Chemistry 230. the discipline. Non-science students who elect to take chemistry to fulfill requirements for a Mathematics 200 is a prerequisite to Chemistry 300(A), 330(C) and 331(B). Physics 110 should degree will find that the subject provides a good be included in the course. insight into the scientific method, though once again it should be stressed that because chemistry is a physical science, the laboratory and **B.Sc.** with Honours in Chemistry class work stresses mathematics more than does This programme is intended to provide a good that of a life science such as biology. Many training in chemistry while at the same time it students who do not intend to become promakes provision for the individual interests of fessional chemists are required to take introducstudents. All students are required to consult tory chemistry and may be required to take annually with the Chairman of the Department, second and third-year classes in the subject as and to obtain his approval of their course well. This group of students can include those selection. taking courses in engineering, pre-medicine, pre-dentistry, dental hygiene, nursing and Year I will normally consist of: pharmacy. Engineering students contemplating 1. Chemistry 110 chemical engineering should consult the Depart-2. Mathematics 100 ment of Engineering for advice on desirable 3. A foreign language at 100 level classes in chemistry. All students intending to 4. One of Biology 1000, Geology 100 or take classes in chemistry beyond the first year Physics 110 level should include classes in mathematics and 5. Elective physics in their first year, and final grades in these classes should not be less than 65%. If they are, the student is bound to find advanced Years II, III and IV must include: (a) Chemistry 210, 230 and 240 classes in chemistry difficult and frustrating.

At the second year level the student is exposed 330(C), 331(B) and 340 are required classes. in the laboratory to the four areas of specializa-(c) Mathematics 200 (a prerequisite for Chemtion into which chemistry has been tradiistry 300(A), 330(C) and 331(B). tionally subdivided. Inorganic chemistry deals (d) Five other classes. These must be chosen as with all the chemical elements except carbon, and the compounds which these elements form. follows: (i) If Physics 110 or a foreign language were Organic chemistry is devoted to the study of not taken in Year I, they must be taken in the almost limitless number of compounds containing carbon. Analytical chemistry is Years II-IV. (ii) Two classes beyond the 100-level must be concerned with the determination of the taken in a minor subject. Minor subjects composition of substances, and with the detecallowed for this degree are biochemistry, tion of elements in quantities however minute. biology, geology, mathematics or physics. Physical chemistry is primarily devoted to the study of the nature of chemical reactions and is It is suggested that these five other classes be undoubtedly the most purely mathematical chosen according to the future plans of the area of chemistry. Beyond the second year student. For example: those planning future level, a student's studies in chemistry become study in physical chemistry should take addiincreasingly concentrated in one of these four tional mathematics and physics classes; those areas. The student may also be introduced to biochemistry, or the chemistry of living orplanning future study in organic chemistry should take one or more biology classes; those ganisms, as well as such specialties as structural planning future study in geochemistry should chemistry, radiochemistry, electrochemistry take one or more geology classes. and theoretical chemistry.

Because advances in chemistry have been and continue to be published in many languages, those who look forward to postgraduate study and research are urged to acquire a reading knowledge of at least two foreign languages. These are usually chosen from among French, German and Russian. The student is referred to the regulations of the Faculty of Graduate Studies regarding language requirements for advanced degrees.

Degree Programmes

General B.Sc. in Chemistry

A candidate for this degree must satisfy all of the general requirements. He will take Chemistry 110 in the first year. In the subsequent two years he may undertake as many as five full classes chosen from Chemistry 210, 230, 240, 300(A), 310, 320, 330(C), 331(B) and 340 (two of 300(A), 330(C) and 331(B) constitute a full class). It is essential that Mathematics 100

(b) Six full classes from Chemistry 300 and 400 levels. Chemistry 300(A), 310, 320,

In all cases it is in the interests of the student to consult with the Chairman and other professors in the department. This may be done at any time during the first year. Experience indicates that March is the most suitable time for discussion of a future programme.

Classes Offered

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, J. E. Greedan, D. L. Hooper, J. C. 1973-74. T. Kwak, P. D. Pacev.

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 be able to use exponents and logarithms, proportionality and variation, and be able to solve quadratic and simultaneous equations. Texts: (1972-73) Dickerson, Gray and Knight, Chemical Principles; (Benjamin, 1970); This text will not necessarily be used in 1973-74.

210 Analytical and Inorganic Chemistry, lect .: 2 hrs.; lab.: 3 hrs.; R. Stephens and O. Knop.

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 may be set on these topics at the beginning of istry, such as competing equilibria, titration of weak and polyprotic acids, is attempted. The laboratory work will involve modern physical separation methods on 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 assignments.

Prerequisites: Chemistry 110 or equivalent; Mathematics 100.

Texts: (1972-73) Bard, Chemical Equilibrium, (Harper and Row, 1966) MacKay and MacKay, Introduction to Modern Inorganic Chemistry, (Intertext, London, 1968). These texts will not necessarily be used in

230 Introductory Physical Chemistry, 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: (1972-73), Barrow, Physical Chemistry, 2nd ed., (McGraw-Hill, 1966). This text will not necessarily be used in 1973-74.

240 Introductory Organic Chemistry, Three sections. lect.: 2 hrs.; optional tutorial: 1 hr.; lab.: 3 hrs.; G. D. Abrams, J. S. Grossert, C. A. Armour.

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

This class will provide a broad introduction the chemistry of carbon compounds, includin molecular shapes and bonding, characteristi reactions and the way in which they take place and the application of spectroscopy to organi chemistry.

Prerequisites: A good comprehension of the principles studied in Chemistry 110. Text: (1972-73), Baker, Organic Chemistry (Wadsworth Calif. 1971.) This text will no necessarily be used in 1973-74

243 Introductory Organic Chemistry with Bio chemistry, 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 com. pounds is given. In the second term students transfer to the Biochemistry Department

300(A) Introductory Theoretical Chemistry lect.: 2 hrs.; C. H. Warren.

This class provides an introduction to quantum mechanics and its application to spectroscopy and the electronic structure of atoms and molecules. The postulates of quantum mechanics are first presented and applied to some simple physical systems. This is followed by a discussion of the rotations and vibrations of molecules, the electronic structure of atoms, molecules and the chemical bond and the electronic structure of conjugated molecules. Prerequisites: Chemistry 230 or consent of instructor.

Text: (1972-73), Hanna, Quantum Mechanics in Chemistry, 2nd ed., (Benjamin). This text will not necessarily be used in 1973-74.

310 Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; To be decided.

The aim of this class is to undertake a systematic study of the chemistry of the elements and their compounds. The first term will deal with the typical elements, the second term will be devoted to the study of the transition elements. Appropriate use will be made of modern bonding concepts such as molecular orbital theory and crystal and ligand field theories, with a view to unifying and illuminating the discussion of chemical and physical properties of inorganic substances.

The laboratory will introduce the student to a variety of problems in inorganic synthesis and characterization. Experiments will be selected to demonstrate the principles and uses of vacuum-line and high-temperature techniques, work in controlled atmospheres (glove-box handling) and non-aqueous solvents, crystal growth, etc. Characterization will utilize physical methods and measurements such as optical microscopy, magnetic susceptibility, magnetic resonance, differential thermal analysis and others.

isite: Chemistry 210.

Prerequisition and Wilkinson, Advanced In-Chemistry, 2nd ed. (Interscience organic U. L. Jolly, The Synthesis and Charac-1900/5 of Inorganic Compounds, (Prentice-Hall, 1970.)

320 Analytical Chemistry, lect.: 2 hrs.; lab.: 5 hrs., L. Ramaley.

Chemistry 320 deals with the techniques and chemiser used to determine the chemical comnotition of a material. The chemical and position 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 reatment of data, chemical equilibrium, theory titrations, electrochemistry, separation theory, and the interaction of light and matter re 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 stoichiometric problems. A basic knowledge of chemical structure and solution equilibria is assumed.

Prerequisites: Chemistry 210.

Text: (1972-73), Skoog and West, Principles of Instrumental Analysis, (Holt, Reinhart and Winston, 1971). This text will not necessarily be used in 1973-74.

330(C) Chemical Thermodynamics, lect.: 2 hrs.; lab.: 3 hrs.; K. E. Hayes.

This class, while primarily intended for Chemistry Honours and major students should prove of interest to students in the fields of Biology, Biochemistry and Geology.

The class will proceed via a review of the laws of thermodynamics as applied to ideal closed systems, to consider the problems of real gases and open systems. Extensive use is made of the chemical potential and the various Maxwell relationships. Specific topics to be covered include, free energy and equilibria, phase equilibria, fugacity and activity, the properties of solutions, activities and activity coefficients, solutions of electrolytes and the Debye-Hückel heory, partial molar quantities and E.M.F.'s and the thermodynamics of ions.

The laboratory, where students must complete ax 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: Chemistry 230, Mathematics 100,

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.

331(B) Chemical Kinetics, lect.: 2 hrs.; lab.: 3 hrs.; every other week; K. E. Hayes, W. E. Jones, P. D. Pacey.

This class deals with the rates and mechanisms of chemical changes. Topics include treatment of experimental kinetic data, free radical intermediates, inhibition and catalysis, photolysis and luminescence, and special techniques for studying fast reactions. Examples will be drawn from reactions in the gas phase, at the gas-solid interface and in liquid solutions. Prerequisites: Chemistry 230 and Mathematics 200 or equivalent or consent of instructor.

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 determination

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 240 or equivalents.

Texts: (1972-73), 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 1973-74.

400(B) Theoretical Chemistry, lect.: 2 hrs.; C. H. Warren.

This class is a continuation of 300(A). Molecular orbital theory and its applications will be examined in greater detail, Group theory will be introduced and applied to spectroscopy and molecular orbital theory. Prerequisite: Chemistry 300(A).

Text: (1972-73) I. N. Levine, Quantum Chemistry, Volume I; Quantum Mechanics and Molecular Electronic Structure, (Allyn and Bacon Inc., 1970). This text will not necessarily be used in 1973-74.

410 Advanced Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; O. Knop.

All chemical elements and compounds can exist as crystalline solids, and most of them normally do. The arrangements of atoms and molecules in such solids, known as crystal structures, closely reflect the bonding properties of the constituent elements. They can only be studied by methods that do not destroy or modify the crystal structure. The aim of this class is to acquaint the student with the methods most frequently employed for this purpose and with the principles of structural inorganic chemistry in general.

Prerequisites: Chemistry 320, 330(C) and 331(B) (or equivalents) or consent of instructor. May be registered for only with prior consent of the Department.

Texts: (1972-73), Evans, An Introduction to Crystal Chemistry, 2nd ed., (Cambridge); Wells, The Third Dimension in Chemistry, (Oxford). These texts will not necessarily be used in 1973-74. Further references should be consulted

420 Instruments in Analytical Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; G. D. Lutwick and R. Stephens.

420 is given as two half classes; 420(A) and 420(B), covering respectively non-elemental and elemental techniques of instrumental analysis.

420(A). Instrumental methods applicable to molecular species, such as samples of organic material, are discussed. Techniques covered are the elemental analysis of organic samples, spectroscopic methods for functional group analysis (infrared, ultraviolet, nuclear magnetic resonance and mass spectroscopy) and the application of colligative properties in the analysis of high purity samples. The operating principles of each instrument are described, together with the methods of sample preparation and the applicability to both qualitative and quantitative analysis appropriate to each technique. Solution of practical analytical problems using the combined techniques is an integral part of the class.

420(B). Instrumental methods of elemental analysis are discussed. Techniques covered include atomic emission and absorption spectroscopy using both flame and non-flame cells, arc and spark spectroscopy, x-ray fluorescence, neutron activation and radiochemical

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methods. Both theoretical and practical experience in these techniques is given. In addition to normal laboratory operation, students are expected to solve at least one specific analytical problem by instrumental means. Texts: (1972-73) S. Siggia, Survey of Analytical Chemistry, (McGraw-Hill Ryerson), Willard, Merrit and Dean, Instrumental Methods of Analysis, (Van Nostrand Reinhold).

430(A) Statistical Thermodynamics and Absolute Reaction Rate Theory, lect.: 2 hrs.; K. E. Hayes.

In the first half of this class the methods of statistical thermodynamics will be developed so as to enable calculation of classical thermodynamic functions from a molecular basis. The topics to be considered include, derivation and significance of the Boltzmann distribution law, the relation of thermodynamic functions to the partition function, the evaluation of partition functions for ideal gases, the heat capacity of gases and solids, the equilibrium constant in terms of partition functions and the statistical thermodynamics of adsorption.

The second half of the class considers the failure of collision theory to predict the absolute rate of chemical reactions, and proceeds to use statistical methods to evaluate the Absolute Reaction Rate Theory which will then be applied to systems of particular interest. Prerequisites: Chem. 330(C).

431(A) Electrolyte Systems, lect.: 2 hrs.; lab.: 3 hrs.; J. C. T. Kwak, L. Ramaley.

This class can be taken in the 3rd or 4th year of study, and provides a theoretical and practical introduction necessary for the application of the physical chemistry of electrolyte solutions in life sciences and medicine. Topics include equilibrium and transport properties of solutions, especially electrolyte solutions, with applications, colloid chemistry and electrokinetic phenomena as applied to e.g. electrophoresis and centrifugation, and a description of membrane transport and coupled transport with examples of biological importance. Laboratory experiments emphasize the measurement of electrical potential differences in low and high impedance systems, microelectrodes, redox-electrodes and selective-ionelectrodes, as well as thermodynamic and transport properties of electrolyte solutions. Prerequisites: Chem. 230 or consent of instructor.

432(B) Atomic and Molecular Spectroscopy, lect.: 2 hrs.; lab.: 3 hrs.; W. E. Jones, C. H. Warren.

The class is designed to introduce the student to the theoretical and practical aspects of atomic and molecular spectroscopy. The major topics will include discussions of techniques of spectroscopy atomic spectra, diatomic molecules, polyatomic molecules and electron and nuclear spin. The discussions of all topics will begin at an introductory level.

The laboratory has been designed to give the M.A. Usmiani student a knowledge of various spectroscopic J. P. Atherton instruments and the analysis of the resulting spectra.

Prerequisites: Chemistry 110 and Chemistry 230 or permission of instructor. Text: To be announced.

440(A) Spectroscopy of Organic Molecules, lect.: 2 hrs.; lab.: 3 hrs.; G. A. Dauphinee, T. P.

This class includes an introduction to the theory of mass spectroscopy and nuclear magnetic resonance spectroscopy, however the focus of the class is the application of these techniques as well as infrared and ultraviolet spectroscopic methods in the structure determination of organic compounds.

Text: Williams and Fleming, Spectroscopic Methods in Organic Chemistry, (McGraw-Hill). This text will not necessarily be used in 1973-74

440(B) Mechanism, Stereochemistry and Synthesis in Organic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; K. T. Leffek, J. S. Grossert and G. D. Abrams.

In this class, methods for determining the mechanisms of organic reactions are discussed from the viewpoint of the physical organic chemist, including such approaches as the use of free energy relationships, kinetic data, and isotope effects. Stereochemistry is considered in terms of the concepts of symmetry, and procedures for the determination of absolute configuration, including the use of asymmetric synthesis, are presented. Aspects of the strategy and tactics employed in the multistep preparation of complex organic molecules are exemplified by consideration of representative major syntheses.

The laboratory will illustrate some of the advanced techniques used in modern organic chemistry.

Prerequisite: Chemistry 340 and Chemistry 230 or equivalents, or permission of instructors.

All classes, 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 A. H. Armstrong I. A. Doull T. E. W. Segelberg

Associate Professors R. D. Crouse (Chairman)

Assistant Professor R. Friedrich

Classics is the study of our origins - how Christian-European tradition to which we belong arose out of the ancient civilizations of the Mediterranean area. The fundamental idea and beliefs of Europeans and North American 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 fulle our own contemporary culture, we must stude its historical origins.

Classics is much more than the study of ancient languages. Languages are not learned for them. selves, 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 course 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.

Students of classics usually learn Greek and Latin. Instruction may also be had in Hebrew, Coptic, Syriac and Arabic.

It is obvious that classics is worth studying for its own sake by students who wish to obtain a better understanding of the common assumptions and beliefs of our society. This knowledge has always been regarded as pertinent to a career in politics and the higher levels of the civil service. For those who are thinking of the clergy, classics is the most relevant preparation.

Classical studies also prepare students for a life of teaching and scholarship in several direct tions. 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 w find in Canada. Classics is also the best preparation for the study of non-Europea cultures (Chinese, Indian, Islamic, etc.), and there is a growing need for specialists in these

redds. For the older history of philosophy, and he history of Christian belief until, and for the Reformation, a knowledge of including, indispensable. The same may be said dassics is indispensable. The same may be said for medieval studies in general. Classics leads for mean Near Eastern Studies (Jewish, habylonian, Egyptian, etc.) and to archeology.

Degree Programmes

General B.A. and B.Sc.

of classes offered by the department, Classics 01 classics and 102, Classics 354, and those Ancient History and Ancient and Medieval philosophy classes not having a language preremisite should be especially useful to students taking a general degree. All classes beyond the 100 level are available for major and minor programmes in classics, and the Department will be glad to assist students in working out programmes according to their interests.

Honours Programmes

the candidate may choose between three programmes: B.A. with Honours in Classics, RA. with Honours in Classics (Ancient distory), 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 major pre-classical civilizations (Sumer, Egypt, The Christian Church and Western civilization

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 pre- In addition to collateral reading, short papers supposed.

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

Forrest, D. L. Hooper.

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 102 Classical Art and Civilization, lect.: 3 hrs., M. A. Usmiani.

The classical Greco-Roman civilization as it was expressed in the visual arts will be the main theme of the class. Although frequent references will be made to ancient literature and some basic reading of Greek and Roman literature in translation will be required, the chief emphasis will be on how the basic classical ideas are reflected in the visual arts, especially sculpture, painting and architecture, and how these parts tended to shape the course of the daily life of the ancients. The lectures will be illustrated.

on selected topics will be required. The course will be useful to students interested in ancient civilization, ancient history and in particular to those studying ancient art. There is no foreign language requirement.

Classics 222 Greek History, lect.: 2 hrs.; J. P. A therton (not offered in 1973-74)

Classics 223 Roman History: The Cultural History of the Roman World, lecture/seminar, 2 hrs.; J. P. Atherton

During the first term the class will study the origins of Roman culture: the formation of the Roman state, the establishment of Republican institutions, the rise to world empire and the final collapse of the Republic will be considered in the closest relation to the peculiar religious and intellectual tradition of the Roman people.

The balance of the year will be concerned with the study of the establishment of the Roman Empire under the Caesars; the emergence within this world empire of new religious forces; and the conflict between the classical tradition and the Christian religion in the later ancient world.

In all periods particular attention will be paid to the connection between religious innovation and change in political and social life and the effect of new beliefs on literature, art and philosophy.

Prerequisite: A history class or a classics class, possibly a class in the social sciences, or at the disrection of the instructor.

Classics 224/524 Christian Beginnings and the Early History of the Church, seminar, 2 hrs; E. Segelberg.

can be understood only from the person and life of Jesus Christ. He does not present himself as a philosopher, but interprets himself in terms of offices and functions to be properly understood only from his Near Eastern background, the result of a slow development through millenia.

This seminar will indicate a few features of that background, will further try to explain certain bacic facts regarding Jesus, and will finally show how his work continues in the Church. One year the development of the ministry will specially be dealt with, another that of the liturgy or sacramental life, or the beginnings of the papacy, etc.

Classics 226/526 Roman Religion, seminar: 2 hrs.; E. Segelberg (not offered in 1973-74).

Classics 227/527 Near Eastern Religion, seminar: 2 hrs.; E. Segelberg

Near Eastern Religion, as known mainly from the Sumerian, Akkadian and other Semitic, especially Hebrew Linguistic areas from earliest times up to the Hellenistic period.

This seminar can preferably be taken by those interested in the Old Testament and those participating in the seminar on the early church.

Classics 252/552 Seminar on Problems of the Hellenistic Period, seminar: 2 hrs.; E. Segelberg, (not offered in 1973-74).

Classics 253/553 Seminar on the Roman **Empire and the Rise of Christianity**, seminar: 2 hrs.; J. P. Atherton (not offered in 1973-74).

Classics 336 Ancient Philosophy from Aristotle to St. Augustine, (same as Philosophy 336), lect.: 2 hrs.; A. H. Armstrong.

Classics 336 (Philosophy 336) studies the development of classical and patristic thought from Aristotle to St. Augustine and examines 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.

Classroom discussion and occasional seminar papers will focus on a few of the most important texts, while the general continuity of the history will be studied in lectures and supplementary readings.

Classics 338 Medieval Philosophy, (same as Philosophy 338), lect.: 2 hrs.; R. D. Crouse.

Classics 338 (Philosophy 338) studies the development of philosophy in the formative age of European civilization and examines related political, institutional, literary and theological concerns. An attempt is made to show how the legacy of classical and Christian antiquity was appropriated and reformed to constitute the ideology of medieval Christendom.

The class will be devoted mainly to the study and discussion of a few fundamental texts, beginning with Boethius' Consolation of Philosophy. Special attention will be given to Anselm's *Proslogion* and the first few questions of Thomas Aquinas' Summa Theologiae. It will be the object of lectures to present the continuity of the historical development and to emphasize the broad implications of the philosophical doctrines presented in the texts. In the latter part of the class, some attention will be given to late medieval Platonism and Mysticism, so that something can be shown of the beginnings of Reformation and modern philosophical and religious thought.

Classics 354 Theory of Drama: Aristotelian and Non-Aristotelian, (same as Comparative Literature 354), lect.: 2 hrs.; R. Friedrich. (not offered in 1973-74).

Classics 461&561 Seminar on the Philosophy of Aristotle, seminar: 2 hrs.; J. A. Doull.

The purpose of this seminar is to determine the original sense of Aristotlean philosophy through the close study of one or more works. 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 (not offered in 1973-74).

Classics 466/566 History of the Interpretation of Aristotle, seminar: 2 hrs.; J. A. Doull (not offered in 1973-74).

Classics 467/567 Seminar on the Philosophy of the Church Fathers, R. D. Crouse (not offered in 1973-74).

Classics 468/568 Seminar on Neoplatonism, Seminar: 2 hrs.; A. H. Armstrong

Topics from the history of Neoplatonism and its relation to the theology of the Greek Church will be studied.

Classics 485/585 Departmental Seminar: Problems of the Fourth Century. seminar, 2 hrs.; A. H. Armstrong, J. P. Atherton, R. D. Crouse, and others.

The object of this seminar is to bring together honours and graduate students and faculty members to study a wide range of problems in the areas of history, politics, literature, philosophy, religion, theology and art, in the period of the emergence of the Christian Empire.

Classes Offered

Classical Languages and Literature

Greek 100 Introductory Greek, lect.: 4 hrs.; R. Friedrich

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 Greek text. After he which does not take long the study of grammar is introduced along with reading and translation of Texts from oignal Greek literature; in the first term chapters [.] the Gospel of St. John; in the second, the fin book of Xenophon's Anabasis. Thus 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 preserved.

At least once a week students will pass in for correction grammatical exercises and/or transla tions from Greek into English. There will be no lab work and no oral classes.

Text: Stephen W. Paine, Beginning Greek

Greek 200 Intermediate Greek, lect.: 3 hrs.: P Friedrich.

Greek 200 is a continuation of Greek 100. The aim of the class is to develop the students 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 symstematic review of Greek syntax. This will be followed by the reading of texts of Plato, Herodotus and Homer.

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.

Greek 300 A and B Greek Drama, seminar: 2 hrs.; R. Friedrich, J. A. Doull.

The first term will be devoted to a study of Aeschylus' Prometheus and other poetic treatments of the Promethcus myth; the second term to the study of the Oresteia. Prerequisite: Greek 200

Greek 301 Greek Historians.

Greek 304A and B Greek Poetry, seminar: 2 hrs.; R. Friedrich, J. A. Doull.

Greek lyric poetry of the Archaic Age will be the subject of this seminar; the works of the poets of this period will be studied against the background of the preceeding period of epic poetry.

In the first term elegiac, iambic and monodic lyric poets will be studied (Archilochus, Solon Tyrtaius, Alcaius, Sappho, Anacreon); the second term will be devoted to a study of Pindar

Prerequisite: Greek 200.

Usmiani.

this class is for students who wish to begin the of Latin in the University. The aim of the and y or near the student to read classical dass is the end of the course with the help of the dictionary. In the course a very basic survey the Roman civilization is also given. The of motor given. The emphasis throughout is on direct reading with the grammar fed in as necessary.

Latin 200 Latin Rhetorical Works, lecture/ discussions 3 hrs.; M. A. Usmiani.

this class consists mostly of the reading of the works of Circero, especially his speeches which how the range of his interest and give a vivid picture of the cultural and social circumstances of Rome of his time. A brief survey of Roman literature and the role of Rhetorics in Roman life will be given.

This class is required for any more advanced classes in Latin.

Prerequisite: Senior matriculation in Latin or Latin 100.

Latin 203 A and B. Latin Poetry, lecture/ discussions 2 hrs.; M. A. Usmiani. (not offered in 1973/74).

Latin 204 A and B 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.

Latin 205 A and B Roman Historians, lect.: 2 hrs.; J. P. Atherton.

This class studies Roman historical texts (writers, inscriptions, and other documents). During the 1973-74 session, selections of allust and Tacitus will be studied. This is essentially a reading class to familarize students with the language and content of the writings of these two great historians. Prerequisite: Latin 100.

Latin 300A and B. The Roman Satire, lecture 2 urs.; M. A. Usmiani.

his class can be taken in two sections as two half classes, the first half (A) consisting of the Natires of Horace and the second half (B) of the Satires of Juvenal, but the class is normally given as one full course as described here.

this advanced class is designed primarily for staduate students and undergraduate honours udents. By special arrangement the class can to be taken by students from other departthents even if they possess little or no knowdge of Latin. They would be permitted to read the texts in translation.

100 Introductory Latin, lect.: 4 hrs.; M. The class follows the development of Latin satire from its origins to Lucend. The state Horace and Juvenal, and a wide selection of their works is read and studied thoroughly. Students are required to read the assignments Syriac 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.

Latin 302A and B. Roman Comedy, lect.: 2 hrs., M. A. Usmiani.

This class is normally given as one full course but it can be taken in two parts, the first (A) consisting of the Study of Plautus and the second (B) of the study of Terence.

This class consists of readings of selected plays This class is taught at the Atlantic School of of Plautus and Terence. As an introduction to Theology. readings, a brief survey of Greek comedy is given, and in a few lectures the general lines of 200 Intermediate Arabic, Roman comedy are sketched. The class work is This class is taught at the Atlantic School of conducted in seminar style, students reporting Theology. 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.

Hebrew

101 Elementary Hebrew and Introductory Readings, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

202 Intermediate Hebrew, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

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. (not offered in 1973-74)

200 Reading of Selections from other Coptic Dialects, E. Segelberg

Commerce

representatives of Latin satire that survived are Partly Nag Hammadi Papyri, and partly Manichaean texts.

100 Introduction to the Syric Language and Literature, (Not offered in 1973-74), E. Segelberg.

200 Syriac Language and Literature, E. Segelherg.

Reading of some early writers such as Aphraates and Aphrem, the famous hymnographer.

Arabic Students wishing to take a class in Arabic must consult with the Department before registering for the class.

100 Introductory Grammar and Reading of Texts.

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.

Professors C. R. Brookbank R. S. Cumming

R.E. George C. W. Schandl

Associate Professors I. D. Misick (Chairman) R. H. R. Glube J. R. Hanrahan I. W. Matthews E. W. Scott I. Scheibelhut R. C. Shook R. G. Storey Assistant Professors C. R. Dipchand C. J. McManus L. W. Mealiea I. Muncaster

> R. S. Sandhu G.E.R. Zinck

Part-time Special Lecturers H. A. McKinley A. Shaw R. L. Towler P. Mason

The Department of Commerce offers a curriculum of undergraduate and graduate studies designed to equip students to serve the community in business, government and the professions. Graduates in good standing from all faculties can apply to enter the graduate programme, leading to the degree of Master of Business Administration. The undergraduate programme includes studies in the humanities and social sciences and in the functional areas of business. Recognition is given to the growing emphasis on quantitative and behavioural analysis.

In all courses the main effort is directed towards drawing out the principles which govern traditional and contemporary practice. The principles are related to current developments in business, government and society at large, and special discussion meetings are arranged in which recognized authorities participate.

The students may follow a general programme of study or choose a measure of concentration in one of five special areas. These are Accounting, Economics, Finance, Marketing and Organizational Behaviour.

All students entering the Commerce programme will be required to satisfy the department as to their competency in the English language.

General Outline of

Undergraduate Studies

I. Honours Programme

Four years of study are required comprising the equivalent of twenty full classes; ten required classes, four elective classes taken from the core areas, three elective classes from outside the core areas, and three classes chosen without restriction. At least one of the required classes must be an honours seminar. The core areas are Commerce, Economics, and Mathematics.

The honours programme enables the student to study a particular area of commerce in greater depth than is possible in the general programme. Certain practical advantages arise from the possession of an honours degree. These include the possibility of a larger number of exemptions from professional courses of the accounting bodies in Canada, credit for part or all of the first year classes in the Master of Business Administration programmes at some Canadian universities, admission to graduate schools which require an honours degree as a prerequisite to admission and a more complete formal educational background for those who will not attend graduate school.

In accordance with general faculty regulations, students in the honours programme are required to maintain a performance satisfactory to the department in each year of study. If this standard is not maintained, the student may be required to transfer to a general degree programme. The honours programme will, therefore, in the first three years, satisfy the requirements of the general degree. Students in are urged to seek combinations of classes which the general degree programme may apply for form a coherent whole. transfer into the honours programme.

II. General Programme

Three years of study are required comprising the equivalent of fifteen full classes; eleven from core areas (nine required with two electives), two from outside the core areas and two selected without restriction.

Programme Particulars

A. Degree Requirements (No special area concentration)

Year I

Three required core area classes: Commerce 101 Economics 100A and 100B Mathematics 110 Two classes selected from outside the core areas.

Year II

The equivalent of five core area required classes:

Commerce 204 Commerce 206A/B (students with an interest in computer science may take Math 227, Math 230, or Computer Science 240 instead of this half class) Commerce 207A/B Commerce 208A/B Commerce 209A/B Commerce 213A/B Commerce 215A Commerce 216B Economics 220A/B or 221A/B

Year III One required core area class:

Commerce 311

Two full classes or their equivalent selected from within the core areas.

Two full classes selected without restriction from those offered within the Faculty of Arts and Science

For honours students the programme for year III as well as for year IV must be determined in consultation with the department and must be approved by the department.

Year IV (honours) One required Honours seminar.

Two classes selected from within the core areas.

One class chosen from outside the core areas.

One class selected without restriction from those offered within the Faculty of Arts and Science.

No 100 level classes may be taken in the fourth vear.

Note: When selecting their electives, students

B. Special Area Concentration - Sample P. grammes

Subject to general faculty regulations and m general outline given above, a student ma devise his own programme of study in cor suita tion with faculty in the department. For the general guidance of students, the department has prepared suggested programmes for those who wish to concentrate in a specific area

1. Accounting

Year I As for those without a special area concentration

> Year II Required core area classes Commerce 204 Commerce 206A/B Commerce 207A/B Commerce 208A/B Commerce 215A Commerce 216B Economics 220A/B or 221A/B

Elective Commerce 310

Three full class equivalent electives chosen from Commerce 214B Commerce 301

Commerce 320A Commerce 451 Commerce 452

Year IV Commerce 450 seminar

The equivalent of three classes from one or more of the following areas. Accounting Finance Economics Mathematics

The equivalent of one elective from outside the core areas.

The professional accounting bodies allow certain exemptions in respect of classes taken in the Department. These differ from province to province.

Particulars can be obtained from the provinci offices of: The Institute of Chartered Accountants The Association of Certified and General

Accountants The Society of Industrial Accountants The Chartered Institute of Secretaries

Year I as for those without a special area ntration.

year II and Year III as for those without special Year It and the second those without special real concentration except that certain electives are listed below. In order to ensure that the ure lister requirements of the 300 level and pretequie economics classes will be met, it will the necessary for students to postpone one or be necosition of the 200 level Commerce core classes to the third year. The Department of Commerce he und be consulted in regard to the classes to be postponed.

Concentration in Applied Micro-Economics Economics 220A/B or 221A/B* Economics 320B Economics 325 Economics 328 One additional class in Economics Concentration in Financial Management and International Trade Economics 220A/B or 221A/B* Economics 324

Economics 326B Economics 330A Economics 423A One additional class in Economics Concentration in Development Economics 220A/B or 221A/B*

Economics 230 Economics 329 Economics 334B Economics 432

"Whichever was not taken to satisfy core requirements.

Year IV Economics seminar The equivalent of four full electives chosen in consultation with the Department.

3. Finance Year I As for those without a special area concentration

Year II As for those without a special area concentration

Year III Required core area class Commerce 311

Recommended electives Commerce 301 or 312A Commerce 307B Commerce 331A Commerce 332B

"geested electives to total of five full classes. Commerce 214B Commerce 310 Commerce 320A

Year IV

Commerce 460 seminar

The equivalent of three class more of the following areas. Finance Accounting Economics (Money and Theory)

The equivalent of one elective core areas.

4. Marketing Year I Required core area classes Commerce 101 Economics 100A & B Mathematics 110 Commerce 208A

Core area elective Commerce 218B

Outside Elective Psychology 100

Year II Required core area classes Commerce 204 Commerce 206A/B Commerce 207A/B Commerce 215A Commerce 216B

Core area electives Commerce 313A Commerce 318B

Outside elective Sociology 100

Year III Required core area classes Commerce 209A/B Commerce 213A/B Economics 220A/B or 221A Commerce 311

Core area electives Commerce 314A/B Commerce 319B Commerce 315B

One elective chosen without res

Year IV Commerce 465 seminar The equivalent of four full ele consultation with the Departme

5. Organizational Behaviour Year I Required core area classes Commerce 101 Economics 100A & B Mathematics 110

Outside electives Sociology 100 Psychology 100

Year II as for those withou concentration

Year III Required core area classes Commerce 209A/B Commerce 213A/B Commerce 311

ses from one or	Year III Required core area class Commerce 311
Banking, Price from outside the	Core area electives Commerce 322A Commerce 323B Commerce 324B one-half class core area elective Two electives chosen without restriction
	Year IV Commerce 470 seminar The equivalent of four full electives chosen in consultation with the Department.
	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.
A/B	102 Renumbered Commerce 311 below
	204 Statistics for Economics and Business, lect.: 3 hrs.; workshop: 2 hrs.; R. E. George (same as Economics 222).
striction ectives chosen in ent.	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, skewness and kurtosis; curve-fitting; probability (estimating mean and proportion in population from samples, and testing hypotheses about means and propor- tions); 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 quanti- tatively, which is usually gained by the study of geometry and algebra at the high school and university level; familiarity with national accounting concepts.
t a special area	Note: Each of the following A/B classes may be offered only as A or B.

59

206A/B Computer Applications to Business Problems, lect.: 3 hrs.; P. E. Mason.

Computers are playing an increasing role both in business and in modern society. In order to familiarize the student with the concept of a computer, its advantages and disadvantages and current applications, this class takes a threefold approach:

1. The computer will be introduced as a tool for solving numeric problems commonly encountered while in university. FORTRAN will be taught in depth and sample problems from such fields as statistics, finance, and market research will be assigned.

2. Large computer systems will be introduced from the point of view of a manager rather than from that of a programmer. Computer Packages actually used for such applications as cost analysis, inventory control and accounts receivable will be implemented, data bases created and simulated production runs made.

3. COBOL, the most commonly used business oriented language used today, will be introduced. A survey of the language combined with introductory problems will be conducted. Prerequisites: There are no prerequisites to this class except the ability to think coherently. It is recommended that this class be taken as early as possible because the use of computer facilities will ease the workload in other classes.

207A/B Introduction to Managerial Finance, lect.: 3 hrs.; C. Dipchand, J. R. Hanrahan.

This class gives an introduction to the problems faced by business managers in the acquisition and effective utilization of the firm's financial resources and presents analytical concepts for evaluating financial decisions. This necessarily involves consideration of how the firm can achieve successful interaction with its external environment and make an appropriate contribution to the operation of the economy.

Essential background knowledge: An understanding of economic principles and the economic environment in which a business operates, and sufficient knowledge of accounting processes and principles to enable the student to use financial data intelligently. Prerequisites: Economics 100A and Economics 100B and Commerce 101.

208A/B Marketing Management, lect.: 3 hrs.: R. H. R. Glube, I. Muncaster.

This class is designed to give the student a basic understanding of the character and scope of marketing and its role in business operations. It focuses upon the concepts and techniques which a business must employ if it is to anticipate and satisfy consumer needs.

Emphasis is placed on the development of understanding and analytical ability in the following areas: the role of the consumer; product-line development; channels of distribution; pricing systems; selling and promotional activities. Case materials are used to give the student insight into the analytical tools used in problem analysis and decision-making.

No previous training in marketing is assumed. Students wishing to concentrate in marketing should plan to take Commerce 208A/B in their first year.

There are no prerequisites for this class. although some knowledge of accounting would be helpful.

209A/B Production, lect.: 3 hrs.; C. McManus.

This half-class is designed to give the student an 218B Marketing Management, lect.: 3 hrs.: 1 insight into the applications of management science as a tool to aid in the decision-making process in production.

The topics which will be covered include: the background of management science, principles of model building, the use of models for resource allocation, control of inventories, simulation, scheduling and control. Prerequisites: Commerce 101, Economics 100, Mathematics 110 and Commerce 204. The Prerequisite: Commerce 208A/B. latter will normally be taken concurrently.

lect.: 3 hrs.; R. S. Sandhu.

The meaning and sources of law, the machinery of justice; torts, formation of contracts, capacity of contract; legality of object, mistake, shop: 1 hr.; J. Matthews. misrepresentation; statute of frauds.

Privity of contracts; interpretation and discharge of contracts; breach of contracts; agency.

214B Commercial Transactions, lect.: 3 hrs.; R. S. Sandhu

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.

215A Organization Theory, lect.: 3 hrs.

The purpose of this class will be to survey both theory and research pertaining to complex organizations with emphasis on design, structure and administrative practices in connection with the environmental setting and how the interaction of these variables relates to organizational performance. Concomitant with this exposure to theory and research students will have the opportunity to apply this knowledge to case studies relevant to complex organizations. While the main emphasis is put upon the analysis of this material, time will also be devoted to the formulation of general solutions and decisions for action.

216B Organization Behavior, lect.: 3 hrs.

The purpose of this class is the development insight into human behavior in organization and capacity for objective analysis of Research and text material drawn from h fields of sociology, anthropology and particular the day and particu chology are used as aids in the development understanding and objectivity. As well dealing with substantive data from behavioral sciences, the class pays considerable attention to case material.

Commerce students are required to take 2151 and 216B as a complete unit with 215A taken prior to 216B. Non Commerce students may take either class as a half class.

Muncaster.

This class develops on the theory outlined in Commerce 208A/B with the goal of developin in the student the skill of soundly analysing and taking effective action in the marketing situation tions which face the practising marketing manager. Instruction will be based on the case method, class participation and role playing and thus will be limited to 40 students.

Note: It may not be possible to offer all the 213A/B Legal Aspects of Business - Contracts, classes listed below in every year. Students should bear this in mind when planning their programme for the following year.

301 Cost Administration, lect.: 2 hrs.; work

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.

Prerequisites: Commerce 101 and Commerce 310. The latter may, with the approval of the instructor, be taken concurrently.

302 Renumbered Commerce 215A and Commerce 216B above.

305B Small Business Management, lect.: 3 hrs. R. Glube.

This class uses written and oral cases to adapt and apply business principles to specific current small-business situations. Students are expected to review and supplement their knowledge of basic business functions, to find and analyze pertinent materials in libraries and from other sources, and to organize and integrate relevant materials and business principles into workable recommendations for managing a variety of small businesses.

Prerequisites: Commerce 101, Commer

the instructor.

w7B Intermediate Finance, lect.: 2 hrs.; C. Dipchand.

more intensive study of capital budgeting, $1 \text{ more apital and valuation theory than that of capital and <math>2074/P$ cost of commerce 207A/B. Special emphasis is d contained on long term capital and the bargain for placen on surgain for and vital in financing the business enterprise. peretuisites: Commerce 207A/B, Commerce Merecularity, commerce 310. The latter may be uken concurrently.

10 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 he taken by those students contemplating an accounting career. Prerequisite: Commerce 101.

311 Planning for Profit and Social Responsibility, lect.: 3 hrs.

The class examines the role business plays in our society; the economic, social, legal and political environment in which firms operate; the effect of these environmental constraints and opportunities on business decisions; the way in which business decisions are made and implemented; management practices. Prerequisites: Commerce 101, Commerce 207A/B, Commerce 208A/B, Commerce 215A, and Commerce 216B.

312A Managerial Accounting, lect.: 3 hrs.; E. W. Scott.

Introductory cost analysis for control and decision-making. Budgeting. Selected problems in external financial reporting including consolidated statements, tax allocation, price level changes and leases.

Prerequisites: Commerce 101, Commerce 207A/B

Note: Students whose major area of concentration is Accounting should take Commerce 301 and Commerce 310 and should not take this class

313A Consumer Behavior, lect.: 3 hrs.; J. Scheibelhut.

Consumer market structure and behavior and heir impact upon the firm's competitive operations and actions. Prerequisites: Commerce 208A/B.

^{314A/B} Sales Management, lect.: 3 hrs.; J. scheibelhut.

mance standards; analysis and control of distribution costs. Prerequisite: Commerce 208A/B.

315B Marketing – Promotion

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 eves of the marketing manager in both 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.

318B Marketing Research, lect.: 3 hrs.

The class will use the scientific method in solving marketing problems. Emphasis will be on planning and formulating the research problems, research design, application of sampling methods, statistical design of experiment, and analysis of data collected. A real-life research project will be required, its nature to be determined considering student interest and background.

Prerequisites: Commerce 208A/B, Commerce 204 concurrently.

319B Product Management, lect.: 3 hrs., I. Muncaster.

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.

322A Interpersonal Dynamics, lect.: 2 hrs., L. Mealiea.

A more intensive study of selected topic areas which emphasize the processes and possible problems associated with the dynamic interaction between individuals. The intention of this half class is to build upon the knowledge gained in Commerce 216B and will employ such learning techniques as sensitivity training, structured exercises in interpersonal relations, and case studies.

²⁰⁷A/B, Commerce 208A/B or permission of Organization of sales departments; sales planning and forecasting: guotas: territories: performing and forecasting: guotas: territories: perf

323B The Personnel Function, lect.: 2 hrs.

This class provides a knowledge of the various personnel processes required in organizations which employ a substantial number of people. Such organizations must deploy personnel on the basis of skills (task specialization) and be concerned with staffing appraisal, training and development, compensation, collective bargaining, handling grievances, health and safety, leadership and justice with respect to employees. All of these processes comprise the personnel function.

Knowledge of the processes is supplemented by the development of analytical skill in coping with various personnel problems and in the integration of the processes with the many other functions required in the organization. This type of "system and process" analysis is built upon the skill and knowledge acquired in the class on Organizational Behaviour. Cases will be used to simulate reality-oriented work environments.

Finally, the role of personnel management and the administration of the personnel function will be subject to consideration and analysis. Prerequisites: Commerce 215A and Commerce 216B.

324A/B Labor Relations, lect.: 2 hrs.

This class will expose the student to the history of organized labor in Canada: union, management and government policies affecting the Canadian worker; and the process of collective hargaining

Prerequisites: Commerce 215A and 216B, or permission of professor.

331A Security Analysis, lect.: 2 hrs.; C. Dipchand.

The objective of this class is to introduce students to the theory and philosophies of investment. This class concentrates on investment analysis suitable for the individual, the estate or small group. The main focus is on marketable securities, stocks, bonds, and investment trusts. Case material is primarily Canadian and covers such areas as growth stocks, new issues, convertibles, closed end funds, mutual funds, and warrants. Reading assignments and case-analysis will provide the student with opportunities to handle investment analysis and portfolio management on a problem basis.

Prerequisites: Commerce 207A/B, Commerce 204, and Economics 221A/B.

332B Money and Financial Markets, lect.: 2 hrs.; C. Dipchand.

Students are introduced to Canada's capital markets and the flow of funds within these markets. Other main areas of the course include term structure and risk structure of interest rates, the risk-return relationship on financial

assets and the efficiency of Canada's capital markets. The class will be conducted in terms of reading assignments, case-analysis, evaluation of available research results and classroom discussion.

Prerequisites: Commerce 207A/B, Commerce 204, and Economics 221A/B.

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., J. Matthews

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.

460 Seminar in Finance

Special seminar restricted to honors students in Finance

465 Seminar in Marketing

Provides an opportunity for advanced students in marketing to examine recent marketing developments and to study intensively selected facets of marketing management. Restricted to honors students in Marketing.

470 Seminar in Organizational Behavior

Special seminar restricted to honors students in Organizational Behavior.

Comparative Literature

Teaching Staff
R. Friedrich (Classics)
G. M. Harvey (English)
R. Ilgner (German)
S. Jones (Spanish)
F. A. Kretschmer (French)
N. Maloff (Russian)
R. M. Martin (Philosophy)
S. Mendel (English)
N. Nevo (Russian)
B. H. Rasmussen (French)
H. R. Runte (French)
R. Runte (French)
M. C. Sandhu (French)
H. S. Whittier (English)

The Departments of Classics, English, French, German, Philosophy, Russian, Spanish and Theatre, offer the following classes in Comparative Literature. These classes may form part of an area of concentration. All lectures are given in English, and works read in English translation:

100 Introduction to Comparative Literature, M. Sandhu.

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 works by Dante, Chaucer, Cervantes, Shakespeare, Molière, 254 Myth in Dramatic Literature, Goethe and others.

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.

110 Modern German Literature in Translation, R. Ilgner.

Major works by Hesse, Kafka, Brecht, Böll, Grass, Weiss, Dürrenmatt, and Mann will be and discussed in English. Detailed reading lists will be available from the Department of German before pre-registration in the summer. Practice in written and oral reports will be carried on throughout the year.

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 com-

prise the basis for the development of English

Generally, works will be taken up in chrome logical order. As the class proceeds, inter relationships and comparisons of theme, for and artistic perspectives in the various work will be developed. Classes generally consist of combination of lecture and discussion. Volum tary tutorials are held once a week for open discussion in addition to class meetings

204 The European Novel, lect.: 2 hrs.: s Mendél.

This class can best be described as a close studof about twelve representative novels of the last two hundred years in translation.

210 Theories and Manifestations of Love in Medieval Europe, H. R. Runte.

A literary and anthropological study of major poetic, romanesque, and dramatic works he English courtly poets, French troubadours, and German Minnesänger, with special emphasis on their relation to our time.

212 The Realistic Novel in 18th Century France and England, R. Runte.

A study of memoires and epistolary novels in Eighteenth century England and France will reveal a close interrelationship between the works of Marivaux, Richardson, Prévost Rousseau, Restif and Diderot. Other works representative of these genres by La Clos. Fielding and Smollett will also be studied.

F. Kretschmer.

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.

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.

306/A Dostoevsky, (New course offering 1973-74), lect.: 2 hrs.; N. Maloff. Open students in all departments. No prerequisites.

ourse is designed to give the student an tinto Dostoevsky's creative work through analysis of his major works. Classes are malysis in English. ducted in English.

Man is a mystery: if you spend your entire life Man to puzzle it out, then do not say that you have wasted your time. I occupy myself with this mystery, because I want to be a man." from Dostoevsky's letter to his brother (1839).

postoevsky takes his rightful place among the postociaries of world literature: Dante, cervantes, Milton, Pascal and Tolstoy. Long before Freud and the school of psychoanalysts, before subconnection of the subconvious. Yet psychology for him was not an end but a means. He remarked: "I am called a but a line caned a psychologist; this is not true, for I am a realist in the highest sense, i.e. I depict all the depths of the human soul."

The existence of God has also "tormented" his entire life and he foresaw history in the light of the Apocalypse to be culminated in the transfiguration of the world by the "new and last Resurrection".

306/E Tolstoy, (New course offering for 1973.74), lect.: 2 hrs.; N. Nevo. Open to students in all departments. No prerequisites.

This course is designed for students wishing to become acquainted with Tolstoy's thoughts and ideas through an analysis of his major works. Clastes will be conducted in English.

Tolstov and Dostoevsky are the two great columns, standing apart in the propylaeum of the Russian literature "Golden Age" temple. It seems Tolstoy has been given to the world for the purpose of being "contrasted with Dostoevsky", said D. S. Mirsky.

Indeed Dostoevsky is considered the "surgeon of the human soul" and Tolstoy a "doctor of humanity".

Tolstoy's talents and genius enabled him to capture the search for identity in 19th century Russia and to interpret it through his own solipsism - a sense of being the great world he writes about. For him self-awareness among all people should be based on "reason, that is, good'

350 European Romanticism, M. Sandhu.

This class will study the origins, main trends, and themes of the Romantic movement in Germany, France, England and Russia, with reference to the works of its most important representatives, e.g. Schlegel, Hugo, Byron, Lermontov, Pushkin and others. Periodic guest lecturers will show the impact of the Romantic Ideals in other fields of human accomplishment: music, painting, etc.

Computer Science

See Mathematics

Economics

Professors

- R. E. George I. F. Graham I. G. Head
- Z. A. Konczacki
- R. I. McAllister N. H. Morse (on leave 1973-74)
- Y. Murata

A. M. Sinclair (Chairman)

Associate Professors

- R. L. Comeau P. B. Huber
- E. Klein (on leave 1973-74)
- C. T. Marfels
- C. Steinberg

U.L.G.Rao

Assistant Professors F M Bradfield G. A. B. Kartsaklis C. M. Ouellette (on leave 1973-74) T. A. Pinfold

The aim of social science is to understand how societies function and how they develop. Economics is one of the social sciences and is concerned with a particular set of activities related to the production, exchange and consumption of goods and services. These activities in a region or nation constitute an economy. Economics also studies how incomes are earned in an economy, why the level of economic activity is what it is, and how different economies or countries are related to one another. To understand the operation of an economy is to be able to predict the effects of changes in any of its parts. It is this power of prediction which makes the study of economics relevant to current problems, because economics can deal with certain questions which our society deems significant such as: how can jobs be made available so that young people ready to earn a living can find work, and do rising prices hinder improvements in the standard of living?

To answer such questions, one must employ economic theory. This is a systematic body of principles that has been developed to explain the operation of an economy as a whole as well as the interconnections of its parts. Training in this theory is essential to any study of economics. Over time, economic theory has been refined by applying statistical techniques to test hypotheses about economic behaviour. Because of this use of statistics, and because much of economic analysis can be simply and precisely expressed in mathematical form, the student of economics will find some knowledge of mathematics and statistics helpful.

Economic theory is used for the interpretation and analysis of a wide variety of problems in various fields of study within economics. Some of the more important of these fields are labour Although students may offer fewer classes in economics, economic development, economic history, international trade, money and bank- ber is deemed necessary to provide a basic

ing, taxation and government expenditure, and the organization of industry. The programmes of study leading to a B.A. in economics allow considerable flexibility in order to accommodate a variety of interests on the part of students, and it is possible to combine economics and another related discipline such as political science, sociology, history or mathematics. Students who wish to acquire a more intensive and broadly based understanding of economics than is possible in the General B.A. course should seriously consider taking an honours degree course.

Students graduating in economics find many well-paid and interesting opportunities for employment in teaching, research and administrative positions in universities, business, government and international organizations.

General 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.

Economics can be taken as the major subject in a general B.A. or B.Com. degree programme, and it may also be taken in conjunction with major programmes in subjects such as mathematics, accounting, political science and history

The necessary core courses for a major in Economics are: Economics 220 (A or B), Economics 221 (A or B), and Economics 222 or 322.

As a guide to the student who is majoring in Economics, the following outline represents a course structure for a typical well rounded programme.

Recommended Course Structure Year I

1. Economics 100 or Economics 110.

2. Mathematics 100 or Mathematics 110.

3-5. Three classes chosen from fields other than Economics.

Year II

6-7. Economics 220 (A or B); Economics 221 (A or B); Economics 222 or 322. 8. One other class in Economics. 9-10. Two classes chosen from fields other than Economics.

Year III 11-13. Three classes in Economics. 14-15. Two classes at least one of which is not in Economics.

Students considering economics as an area of concentration should consult the department about their programme.

economics than the seven suggested, this num-

knowledge of the discipline and should be regarded as the minimum for preparation for a graduate programme in economics.

Students must satisfy the overall requirements for the degree programme in which they are registered. (B.A., B.Com., B.Sc., etc.)

Concentrated Integrated Programme

The Department is now offering an alternative course structure which may be of interest to students who wish to prepare themselves for a two-year M.A. programme or for work as an economist. The Concentrated Integrated Programme differs from the normal course of study since students will work on one class at a time, rather than the usual five, in their third year. The third year consists solely of economics classes taken in sequence, whereas the second year would consist primarily of classes in other subjects.

The integrated third year will be structured as follows (with options depending on whether the student is interested in an M.A. or in employment):

Weeks of Term	Segment of Programme
1-4	Micro theory
5-7	Macro theory
8 - 10	Advanced theory or
	applied field
11 - 14	Statistics
15 - 17	Economic History
18 - 19	History of Economic Thought
	or applied field
20 - 26	Applied Fields (3)
27 - 28	Policy seminar

Students who are interested in applying to enter the programme in September, 1973, or who wish to know more about it, should contact Professor F. M. Bradfield, Department of Economics, before April 30, 1973. The programme is designed for a maximum of 20 students and a minimum of 10 students.

African Studies Programme

The Department is cooperating with several other Departments in offering an African Studies Programme. Interested students should contact Professor Z. A. Konczacki.

Other Programmes

The Department is prepared to assist students who may wish to devise their own programmes under the present curriculum regulations. Interested students should consult Professor F. M. Bradfield, the Undergraduate Co-ordinator.

Honours Degree Programme

The necessary core courses for an Honours Degree in Economics are: Economics 100 or 110; Economics 220 (A or B); Economics 221 (A or B); Economics 320 (A or B); Economics 321 (A or B); Economics 322; Mathematics 110; a course in Economic History; a course in the History of Economic Thought.

The following course structure is recom- in the second half of the year, the basic the

Year I

1. Economics 100 or 110. 2. Mathematics 110 or 100.

3-5. Three classes in fields other than Economics

Year II

- 6. Economics 220 (A or B) and 221 (A or B). 7 Economics 322
- 8. Economics 232 or other economic history

9-10. Two classes chosen from fields other than Economics

Years III and IV

11-16. Six economics classes including 327, 320 (A or B), 321 (A or B), 17-20. Four classes in other areas chosen in consultation with the Department.

The student's programme will be chosen in consultation with the department and must have the approval of the department.

Honours students must pass a comprehensive examination at the end of their fourth year, or write a series of short papers, at their option.

Of the classes selected outside of economics in the third and fourth year, students must include at least two classes above the elementary level.

Students are advised that mathematics is required for graduate work in most good graduate schools. The value of Econometrics and of additional mathematics is therefore stressed.

In some instances, the department may permit students to take classes in other subjects in lieu of classes in economics and may permit minor variations in the required classes.

Students must be careful in arranging their courses to ensure that they satisfy the overall requirements for the General B.A. degree.

Combined Honours

Combined honours programmes may 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.

Classes Offered

100 Introductory Economics, lect.: 2 hrs., tutorial 1 hr., R. I. McAllister, A. Sinclair.

The Economics 100 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, interest, money, and prices; and the theory of

of the first term will be applied and extended of the first term are a seconomic problems and by identifying specific economics to the seconomics to employing the tools of economics to analy them and to propose policies for their solution

At the mid-term, students with a grade of B $_{\rm B}$ At the mid-term, out B of better have the option of continuing with Economics 100 or of going into Economic 220B or Economics 221B. Consult the Index graduate Coordinator, M. Bradfield, for Cetain

110 Introductory Economics: A Mathematical Approach, lect.: 2 hrs., tutorial 1 hr. Pinfold.

This is an introductory class for students with background in mathematics. Similar to Em nomics 100, the class is designed to provide general introduction to economic science and to introduce students to the way in which economic analysis can be applied to resolve economic problems. However, the approach taken to the material will be more rigorous Mathematical tools will play an integral role in developing the theorems and proofs. A know ledge of differential calculus would be helpful

At the mid-term, students with a grade of R have the option of continuing with Economics 110 or of going into Economics 220B or 221R Consult the Undergraduate Coordinator, M Bradfield, for details.

220A/B Micro-Economic Theory I, lect.: 3 hrs.: (offered both terms).

Microeconomics deals with the economic behaviour of households as purchasers of output and suppliers of input services, and of firms as producers of outputs and purchasers of inputs. as well 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 to 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, applications of these ideas are considered, in order to illustrate the range and power of micro-economic theory in dealing with practical economic issues. Prerequisite: Introductory Economics.

221A/B Macro-Economic Theory, lect.: 3 hrs. (offered in both terms), G. A. B. Kartsakiis, 1. 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

mic growth. Both "open" and "closed" mics are considered. Major emphasis is place on the development of the theoretical

isite: Introductory Economics.

2022 Economic Statistics I (same as Commerce 122 bect.: 3 hrs.; workshop 2 hrs.; R. E.

ropics studied include the definition, functions topics of statistics; the design and and source and statistical enquiries; statistical ubles, graphs and diagrams; measures of central tendency, dispersion, skewness and kurtosis; urve-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.

Rackground knowledge that is essential for this elass includes: algebra at approximately Grade vi level; some experience of constructing and interpreting graphs; the ability to think quantitstively 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.; (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 memisphere. The class therefore is a study in the formation and breakup or change in mpires, the shifting balance of power between countries and regions, the role of the Caribbean areas, the rise of the United States to a position ^m 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 ome theory is helpful in discussing Canadian problems and policies, especially in the wentieth century. However, no strict prerequisites are required, although a class in principles and some knowledge of story would be beneficial.

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 routes and trade centers; overseas trade; slavery and slave trade; Arab and European penetration and its economic impact.

The discussion concentrates primarily on tropical Africa and it is carried up to the times of the partition of the Continent by the European powers in the late nineteenth century.

No prerequisites are required, although Introductory Economics and some knowledge of history is desirable.

235B Economic History of Tropical Africa: Colonial Period, lect.: 2 hrs.; Z. A. Konczacki.

This class deals with an era which began with the "scramble" for African colonies, and ended with the coming of independence. A survey is provided of colonial economic policies, prior to 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 Introductory Economics and Economics 234A are desirable.

236B Recent Economic Developments in Sub-Saharan Africa, seminar: 2 hrs.; Z. A. Konczacki (not offered in 1973-74).

This seminar centres on the discussion of the impact of colonial heritage, present structure of African economies, problems of economic 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.

Prerequisite: Introductory Economics.,

234A Pre-Colonial Economic History of Sub- 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 to these problems, and to provide him with a broad background of institutional material on the structure and performance of a variety of economies. Reading on specific countries provide the basis for several short papers, but there is no written examination.

> The student taking this class must understand 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: Introductory Economics.

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: Introductory Economics, 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, criticalpath scheduling etc.

4. Application. The gist 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 business, 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: Introductory Economics or degree in 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.

321A 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 twosector models); and trade cycle models. Prerequisite: Economics 221A/B and Mathematics 110 (or equivalent).

322 Intermediate Statistics, lect.: 3 hrs.; U. L. 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. Introductory Economics is also required.

324 Public Finance, lect.: 2 hrs.; tutorial 1 hr., I. G. Head

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 stability tion. The final section considers the species problems of public finance in a federal system The analysis of the various sections will illustrated from and applied to the fise systems of Canada and other countries Prerequisite: Introductory Economics. En nomics 220A/B and 221A/B are desirable

325 Labour Economics, lect. and seminar; hrs.; C. Steinberg

Some nine million Canadians are directly dependent upon wages and salaries for a livin. 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, employ ment 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 develop ment 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 ware 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: Introductory Economics 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 Comeau

The 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

than their detailed modes of operation. other under Canadian institutions form the Contemps of the course, and Canadian experience in hists of monetary policy to influence the the use is examined. A knowledge of marcoconomics is assumed. Proteguisite: Economics 221A/B.

107 History of Economic Thought, lect.: 3 hrs.;

the approach taken in this class is to study the intellectual efforts that men have made in erder to understand economic phenomena". A order to unevery of medieval and mercantilist brei sure is followed by an examination of English classical political economy and Marxian conomics together with that of other sociaists. The focus then shifts to the marginalists, peo-classicists, and the institutionalists. Problens 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 depenes 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 guickly. Prerequisite: Economics 220A/B and 221A/B

are recommended.

328 Industrial Organization, seminar: 2 hrs.; C. Marfels.

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 market share 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, larket 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.

Urban Economics is essentially the application of tools of economic analysis to the problem of urban areas. Urban area is loosely defined so as to include small towns as well as large cities. Topics discussed include: the origin of cities, factors affecting urban economic growth, the goals of an urban area, problems in intra-urban resource allocation, urban transportation, production of public goods in urban areas, and urban planning. Flexibility in selecting class content is considered important. Topics suggested by students are welcome. Students are expected to present papers on topics of their choice.

Prerequisites: It is strongly recommended that students have a sound background in both macro- and micro-economics. Economics 220A/B and 221A/B, or their equivalent would be a minimum. The class is designed as an application of theoretical tools. No theory will be taught. Students will also find a knowledge of calculus useful, but not necessary. If a prospective student is unsure about the suitability of his background, he should consult the instructor.

330A International and Interregional Exchange, lect : 2 hrs.:

This class considers the causes of international and interregional exchange of goods and services 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 on trade are considered after the pure theory of international trade and its implications have been explored. Depending upon class interest and availability of time, the subjects of economic integration and of Canadian commercial policy may be discussed in some detail. Prerequisite: Introductory Economics and 220A/B, or two full-year classes in economics. The entering student must have a reasonably addition, the ability to follow arguments matical techniques.

lect.: 2 hrs.; tutorial 1 hrs.; Z. A. Konczacki.

The purpose of this class is to provide a

theoretical framework for the understanding of the process of economic development in the more and the less developed countries with a view to an eventual application of this framework 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 of economic development and their appraisal. The concluding seminars are devoted to the problem of the foundations of the theory of economic development, and a distinction between the concepts of unilinear and multilinear evolution is discussed.

Prerequisite: Introductory Economics. A class in macro-economics equivalent to Economics 221A/B, and History of Economic Thought is desirable.

334B Policy Issues in Economic Development, seminar 2 hrs.

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 saving 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 strategies.

Prerequisite: One half-year class in economic development, or Economics 241A and 242B; alternatively 220A/B and 221A/B.

336B Regional Development, seminar 2 hrs.; and tutorials; R. I. McAllister.

This class enables students to examine the process, prospects and problems associated with regional development in Canada in particular, and in the more industrialised countries in general. The interdependence of economic, political and social forces is markedly in evidence in the evolution of regional policies, and while this course will be oriented largely from a concern with the economic forces underlying the process - these other factors will be taken into consideration. The approach will contain four main elements: (a) the good grasp of micro-economic theory. In application of economic 'principles' in the context of regional development; (b) a comcouched in terms of high school mathematics is parative review of regional development exessential since part of the exposition by the periences and policies of a number of inlecturer makes use of algebraic and mathe- dustrialized countries; (c) Canadian regional development experiences, with particular focus on the Atlantic region; (d) regional field case 333A Theories of Economic Development, study; each student will examine the background and role of one pertinent project such as D.E.V.C.O. in Cape Breton, the Newfoundland centralization program, the Saint John

multi-industry complex. The class will visit several such projects over the period.

Prerequisite: This class is intended very largely for graduates (not necessarily in economics), who already have a number of years work experience on problems associated with regional development. A limited number of other students (with a substantial background in economics and/or political science) will be admitted.

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 brings in various problems. The following problems will be discussed in detail: Stochastic regressions, generalized least squares, Autocorrelation, Heteroskedasticity, distributed lags and dummy variables. All these problems are single equation problems.

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 disucssed.

Monto Carlo methods as alternatives to analytical technoiues 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.

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 investment, commercial policy, and development through trade. 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 macro-economics of aid, including analysis of dual gap models, aid requirements, absorptive capacity, debt service, and loan terms; the micro-economics 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 economics

424B Economic Development and Ecology, sense that they must be completed before the 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: Economics 333A. Students may also be admitted with special permission of the if the class were a research unit assigned the instructor.

426B Monetary Policy, lect.: 3 hrs.; R. L. Comeau

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.

Economics 431B International Payments, seminar: 2 hrs

Selected topics in recent international monetary history are examined, the causes of and remedies for external inbalance in national economies are considered, and the reorganization of the international monetary system is discussed. Depending upon class interest. certain issues of international development finance and problems of instability and growth in the international economy may be discussed in detail.

A substantial proportion of class time is devoted to the discussion of papers prepared by students. A comprehansive reading list is distributed.

Prerequisites: Economics 330A or 326B and 220A/B. These are strict prerequisites in the general and specific policy issues. The topic

student enrolls in the class.

In addition the ability to follow argument covered in terms of high school mathematics essential since part of the exposition makes us of algebraic and mathematical techniques

432 Regional Economics, seminar 2 hrs.; F. M Bradfield.

Regional economics applies economic theory to the problems created by the differential impact economic change on the regions of of developed economy. The intent of this course to develop a logical analytical approach to the problems of regional development. The course develops an understanding of the basic proh lems, their interrelationships, and their correct tion or amelioration. When the basic problems are understood, policy issues become clarified and easier to analyze. The course will operate as task of preparing a rigorous development plan for a region of class choice (presumably Nova Scotia, or the Maritimes, given the usual interests of the class). The class will define the various areas or components of the plan and assign tasks to members of the class, either as individuals or teams. Class time will be pent analyzing areas, defining needs and directine the individuals working in those areas. Papers will be discussed while being worked and as seminar papers when completed. The professor will not lecture to the class but will, with the rest of the class, question assumptions and analyses, suggest directions, and if necessary, serve as referee

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.

448A Philosophy, Politics and Economics (same as Philosophy 448A and Political Science 448A), seminar: 2 hrs.; D. Braybrooke.

449B Philosophy, Politics and Economics (same as Philosophy 449B and Political Science 449B), seminar: 2 hrs.; D. Braybrooke.

450 Senior Seminar on Economic Policy, seminar: 2 hrs.; J. 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 be made up of those who have a strong interest in economics and who have sufficient preparation to participate in critical discussions of both

discussed will depend partly on the particular L. G. Vagianos discussor of the students in the class.

interestisites: A good preparation in macro- and Prerequine and prerequire in macro- and milero- economics. Normally Economics 320B and 321A will be required. Students may also and admitted with special permission of the instructor.

Graduate Studies

Graduate programme the Deputy to the M.A. and Ph.D. degrees. Details 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 lasses at the discretion of the instructors concerned.

Education

Professors E. Z. Friedenberg H. J. Uhlman (part-time) L Bremer (Killam Senior Fellow)

Associate Professors E. T. Marriott (part-time) S. W. Semple (Chairman) s S. Sodhi M. I. Walter (part-time)

Assistant Professors D. Farnsworth R. Gamberg W. F. Hare D. J. Huegel G. B. Jefferv P. Keane D. D. Paré H.E. Poole J. B. Roald K. L. Sharma

Lecturers A. Bremer M. J. Meade W. D. Van Zoost

Teaching Assistants B. DeVille G. B. Punke - Field Development Officer

Special Lecturers

M. Bishop T. Carter B. S. Clark V. Cronin F. Damtoft V. A. Ellis W. T. Kennedy H. P. Moffatt J. Norman D, T. Paull C. Purcell A. Ricker Robson O.B. Roe - F. Scobbie K. C. Stickings J. A. R. Tibbles

N. Watts E. Welland

Almost everyone nowadays is aware of the Further information about the Learning Reimportance of the process of education in the source Centre, and its relationship to the modern world. A modern advanced society like programmes of the Department, may be our own, when compared with earlier or obtained on request from the Secretary, B.Ed. simpler societies, is characterised by the un-Programmes. paralled extent and complexity of its social heritage, that is of the total fund of knowledge, skills laws customs, and attitudes it The Department offers: possesses. To pass on this heritage (or the 1. a four year integrated course at the end of relevant parts of it), and to foster conditions which students are awarded simultaneously the under which it may be enlarged and purified, degrees of B.A. or B.Sc.sand B.Ed., and becomes a major task. The task might be made easier if biologically each generation could start 2. a sequential course of one year which may the learning process where the last left off, if, be taken by students who have already comfor example, the new generation were endowed pleted a B.A., B.Sc., or B.Comm. degree course at birth with speech and the ability to read, or otherwise fulfill the requirements for admiswrite and count. But, whether we might wish it sion to the B.Ed. programme, and at the end of or not, things are not arranged in that way and which the degree of B.Ed. is awarded. each generation must start from the beginning. As each generation, taken as a whole, always 3. two classes which may be used for credit has more to learn than the last, (and in modern towards a B.A. or B.Sc. (Education 401 and conditions frequently much more), and as there 402). is a continual need for adaptation to changing conditions, it is clear that the problems of The instruction offered in the education classes modern education are manifold and complex and the challenge severe.

Educational ideas are in ferment at the present time and serious voices can be heard taking very different positions on such matters as student responsibility, discipline, specialisation in High School, and teaching methods. At the same time new ideas (or in some cases, old ideas in new guises) challenge the student teacher, e.g. teamteaching, micro-teaching and continuous progress. Is a system of public schooling defensible at all? To what extent is teaching neutrality possible or desirable? Clearly to enter an education programme at such a time is not to enter a form of learning in which one can sensibly expect ready answers to such issues and problems. The Department of Education at Dalhousie is concerned to involve the student in such problems, to call attention to the relevant literature, and to aim at a high level of intellectual inquiry. It is vital that the student challenge ideas which he will encounter, and think out his or her own position on the issues. This is no more than to point out what is true of educational processes at all levels, that they are concerned to develop understanding. This general outlook permeates the whole programme, including academic courses and methods courses as well as the periods of Field Experience. Involvement cannot be summarised in terms of "listening and learning" but extends to contributing, rejecting, debating, experimenting and so on.

Facilities of the Department

The Department occupies a three-building complex, organised around a Learning Resource Centre which consists of five units: Field Development Unit; Learning Materials Unit; Playgroup (pre-school unit); Counselling and

visual Unit. When fully renovated the Centre will place an emphasis on open space and the mobility of people, equipment and materials within the larger area.

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 are integrated with academic classes in the second, third and fourth years, the first year being confined to the regular classes required for the B.A. or B.Sc. degree. A student wishing to enter the integrated course must apply to the department during the first year at the latest.

Traditionally the programmes are divided into Elementary and Secondary. The divisions are much less distinct now and this is reflected in the large number of options available in some courses. Requests for different course combinations are allowed by the department.

The Department is also encouraging the development of experimental projects involving alternative courses to the traditional ones. Students interested in participating in such projects are invited to indicate this on the Departmental Application Form and to discuss possibilities during their interview for admis-

Certification of Teachers

Licenses to teach are issued by the Nova Scotia Department of Education. A B.Ed. has entitled the holder to a Teachers' Certificate, Class 5 in the past. According to the regulations of the Province of Nova Scotia, every applicant for a Teacher's License or Professional Certificate must submit with his application, documentary evidence (in a form prescribed by the Minister of Education) respecting the applicant's moral character, age, health, training and gualifications. Further information may be obtained from the Registrar, Nova Scotia Department of Education. In New Brunswick, a B.Ed. graduate Interpersonal Relations Unit; and the Audio- may expect to receive a Class 4 certificate.

Scholarships

The Nova Scotia Department of Education no longer pays the fees of students in the B.Ed. programme who intend to teach in the Province

Details of Dalhousie scholarships and other funding sources are given in the information supplied to applicants.

Degree Programmes

B.Ed. Elementary and Secondary Sequential (One-year) Course

Entry Requirements

1. B.A., B.Sc., or B.Comm. by September 1973. Candidates with other bachelor degrees should enquire from the Secretary, B.Ed. Programme.

2. Applications from all students are welcomed. Opportunity to draw attention to strengths is provided by the letter of application

Application

1. Complete Dalhousie University Application Form which is available on request from the Admissions Office, Dalhousie University, Halifax. Nova Scotia.

2. Write to the Secretary, B.Ed. Programme, Department of Education, Dalhousie University stating preference for the Elementary Division or the Secondary Division. In the case of the Secondary Division specify main teaching subject interests.

Applicants will receive:

- (a) Department application form
- (b) Two reference forms
- (c) Further details

(d) An interview date, which must be confirmed by the applicant.

Selection is based on:

1. Academic record: All applicants, including Dalhousie graduates, must ensure that their transcripts are forwarded to the Admissions Office.

- 2. References.
- 3. Interview.

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 an elective approved by the Department.

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. 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. They are advised to consult with the Coordinator of the B.Ed. Programme when drawing up their programme for the first degree

Diploma in Education

The award of a Diploma in Education was discontinued following Spring Convocation,

Transfer of Credit

1973.

Students who wish to obtain the degree of B.Ed. with transfer of previous credit must obtain the degree of B.A., B.Sc., or B.Comm., fulfill the requirements for admission to the B.Ed. programme, and successfully complete at Dalhousie University at least two and one-half of the classes required for the Bachelor of Education degree.

Decisions concerning transfer of credit will only be made following consideration of transcripts and students' intended areas of study. Enquiries should be directed to the Secretary, B.Ed. Programme

B.Ed. Elementary and Secondary Integrated (Four-year) 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 for admission to the Integrated Course, 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 w normally be sufficient to complete this coup of study.

B.Ed. (Elementary): Integrated Course Year I

1-5. The first year of the course must meet first-year requirements for the B.A //D degrees (see Degree Programmes, section 5.1) English 100 must be taken.

Year II

6-8. Education 401, 403 and 408 (field en perience). 9-11. Three classes in arts and science

Year III

12-15. Education 404, 406, 408, and 407 16-18. Three classes in arts and science

19-21. Education 402, 408 and an elective 22-24. Three classes in arts and science,

Overall Requirements

The nine classes in arts and science taken in the second and subsequent years must meet the requirements set forth in Degree Programmer sections 5.2.1.

Specifically.

(A) the major (four to eight classes selected in accordance with major departmental require. ments) must be in a subject taught in Nova Scotian schools.

B. Seven of the nine classes must be at the 200 level or above.

C. On registration in his second year, the student must declare his major and have it approved by the department concerned.

D. At least one class in English beyond the 100 level must be taken.

E. Electives may be chosen from the subjects listed in groups A, B, C and D (Legree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

B.Ed. (Secondary): Integrated Course Year I

1-5. The first year of the course must meet the first-year requirements for the B.A./B.Sc. degrees (Degree Programmes, section 5.1) English 100 must be taken.

Year II

6-8. Education 401, 405, and 408 (field experience).

9-11. Three classes in arts and science.

Year III

12-14. Education 402, 408 and 406. 15-18. Four classes in arts and science.

 $E_{\text{ducation}}^{\text{IV}}$ 407, 408, and one elective. Year IV Three classes in arts and science. 19-21 22.2%

Overall Requirements

Overant to a science chosen in the the ten and subsequent years must meet the requirements set forth in Degree Programmes, rection 5.2.1. Specifically,

A Seven of the ten classes in arts and science A. Service in the second and later years must be in twen must be in two subjects beyond the 100 level; these should two subjects regularly taught in Nova scotan schools. The seven classes must be scottant of the state of the second state of the second se one subject and two in the other, or four in one subject and three in the other.

a 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 (Degree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

C. On registration in his second year, the student must declare his major and have it approved by the department concerned.

Classes Offered

The following list represents the 1973/74 classes. Minor changes will be noted in the pre-registration material sent to students who are 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 provided a range of choices within the broad subject area encompassed by the title of the class.

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 Senescense.

A survey of the physical, physiological and psychodynamic factors in the development of the individual from pre-birth until senescense. 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 Education)

This class consists of two lecture hours per week. Mainly theorectical, 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.

The following classes listed under 492 are exactly the same as those offered under 402. They are designed for Education students who have already chosen their required credits from 402 areas and who wish to take further study in foundations for their final elective credit: this they can do by selecting other sections of 402 and registering them as 492.

402A(1)/492A(1) The History of Western Educational Thought.

This class will examine the evolution of significant ideas, problems, and issues in western educational thought from the fifth century B.C. to the nineteenth century.

402B(1)/492B(1) The History of Western Educational Thought.

This class examines the evolution of significant ideas, problems, and issues in western education in the nineteenth and twentieth centuries. Special emphasis is placed upon selected utopian thinkers and other social commentators.

402(2)/492(2) The Development of Scientific and Technical Education, Not offered in 1973-74.

402A(3)/492A(3) Philosophy 218A Introduction to Philosophy of Education.

Conceptual analysis of certain crucial ideas in educational theory such as indoctrination, discussion, controversy, and miseducation.

402B(3)/492B(3) Philosophy 218B Curriculum Problems

Philosophical investigation of important ideas in curriculum theory such as needs, interests, creativity, aims, and relevance.

402(4) British Education and Its Influence on Canadian Education.

This class will trace the general growth of education in Britain and examine some relationships to developments in Canada. Attention will be devoted to the relative importance of social class, the Church, and the State, in this growth; and a survey made of contemporary British education.

402A(5) The Historical Development of Education in the Canadian Social Context.

This class will examine the evolution of education in Canada from colonial times to the 1870's approximately. Special emphasis is placed on the social context of education.

402B(5)/492B(5) The Historical Development of Education in the Canadian Social Context. J. B. Roald.

This class will examine the evolution of education in Canada from the 1870's to the present day. Special emphasis is placed upon the social context of education.

402(6)/492(6) An Outline of Adult Education.

This class will survey the contemporary field of adult education, and examine some of its philosophical and historical antecedents. It is hoped to provide a limited number of students with an opportunity for some field experience in adult education.

403 Methods of Teaching (Language Arts and 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 class will focuss on the learning and teaching of elementary school mathematics through the use of concrete materials. Emphasis will be placed on a "math lab" approach rather than on trying to 'cover' the curriculum and beyond. No particular math background is assumed.

404 Methods of Teaching (Science and Social Studies)

Elementary Science

This class will study the ways children investigate and learn about the material world. Special consideration will be given to the child as the principal agent in his/her own learning with emphasis on concrete experiences and practical learning activities.

Social Studies

This class will study ways in which to develop approaches in social studies education appropriate to young children.

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, 466C, 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.

Students taking this class might wish to consult the instructor concerning possible admission to two full and related classes offered by the School of Library Service: LS316 Children's Literature, and LS311 Literature for Young Adults.

415C History

Various aspects of curriculum development and competing teaching strategies will be explored. This examination is intended to aid the student in developing a consistent approach to history and social studies education.

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.

Students wishing to take this class without previously having taken an undergraduate class in geography will be required to take Education 416, Geography in Education, as their elective.

435C Mathematics

Computing and mathematics, the nature of mathematical education and its development in school, problem solving, micro-teaching situations, and contact with the work in local classrooms, form the framework for the course.

436C Curriculum Development in Mathematics

Students wishing to concentrate their methods work in mathematics may join this class to study current developments in North America and Europe and examine units suitable for inclusion in the Nova Scotia programme. Students may register for this class only with written consent of the instructor.

445C Physics

A study of the objectives of a high school physics programme, curriculum development, subject evaluation, innovation in science teaching and general instructional methods.

446C Chemistry

This class will study the teaching of chemistry in two ways. The first will involve the development of a rationale for teaching science that is consonant with the nature of the discipline: the second will give consideration to various curriculums and instructional styles, and their basic assumptions and objectives.

447C Biology

In addition to studying the current classes in Nova Scotia, ways of harnessing student interest in ecological matters as a means of promoting broader study are considered. A variety of teaching approaches are examined and seminars and discussions relating to lesson planning and science projects are part of the programme.

448C Geology

This subject is taught in Grade 12 classes in Nova Scotia. The importance of practical work is examined by use of experimental labs. The applications of general teaching methods to specific lessons and series of lessons are demonstrated and practiced. Laboratory sessions provide the student teacher with knowledge to carry out demonstrations required in the teaching of the class and enable him to become familiar with various kinds and arrangements of learning materials and apparatus.

465C Methods of Teaching French

Deals with objectives, subject matter, techniques, materials, curriculum design and testing in teaching French. Prerequisite: Education 421.

466C Methods of Teaching German

Deals with objectives, subject matter, techniques, materials, curriculum design and testing in teaching German. See also Department of German section.

475C Economics

This class reviewss 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

The following classes listed under 496 are exactly the same as those offered under 406. They are designed for Education students who have already chosen their required credits from 406 areas and who wish to take further study in Educational Psychology for their final elective credit: this they can do by selecting other sections of 406 and registering them as 496.

406Å(1)/496A(1) Educational Psychology for

This class will examine varieties of human This class with out and manifestation A synthesis of association learning, insightful learning and purposeful learning into an inter related model will be discussed. Such topics a neurological foundations of learning, cognitive growth and language development, attinde formation, complex motivation system educational objectives and individualized lesson procedures will also be considered

406A(2)/496A(2) Educational Psychology for Secondary Teachers

The primary purpose of this class will be u investigate and discuss the basic principles of Educational Psychology. Specifically, the nature of teaching, motivation, and learning will be examined.

406A(3)/496A(3) Psychology of Learning Language & Cognition

This class is particularly designed for those who have some background in psychology. The bulk of discussion should centre around some of the major contemporary theories in Learning Language and Cognition.

406B(1)/496B(1) Psychology and Education of the Exceptional Child

This class will attempt to provide a broader understanding of the term "exceptional child." An attempt will be made to discuss the genetic and environmental causes that determine and sustain the exceptional behavior. Psychodiagnostic and remedial processes to help children with expressive and/or receptive behavior problems (speech, hearing, vision, neurological and non-sensory impairments) will be considered. Administrative use of standardized tests which has generated artificial labels, and has led to recent court cases in

As the title suggests, the intellectual, social, and emotional growth of the child will be studied. View points of Bruner, Piaget, Hunt, and Skinner will be discussed.

406B(4)/496B(4) Psycho-Diagnostic proaches to Special Education

The objective of this class will be to examine special educational practices which attempt lo help the "special child" "adjust" to the school as it presently exists. Diagnostic approaches

lead to "suspicion confirming" and which holing" of the child will be considered: pipeonia to special and remedial education ill be examined.

Relations

one portion of the class will study the writing one policetives, teacher-made tests. standardized of oujection, variation, basic statistical ideas and the evils of testing.

In the remaining portion of the class, students will study human relations in the classroom. Emphasis will be placed 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.

108 Field Experience

It is the primary objective of the field expetiences to provide students with oppormities to analyze, compare, and participate in a variety of teaching-learning settings.

Integrated (four-year) Course

students in this programme will be required to accumulate a minimum of 360 clock hours in approved field experience situations.

In the second and third years of the progamme, students will be required to commit themselves to a weekly field experience assignment (a day per week, or equivalent) and a block period at the end of the year. Students in the fourth year of the programme will be required to complete a three week block period at the beginning of the school year.

All arrangements for field experiences are handled by the Field Development Officer.

Sequential (One-year) Course

Students in this programme will be required to complete a minimum of 240 clock hours in approved field experience situations. Field experiences may be under-taken in two prearranged block periods or in a combination of block periods and specially arranged weekly experiences.

All arrangements for field experiences are hand ed by the Field Development Officer.

109 Physical Education

This class will be given by various members of the faculty in the School of Physical Education. It is intended, firstly, to broaden the student's understanding of physical education by examinng its historical, philosophical, physiological, inesiological and psychological foundations. condly, it endeavours to familiarize the prospective teacher with school programmes of invsical education and with the specific probems associated with coaching school teams.

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 involved firstly as a participant, so that skills can be analyzed 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 toward teachers of the humanities, it attempts to demonstrate how active involvement in a situation can invigorate the study of social issues.

412 Music as a Medium in Education

This class studies music as a form of expression and its potential contribution to education. The class work is not restricted to specific grade levels or methods of teaching music, but examines the broader question of music and education.

414 Creative Activity in the Arts

This class is intended as an aid to those students who would like to teach the arts in an integrated way at the elementary school level.

Creative Art, Movement,s and Drama are presented as independent areas but are constantly interrelated through lecture demonstrations. The latter are followed by projects and research work in which students use resource centres and explore the development of resource materials for classroom use.

416 Geography in Education

This class is intended to be an introductory one, at first-year level, in which the major concepts and methods of enquiry in geography are studied. The course will involve independent study, and laboratory work, and will deal particularly with the contribution of geography to general education.

417 Introducation to Audio-visual Media

An introduction to the use and understanding of audio-visual techniques in teaching-learning situations. The course attempts to cover some of the basic theory regarding the "which, when, and why" of audio-visual media, but also through workshop situations it concentrates on the "how" aspect of the media.

418 Curriculum and Instruction in Elementary School Reading

This basic course in the teaching of reading is designed to introduce the components of the reading process through an analysis of the students own performance in reading. It will

North America, will also be discussed.

406B(2)/496B(2) Psychology of Adolescence

The major thrust of this class will be directed toward the examination of various contemporary issues related to adolescence. Relevance will be the "watch word" for discussion.

406B(3)/496B(3) Psychology & Education of the Young Child

The practical laboratory work is intended to the learning process in reading, types of reading programmes in schools, techniques for developing reading skills and abilities, and will involve students in the use of standardized and informal reading tests; the processes of diagnostic teaching and learning, the use of large group, small group and individual activities to explore course topics.

419/509 Combined Seminar Readings in Plato and/or Dewey

This seminar is a graduate-level class available also to B.Ed. students and providing an opportunity for the study of theories held by Plato and/or Dewey with important implications for contemporary education.

420A Curriculum Planning

A class designed to introduce intending teachers to basic principles of curriculum construction as it relates closely to their professional practice.

420B Alternative Views of the Curriculum

An exploration of the various ways to identifying the curriculum, its contraction and expansion, and its underlying principles together with a consideration of structures as ends and means

421 Applied Linguistics for teachers of French

Introduction to principles of phonetics, morphology, syntax and semantics as they apply to the practical problem of teaching French in the classroom. Emphasis will be placed on learning and teaching pronunciation, self-expression, reading and an awareness of language as an expression of culture. This class serves as prerequisite for Ed. 465C (Methods of Teaching French).

Engineering and Engineering-Physics

Engineering Professor K. F. Marginson (Chairman)

Associate Professor A. Creelman (N.S. Technical College)

Assistant Professors D. M. Lewis E. N. Patterson

Engineering-Physics Professors H. W. King A. Levin (Chairman)

Assistant Professor S. T. Nugent

The profession of engineering is today expanding its scope and changing its pattern of include a study of the component aspects 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, computer 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 Science in Engineering-Physics at Dalhousie.

The department also offers the first two years of a six-year course in architecture leading 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 that 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. Having completed the course, they will be admitted without further examination to the Nova Scotia Technical College School of Architecture.

Degree Programme

Uniform B.Sc. for Engineering Year I

- 1. Physics 110
- 2. Mathematics 100
- 3. Chemistry 110
- 4. Elective

5. Elective **Engineering 001**

Engineering 001, An Introduction to Professional Engineering, is a non-credit class, which should be taken by all students. The two electives must be chosen so as to satisfy the University regulations for the General B.Sc. Some students will be permitted to enroll in Engineering 200 in their first year, substituting this class for one of the electives, which would then be taken in the second year.

Year II

programme.

- 6. Physics 221 7. Mathematics 228
- 8. Chemistry 230
- 9-10. Engineering 200, 220A, 220B,

Engineering 310

Engineering 310 is a non-credit class which must be taken by all students. Students planning to specialize in mining or civil engineering may take Engineering 210B and Engineering 211B in addition to the above classes. Mining or civil engineering students who do not Year IV take these classes while at Dalhousie will have to elect classes in Surveying at N.S. Technical College; they will thus limit their choice of electives at N.S. Technical College.

prior to registration for Year II to discuss their

Year III 11. Mathematics 328 12-15. Engineering 230, 320, 330A, 330B,

340A, 340B

Students planning to specialize in mining engineering are required to take Geology 100 in addition to the above classes. Students planning to specialize in civil engineering may take Geology 100. Civil engineering students who do not take Geology 100 while at Dalhousie will have to elect a class in Geology at N.S. Technical College; they will thus limit their choice of electives at N.S. Technical College.

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 interests 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, materials science, instrumentation and measurement techniques. The course leads to the degree of Bachelor of Science in Engineering-Physics which has honours standing.

Completion of the course is excellent preparation for industrial research or graduate studies in applied sciences.

Degree Programme

B.Sc. in Engineering-Physics Year I

- 1. Physics 110 2. Mathematics 100
- 3. Chemistry 110

4. Elective (Arts) All students should consult the Department 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 300-level class 15. Mathematics 300-level class
- 16. Elective (Arts)

- 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 Engineer ing, 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 the discuss the various formal branches of engineer. ing and the spectrum of engineering functions 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. K. F. Marginson.

instrument of thought - the graphic of 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 geo metric implications of engineering formule. The class is concluded with fairly large design project done on a team basis by the students. Prerequisites: Mathematics 100; Physics 110. Text: TBA

10B Surveying, lect.: 3 hrs.; E. N. Patterson.

class is an introduction to the funda-This trace surveying. Topics covered include mentals of land measurement, precise levelthe transit, stadia and plane table surveys, computations, adjustments and noting of results, the determination of plotung azimuth and latitude based on merioran, observations, construction surveying,

alignments, curves. Text: (1972-73) Bouchard and Moffitt, Surveying.

ollB Survey Field Camp, E. N. Patterson.

The survey field camp will normally be held mediately 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. Traverse computations will be performed by hand as well as by digital computer methods.

Prerequisite: Engineering 210B Text: Same as in Engineering 210B

220A Engineering Mechanics - Statics, lect.: 2 hrs.; lab.: 3 hrs.; E. N. Patterson.

This class is an introduction to the study of engineering mechanics. Following a presentation of basic concepts, a brief treatment of vector algebra will be given. The student will then study the equivalence, resultant and equilibrium of force systems acting on a particle or on idealized rigid bodies such as trusses, frames and machines.

The class material will correspond closely to that described in the text. Prerequisite: Mathematics 100. Text: (1972-73) Meriam, Statics.

220B Kinematics, lect.: 2 hrs.; lab.: 3 hrs.; F. K. Marginson

Students taking this class should have taken a class in calculus and should be proficient at dealing with rates of change. A firm grasp of the vector concept is desirable.

he class will cover the motion of particles, lines and rigid bodies. Displacements, velocities, ust and second degree accelerations will be discussed graphically and analytically.

applications of the theory will be made to the motion of various types of mechanism, and the the computer in kinematic analysis and ynthesis will be considered.

terequisites: Physics 100; Mathematics 100. ext: (1972-73) Huang, Engineering Mechanics olume 2.

²³⁰ Introduction to Electrical Engineering, eet.: 3 hrs.; lab.: 3 hrs.; A. Creelman.

 T_{he} class is an introduction to electrical

in this subject for certain engineering disciplines. Consequently, while the analysis of linear circuits is dealt with in some detail, a considerable emphasis is placed upon practical devices and systems. The laboratory periods illustrate the use of electrical measuring devices and introduces the student to conventional methods of testing electronic and electro mechanical equipment. Prerequisite: Mathematics 100; Physics 110;

Engineering 310 (taken concurrently). Text: (1972-73) Del Toro, Electrical Engineering Fundamentals.

310 Engineering Problems by Computer Methods, 1 afternoon per week, D. M. Lewis/E. N. Patterson.

This is a class which will prepare the student to write his own Fortran IV digital computer programs for the solution of engineering problems. It will consist of a series of case studies of actual engineering problems which each student will execute on the CDC 6400 computer. Results will be submitted to the instructor. Students will also have an opportunity to use some of the standard application programs which are available, such as COGO and ECAP.

Prerequisites: Registration in second-year engineering, or consent of instructor. Text: (1972-73) 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 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.

220A, 220B; Engineering 310. Text: (1972-73) Huang, Engineering Mechanics Volume 2.

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 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, fatigue, creep and viscoelastic behaviour, covering metals, plastics and composite materials, and is continued in the sections concerning thermal, electrical and chemical properties.

This class gives extensive coverage to the third

Prerequisites: Mathematics 100; Engineering

engineering. However, it is also a terminal class The laboratory consists of a series of demonstrations of the dependance of properties on structure or microstructure and includes time set aside 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 Materials, (Penguin Books, 1968)

> 330B Strength of Materials, lect.: 3 hrs.; labtutorial 3 hrs.; D. M. Lewis.

> This class is an introduction to the study of the stresses, strains, and deformation of a solid body which results when static forces are applied to the body. Topics discussed include: the definition and transformation relation of stress and strain; torsion of circular sections; stresses and deflection of beams; column action.

> Prerequisites: Engineering 220A; Engineering 330A.

> Text: (1972-73) Higdon, Ohlsen, Stiles, Weese, Mechanics of Materials.

335 Electronics, lect.: 3 hrs.; A. Levin.

This 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.; 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, reversibility, 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.; E. N. Patterson.

Fluid mechanics is the engineering science upon which such specialties 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 aspects.

Prerequisites: Concurrent registration in Engineering 320, or the consent of the instructor. Text: (1972-73) 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 class.

416 Mathematical Methods of Physics, lect.: 3 hrs.; S. T. Nugent.

Topics discussed include: ordinary differential equations, complex variables, integral transforms, special functions, partial differential equations, eigenfunctions, eigenvalues, Green's functions, perturbation theory, integral equations, calculus of variations and tensor analysis. Prerequisite: Registration requires prior departmental consent.

Texts: Arfken, Mathematical Methods for Physicists (2nd ed.), Matthews and Walker, Mathematical Methods of Physics (2nd ed.).

420 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. Texts: TBA.

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).

435A Semiconductors, lect.: 3 hrs.; A. Levin.

Properties of intrinsic and doped semiconductors; carrier generation and transport, Hall effects and Shockley Haynes experiment; semiconductor diodes, fields and carrier densities, transport equations; special 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.

English Language and Literature

Professor Emeritus C. L. Bennet

Professors A. R. Bevan J. Gray (Chairman) M. G. Parks M. M. Ross S. E. Sprott (Sabbatical leave 1974) D. P. Varma

Associate Professors S. A. Cowan R. MacG. Dawson (Sabbatical leave 1973/74) J. Fraser A. J. Hartley S. Mendel A. N. Raspa R. I. Smith H. P. Sucksmith H. S. Whittier

Assistant Professors R. S. Hafter G. M. Harvey M. A. Klug H. E. Morgan C. J. Myers N.S. Poburko R. L. Raymond

H. D. Sproule G. F. Waller

Part-time Instructors E. Horlock E. Sutherland

Killam Post-Doctoral Fellow (1972/73) M. Estok

The study of English literature at Dalhousie is not just the study of the literature of Eigland To be sure, it is largely concerned with the rich written heritage of the British Isles, but ranges far beyond their shores to include the study of writing in Canada, the United States, parts of the English-speaking Commonwealth and indeed, some European countries, in transla tion.

It ranges widely in time, too, from early Anglo-Saxon works of the eighth century through thirteen centuries of changing ideas and language to the still-changing thoughts, feelings and expression of the 1960s and 70s. The many forms that the written word may take - poetry, fiction, drama, essay, history - are read, not only for an understanding of the literary evolution that brings them to be what they are, but also for an understanding of that which is temporary and that which is more enduring in the values and ideas that they embody.

Indeed, the purpose of English studies at Dalhousie, briefly stated, is the enjoyment and understanding of the written word. Since the word is the principal link between the individual heart and mind and the rest of the world, such studies naturally touch upon philosophy, politics, religion and the fine arts as well. At the same time, the student is himself encouraged to think, and to use language with clarity, judgment and imagination.

In more detail, the goals of English studies are to perceive that reading is a source of pleasure, knowledge and wisdom, to sharpen the powers of discrimination between what is good and bad in literature and ideas, to gain some understanding of the process by which great writing is achieved and indeed to inspire the student to his own best expression.

In the first year, English 100 is required by all students who wish to take further English classes. There are twenty different sections ranging from historical surveys to more specialized studies of periods or themes. To enable students to choose the one most suited to their inclinations and needs the English Department and the Registrar's Office have an English 100 supplement which includes the aims and reading lists of each section. Only under very

striordinary circumstances is exemption from English 100 granted.

Classes numbered from 200-228 are especially classes in students who are concentrating in suited for students it are sulter in studying it as a complement to their inguisity area, or taking an elective, and classes main area, and classes beyond 250 are designed as studies of spebeyond areas for Honours students. Honours classes are open to General students with the dasses of the Chairman and the professor concerned.

Faculty Advisors

As soon as possible in the academic year, each and ant who intends to concentrate on English is given a Faculty Advisor who will aid in the arrangement of a programme to suit individual interests. All students interested in the study of the English language and literature should notify the Department of this interest in order that this Advisor may be assigned.

Degree Programmes

The General B.A. in English

students should consult with their Faculty Advisors about their choice of classes. The Department expects General students to form coherent programmes of four to eight classes in English above English 100. Students should note that:

(1) of the classes beyond English 100 required to constitute a programme in English for the general B.A. degree, not more than three should be drawn from any one of the following three groups of classes:

- (a) 203, 214, 218, 224 (b) 205, 206, 208, 215, 216
- (c) 209, 210, 212, 213, 217

(2) classes numbered from 201-228 (excepting 201, 206, 207, 218) are not accepted as preparation for Graduate Studies in English. Students who may desire to change to an Honours Programme or continue in Graduate Studies should arrange with their Advisor to complete several Honours classes before graduating with a General B.A. It is possible to enter a two-year M.A. course on completion of a General B.A. degree, but only if the student has completed four or five Honours rather than General classes for his concentration and has alfained at least a second-division average in

The B.A. with Honours in English (Major Programme)

the Honours course in English offers a systematic study of the subject which acquaints the student with the major writers and trends from medjaeval times to our century. It is therefore of particular relevance to the student who is ^{nterested} in a detailed study of English as a basis of a liberal education, to the prospective high-school teacher of English who needs a comprehensive understanding of the subject, and to the student intending to proceed to the raduate 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.

addition to English 250A) beyond the 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 Section C. English 251; English 352 Section D. English 254; English 356 Section E. English 354; English 452; English 457

Section F. English 453; English 455

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, 454

This class provides an introduction to the scientific analysis of language and a survey of English 250A (Bibliography), a non-credit class the historical development of English. Attenwhich meets one hour per week in the first tion is paid to modern theories concerning the term, is required of all Honours students and is structure of English, to the concepts of "style" to be taken in the first year of the Honours and "usage", and to the relevance of linguistic course research to literary criticism and language teaching. Attention is also paid to the "an-The Honours student must meet the requirecestry" and evolution of the language, with the ments for the General B.A. degree. He is sources of its vocabulary and the ways in which advised to select a minor from one of the the sounds, forms, syntax and very meaning of subjects listed under either Group A or Group words in English have changed over the B in the "Degrees and Courses" section of the centuries being studied through selected literary Calendar. texts.

B.A. with Combined Honours

There are several Combined Honours proarammes.

English and French English and History English and Philosophy English and German English and Spanish English and Theatre

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 mentioned above, he should see the Chairman of the Department as soon as possible.

A Joint Honours programme, involving cooperation between the Departments of English at Mount Saint Vincent and Dalhousie, has been established. Students interested in this programme are advised to consult the Chairman of the Department for further details.

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

generalizations. 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 The Honours course consists of nine classes (in reader and a more exact and imaginative writer.

> The subject matter varies from section to section. Detailed syllabi of all sections are available. Practice in writing is carried on throughout the year in fortnightly essays.

Each section attends three lectures per week. In addition, the tutors attached to each section conduct small discussion groups and personal interviews with students.

Classes for General Degree

201 The English Language, lect.: 2 hrs.; H. E. Morgan.

Preparatory reading: C. Laird, The Miracle of Language (Fawcett); W. L. Anderson and N.C. Stageberg, Introductory Readings on Language, 3rd edition (Holt, Rinehart and Winston, 1970).

This class is not prerequisite to, but is useful as an introduction to, English 253 and 351 (Old and Middle English).

203 Masterpeices of Western Literature, lect.: 3 hrs.; H. 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.

Mendel.

This class is devoted to an intensive study of about a dozen representative European novels of the last two hundred years. The method of approach and the character of tests and examinations are such as to render it necessary for the student to attend most of the lectures. Since a considerable amount of attention is paid to the philosophical ideas which bulk large in many of the novels studied, students who are taking (or have taken) Philosophy 270 are strongly advised not to take this class.

205 Victorian Literature (not offered in 1973/74).

206 American Literature of the Nineteenth Century, lect.: 2 hrs.; S. Cowan.

This class is a survey of American literature through representative works by major American writers from 1800 to 1900. Some of the writers studied are Cooper, Hawthorne, Poe, Emerson, Melville, Whitman, Dickinson, and Twain. The student will write one long paper or several short ones each term, and there is an examination in the Spring. Students may be required to present reports to the class.

207 Canadian Literature, lect.: 2 hrs.; M. Parks, H. Sproule.

This class is a survey of English-Canadian literature with emphasis on poetry and fiction from the 1920s 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 (Haliburton, Richardson, DeMille (prose); Howe, Goldsmith, Isabella Crawford, Carman, Roberts, Lampman, D. C. Scott (poetry)) 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. The following authors will be included: Leacock, Grove, MacLennan, Callaghan, Davies, Raddall, Buckler, Lawrence, Watson (prose); Pratt, A. J. M. Smith, F. R. Scott, Klein, Birney, Layton (poetry).

208 The English Novel to 1900, lect.: 2 hrs.; A. R. Bevan.

This class will follow chronologically the development of the English novel from the early eighteenth century to the end of the nineteenth century. The novels to be discussed are chosen from a long list of works that have withstood the test of time.

209 Twentieth-Century Fiction, lect.: 2 hrs.; A. N. Raspa, H. Whittier.

English 209 is intended as an introduction to the main thematic and technical trends in the modern English and American novel. The

204 The European Novel, lect.: 2 hrs.; S. lectures focus on representative novels of some End of the term papers will determine for of the major figures of the first half-century and on significant novels of the past two decades.

> 210 Modern Poetry in English (not offered in 1973/74).

212 British Literature of the Twentieth Century, lect.: 2 hrs.: N. S. Poburko.

This class is an approach to the reading of twentieth century British poetry, prose and drama. Central themes of this period are viewed through a study of the works of selected authors. The writers considered in 1973-74 will be: D. H. Lawrence, T. S. Eliot, James Joyce, G. B. Shaw, Graham Greene, W. H. Auden, Samuel Beckett and Doris Lessing.

213 American Literature of the Twentieth Century, lect.: 2 hrs.; R. Hafter.

The reading list for this class is fairly extensive and includes plays, short stories, poetry, and novels, with emphasis on the last-named. Classes will be conducted by lectures and discussions. There are no examinations, but brief questionnaires may be given to keep students honest in fulfilling reading requirements. In addition, there will be a first-term paper and a final paper which will involve outside reading. In computing grades, great stress will will be placed on the ability to write lucidly; students who have difficulties in this respect are advised to avoid this class.

214 Shakespeare, lect.: 2 hrs.; C. Myers/S. E. Sprott/G. Harvey/G. Waller.

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.

215 Poetry of the Romantic Period, lect.: 2 hrs.; G. Harvey.

This class concentrates on some major works of Wordsworth, Coleridge, Byron, Keats, and Shelley. During the first term some attention will be given to representative poems of the pre-Romantics in the course of an introduction 250A Bibliography, lect.: 1 hr.; (first term to the Romantic movement.

Varma.

This class will survey the origins and development of The Tale of Terror and Supernatural during the later half of the eighteenth century and its various manifestations and influences in succeeding fiction. Not only the chief landmarks of the gothic fiction will be charted, but the students will also explore the various chambers of horror-literature. There will be no final examination, but students will work on assigned tests and participate in discussions.

grades.

217 African Literature, lect.: 2 hrs.; R Smith.

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 he modern, and will reflect the attitudes of various African cultures towards racism, colonialism and African nationalism.

218 Medieval Literature (not offered 1973/74).

220 English Drama (not offered in 1973/74)

222 English Satire (not offered in 1973/74 hour see English 227).

224 Renaissance Poetry (not offered in 1973/74).

225 Epic Poetry and Prose (not offered in 1973/74).

226 Tragedy (not offered in 1973/74).

227 Comedy and Satire, lect.: 2 hrs.; J. Grav

The comedian and the satirist are interested in both the laughable and the deplorable anties and eccentricities of human nature. This class will concern itself with their points of view, as expressed in such varied forms as stage comedy. graphic satire, the comic novel, and the humorous essay. It will also consider theories of comedy and laughter in their application to literary types, including situational, romantic, satiric, sentimental and domestic comedy, as well as rollicking farce, slapstick, "sick" comedy and the absurd. Wherever possible, lectures and class discussions will be supplemented by play readings, films and other illustrative materials.

Prerequisite: English 100 and an adaptable sense of humour.

228 Lyrical Poetry (not offered in 1973/74).

Classes for the Honours Degree

only), R. L. Raymond.

216 The Gothic Novel, lect.: 2 hrs.; D. P. 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

icularly older ones.

the class meets one hour a week during the the class only and includes the assignment of exercise to be done in the library.

raglish 250B Practical Criticism, lect.: 1 hr. (second term only); R. Raymond.

this is a non-credit class designed to acquaint the student with various recent and current the survey to the understanding, significance and purpose of literature. Emphasis will be given to exercises in which various critical approaches are applied to both older and modern works.

251 Sixteenth-Century Non-Dramatic Literature, lect.: 2 hrs.; M. G. Parks.

This class is a survey of the literature (other than drama) of the sixteenth century in England. The works that will be studied include those that both led towards and grew out of the turmoil that accompanied the reform of the Christian Church during the period. Other works represent the fresh flowering of literature that resulted from the rediscovery of classical culture and ideals. The first term is chiefly devoted to the prose of reform, biography, history and fiction. The second term is devoted to a study of the development of poetry, principally lyric, but centering upon Books I and II of Spenser's Faerie Queene.

252 Shakespeare and the Drama of His Time, lect.: 2 hrs.; S. E. Sprott/G. Harvey.

Some fifteen plays by Shakespeare are read in the context of representative plays by his earlier and later contemporaries, especially Marlowe and Jonson. The class is a seminar, intended primarily for Honours students though open to General students who have obtained a second-class grade in English 100 or have completed an upper-year class in English.

253 Old English (not offered in 1973/74).

254 Restoration and Eighteenth-Century Literature (not offered in 1973/74).

351 Middle English, lect.: 2 hrs.; H. E. Morgan.

This class offers an introduction to Middle English language and literature through study of Chaucer's poetry, the A-text of Langland's thers the Plowman, and Sir Gawain and the Green Knight. Through his readings, the student should gain some historical sense of the anguage, of the social milieu and especially of the late-medieval social tensions which contributed to the literature's brilliance.

Preparatory reading: Chaucer's poetry and H. S. ennett, Chaucer and the Fifteenth Century Oxford History of English Literature, vol. II, W.F. Bolton (ed.), The Middle Ages (Sphere bk.); J. B. Morrall, The Medieval Imprint Penguin); M. Keen, History of Medieval Europe (Penguin).

ture, lect.: 2 hrs.; S. Cowan.

This class is a study of representative works of Bacon, Donne, Jonson, Burton, Browne, Herrick, Herbert, Crashaw, Vaughan, and Milton.

The aim of the class is, through a study of representative writers, to provide the student with an introduction to both the individual and traditional characteristics of the poetry and prose of the period. Classes are conducted by a combination of lecture and discussion. Students present brief reports to the class that establish starting points for discussion. One long paper or several short ones are written each term, and there is an examination in the Spring.

354 Victorian Novel, lect.: 2 hrs.; H. P. Sucksmith.

This class will consider the work of the major English Victorian novelists from Dickens to Hardy with three minor novels which are of special importance. The fiction of the period will be carefully related to the social, economic, political and cultural background as well as examined critically. There will be both lectures and discussion. Assessment will be based upon the year's work including term-papers and class tests. A reading list is available in the Department office and pre-reading is strongly advised.

356 Literature of the Romantic Period, lect.: 2 hrs.: A. I. Hartley.

A study of the major poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats, supported by a survey of the genesis and development of the romantic movement as well as by representative prose of the period.

S. Mendel.

This class is chiefly concerned with ideas. It studies representative writers of the period with a view to exploring the main currents of thought and opinion on such topics as religion, politics, art, education and society.

453 Twentieth-Century English Literature, lect.: 2 hrs.; J. Fraser.

This seminar is for honours students and for M.A. students in their make-up year. The procedure in it is to present students with a variety of texts and problems in a meaningful sequence and let them argue about them. Each member of the seminar writes two papers to serve as starting points for the class discussions. There are no examinations, but regular attendance is expected, in the interests of effective debate. The following prose works will be discussed: Joyce, A Portrait of the Artist as a Young Man (Penguin); Conrad, Victory and The Secret Agent (Penguin); Woolf, To the Lighthouse (Penguin); Lawrence The Rainbow; of the Faculty of Graduate Studies.

to the establishment of texts, par-to the establishment of texts, par-to the ones. 352 Seventeenth-Century Non-Dramatic Litera-to the ones. 552 Seventeenth-Century Non-Dramatic Litera-to the ones. Collection of Essays (Anchor); Beckett, Endgame; Pinter, The Birthday Party; Cary, The Horse's Mouth (Penguin); Durrell, Justine; Murdoch, Under the Net. Interspersed with these, selections from the following poets will be discussed: Pound Eliot, Yeats, Hopkins, Auden, Dylan Thomas, Hardy, Graves, Gunn, Hughes, and one or two younger ones. The editions indicated are the ones that the bookstore will be carrying.

> 454 Literary Criticism, lect.: 2 hrs.; N. Poburko.

This class is primarily for fourth year honours students. It deals with varieties of modern criticism since Matthew Arnold. The authors to be considered include T. S. Eliot, F. R. Leavis, I. A. Richards, Edmund Wilson, and such European critics as Barthes, Goldmann and Lukacs.

455 Modern American Literature, lect.: 2 hrs.; M. Klug.

This class will study the growth of American literature over the past seventy years. The first term will be devoted to poetry and will centre on readings from Frost, Eliot, Lindsay, Stevens, Williams, Crane, Lowell, and Roethke. Through the second term we will be working with fiction: Dreiser's Sister Carrie, Fitzgerald's Great Gatsby, Hemingway's The Sun also Rises. Faulkner's Light in August, Ellison's Invisible Man, Bellow's Adventures of Augie March, and Mailer's American Dream. The classroom work will involve lecture and discussion. Each member of the class will write one paper in the fall and spring term on a topic of his own choice. A final examination on the year's reading will be set.

452 Nineteenth-Century Thought, lect.: 2 hrs.; 457 Victorian Literature, lect.: 2 hrs.; M. Ross.

A study of the major Victorian poets and prose writers (other than novelists). Attention will be given to the changing philosopical, scientific and social pressures of the period. The main emphasis of the class will be on the poetry of Tennyson, Arnold and Browning and the prose of Carlyle, Ruskin, Newman, Arnold and Pater.

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 for revised class and text lists.

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

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French

Professors H. F. Aikens P. Chavy

Associate Professor D. W. Lawrence

Assistant Professors

W. Ajami E. Bovd T. P. Carter B. E. Gesner W. T. Gordon S. Journoud R. Kocourek F. A. Kretschmer H. R. Runte M. Sandhu C. J. Simon

Lecturers

M. Bishop I. W. Brown I. P. Gaillard de Semainville R. Ginsberg K. Haberl M. Leal E. Messinger R. Runte

Lecturer (part-time) H. E. Bednarski

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 and

French studies, you should consider the possi- (b) spend at least one summer in a French bility 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 (as early as possible) with the department 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 main area of concentration, the course may be arranged in two ways:

Programme under Old Regulations

First Year *Either* (A) 102 or 134 OR (B) 102/202 combined.

Second Year

Either (A) (If programme A has been followed in the First Year), 202 or 204 and one or more of 230, 231, 232. Or (B) (If programme B has been followed in the First Year), two or more of 230, 231, 232 (3) A student admitted to a French course at and 304.

Note 202 is the normal continuation of 102, while 204 continues 134. The combined class 102/202 will normally be followed by 304. Classes 202 and 204 are mutually exclusive.

Third Year

321, 322, 330, 331, 340, 350 (A and B).

Programme under New Regulations See Programme Planning Guide.

Note The following courses may not be counted toward a degree in French: 100, 106, 206.

Bachelor of Arts with Honours in French

A decision regarding admissibility to Honours is not usually made until the end of the student's second year in the Department. Details of the Honours program in French in the Third and Fourth Years are to be arranged by consultation with the Department. Honours students may like to opt at this point for either a language or a literature bias to their studies. Honours standing may be granted to courses taken at the 200 level if the grade awarded (minimum grade B-) is sufficiently high.

Students in the Honours programme with French as main subject are normally required before graduation to:

(a) Either: write an Honours essay under the supervision of a member of the Department in an area connected with the programme. Or: write a comprehensive examination;

(b) speak at the speaking community to consolidate their know ledge of the language.

Bachelor of Arts with Combined Honours in French and Another Subject

Programmes may be arranged by consultation concerned. Students planning a continuents 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 fulfill degree requirements without the express an proval 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.

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.

Up to five of 230, 231, 232, 304, 310, 312, (5) Enquiries concerning prescribed texts should be made at the end of the preceding academic year.

French Classes Offered

100 French and French-Canadian Literature in English Translation (20th century), lect.: 3 hrs. ner week.

Not for credit towards a degree in French. This is a class with limited enrolment designed to act as an introduction to French and French-Canadian Literature for non-specialists.

100 Comparative Literature, (See Comparative Literature Section).

102 Spoken and Written French, lect: 3 hrs. language lab.: 2-5 hrs. per week.

This is an intensive course designed for students who wish to achieve proficiency in spoken and written French, either for general purposes of as a preparation for further study in French language and literature. There will be an emphasis on oral proficiency. Most students will have studied French in high school but may have had limited experience in the spoken language. Students who have not previously studied the language are admissible. Clas sections (limited to fifteen students) meet three

weekly. These lecture periods are directly and to individual practice in the language related in the language the tanguage boratory, work in the language laboratory. There wish to main time to be spent in these sessions the considered normal of the hours week is considered normal. Students intered in this course should complete a special om available from the Admissions Office.

NOTE: French 102, while a full credit course, the first half of an integrated two-year torms the more advanced portion being French 202. French 102 and French 202 may taken in the same year (for two full credits). petails are explained in the special form mierred to above.

http://www.conficiency in Reading, lect.: 3 hrs.

For students wishing to acquire or improve tills in comprehending written French, without extensive training in the spoken language or the active use of the written language. Although designed primarily for undergradutes, this class can also accommodate and meet the needs of graduate students required to show eidence of a basic reading knowledge of French

134 Written and Spoken French, lect.: 3 hrs. per week.

This course is designed for students who wish to achieve proficiency in spoken and written French. It differs from French 102 in that there s more emphasis on the acquisition of skill in composition and an introduction to literature, Classes are held three times weekly. There is no language laboratory practice in connection with this course. Using a basic text (Reflex French), the student memorizes key sentences useful in conversations and illustrating correct usage. A grasp of these basics should lead to simple onversation and written exercises. By the end of the first term, the student should have advanced to dialogue, play scripts and free omposition. The primary text is then supplemented with two simple novels to build wabulary, reinforce the student's knowledge ^{of underlying} structure and serve as a basis for conversation in class. Toward the end of the cond term students are expected to be upable of writing paragraphs or short essays of critical nature. Students will be assessed on written exercises, participation in class ^{ad an} oral test at the end of each term.

^{32A} Spoken and Written French, intensive, 310 Literary Appreciation, lect.: 3 hrs. per Part II), lect.: 3 hrs.; language lab.: 2-4 hrs. per

^{nues} and completes the basic work begun French 102. Lab hours are freely chosen as rerich 102.

^{equisite}: French 102 or equivalent.

^{the: French} 102 and 202 may be taken in the Me year: see note following French 102.

202B Spoken and Written French, intensive, This class will consider French and French-(Part III), lect.: 3 hrs.; language lab.: as Canadian civilization in a variety of ways and required.

Sections will be devoted to subject material in which students express a particular interest. In some cases, the subject material may be studied throughout the whole semester (stylistic variants (including colloquial forms) of the basic material learned in French 102 and 202A; critical reading of a literary work with elementary essay writing); in other cases, a number of shorter options, each one lasting approximately two weeks, may be offered during the semester (letter writing, French-Canadian speech, the language of specialized activities such as the telephone, photography, sports, games, etc.). Details will be available by registration time. Prerequisite: French 202A or equivalent.

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 composition.

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 Introduction to French Literature, lect.; 3 330 French Literature of the 17th and 18th centuries lect.: 3 hrs. per week. hrs. per week.

Canadian literature from the 18th to the 20th lect.: 3 hrs. per week. century.

231 Introduction to French Literature, lect.: 3

French and French-Canadian theatre in the 20th century

232 Seventeenth Century Literature, lect.: 3 hrs. per week.

This class will deal with the theme of love and its treatment in 17th century French literature.

304 Composition, 3 hrs. per week.

Continues the language work of 204 at a higher level.

week.

Practical exercises in literary appreciation, "explication de texte". The texts selected will range from the 17th century to the present day. Passages from earlier authors may be used in modernized versions

312 Civilization of France and French Canada, lect.: 3 hrs. per week.

will not be concerned exclusively with literature, although a number of texts will be examined for the light they throw on society.

321 General Phonetics, lect.: 3 hrs.

Study of the sounds of language, especially those of English and other languages of particular interest to students; how these sounds are perceived and produced; how they may be classified; how they may be taught; practice in the use of phonetic script; introduction to phonemics. Not a class in remedial pronounciation. Language lab work may be required for some exercises.

Prerequisite: Good knowledge of spoken English and familiarity with the spoken form of at least one other language.

322 Introduction to Linguistics

Study of the nature of language: elements of phonetics and phonology; writing; grammar (units, categories, functions); words and meaning (lexicon, semantics); summary of historical, comparative and contrastive linguistics; survey of major world languages; chief events in the history of linguistics. In view of the essential role of language in human life, this class is suitable for inclusion in various study programmes.

Study of "le conte" in French and French- 331 French Literature of the 19th century,

340 Introduction of French-Canadian Literature, lect.: 3 hrs. per week.

350A Introduction to Medieval French Literature, lect.: 3 hrs. per week.

350B Introduction to 16th Century French Literature, lect.: 3 hrs. per week.

404 Composition, lect.: 3 hrs. per week.

Continues the work of 304 at a higher level. Prerequisite: French 304.

423 Evolution of Linguistics, lect.: 3 hrs.

The development of language study from early times to the present day. Special attention will be paid to the linguistic ideas of the twentieth century.

430A/B Medieval French Literature, lect.: 3 hrs. per week.

431A/B Sixteenth Century French Literature, lect.: 3 hrs. per week.

432A/B Literature of the 17th Century, lect.: 3 hrs. per week.

hrs. per week.

434A/B Literature of the 19th Century, lect.: 3 hrs. per week.

435A/B Literature of the 20th Century, lect.: 3 hrs. per week.

Geology

Professors H. B. S. Cooke (Carnegie Professor) M. J. Keen G. C. Milligan

Associate Professors

J. M. Ade-Hall F. Aumento (Chairman) F. Medioli P. E. Schenk

Assistant Professors D. B. Clarke

G. K. Muecke D. J. W. Piper M. Zentilli

Research Associates (Primary appointments elsewhere) J. F. Jones L. H. King B. D. Loncarevic J. P. Nowlan B. R. Pelletier

Post Doctoral Fellows S. Barr (Oceanography) K. Kitazawa

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? Can you imagine the economic impact on Nova Scotia if oil is discovered in commercial quantities 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 may have been barely big enough to bathe 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.

433A/B Literature of the 18th Century, lect.: 3 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, former 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 Rockey 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 protozoas. 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 logical surveys and Departments of Minest the Canadian government is responsible supplying geologists to agencies sup UNESCO to work in under-developed tries. A graduate with a geology degree and reasonable background in other sciences we find teaching in high school challenging.

High School Preparation

Students in high schools who plan a careprin sciences involving the earth, such as geology or geophysics, should note that it is sensible to the to have the following subjects in Grades XI XII:

Grade XII mathematics, plus two of Chemistre Physics and Biology. (The third should have been taken in Grade XI if possible)

Note that these are not prerequisites, but we do strongly advise them. The student should aim to make up deficiencies in his or her high school preparation in the first year at Dal housie. Note too that at present Grade XII Geology is not counted as equivalent to Geology 100 level class in Geology at Dat housie.

Degree Programmes

The tables on the pages that follow are only a guide, and are not rigid requirements. Any student who wishes a different combination is welcome to consult with Geology staff members, and in particular the Chairman, and ask for advice. A wide range of choices is possible. A student who intends to take degree in Geology, or is even considering doing so, should consult the Chairman as soon as possible. First year students should make every effort to seek such advice prior to registration for the first time. All students majoring in geology must consult with the Chairman of the Department prior to registration for the second year.

Student's who intend to make their careers in Geology, or intend to pursue graduate studies, should consider taking an honours programme and, if possible, take an introductory class in Geology in the first year.

All students who expect to graduate with honours in Geology in or after 1975 are required to include Geology 201, 202 and 301 in their programmes.

Year I	Geology 100 Chemistry 110 or Physics 110 Math 100 Two classes chosen from two non-science groups.
Year II*	Geology 201 and 202. Two classes from Chemistry, Physics, Biology, or Mathematics. One elective.
Year III	Geology 301 and two other 300-level classes in Geology. One elective and one class in Biology, Chemistry, Physics or Mathem
(By the e	nd of the second year the student should have completed at least one o lasses should be included in the first year).
(Note that	, in addition to the Geology classes, as suggested here, at least one o

me for General Students majoring in Geology

(1) If only one class in Biology is taken, Biology 3321 is relevant to Geology students and may be taken by them with no prerequisites. 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.

Mathematics 200, 220, or 228 are all sensible second classes in Mathematics – but note any restrictions there may be on 220 or 228 as merequisites, 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 a vientific career may be severely handicapped if he has not taken at least one class in Mathematics, and (b) that many graduate schools demand reading bility in a foreign language.

(n) Any student who is not sure of a suitable programme 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) s 100 chosen from Languages, Hu	manities or Social Sciences	
	Chem. 100	Physics 110	Chem. 110	Chem. 110	Biology 101
Year II	Geology 201 Geology 202 Engineering 210 and 211 Math 200 or 220 or 228 Physics 110 Elective	Geology 201 Geology 202 Physics 230 Math 200, 220 or 228 Chem. 110	Geology 201 Geology 202 Chem. 210 or 230 Physics 110 or Math 200 or 2065A and 2075B, or 227, or 228 Elective	Geology 201 Geology 202 Chem. 210 or 230 Physics 110 Elective	Geology 201 Geology 202 Biology 2000, or 2040A and 2060B Chem. 110 or Math 200 or 227 or 228 or 2075 Elective
Year III	Geology 301 Geology 302 Geology 303 Geology 304 Chem. 210 or 230	Geology 301 Geology 306 Physics 221 Geology elec- tive Elective	Geology 301 Geology 302 or 303 Geology 304 or 308 Chem. 210 or 230 Elective	Geology 301 Chem. 210 or 230 Two of Geology 408 or 460 or 304 Elective	Geology 301 Geology 302 Geology 305 Biology 3321 or 3323 or 3063 Elective
Year IV	Geology 400 Geology 306 Geology 404 Geology 403 or 453 Math, Phys. or Chem. elective	Geology 303 Geology 400 Geology 405 Geology 304, 404, 445, or 460 Math, elective	Geology 400 Geology 454 Geology 407 or 408 Geology 460 or 404 Physics, Biology or Math, elective	Geology 400 Two of Geology 407, or 454 or 408 Geology elective Elective	Geology 303 or 304 Geology 400 Geology 455 or 402 or 456 Geology elective Biology, Phy. Chem., or Math, elective

natics

class in each of: Mathematics, Chemistry, and Physics. If possible two

ther 200-level class must be included in the programme to fulfill the



Table III: Honours (combined) Π III with Biology with Physics with Chemistry Geology 100 Year I Mathematics 100 Two classes chosen from Languages, Humanities or Social Sciences Physics 110 Chemistry 110 Biology 1000* Year II Geology 201 Geology 202 Elective Elective Elective Physics 211 and 231 Biology 2000⁵ Chemistry 210 A class in Chemistry, Physics or Mathematics 200, 220 or 228 Mathematics 200, 220 or 228 Mathematics Year III Geology 305 Geology 301 Elective Elective Chemistry 230 Biology 3321 Elective Physics 315 or 335 Chemistry 320 Biology 3323 Geology elective Geology elective Geology elective Geology 401, 456 or 457 Year IV Geology 401 Geology 303 Geology 454 Geology 302 Geology 306 **Geology** elective Geology elective Geology elective

Note:

(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, no later than the third year.

Physics or Biology elective

Chemistry 410

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).

Physics 320, 416 or 445

Mathematics 200, 220 or 228

(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 4900, and write a comprehensive examination.

(5) *Students with Grade XII Biology should do Biology 2000, or two of Biology 2010A/B to 2060A/B, not Biology 1000, 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

3321 Invertebrates I 3063 General Ecology 3061B Structure and Functions of Ecosystems

3062A Structure and Functions of Ecosystems П

4064C Pleistocene biogeography

Chemistry

510 X-ray Crystallography 512 Crystal Chemistry

Mathematics

206A Probability and Mathematical Statistics (with Geology 521)

220 Applied Mathematics 227 Numerical Methods and Fortran Pro-

gramming 228 Applied Mathematics for Engineers I

328 Applied Mathematics for Engineers II

Oceanography

200, 511A, 512A, 513B, 514B Introductory Classes 522, 523, 524, 525, 531 Advanced Classes.

Physics

335 Electronics 445 Geophysics 645 Advanced Geophysics

Geology 100, Geology 101 and Geology 140. 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 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 youngest 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 the rocks? or how would you make map of the rocks of the ocean floor or of Nov-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

Biology elective

Physics 221 or Mathematics 200, 220 or 228

apics such as these are only a part of a of the earth. How are landscapes formed? where would you seek oil? Or why does a or where a why does a on or why does a and a start and a start and reverse? What happens to living organisms held revelue? What did Nova Scotia look like hen hundred million years ago?

introduction to Geology lect.: 3 hrs.; lab.: thrs.; H. B. S. Cooke.

mis is an introductory class for students intending to take a degree in geology, and for engneers. An attempt is made to guide the undent to an understanding of the development and present state of the earth and planets, and to give groundwork for further classes. A ext will be prescribed, and texts and reference books in the library will be recommended at appropriate times in the class. Laboratory work conducted in the field during the fall and meets at 2 p.m. in the fall term because of early Jarkness in November. The field exercises result the production of a geological map of a small

Introduction to Geology, lect.: 3 hrs.; lab.: thrs.; (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 demontration and lab.: 3 hrs.; one evening per week, M. J. Keen and staff.

lhis is an evening class intended, like 101, for mose interested in the earth, but do not plan a areer in professions involving geology. There the no science or Math. prerequisites for this lass. Under normal circumstances a student annot go from this class into Geology 201 or ¹⁰², but can enter Geology 240, 241 and 242.

Two Hundred Level Classes in Geology

the two-hundred level classes fall into two legories.

^{reology} 201 and 202 are for majors and onours students in Geology and must be taken concurrently. They are classes in which an allempt is made to provide a student with tools reeded in 300 and higher level classes, at the ame time retaining an awareness of the whole abject. The two courses are integrated through densive field work in the geology of Nova ^{blia,} Samples and data collected on the field bs will be used for subsequent laboratory ^{vestigations.} One tutorial per week, alternatpart of this program.

Note that the normal prerequisite for Geology 201 and 202 is Geology 100. Under exceptional circumstances Geology 101 and 140 may be acceptable. Students majoring in Geology are strongly advised to select their other courses in Second Year in accordance with the prerequisites for 300-level Geology classes.

Geology 240, 241 and 242 are classes for students who do not intend to major in Geology, but are simply interested in the earth. The only prerequisite for entrance to any of them is one of the 100 level Geology classes. They may *not* be taken for credit as Geology classes by any major or honours student in Geology; the equivalent 300 level classes 341 and 342 may be taken for credit as Geology classes.

201 Introduction to the Study of Minerals and Rocks, lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento and staff

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.

The study of mineralogy leads naturally into the study of rocks. The mineralogical composition and mode of formations of a wide range of igneous, sedimentary and metamorphic rocks, collected on field trips, will be discussed.

Laboratory studies involve the identification of unknown minerals and rocks both in hand specimen and with the aid of the petrographic microscope.

202 Introduction to Stratigraphy, Paleontology, Structural Geology, lect.: 3 hrs.; lab.: 3 hrs.; P. E. Schenk and staff.

In combination with Geology 201, this class classes for students concentrating in geology in aims to introduce the student to greater depth a degree programme. These students may, and intensity in his study of geology. Geology however, register in Geomorphology 342. 202 concentrates on the practical application of field techniques and tools as well as laboratory procedures that a geologist uses to interpret 301 Igneous and Metamorphic Petrology, lect.: rock. The geological evolution of Nova Scotia is 3 hrs.; lab.: 3 hrs.; D. B. Clarke/G. K. Muecke. used as a case history to illustrate these principles, techniques, and tools. Field trips are The mineralogy and texture of rocks are the the basis for the course and will follow the rock products of their environment and mode of cycle to build a geologic section of the formation; thus macroscopic and microscopic province. Observations and samples are proinvestigations of these rocks provide clues to cessed during indoor labs in both 201 and 202. the condition prevailing at the time of their The student is introduced to methods of formation surveying, simple structural interpretations, paleontological dating and paleoecology, and Igneous rocks will be discussed under such stratigraphic observations and principles used in topics as mineralogical and chemical classificadeciphering the geological history of an area. tion, methods of depicting chemical data, Application of plate-tectonics to Nova Scotia mechanisms and environment of magma proserves as an example of the evolution of large duction, various mechanisms of magma evolucrustal blocks. tion and comagmatic provinces.

ing between 201 and 202, will be an essential 240 Marine Geology and Geophysics, lect., lab. and discussion: 3 hrs.; one evening per week, D. J. W. Piper.

> This class presents the new ideas concerning the earth that have developed in recent years, largely through studies of marine geology and geophysics. It also attempts to show the range of marine geological work, and its relevance to other fields of science, as well as engineering, economics and politics. The class may not be taken by students majoring in geology; it is suitable for students who have geology as their minor; and those who would simply like a second class in geology (including high school teachers, or interested professionals at government institutions).

Prerequisite: any first level class in geology.

241 Environmental Geology, lect.: 3 hrs.; D. J. W. Piper and staff.

Geology and man interact closely in their ceaseless attempts to modify the earth, man's habitat. The environment, be it at its most artificial, the city, the highway, or at its other most natural extreme, the continental shelf and ocean basin, is full both of resources and hazards. The nature of these resources, their distribution, use and reclamation, will be discussed together with the prevention and prediction of the accompanying hazards in relation to modern use and technology.

242 Geomorphology, lect.: 3 hrs.; D. J. W. Piper and staff.

The surface features of the earth are undergoing constant modification depending on principles related to time and the local environment. Canada abounds both in the diversity of these environments, and in their variation with time during and subsequent to the last ice age. The classification of the resultant landforms, ranging from desert to coastal, and their appearance on maps and satellite remote sensing photography, will be illustrated.

As for other 240 classes, this course is not suitable as an alternative to other second year

Metamorphic rocks will be considered as the products of thermal and dynamic processes operating on preexisting rocks. Stability relations of minerals under varying temperaturespressure conditions and the concept of metamorphic facies will be stressed.

Prerequisites: Geology 201 and 202, Chemistry 110.

302 Stratigraphy and Sedimentology, lect.: 3 hrs.; lab.: 3 hrs.; P. E. Schenk.

The purpose of this course is to enable geologists to recreate conditions at the surface of the earth for any area at any selected time in the earth's history. To do so requires knowledge of processes operating today both at the earth's surface and below. The syllabus is: tools, involving sedimentology, paleontology, and sedimentary tectonics to evolve tectonicenvironmental models; methods, involving problems in vertical and lateral variations, and in classification, nomenclature, and correlation; and results, involving application of plate tectonics to the evolution of Atlantic Canada.

The course is built around at least five field trips which construct in some detail the geologic history of Nova Scotia. Material collected during these trips is processed by the class so that indoor labs deal with microscopy of sediment as well as thin section. Data from these labs augment field observations and assigned reading, and are presented in an elaborate synthesis of Nova Scotian geology. The class is introduced in the fall to the computer via BASIC and remote terminal so that processing of data and its illustration can be performed by machine.

This class is suitable not only for students specializing in sedimentary rocks but especially for those in other areas of earth science, general course B.Sc., or emphatically, earth science teachers

Prerequisites: Geology 201 or 202 or equivalent

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 mining.

Texts: There is no prescribed text for the class. Introduction to the Structure of the Earth by Spencer, will be found useful, and students are also referred to other texts and to the geological journals. The class requires a considerable amount of reading.

Prerequisites: Geology 201 and 202.

304 Introduction to Mineral Deposits, lect.: 3 hrs.; lab.: 3 hrs.; M. Zentilli.

This class is an introduction to the principles and processes governing the formation, nature and distribution of metallic mineral deposits and the industrial rocks and minerals. Economically significant mining districts in Canada and elsewhere are discussed to illustrate particular classes of ore deposits, their geological environments and the methods used in their investigation.

A text will be recommended, but a considerable volume of reading from technical journals will be required.

Prerequisites: Geology 201, 202, Geology 301, 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 201 and 202 or Biology 2000 or Biology 3321. Note this class is suitable for Biology students without previous geology classes.

306A Plate Tectonics, lect.: 3 hrs.; lab.: 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 the 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 magnetism, the radioactive dating of lavas and to the results of the recent drilling

into the ocean floor from the "Glomar Class into the ocean noon the stand of the shall also here the shall als looking at the geology of fascinating areas such as the volcanic Mid-Atlantic Ridge, the Gui California and the San Andreas Fault and the California and the West Coast of South America. These are all areas where crustal plate interaction is going or

The class will be taught so that current concepts, results and problems will be full discussed. Maths and physics will be kept at the 200 level.

Prerequisites For Geology majors: Geology 201 and 202. Physics 100 or 110, Math 100, Math 100 and two 200 level Physics classes Note this class is suitable for physics student without previous Geology classes.

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 marine 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. 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.

307 Tutorial Class conducted by individual faculty

This course will permit a student to pursue his interests in any selected field of geology and geophysics to a degree not generally found in other classes offered. The student will work closely with his tutor, preparing papers for discussion with him, and may even undertake some investigation and prepare the results in the form of a research paper.

Note that students should consider carefully before registering for this class whether their needs cannot be met by other classes, and no student may register without permission from the Chairman or appropriate undergraduate advisor.

341 Environmental Geology, lect.: 3 hrs.; D.J. W. Piper and staff.

This is taught as Geology 241, but with additional reading and exercises; it is suitable a a Geology credit for majors and honour students.

Geomorphology, lect.: 3 hrs.; D. J. W. oper and staff.

is taught as Geology 242, but with tional readings and exercises; it is suitable Geology credit for majors and honours

Four Hundred Level Courses

Note (1) Geology 400 is normally a required vole (1) a required for all honours (major) students in course ion who enter an honours program in rology, thereafter. Honours (combined) stuents in Geology will not be required to take it to do so would cause undue difficulty in their ogram. (2) Classes labelled "alternate years" rogram evertheless be given if six students or more register for the class.

100/500 Problems concerning the Earth, lect.: ahrs.; Staff.

his is a discussion course designed to bring to undents' attention problems that an expert in earth sciences may be expected to meet ing the next decade. Some of these probms will concern the recognition and extracon of natural resources in ever more exacting ad hazardous natural conditions, the management of natural resources, a very important abject for earth scientists living in a country which is one of the major suppliers of minerals to the world and the control and prevention of environmental damage caused by mineral extraction, transportation or use. Other problems, requiring the same intellectual approach of ibsorbing information followed by making balanced judgements on the meaning of the information and deciding the courses of action to take, will concern the more academic earth scientist. He will probably be following the trend of the current revolution in our understanding of the nature and history of the earth's nust, or looking at heterogeneity in the deep interior

Prerequisites: 200 and 300 Level courses in Geology or permission of the instructor.

401/501 Sedimentology and Sedimentary Petrology, lect.: 2 hrs.; lab.: 3 hrs.; D. J. W.

this class follows naturally from 302. Students the have not taken 302 will be expected to make up the background themselves. Topics to ^e discussed include: the origin of sediments, *dimentary textures and structures, the composition of sediments, their classification and omenclature, the petrography of gravels, sandtones, shales, limestones, and non-clastic ediments. Special emphasis is put on the provenance, the dispersal and the deposition of cdiments as well as their diagenesis.

^{Juring} the laboratory period students work on problems which were discussed during the tetures. They will familiarize themselves with he different types of sediments both mac-^{oscopically} and microscopically. Students are

encouraged to participate in one or two seminars. Two term papers are required. Prerequisites: Geology 302 completed, or being taken concurrently.

403 Advanced Structural Geology, hours to be arranged. G. C. Milligan. (Offered in 1973-74 and alternate years).

This class will consider the life-history of a mountain range as a theme upon which to base discussion of tectonic processes. It is proposed to use the western Cordillera and the Alps as examples.

The class is conducted as a colloquium and participants will be required to read extensively in the relevant journals. Prerequisites: Geology 303 or permission, of the instructor.

arranged. M. Zentilli (Offered in 1974-75 and alternate years).

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. Prerequisites: Geology 201, 202, 301, 303, 304; Chemistry 230. Exceptions with the permission of the instructor.

407/510 Advanced Igneous and Metamorphic Petrogenesis, lect.: 3 hrs.; lab.: 3 hrs.; D. B. Clarke, G. K. Muecke. (Offered in 1973-74 and alternate years.)

A wide range of igneous rocks will be discussed from a petrogenetic standpoint. The petrogenetic problem for each rock type will be defined and then its origin considered in the light of recent information from the fields of geochemistry, isotopic studies and phase equilibrium studies.

Metamorphic rocks will be discussed as products of physico-chemical processes in open and closed systems. Experimentally determined phase relations of metamorphic minerals will be 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. 230

408/511 Advanced Mineralogy and Crystallography, lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento, D. B. Clarke, G. K. Muecke. (Offered in 1974-75 and alternate years).

Prerequisites: as for 306A.

404 Ore Deposits, Advanced Class, hours to be

Advanced work in crystallography and crystal chemistry preceeds a systematic examination of the chemistry, structure and occurrence of the major rock and ore-forming minerals. Laboratory work includes the use of X-ray and other modern analytical techniques in the identification of minerals and determination of their parameters, symmetry and structure. Prerequisites: Geology 201 and 202.

445/545 Physics of the Earth, lect.: 3 hrs.; P. H. Reynolds, R. D. Hyndman, M. J. Keen and J. M. Ade-Hall.

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, global geophysics, continental drift and sea-floor spreading.

Taught concurrently with Physics 445. See also Geology 462/562; 306A, B; Oceanography 511A. Prerequisites: Registration requires the prior consent of the Department.

Texts: Wyllie, The Dynamic Earth, (Wiley, 1971); Stacey, Physics of the Earth (Wiley, 1969); Garland, Introduction to Geophysics, Mantle, Core, and Crust, (Saunders, 1971).

452/502 Earth Science Seminar, one afternoon per week; P. H. Reynolds, R. D. Hyndman, J. M. Ade-Hall, M. J. Keen, and others.

This is non-credit seminar course given concurrently with Physics 645, Oceanography 645. All geophysics graduate students are expected to attend

453/503 Hydrogeology, hours to be arranged; Staff (Offered in 1974-75 and alternate years).

This class studies the occurrence, movement and distribution of water, as related to earth materials, with emphasis on the exploration, development, utilization of groundwater and related environmental issues.

The class work includes the principles of groundwater flow, aquifer hydraulics (with problems including well design and completion), water chemistry, hydrologic systems, i.e. groundwater-surface water interaction, and digital modelling. Problems regarding the groundwater flow system and natural and artificial contaminants will be discussed including such items as nitrate contamination and land use relationships, contamination due to de-icing salts, oil and gas, fertilizers, pesticides, Prerequisites: Geology 301, Chemistry 210 or herbicides, and other pollution sources. The disruption of the natural groundwater flow system due to construction works will also be examined.

> Students will be asked to present and participate in seminars.

454/504 Geochemistry, lect.: 3 hrs.; lab.: 3 hrs.; G. K. Muecke.

The abundances of the elements and their distribution in the solar system, the lithosphere, the hydrosphere and the atmosphere will be investigated in the light of chemical processes. The emphasis of the course will be on demonstrating how principles of crystal chemistry, thermodynamics, solution chemistry etc. can be applied to the solution of geological problems. Discussions on such selected topics as exploration geochemistry, environmental geochemistry and lunar geochemistry will be included if time permits. Students will be encouraged to pursue some aspects of the course at depth and to present the results of their investigation in the form of two term papers.

The laboratory will consist of an introduction to methods of rock and mineral analysis and will include an exposure to classical, spectrophotometric, flame photometric, atomic absorption, X-ray fluorescence and neutron activation analysis.

Prerequisites: Geology 201 and 301; or a good background in Chemistry. Students wishing to take this class should have a good background in either geology or chemistry and should consult the instructor before registration. Note that this class may be taken by students with a good background in Chemistry who have taken no previous geology classes.

Geology 455/505 Advanced Earth History, lect. and seminars to be arranged; P. E. Schenk. (Offered in 1973-74 and alternate years.)

This class is designed to apply plate tectonics to the earth's past, and so to evolve the history of the earth's continental masses. The initial phase will describe in lecture format the geology of these continental blocks. After this survey, the theory of plate tectonics will be applied to the Northern Appalachians and will involve the geology surrounding the North Atlantic basin. After this example, seminars by students will attempt to reconstruct the evolution of chosen continental areas.

Prerequisites: Geology 302 and Geology 401/501.

456/506 Introduction to Micropalaeontology, hours to be arranged; F. Medioli. (Offered in 1973-74 and alternate years.)

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, H. B. S. Cooke. (Offered in 1973-74 and alternate vears).

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.

A special half-credit laboratory programme complimentary to this seminar is offered in the Department of Biology as Biology 4064C, Pleistocene Biogeography, and all students taking the seminar are urged most strongly to take Biology 4064C as well; it will be counted, where convenient for the student, as a geology credit Geology 464C. For details see entry under Biology 4064C.

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 will be admitted. Reading forms a substantial part of the class as there is no single text available.

460A/560A Principles of Isotope Geochemistry, lect.: 3 hrs.; lab.: 3 hrs.; G. K. Muecke. (Offered in 1974-75 and alternate vears).

The study of naturally occurring isotopes, both radioactive and stable, forms a major and ever expanding field of geochemistry. This class 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 oxygen.

Prerequisites: A good background in Geology or Physics, or Chemistry, and permission of instructor

460B/560B Geochronology, lect.: 3 hrs.; lab.: 3 hrs.; P. H. Reynolds; (Offered in 1974-75 and alternate years).

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 be discussed process, and their daughters as tracers in isotopes and their daughters as tracers in geological processes will also be stressed geological processes Prerequisites: Geology 460A, or equivalent plus a good background in geology, or physics, or chemistry, and permission of instructor.

461/561 Marine Geology and Geophysics hours to be arranged; M. J. Keen and D. J. Piper.

We are concerned in this class with some modern concepts and techniques in marine geology and geophysics. We will in the course of the year take a few topics and consider them of the year take a study of one of the inlets of the Atlantic coast of Nova Scotia will be an integral part of the course, occupying a few days in the fall term, to be arranged at the convenience of the class and instructors Prerequisites: Geology 302 or 306A. B or permission of instructor.

462/562 Applied Geophysics, lect.: 3 hrs.: P. H Revnolds.

This will be a theoretically-oriented course designed for senior undergraduates and for graduate students. Substantial background in mathematics and physics will therefore be required.

Topics: Fundamental of elasticity theory and the wave equation, plane seismic waves in layered media, seismic interpretation theory. potential field theory, reduction and interpretation of gravity data, reduction and interpretation of magnetic data, the resistivity method, electromagnetic induction theory, methods and interpretation.

Prerequisite: Interested students should consult with instructor.

Text: Grant and West, Interpretation Theory in Applied Geophysics, McGraw-Hill, 1965.

463/563 Numerical Methods, hours to be arranged, P. E. Schenk. (Offered in 1974-75 and alternate years.)

This class deals with numerical methods for non-mathematically orientated people. It is designed to show how to plan an attack on geological problems, and to store, manipulate, and analyze data to solve such problems by computer-based analytical techniques (including simple programming). The class is in two parts (1) simple applied statistics, and programming via BASIC (or FORTRAN); (2) application of statistics using the machine to help in data information and retrieval, data portrayal, sampling schemes, data analysis including classification schemes, and simulation of geologic environments using mapped litho/biofacies.

Geology Seminar

Papers are presented by guest speakers, roem All bers of the staff and senior students. graduate students are required to attend.

Field Classes

spring Class in Field Geology pring unoversion with Mount Allison, St. Francis wer, St. Mary's and Acadia universities, a wier, of approximately two weeks' uration is conducted at Crystal Cliffs, N.S. this class is held immediately following the ulusion of spring examinations. It is comsorty for students specializing in geology, their third year. A fee of \$50 for full after the second instalment of miversity fees.

Class in Exploration Geophysics

field class of three days' duration is held in the early Fall. It is not, at present, compulsory.

Graduate Studies

sudents with good degrees in any of the viences or mathematics who wish to study some aspect of the earth are welcome. Graduwork leading to the degrees of M.Sc. and D. is possible in a number of different fields. These include for example: Appalachian stulies, economic geology, hydrogeology, petrolgeochemistry, mineralogy, geophysics, strumentation development, marine geology and geophysics, Quaternary studies, micropalaeentology, and sedimentology.

Interdisciplinary studies are encouraged, and there is active co-operation between the science departments and the Institute of Oceanography a Dalhousie University. There are many studies m 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 opporunities this affords. Research is often done in co-operation with government laboratories such is 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

ssociate Professors . Gaede 0. Steffen ssistant Professors A. Fricke . llgner . Roulston 4.G. Schwarz

cturers Josenhans Zeeh

German studies may be divided into two Year III 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, 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 19. One class in the minor subject. 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 idealism.

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 studied 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.

gramme)

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, Comparative Literature 100, History 100, Philosophy 100 4. A social science class. 5. An elective.

Year II 6-8, German 200, 202, 221.

9. One class from Classics 100, Comparative Literature 100, History 100, Philosophy 100. 10. An elective.

B.A. with Honours in German (major pro

11-12. German 301, 303. 13. One class from German 300, 302, 352, 353 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, 451, 45220. An elective.

Combined Honours

It is possible for students to take an honours degree combining German with French, Russian, Spanish, English or Greek. Any student intending to take such a combined honours degree should consult with the two respective departments to arrange the details of such a programme.

Programme for Future Teachers of German.

The Department also offers a special one-year programme in conjunction with the Department of Education for third year students of German. All courses under this programme must be taken as a unit. Any student desiring to pursue this programme should consult with the Department.

1. Prerequisite: Successful completion of an intermediate German Course (such as German 200) or equivalent.

- 2. Structure of Programme.
- a) intensive language training (German 300)
- b) philosophy and linguistics (German 350)
- c) teaching methods (German 351)
- d) work in German civilization

Introductory Classes Offered

Introductory classes do not require previous knowledge of German.

100 German for Beginners, lect.: 3 hrs.; G. Josenhans, A. Roulston.

German 100 is a seminar class for beginners, and no previous knowledge other than a reasonable background of English grammar is required. Its equivalent is two years of German in high school with a final mark of 75% or better. While the texts may be similar to those used in high schools, the University course offers more facilities for learning, such as language laboratories and opportunities for oral work, supplies of books, and magazines and papers in German for study. More independent work is demanded of the student than is customary in high schools.

The class is taught mainly in German, emphasizes the spoken language, and provides the student with the knowledge of basic grammar. Intensive language laboratory work and attendance at small conversation groups is required.

Text: Schulz/Griesbach: Deutsche Sprachlehre für Ausländer. Grundstufe in einem Band.

Glossary: Deutsch-English. Deutsche Sprachlehre für Ausländer. Grundstufe in einem Band. Hueber Verlag, München.

This class or its equivalent is a prerequisite for all classes on the 200 level.

105 German Reading Course for Beginners. lect.: 3 hrs.

This class is designed for students who wish to have a good reading knowledge of the German language. A successful completion of the course should enable the student to read German newspapers and texts in the humanities and social sciences. This course may also be chosen as a prerequisite for German 201. To proceed to German 200 a student must have a high second class mark or the permission of the Department

All students are required to attend a tutorial 1 hour per week to promote reading fluency. Text: Jannach, German for Reading Knowledge., American Book Co., New York, German periodicals and newspapers.

110 German Literature in Translation, lect.: 3 hrs.; R. Ilgner.

Major works by Hesse, Kafka, Brecht, Böll, Grass, Weiss, Dürrenmatt, Mann will be read and discussed in English. Although there is no prerequisite for this class, it is recommended for students taking a beginner's German class concurrently. Detailed reading lists will be available from the Department before preregistration in the summer. Practice in written and oral reports will be carried on throughout the year.

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 for those students who wish to take German for 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 for classes beyond the 200 level.

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 dictated to conversational practice exclusively. Text: Schulz/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 knowledge.

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 preposition, declensions of adjectives, syntax - main clauses, dependent clauses, questions, imperatives, direct speech. The knowledge required can be found in books of German 100 or Grade X, XI, XII German, and in German basic work lists.

A combination of German 200 and German 202 serves as an accelerated Intermediate German course and is designed for students who want to make rapid progress in the language.

200 Intermediate German, lect.: 3 hrs.; K. Fricke, G. Josenhans, H. G. Schwarz,

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 on 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 develop

The class work includes the reading of simple and moderately difficult modern German liter ture and a complete review of the grammar

Prerequisite: German 100 or equivalent Texts: Richmond/Kirby, Auslese, (MacGrav Hill); Robert O. Roseler, German in Review development of their language abilities

201 Scientific German, lect.: 3 hrs.: Roulston.

This is primarily a reading and translation class designed to enable science students to read scientific papers, reports, and articles in scien tific journals in the original language. The grammar text used in the class emphasizes the aspects of grammar that must be known to accomplish this. Class work emphasizes chief the analysis of typical sentence construction found in the reading selections, vocabular 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. degrees

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, G. Josenhans.

English texts from various periods and of different types will be translated into German.

These translations will lead to the discussion of specific difficulties of grammar and construction. Students must prepare translations or compositions for each class. Dictations are given once a week. The class will be conducted mainly in German.

Prerequisite: German 100 or equivalent.

221 Introduction to German Literature, lect.² hrs.; K. Fricke.

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) and the 20th century (Kafka, Brecht).

will also provide the material for a of the characteristics of literary poetry, narrative, prose, and drama. A "literary language" will be offered once

week. German 200 or equivalent.

Advanced Classes Offered

uvanced classes are based on German 200 or equivalent knowledge.

German Composition, 3 hrs.; R. Ilgner.

the aim of the class is to develop in students ability to express themselves freely and are fly in different styles (e.g. personal and afficial letters, reports, descriptions) within the ocabulary of present day German social, whiteal, cultural and scientific life. Students to do translations and exercises synfax, and to write essays on various topics.

the class will also study the various uses of monyms, idioms, different meanings of similar words within changing contexts, and abulary within selected word patterns. Prerequisite: German 200 or equivalent.

ml Baroque Age, lect.: 2 hrs.; F. Gaede. (not fered in 1973/74).

the class studies German literature between the 16th and 18th centuries as a direct reflection of he 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 10 thetorics, the art of emblematas and algory, mysticism and mannersim which determine and characterize the European literature d the Baroque Age. The discussion will concentrate on the works of Brant (Ship of lools), Grimmelshausen (Picaresque novel), Gryphius (martyrdrama, sonnet), Flemming (petrarcism) and Angelus Silesius (mystic (Pigram). The study of these texts will give the students a thorough understanding of the epoch.

Prerequisite: German 200 or equivalent.

^{4/2} German Literature in the Age of Enlightenment, lect .: 2 hrs.; K. Fricke.

he European movement of Enlightenment laid ^{at social} and philosophical foundations of the ^{rode} n world. Its literature, predominately a omain of the socially rising bourgeoisie, is the dest directly accessible to modern man. The tters of the Age of Enlightenment in Gerany were influenced by classical Greek and in literature, French and German Baroque Cervantes, Shakespeare and 18th English literature that displays such a awareness of the literary productions of ther European nations, whether it was to free from their dominance or to draw inspiraon from them.

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. (not offered in 1973/74)

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 seminar: 2 hrs.; F. Gaede. writings of the time from 1770 to 1800 will first concentrate on later works by Lessing A detailed study is made of Hegel's Asthetik which reflect some of the inherent difficulties which is the foundation of modern theory of of Enlightenment. Following the course of art. Selected examples of aesthetic theories in history, the writings of the young Goethe, of the 19th cnetury will be investigated. The Herder, Schiller and their contemporaries of discussion will also concentrate on important "Storm and Stress" will then be studied. writers of the Hegelian tradition such as Georg Criticizing Enlightenment, these writers ex-Lucaks, Bertolt Brecht and contemporary pressed new conceptions of nature, history and theoreticians of literature and fine arts. individuality. Finally, Goethe's and Schiller's Prerequisite: German 200 or equivalent. humanism or classicism will be discussed in an attempt to reconcile the individualism of the 400 The Period of Transition: Goethe and His "Storm and Stress" with the objective forces in both history and nature. Time (II), lect.: 2 hrs.; D. Steffen. Prerequisite: German 200 or equivalent.

320 German Special Topic Course, lect.: 2 hrs.

This course is designed to present subjects which are not regularly offered by the Department. This may include literary works of the past, contemporary literature, and topics which have connections with other fields of study. Subject and instructor will change from year to vear.

Prerequisite: German 200 or equivalent. Students who register for a specific program of study will consult their advisor.

The class will examine the nature and extent of 350 German Philology and Linguistics, lect.: 2 hrs.; H. G. Schwarz.

> The aim of the course is to familiarize the student with the German language in its historic development as well as its present-day structures. The fields of phonology, morphology and semantics will be extensively covered and will also serve as an introduction to the methods of modern linguistics.

> Students are expected to work independently or in groups on set projects. Prerequisite: German 200 or equivalent.

> 351 Theory & Practice of Language Instruction, lect.: 2 hrs.; H. G. Schwarz.

> This class is given in conjunction with the Department of Education and will introduce the future teacher of German into theory and practice of language teaching.

> 352 Aesthetic Theories, seminar: 2 hrs.; F. Gaede.

> The development of arts cannot be understood without knowledge of its theoretical or philosophical foundations. The aesthetic theories of Plato, Aristotle, Scaliger, Baumgarten, Lessing, Kant and Hegel will be discussed. Particular reference will be made to the historical connection between logic, rhetoric and poetics. This leads to a better understanding of the history of literary genres, of important concepts such as idealism and realism, symbol and allegory or mannerism in literature and fine

Prerequisite: German 200 or equivalent.

353 Modern Theories of Art and Literature,

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 Kleist will add to the student's understanding of the nature of the conflicts experienced by all of these writers

401 Literature and Society, 1830-1880, seminar: 2 hrs.; K. Fricke. (not offered in 1973/74)

This class will concentrate on the literature of the "age of liberalism", the transition between feudal and industrial society. Summarily characterized as "realistic", its literature reflects the profound social changes which the bourgeoisie initiated and experienced and the confusion of values of this society.

Works by the following authors will be studied: Böhner, Heine, Mörike, Droste-Hülshoff, Keller, Storm, Hebbel, and Fontane. A detailed reading list is available at the Department. Prerequisite: German 200 or equivalent.

420 Modern German Literature, lect.: 2 hrs.; F. Gaede.

A study is made of trends in German literature of the late 19th and the first half of the 20th centuries. The course of Europe's history is most sensitively reflected in the development of modern German literature. The insufficiency of the traditional literary forms to express the experience of a new reality resulted in a new literary language. The class will enable students to understand this language. During the first term poetry, drama and prose of Naturalism and Expressionism will be studied, particularly the writing of Gerhart Hauptmann, Franz Kafka and Thomas Mann. In the second term the works of Bertolt Brecht will be discussed. Prerequisite: German 200 or equivalent.

452 German Philosophy: Hegel's Phenomenology of Mind, seminar: 2 hrs.; D. Steffen.

The Phenomenology of Mind, published in 1807, was Hegel's first major work. He intended to write an introduction to philosophy by demonstrating the necessity of the advance from the most immediate form of knowledge to absolute knowledge. To achieve this he had to write the Phenomenology as an introduction to his own philosophy.

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 Kierkegaard and Marx, and the school of Historicism.

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) J. E. Flint P. Fraser H. S. Granter R. M. Haines G. R. MacLean P. B. Waite J. B. Webster

Associate Professors D H Crook

C. B. Fergusson P. D. Pillay M. Reckord

Assistant Professors

J. E. Crowley J. Fingard J. F. Godfrey L. D. Stokes 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 means to soothe doubt and demonstrate the essential 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 classes nave university levels of study. The ability to repeat what has been heard in lectures and 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 i in significant patterns and to allow ideas to be tested against such knowledge.

The subject of history does not have monolithic body of knowledge. Historical understanding is a matter of interpretation, of offering explanations for events and movement 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 coller. tion of historical literature and the 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 form.

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.

The Department appoints advisors to counsel students. Before registration students should consult with departmental advisors concerning their programme of study and should secure departmental approval for admission to the particular classes they wish to take.

1. General Degree Programmes

Students who wish to major in history choose a 100-level class and at least five or six and no more than eight upper-level classes, of which two or three should be at the 300-level. First-year students may take two 100-level classes in history.

Students who wish to build up a greater specialization in history than the minimum requirements may do so by taking classes 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

Such classes are listed in the Calendar the heading of the department con-

Interdisciplinary Programmes

dieval Studies Programme.

rican Studies Programme (for details consult be Department).

Honours Degree Programmes

d manual choose from several honours programmes:

Suropean: A selection of classes in Medieval, Modern, and Modern European history in emphasis, if desired, on the national history of a European country.

with American: A concentration of classes in the history of Colonial North America and in anadian and United States national history.

ufrican: Classes in African history may be combined with classes in British colonial

British and British Imperial: A concentration of disses 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.

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 aperiencing the events, ideas and colour of the modeen 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 1973-74)

120 History of Canada, lect.: 3 hrs.; P. B. Waite

^{his class} will cover the development of Canada from prehistoric Indian cultures to Pierre rudeau. It will have a central core of social and political history, but will range across nomic history as well as Canadian literature. his is history for people who like Canada.

¹⁹⁹ Problems of Historical Study and Writing, seminar 2 hrs.

^{is class} is for first-year students only, and is "signed for those who plan to continue study history or closely allied subjects. It is intended to introduce the student to 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 and Republican Culture, 1750-1820, J. E. Crowley 199/2 Spain, France and England in America, J. Fingard

The class examines a series of topics and themes, chosen principally in the period from 199/5 Medieval Life and Thought, R. M. Haines the American Revoluation to the present, to 199/6 Blacks and Whites, 1496-1970, M. illustrate the character and motivation of British expansion overseas. Changing British Reckord 199/7 Fascism and Nazism, L. D. Stokes attitudes and policies towards the empire, 199/8 British Imperialism and West African problems created by the contact of white Nationalism, 1850-1920, J. E. Flint, J. B. settlers and indigenous populations, colonial Webster revolts and independence movements will be 199/9 Canada, 1835-1935: Gentlemen versus discussed. A section of this class will be given in Rebels, D. A. Sutherland the evening.

199/10 American Foreign Policy in the 20th Century, G. D. Taylor

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, approximately from 1500 to 1800. Among the topics treated are the Reformation and the Counter-Reformation, economic and cultural expansion overseas, the consolidation of national states and their attendant rebellions, the intellectual history of political and scientific development, and the changes and continuities in economic and social structures.

205 Modern Europe, J. F. Godfrey, L. D. Stokes.

The class discusses selected topics in Modern European History, 1789-1945, at weekly twohour meetings. For each topic, there will be one week of general readings, one week of specialized readings, and one week devoted to student projects. There will also be several guest

problems of historical study, including the lecturers during the year. Attendance and active participation in all sessions are required. A section of this class will be given in the evening.

> 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 English history, from Anglo-Saxon times to the twentieth century, ary 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

North American History

220 The Canadian Mosaic: Themes in Canadian History, informal lecture/discussion: 2 hrs.; J. Fingard, D. A. Sutherland.

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 study. A section of this class will be given in the evening.

Prerequisite: A history class at the 100-level.

222 Canadian Economic History, lect.: 3 hrs.; (for details see Economics 232)

230 American History, lect.: 2 hrs.; 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 patterns of social, political, economic, and cultural development. The writing of essays encourages the mastery of specific knowledge of how those patterns became such. In this way, general themes of American history are the means by which students increase their ability for thinking and understanding.

240 History of Tropical Africa in the Nineteenth and Twentieth Centuries, J. E. Flint, J. B. Webster

In lectures and tutorials students will be enabled to grasp and absorb some of the major themes of African pre-colonial history by a study of the internal politics and developments of African states and societies such as the Yoruba empire, Ashanti and Dahomey in West Africa, and African states like Buganda around the East African great lakes. The theme of cultural contact and it effects will be prominent in considering Muslim revolutions in West Africa, and Arab penetration in East Africa, as well as the impact of Christian missionaries in both areas. The second term will deal mainly with the impact of European colonial rule; the partition of Africa, the establishment of differing types of European rule, and African responses by resistance and nationalism which culminated in the emergence of independent African states. A section of this class will be given in the evening.

Classes Offered at the 300 Level

300-level classes in history are intended for third-year students who have completed work at the 100 and 200 levels. In general, these classes are concentrated in area and time and allow students to pursue interests developed in 200-level classes. The Department will probably be offering additional 300-level classes, details of which will be available at registration.

European History

300 Medieval Civilization, discussion/tutorial: 2 hrs.; R. M. Haines (not offered 1973-74)

302 The Medieval Church, discussion/tutorial: 2 hrs.; R. M. Haines

History 200 or 300 provides appropriate background for this class. The approach is thematic. Aspects of Christian belief and practice, art, architecture, law, administration, and institutions are studied within a mainly European framework. Classes will provide opportunity for the planning of individual themes and the discussion of problems which arise. All students will be expected to make informed contribution to such discussion and to write a small number of well argued and documented papers.

305 Modern Russia, discussion/tutorial: 2 hrs.; (instructor to be announced).

306 Modern France from the Revolution of 1848 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 misfortunes. If, in spite of this, mediocrity shows in her acts and deeds, it strikes me as an absurd anomaly, to be imputed to the faults of Frenchmen, not to the genius of the land. But

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 1940-42).

307 Modern Germany, discussion/tutorial: 2 hrs.; L. D. Stokes

History 205 provides the appropriate background for the class which examines selected topics in 19th and 20th century German history. These include German nationalism and liberalism, the role of Prussia, industrialization, the political parties and civil-military relations. Extensive reading in primary and secondary sources is required and each student will prepare a research paper during the second term. A reading knowledge of German is not necessary.

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 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 Biology Department classes as Biology 3400, and may thus be taken as a science elective.

English History

314 England under the Tudors and Stuarts. discussion/tutorial with occasional lectures: 2 hrs.; H. S. Granter

This class will deal with such topics as the religious reformation in England, the rise of the gentry, the age of Elizabeth, the agrarian revolution, Anglican, Catholic and Puritan, the Civil War and the restoration of the establishment, parliamentary monarchy and the rule of law, and the growth of individual liberty.

316 England in the Nineteenth Century to 1867, discussion/tutorial, with occasional lectures: 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 society.

317 Late Victorian and Edwardian England seminar, 2 hrs.; P. Fraser

The class will examine selected aspects political, social and intellectual history, such 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, elec tioneering 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 change ing 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 to 1914. There will be emphasis on social and political history, but students can expect 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 Canadian Social History, seminar: 2 hrs.1 Fingard

History 220 provides the appropriate back ground for this class which examines social attitudes and problems of various elegnents in the population in the 19th and early 20th centuries. The topics include: British and American influences; immigration, settlement and class structure; moral and social reform movements; manifestations of nativism; cases of privilege and inequality. For their essays,

will be encouraged to write research which may be based on Nova Scotian

The Anglo-American World: The Seventhe Century, J. E. Crowley, G. D. Taylor

this class considers the interaction of British ^{his} class al North American colonial experiences from exploratory and commercial ventures of the the expension of the consolidation of mercantile imperial organization by the Treaty of ind inport of the freaty of th tree problems of cultural diffusion and interacno and as an opportunity for interpretation of topic fortunately lacking in historiographical thodoxy. Focusing on patterns of growth and in political, economic and religious stitutions, the class integrates the American plonial experience with British settlement in wand and political and cultural conflict at tome. The major themes of the class are the aterplay of British and American politics, the ale of ideas as guides to action and limits of perception, the transplantation and modificason of British institutions, and the effect of the new world on the old.

mwley (not offered 1973-74)

337 Cuba and the Caribbean, seminar: 2 hrs.; W Reckord

is class will examine the impact of imretialism on the Caribbean: analyze the charateristics of Spain, French and British colonial ociet'es and the nature of the recurrent struggles for independence. Particular attention sill be paid in the second term to the origins of the socialist revolution in Cuba and its current rogress. Admission with the instructor's Inproval

338 Modern America: The Twenties, tutorial: 2 D. H. Crook.

³³⁹ The United States in the Twentieth Century: The Architecture of Complexity, lutorial: 2 hrs.; G. D. Taylor

his class investigates the response of American political and economic institutions to the ^{roblems} of industrialization and urbanization. udy focuses on patterns of organization: the rowth of public and private corporate forms of areau cracy; the emergence of new interest "oups; and the impact of these developments ^{a the} traditional American political and social the ture. The class will emphasize discussion individual research by the student within general framework.

can History

The Origins of Tribalism and Nationalism Africa, J. E. Flint, J. B. Webster

bry 240 or History 213 both provide an propriate background for this class. Students ^{o d}o not have this preparation may be

admitted, but should consult the instructor 499 Honours Essay, Staff before registering.

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 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 movements were a reaction against colonial rule, the social contest 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 History 460 and History 499 are required of fourth-year history honours students; firstyear M.A. students may also attend History 460

460 History in Theory and Practice, discussion/ tutorial: 2 hrs.; P. Fraser

This class is intended to provide an introduction to the study and use of mediaeval records, mainly those from English archives, as well as practical instruction in their transcription. The records studied will be almost exclusively in Latin, so some knowledge of the language is required at the outset.

460 Historical Words and Ideas, discussion/ tutorial: 2 hrs.; P. Fraser

The topics covered will be adaptable to the needs and preferences of students, but in general terms the class will consist of studies in historiography, schools of history, the diversity of historical topics such as art history or the history of science, and the debate about the theory of the discipline of history.

135 Colonial America, tutorial: 2 hrs.; J. E.

The class involves the comparative study of

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 3400/History 310, The History of Science; J. Farley.

Physics 402B; Special Topics in the History and Philosophy of Science.

Psychology 358, History of Psychology, J. W. Clark.

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.

Linguistics

Students of a variety of disciplines and especially those whose chief interest is in languages should consider the courses offered in linguistics. They are normally available to students having a good knowledge of both English and another language, usually French. For details see under French (321, 322, 423).

Mathematics

Professors J. Ahrens E. Blum M. Edelstein A. J. Tingley 96

Associate Professors D. S. Chehil R. P. Gupta M. J. L. Kirby S. N. Sarwal S. Swaminathan A. C. Thompson

Assistant Professors

H. Brunner J. C. Clements K. A. Dunn C. A. Field G. Finke I. F. Goodfellow L. A. Grünenfelder C. S. Hartzman E. L. Heighton R. D. Holmes L. L. Keener E. B. Mercer R. Paré T. W. Rishel F. J. Servedio W. R. Smith P. N. Stewart W. R. S. Sutherland K. K. Tan K. L. Weldon

Senior Killam Research Fellow P. A. Fillmore

Post-Doctoral Fellows

J. B. Collier R. Jeltsch S. L. Mehndiratta S. W. Sorensen

As man has viewed his environment, he has always tried to find patterns and relationships within it. For example, it was discovered many centuries ago that the lengths of the sides of a right angled triangle have a very precise relationship to each other: much later it was learned that the period of a pendulum is proportional (to a fairly high degree of accuracy) to the square root of the length of the pendulum. To aid his senses in the search for such patterns, man has developed all kinds of instruments and devices for accurately measuring all sorts of aspects of the universe from the distance between atoms to the distance between stars.

Some of the patterns, for example the two cited above, are concerned with numbers while others, for example the precise beauty of symmetric crystals, are concerned with things which are not numbers, and which are not readily measurable.

Mathematics is concerned with this kind of pattern or structure as an abstract entity which can be studied quite apart from the physical experiences which give rise to it. For example the knowledge by ancient Egyptian surveyors of the fact that the sum of the squares of the lengths of the two shortest sides of a right angled triangle is equal to the square of the length of the longest side of the triangle inspired the

ancient Greek mathematicians to examine right angled triangles as *abstract* objects and to "prove" that the said relationship always holds.

Since so many of the relationships we have been talking about are numerical, a basic concern of mathematics is the structure of numbers themselves. We all know that two numbers can be added together to give a third number but what is "addition"? What basic properties does addition have? Consider the following two collections of numbers: 0, 1, 2, 3, 4, 5, 6, ...

1, 2, 4, 8, 16, 32, 64, ...

If we add 2 and 3 we get 5 while if we multiply 4 and 8 (which are the numbers in the second collection which are directly under 2 and 3 in the first) we get 32 (which is the number directly under 5). The laws of "indices" say that this is true whichever pair of numbers we look at. Why? Is there any real difference between addition in the first collection and multiplication in the second?

More basically still, mathematicians are concerned with the meaning of the word "number". Greek mathematicians were greatly disturbed when Pythagoras's theorem (which we have already mentioned) led them to the discovery that $\sqrt{2}$ is not a "rational number", i.e., a number which is the ratio of two whole numbers. They were disturbed because they (and everbody else who had thought about it) believed that all lengths should be rational. This is perhaps the first example of mathematics proving intuition to be wrong. Moreover, physics could never prove that $\sqrt{2}$ is irrational; even if a "perfect" right angled triangle 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 time, what can be said about the body's acceleration or the total distance it travels in a certain time? These are the problems which gave rise to that part of mathematics called Calculus.

So far we have talked about mathematical problems which arose directly out of physical investigations. Mathematics, however, in its study of abstract structures, can proceed independently of the other sciences and, indeed, advance ahead of them. It was in 1830 that J. F. C. Hessel discovered the 32 "crystal classes" which describe all the possible ways in which crystals can be symmetric. It was in the practiced it for a while.

same year (but quite independently) that the French Mathematician Galois (age 19) defined 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 in vestigated the properties of what we now call "Hilbert Space" which is another abstract mathematical structure. It was not for number of years after that the physicists found that this was precisely what was needed to describe "quantum mechanics."

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

courses fall into three types, with much overlap

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

2. A study of the interrelationships and interplay between various kinds of mathematical structures. 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 strue logical beauty th mathematics has study can give gre

You will see that been used a gr paragraph. This difficult to define mathematics. As with music and religion, one only begins to get a feeling for what mathematics is after one has

Degree Programmes

unthematics as an Area of Concentration.

students who plan to major in Mathematics studentarrange a programme in consultation stould a member of the Department. A major will a will include 200, 203-204 (or programmer courses) and at least one course utibered 300 or above. The courses 102, nut 106-107, 110, 220, 228, and 328 may not be included.

The Department offers courses of interest to majors in the following areas of Mathematics: Calculus and Differential Equations: 200, 300, 311, 312. Analysis: 250, 304, 350.

Geometry, Logic, Theory of Numbers: 202,

205, 305, 307. Algebra: 203, 204, 303. Probability and Statistics: 206, 306, 310.

Numerical Analysis: 226, 227, 320. Operations Research: 230, 330.

Those students who wish to arrange interlisciplinary programmes (with such fields as Computer Science, Physics, Chemistry, Biology, Psychology and Economics) are invited to discuss their interests with the Department.

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 horours 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 made

Year I and Year II

Mathematics 100 (or 110 or 151) will normally be taken in Year I, and 200 (or 250), 203, (204) in Year II. Math 203 and 204 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.

ear III and Year IV

205*

ath 300 (or 350) and Math 303 and five tional classes at least two of which will be Inbered 400 or above. Of these five classes, ^{prmally} at least three will be selected from ^{folips I} and II below with at least one from ⁹ group. Other classes may be selected from d) a discussion of some of the simpler import-^{se} or other offerings of the department.

	Π
	306
	310

305*	311 and	4.4
307*	320	
401	330	
403	402	
*NT		1

*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.,

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;

ant problems of pure mathematics and its applications, including some which often come to the attention of the educated layman and cause him needless confusion;

very different from high school mathematics. In High School, the emphasis is usually on 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 log (ab)=log a + log b. In university, the emphasis is on why this equation is true and what does log mean.

It might be said that university mathematics and fuzziness at the edges.

structure which we call the real numbers.

ictures themselves have such a	Y
that few would claim that	M
only a utilitarian value; its	au
at aesthetic pleasure.	n
t the words for example have	n
reat deal in the preceding	g
is because it is extremely	e
where the second	t

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 matrices.

100 Differential and Integral Calculus, lect.: 3 hrs

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 area 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.

One section of this class, section (13), 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.

102 Mathematics for Liberal Arts Students, lect: 3 hrs.

The course is intended for students at the university who wish to become acquainted with mathematics as an art rather than as a tool for the sciences. It will discuss some of the more elementary yet interesting and entertaining aspects of mathematics for a student who has completed senior matriculation in high school and who wishes to see more of mathematics.

Topics will include truth tables, examples of axiom systems and models, the integers, mathematical induction, properties of the "infinite" versus the "finite"; the real numbers, some calculus - definitions and examples of the derivative and the integral and their elementary properties as far as the Fundamental Theorem of Calculus.

Historical facts and cultural significance will be stressed continually.

This class will be offered only if there is sufficient enrollment

Prerequisite: Senior High School Mathematics.

106 Introductory Statistics for Non-Mathematicians, lect.: 3 hrs. (Half-course).

Through extensive use of illustrative real-life examples, the student is introduced to the basic concepts of statistics: data reduction, estimation, and hypothesis testing. These examples will be drawn from a wide variety of disciplines. The emphasis of the course will be on statistical concepts, rather than mathematical manipulations. The course is open to students of any year.

The principal aim of the course will be to enable students to identify and formulate the statistical aspects of real-life problems and to become familiar with the statistical vocabulary most commonly used in scientific journals. The student must also become aware of the pitfalls that await the naive user of statistics. Students requiring a more extensive exposure to the statistical methods of scientific experimentation are encouraged to follow this course with Math 107.

Topics will include descriptive statistics, elementary probability and distributions, estimation, hypotheses testing and regression. Prerequisite: High school algebra.

107 Statistical Techniques of Scientific Experimentation, lect.: 3 hrs.

This course extends the introduction of statistics provided by 106 to include a collection of techniques that are widely used in the experimental sciences. Topics will include regression and correlation analysis, analysis of variance, and curve-fitting techniques. The presentation of these topics will include consideration of the statistical aspects of experimental design.

The objectives of this course are

1) to explain what information can be obtained from experiments through use of these techniques.

2) to explain the assumptions that must be satisfied before these techniques can be applied. 3) to illustrate the nature and methods of the necessary computations. Prerequisite: Math 106.

110 Mathematics for Commerce and Economics, lect.: 3 hrs.

The class provides a survey of mathematical 202 Basic Concepts of Mathematics, lect techniques which are useful in analyzing mathe- hrs. matical models in economics and management. The material covered in the class is similar to that presented in mathematics 100. However certain topics (such as Taylor's series, volumes of revolution) included in Mathematics 100 are not covered in Mathematics 110. In their place Mathematics 110 includes an introduction to matrix algebra, maximization of functions of two variables and Lagrange multipliers.

This class is 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 economic and management problems will be stressed

Prerequisite: High school mathematics.

151 Differential and Integral Calculus for 203 Matrix Theory, lect.: 3 hrs. (Half-course) Honours Students, lect.: 3 hrs.

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, attain- Topics will include the following: Vector ment 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. Integration, definiton and properties of Riemann integrals, evaluation. Fundamental Theorem; some techniques of integration; improper integrals. Prerequisite: Good standing 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, continuous functions and their fundamental properties, partial derivatives and applications, convergence and divergence of infinite series, power series, double integrals, functional determinants, geometry of euclidean vector spaces with emphasis on three dimensions, elementary differential equations. Prerequisite: Mathematics 100.

Two important concepts in Mathematics definition and proof - form the basis of the class. Symbolic logic is introduced and working knowledge of the logical connectives including the universal and existential quant fier are studied and used by the student to make precise certain statements in mathematic and as aids in proof. A first definition of proof is part of the study of the propositional calculus. This definition is augumented when the predicate calculus is studied. A final and further augumented definition is given when the role of tautologies in proofs is discussed

The real number systems are constructed using decimal rationals instead of the usual Cantor or Dedekind approach. Sufficient elementary set theory and abstract algebra is studied to make this topic self contained. Prerequisite: Math 100.

Topics will include the following: solutions of systems of linear equations, matrices and matrix operations, equivalence, rank, inversion diagonalization, canonical forms, determinants, and applications of matrix techniques to other branches of mathematics as well as to social sciences and other disciplines.

Prerequisite: Math 100, 110 or 151, or consent of the instructor.

204 Linear Algebra, lect.: 3 hrs. (Half-course).

spaces, bases, dimension, linear transformations, representation of linear transformations by matrices. Prerequisite: Math 203.

205 Projective Geometry, (not given in 1973-74)

We begin with a brief discussion of the role of the "postulates" of Euclidean geometry, especially the Parallel Postulate of Euclid, and go on to some elementary theorems of Non-Euclidean Geometry. Some of the basic properties common to the Euclidean and Non-Euclidean geometries are investigated. We introduce axioms for geometry which describe these properties and the axioms are shown to be consistent and independent by giving finite models or finite geometrics. The axioms are those for Projective Geometry.

Projective geometry is then studied in detail with topics including duality, Desargues's Theorem, the harmonic relation, algebraic models for the projective plane, cross ratios, Pappus's Theorem, the Fundamental Theorem of Projective Geometry, conics. Introduction of Coordinates in a projective plane, discussion of Klein's Erlanger Program.

ourse is intended for anyone with an t in Mathematics and geometry, especiuterest those who enjoy engaging in deductive the ning. The linear algebra necessary shall be developed in the lectures.

and Probability and Mathematical Statistics, lect.: 3 hrs.

probability Theory allows the mathematician to propagation and a state of the nout know for sure whether tomorrow's rinfall will be heavier than usual or not, it is possible to state the odds of such an event possible using the language of probability. the information that underlies such a statement would typically be derived from data relating to our past experiences with patterns of minfall. The process of deriving information from data can be formalized into a mathematical framework, and this formalization is then the focus of the field of mathematical datistics. Information inferred from observed data is usually subject to the uncertainty in the data, and we again need the language of probability theory to express precisely our helief in such information.

A mathematical approach will be used throughout the course. The establishment of the fundamentals of probability theory will be followed by the application of probability theory to the development of the principles of statistical reasoning. The course is designed to provide a sound basis for further study in probability and statistics.

The following topics will be included: A. Probability

Probability theory, combinatorics, random variables, probability distributions, mathematical expectation, limit theorems, introduction to stochastic processes.

B. Mathematical Statistics

Estimation Criteria and Methods, Hypotheses testing (Parametric and Nonparametric), regression and correlation, Chi-square tests. Prerequisite: Math 100

220 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, ine and surface integrals, integral theorems, differential equations, sequences and series, ^{omplex} analytic functions.

stucents who intend to do advanced work in mathematics are advised to take Math 200 rather than Math 220. However, students who omplete Math 220 with more than the minimum standing may be admitted to classes where Math 200 is the normal prerequisite. redit will not be given for more than one of ^{lath} 200, 220, 228 and 250. equisite: Math 100.

²²⁵ Introduction to Fortran Programming, ect.: 3 hrs. (Half-course).

This course provides an introduction to the Fortran programming language which is in wide use throughout the sciences. Examples and applications are included. Particular emphasis is placed on numerical techniques appropriate to

The course leads naturally into subsequent courses in numerical methods (227) and optimization models (230). The material is also related to other courses in linear algebra (203), calculus, statistics and computer science. Prerequisite: High School Mathematics.

227 Numerical Methods and Fortran Programming, lect.: 3 hrs. (Half-course).

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. The numerical techniques studied include those for the solution of polynomial equations, the approximation and interpolation of functions, some methods for numerical integration and differentiation 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 and 225 (or equivalent).

228 Applied Mathematics for Engineers I, 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 complex variables. Sequences and series 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 formalism.

Students offering Mathematics 228 will not be given credit for either Mathematics 200 or Mathematics 220.

230 Operations Research and Fortran Programming, lect.: 3 hrs. (Half-course).

This class provides an elementary introduction to some of the numerical methods which are being applied to problems in business, eco-

matrix algebra.

nomics and the sciences. These methods generally determine a best, or optimal, solution to a model of the original problem. Using digital computers it becomes feasible to consider some of the actual applications of these methods.

The mathematical methods studied include optimization techniques from the calculus, solution of polynomial equations, the simplex method for linear programming and the special versions for the assignment and transportation problems, as well as methods for dynamic and random processes as in inventory and queueing problems. 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 and 225 (or equivalent).

235 Foundations of Mathematical Astronomy, (not offered in 1973-74), 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 admission to the Armed Forces. It provides upto-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 coordinates.

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 gaining 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 151 or good standing in

Math 100, with the consent of the instructor.

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; Fourier 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.

Knowledge of Algebra is indispensible to understanding the language within which most mathematical ideas are embodied and formulated. The Modern Algebra course and its subject matter are just as important to the student of mathematics as are Matrix Theory and Linear Algebra; it is both an extension and a completion of the material in those courses.

The course syllabus includes the concepts, basic theorems and examples of permutation groups, abstract groups, rings, fields, and quotients. These topics appear in every aspect of mathematical reasoning and are of wide utility in applied mathematics, chemistry and physics. Prerequisite: Math 203 and Math 204 or consent of the instructor.

304 Foundations of Analysis and Topology; lect.: 3 hrs.

The main topics of this class are: i) Basics of Naive Set theory, and ii) Introductory concepts of Topology.

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. A fixed point theorem and its application to Zorn's Lemma and related matters (Axiom of Choice, Well Ordering Theorem). Cardinal and ordinal numbers and their arithmetic.

Metric Spaces, examples. Bounded, totally bounded, compact, and complete sets in metric spaces. Lipschitz and contraction mappings.

Topological spaces, examples. Open and closed sets, bases. Continuity, compactness, connectedness.

Prerequisites: The equivalent of Math 200 and 204 and the consent of the instructor.

305 Differential Geometry and Tensor Analysis, 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 variations, 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 matrices, determinants, the technniques of calculus, power 311 and 312 Differential Equations, lect: 3 series, some ordinary and partial differential equations.

203.

306 Probability, lect.: 3 hrs.

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 To answer questions of astronomy, physics, 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^2 , Students t- and f- distributions, estimation from samples, tests of hypotheses.

Prerequisite: Calculus to at least the level of Mathematics 200. This may be taken concurrently.

307 Theory of Numbers, lect.: 3 hrs.

Congruences and residues; elementary properties of congruences; linear congruences; theorems of Fermat, Euler and Wilson; Chinese remainder theorem; quadratic residues; law of quadratic reciprocity; Legendre, Jacobi and

Arithmetic functions; Euler's functions ϕ (h) Arithmetic functions w(n); the function d(n) and $\delta_{\mathbf{k}}(\mathbf{n})$.

Algebraic fields; algebraic numbers and integers Algebraic licius, and uniqueness of factorization, definition and elementary proporties of ideals; ideal classes and class number.

Properties of binomial and Q - Binomial coefficients. Prerequisite: Consent of instructor.

310 Mathematical Statistics, lect.: 3 hrs. (not offered in 1973-74)

Random variables, distribution of random variables, discrete distributions, sampling distributions, interval estimation, point estimation, sufficient statistics, maximum like hood estimation, statistical hypotheses, likelihood ratio tests, regression and correlation, multivariate normal distribution, sequential analysis. Prerequisite: Math 207 or the equivalent

hrs. (Half-courses).

natural laws expressed by relations ariong functions and their derivatives, such relations are called differential equations. Newton's law of universal attraction, Kirchhoff's laws in electricity, the law of natural growth and decay are examples of differential equations.

chemistry, engineering, biology, etc. the specialist must know how to obtain those functions which satisfy the given natural law and the particular requirements of the considered problem. In this way are found for example, the currents in an electrical network, the concentration of a solution, the resistance of a beam, the trajectory of a rocket, the number of bacteria in a given culture, etc.

These classes contain a study of the elementary theory of ordinary and partial differential equations. Emphasis is given to basic methods such as substitutions, operators, transforms, solution by series. Various applications are studied, e.g. most of the above mentioned problems, the motion of a satellite, etc.

Math 311 contains the topics differential equations of the first order, Lapiace transforms, the second order linear differential equation.

Math 312 consists of ordinary differential equations and partial differential equations. The part of the class which deals with ordinary differential equations includes the topics solution by series, special functions, systems of differential equations, total differential equations. In the part of the class on partial differential equations the topics linear partial differential equations of the first and second order

cohlems of mathematical physics solved utier series are included. 311 is preroutile for 312 and a knowledge of the topics netimediate calculus as covered in Math 200 228 is the prerequisite for 311.

Data Analysis, (Biweekly two hour sessions moughout the year, ½ credit.)

this course provides the students with exthe statistical problems. The perfence is organized so that students act as distical consultants, under the supervision of the instructor, to scientists and others requiring sistance with data analysis. The problems ficing a statistical consultant are the following: identify clearly the statistical component of the problem facing the consultant.

decide whether the problem can be handled using standard techniques, and if not, develop a new technique.

sudents will be encouraged to develop novel upproaches to the consultees problem. In so far it is possible, a student will be able to follow up those consulting problems which interest m most. Consultation contact hours will on occasion be replaced by survey lectures on applied topics prepared by students. Evaluation will be based on participation in consulting and on these survey lectures.

Prerequisite: Math 107 and consent of in-

320 Introduction to Numerical Analysis, lect .:

One aim of this class is to derive efficient methods for the numerical solution of problems rom various branches of mathematics. The other, more important aim is to provide an understanding of these methods by using ngorous 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: lterative solution of nonlinear algebraic equations (and systems of such equations), direct ^{ind} iterative methods for systems of linear lgebraic equations, iterative methods for eigendue problems of matrices, linear approximation of functions (interpolation, least-squares ^{approximation}, Chebyshev approximation, approximation by spline functions), numerical differentiation and integration, linear difference quations, finite-difference methods for or-^{lhary} differential equations (initial-value prob-^{tms} and boundary-value problems).

rerequisite: Mathematics 200 (or 250) or onsent of instructor.

³²⁸ Applied Mathematics for Engineers II, lect.: 3 hrs.

the following topics will be discussed: First term:

Linear algebra: matrix theory, systems of inear algebraic equations (theory and num-

erical 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, discussion of stability properties (absolute stability, A-stability) of these methods, examples of multistep methods for first-order equations.

Second term:

a) 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.

Students offering Mathematics 328 will not be given credit for Mathematics 300. Prerequisites: Mathematics 228 or 200, or equivalent class.

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 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.

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 mentioned above, the variables are restricted to being integers. As this is currently an area of very active research by many people in the Opera-

3 hrs.

Prerequisite: Mathematics 200 and Mathematics In any scientific or technological field there are

The second part of the class is devoted to the

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 Real Analysis, lect.: 3 hrs.

Real analysis is that branch of mathematics that has grown out of the study of the real number system and its properties. A large portion of this course will be devoted to a rigourous development of the classical theory of functions of a real variable. The course will also include many of the important theorems from Integral Calculus.

Class Outline: Development of the real number system and its properties. Sets, metric spaces and the topology of metric spaces, particularly Euclidean space. Compactness. Sequences and continuity. The Riemann-Stieltjes integral. Infinite series and power series. Sequences of Functions and uniform convergence. The Stone-Weierstrass theorem. Functions of several variables. The inverse function theorem and the implicit function theorem. Line and surface integrals. Differential Forms and the theorems of Stokes and Gauss. An introduction to the theory of complex variables.

Students who intend to honour or do graduate work in mathematics, are advised to take this class, not Math 300. Credit is given for only one of Math 300 and 350.

Prerequisite: Math 204, Math 200 or 250.

401 Measure Theory and Integration, lect.: 2 hrs

In this class we study 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 tions Research field, the techniques presented 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 others.

Some familiar functions are extended to the complex plane and used to illustrate the properties of more general functions.

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 complex 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 mapping, power series, analytic continuation, Riemann surfaces, Laurent series, theory of residues, meromorphic functions, normal families, Riemann mapping theorem, harmonic functions.

Prerequisite: A knowledge of real variable analysis, preferably to the level of Mathematics 300

403 Advanced Modern Algebra, lect.: 2 hrs.

This class will take up topics in modern algebra beyond the level of Mathematics 303. The structure of groups, rings, modules, sums, products, coproducts, tensor products, direct and inverse limits shall be formulated and studied in the language of Universal Algebra and Category Theory.

405 Introduction to Algebraic Geometry, (not offered in 1973-74)

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, prevarieties, dimension, spec, affine schemes, preschemes.

Text: Mumford's Introduction to Algebraic Geometry.

406 Statistical Inference, 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 competently 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 x², Minimum variance unbiased estimation, interval estimation, minimax and Baye's estimation, Neyman-Pearson's lemma composite hypotheses, goodness of fit tests, likelihood ratio tests, critical region, locally most powerful tests, nonparametric tests.

Prerequisite: Mathematics 200 and 306.

410 Decision Theory and Theory of Games, lect.: 2 hrs. (not offered in 1973-74)

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 problems.

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 extension forms, games with infinitely many strategies continuous games, separable and cocperative games, zero sum and non zero sum n person Prerequisite: Mathematics 306

412 Ordinary Differential Equations, lect.

Ordinary differential equations in the real and complex domains. Successive Approximation Ascoli-Arzela Theorem, existence and differ entiability of solutions. Linear systems with constant and periodic coefficients. Analysis of singular points. Poincaré Bendixson theory perturbation theory, Sturm-Liouville theory and asymptotic expansions. Applications to physical, biological and economic problems. Prerequisite: Consent of the instructor.

413 Ring Theory, lect.: 2 hrs.

Structure of associative rings including Grothendieck's functional representation of commutative rings. Primary decomposition Jacobson's theorems. Goldie's theorem. Artin. Wedderburn theorem.

Prerequisite: Math 303 and consent of 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 on the interval [0, 1], and it is from this fact that the name functional analysis comes. Also, like linear algebra and mappings which are of importance are the linear ones. Unlike linear algebra, however, the notion of distance plays a crucial role, for example, in the function space mentioned above the distance between two functions f and g is given by $\sup f(x) - g(x)/i$ $x \in [0, 1]$, and hence the mappings which are studied in functional analysis are the continuous linear mappings.

Thus, functional analysis brings together algebra, analysis and topology and much of its interest lies in the richness of the mathematical structures involved and the interplay between, for example, the algebraic and the topological notions. Though there is a good deal of topology in the class, all that is required is developed at the beginning.

Class Outlines:

- a) Topological introduction mainly devoted to metric spaces.
- b) Vector spaces with a distance derived from a "norm" inner product, i.e. Hilbert space. c) The properties of continuous linear functions from a normed vector space to the scalar

whe most important theorem here is the anach theorem.

geometric nature of some of the nences of the Hahn-Banach theorem.

properties of continuous linear functhe provide interior func-from one normed vector space to another, w uniform boundedness principle and closed h theorem).

should be pointed out that in (c) and (e) not are continuous linear functions studied aly are space of "all" of them is to al object of study.

Continuous linear functions from a normed tor space into itself are studied in detail. is sometimes given the name "special the special the special the special the special theory and contains the theory of eigenvalues and diagonalization of matrices.

Perequisite: The indispensable requirements for understanding this class are a thorough the wiedge of linear algebra and real analysis.

Introduction to Partial Differential Equa sons, (not offered in 1973-74).

Instituction, study and solution of differential equations of applied mathematics. Hilbert mace, separation of variables and Sturmtiouville theory. Green's functions, eigenfuncon expansions and generalized solutions. Fourier and Laplace transforms. Applications to some problems in physics, chemistry and engineering.

Prerequisites: 204 and 312 or the consent of the instructor.

430 Optimal Control: Theory, Methods and Application, lect.: 3 hrs. (not offered in 073-74)

his class retraces the historical path in the warch for optimal solutions using techniques from the differential calculus. During the first m the calculus of variations will be studied oth particular emphasis on the sufficient conditions for optimality. The effects that this warch had on the developments in analysis can 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 beory. Finally these theories will be applied to variety of problems such as economic growth theory, inventory control, regulators in mechanics or electronics, as well as to the dassical problems in geometry which gave rise o the whole topic.

reequisite: Math 300 (or 350) or consent of astructor.

"gested Texts: L. C. Young, Calculus of ^{ariations} and Optimal Control Theory; R. ellman and R. Kalaba, Trends in Modern ontrol Theory.

Computer Science

Ahrens, Professor (N.S.T.C.) inke, Assistant Professor (N.S.T.C.) 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 1973-74 on the Dalhousie Campus.

240 Introduction to Computer Science, lect.: 3 hrs.

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 optimization.

Prerequisite: Mathematics 100 or 110. An introductory class on the efficient use of digital computers.

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 206.

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 timesharing.

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 Equations

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 instructor.

Suggested texts: L. C. Young Calculus of Variations and Optimal Control Theory; R. Bellman and R. Kalaba Trends in Modern Control Theory.

Mediaeval Studies

The period commonly called the Middle Ages (approximately A.D. 400-1500) offers a unique opportunity to study Western culture as a whole. Indeed, any attempt to study a part of this period in isolation leads to a conviction that such an investigation can never be satisfying and that the walls between disciplines must be broken down and the literature seen in relation to the philosophy, the philosophy in relation to the history, and the history in relation to the languages. No matter what the vernacular tongue of any geographical area, there was one common language throughout Europe and one church, and the study of these leads inevitably to a consideration of paleography, art, architecture and music.

The field is a very large one and could become a fascinating and rewarding area for a certain type of student - the one who likes to immerse himself in his work and who feels that university studies need not involve storing knowledge in separate pigeon-holes because his language course has nothing in common with the social science he is required to take.

The regulations for the Honours degree permit a structured programme to be set up in Mediaeval Studies which cuts across traditional departmental lines while allowing considerable freedom in choice of classes.

The professors currently involved in this programme are: R. Crouse, J. Doull, E. Segelberg (Classics); R. Dawson, H. Morgan (English); H. Rasmussen, H. Runte (French); K. Fricke 104

(German); R. Haines (History); J. Aitchison (Political Science). A student who is interested in entering the programme in Mediaeval Studies should speak to one of these faculty members, who will then refer him to the Administrative Committee for the planning of his course.

Structure

The Honours degree in Mediaeval Studies must have a major field consisting of 9 classes. selected from those with Mediaeval Studies numbers, which will include at least one in each of: a literature, history, philosophy and Latin. Other classes will depend on the individual student's interests, but all four disciplines must be represented. The minor field may be varied to suit the taste of the student: he may wish to continue into later periods in his favourite discipline or he may wish to acquire another language to help him in his work. No class in the minor field may be from the Mediaeval Studies group. The four classes not in the major field may be widely scattered: one or more of them may be 100-level prerequisites which were not taken in the first year but which may be necessary for later mediaeval work, e.g., introductory German or Latin or Political Science.

Some sample programmes which might be followed are:

Literary: English. Major: Med. Stud. 201, 202, 203, 204, 211, 301, 302, 401, 261, Minor: 2 classes in English, possibly English 251 and 252. Four additional classes: possibly Philosophy in Literature (Phil. 270), History of England (Hist. 210), German for Beginners (German 100), and Intermediate German (German 200).

Literary: non-English. Major: Med. Stud. 211, 207) 212, 221, 222, 204, 301, 303, 261, 402. Minor: 2 additional classes, possibly in French or German. Four additional classes: possibly Latin 100, Philosophy 100, plus another Latin and another Philosophy.

Historical. Major: Med. Stud. 301, 302, 303. 304, 311, 401, 414, 202, 261. Minor: History 210, and 314. Four additional classes: possibly introductory and intermediate Latin and two French.

Philosophical, Major: Med. Stud. 402, 401. 403, 414, 301, 302, 204, 211, 261. Minor: possibly two classes in the later history of philosophy. Four additional classes.

Classes

The classes available from which a mediaeval grouping may be formed are given below. Some of them are on an ad hoc basis, depending on the needs of students in any given year. The numbering of the classes reflects subject and department, rather than order of difficulty or of priority.

Med. Studies

201 History of the English Language (Eng. 201) D. F. Wilson (Music History, Conducting)

202 Old English (Eng. 253)

203 Tales from Chaucer & Malory (Eng. 218)

204 Middle English (Eng. 351)

211 Intro. to French Lang., and Lit. of the Middle Ages (French 430)

212 Intro. to Provençal Lang. & Lit. of the Middle Ages

221 Middle High German I

222 Midle High German II (1973-74)

261 Intro. to Mediaeval Latin

262 Intro. to Mediaeval Greek

301 Mediaeval Life & Thought (Hist. 199/5)

302 Mediaeval Europe (Hist, 200)

303 Mediaeval Civilization (Hist. 300)

304 Roman History (Classics 223)

311 Palaeography (Hist. 501)

401 Mediaeval Philosophy (Classics 240)

402 Latin Philosophical Texts (Classics 201)

403 Seminar on the Church Fathers (Classics 464)

404 History of the Interpretation of Aristotle (Classics 463)

414 Mediaeval Political Philosophy (Poli, Sci.

It is possible that in the future some of the following may be added to the programme. though they are not offered at present:

Intro. to Med. Spanish Lang. & Lit.

Old English Archaeology

Old Icelandic

Byzantine and Latin Liturgiology.

Microbiology see Biology

Music

Associate Professors

R. D. Byham (Music History; Piano) V. A. Ellis (Music Education), Acting Chairman** J. M. Gayfer (Music Education, Band, Orchestra)

Gary Karr (String Bass)

Assistant Professors

D. M. Farrell (Music Theory) John McKay (Piano) H. P. May (Voice) A. G. Scott-Savage (Voice)** J. E. Sorenson (Music History)** J. S. Tittle (Music Theory)

Special Instructors*

N. Babineau (String Class) M. Ball (Percussion) G. Bornoff (Strings) J. C. Doane (Brass Class; Classroom Instruments) J. Grew (Organ) A. Hoffman (Tuba) P. Murray (Chorale) S. Pederson (Flute) E. Raum (Oboe) R. Raum (Trombone, Brass Ensemble) J. Stern (Trumpet)

Special Appointment Karr-Lewis Duo, Artists in Residence Associate Professor Gary Karr (String Bass) Mr. David Harmon Lewis (Harpsichord)

*Additional Instructors to be appointed. **Members of the Executive Committee until July 1, 1973.

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 year. Dalhousie University sponsors a series of performances by internationally known artists and ensemiles as well as recitals and concerts by the Department of Music Faculty, students and ensembles. The Atlantic Symphony presents its Halitax concerts in the new Dalhousie University Arts Centre.

Ensembles

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.

who wish to enrol in a degree rodents in the Department of Music must the requirements for admission to the and the state of automation automation to the automatic ditional requirements in the Department of Admission to the Department of Music largely dependent on the results of an with Faculty members of the Departadulters, in which the student is expected demonstrate proficiency as an instrumental vocal performer. Information regarding the equired levels of proficiency may be obtained the Department of Music. Early applicafor an audition is advised.

then making application for admission to the inversity, music applicants should request the applementary application form for the Department of Music.

Degree Programmes

Rachelor of Music Education

the Bachelor of Music Education is a four-year programme with emphasis on the highest ussible development of musicianship and proresional training in the skills of teaching vocal and instrumental music. Students completing Bachelor of Music Education degree receive Nova Scotia Teacher's Certificate (Class 5).

the public schools of the cities of Halifax, Dartmouth, and Halifax County have the urgest concentration of music teachers east of Montreal. A close relationship has been stablished between these schools and Dalhousie which will give students an opportunity to be taught and supervised by music specialists is 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 exdusive. Depending on their qualifications and interests, students will be encouraged to parbeipate in both areas of concentration.

Year T

Major Applied Study and Ensembles 2. Music 100 3. Music 210 4-5. Arts electives

^{ajor} Applied Study and Ensembles

assroom Observation and Secondary Stu-

Music 310

Educational Psychology (Education 406) 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 401)

*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 L 1. Major Applied Study with Ensembles 2. Music 100 3-5. Arts electives

Year II

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, 301, 310.

B.A. with Honours in Music (major concentration)

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.: 3 hrs.

A comprehensive view of the present musics of the world and of the history of music in Western culture, with attention given to de-

velopments in North America. Styles, forms and composers are introduced through elementary analysis and guided listening to recorded and live performances of music. Social, aesthetic and philosophical frames of reference are considered. Open only to students whose major field is music.

105 Introduction to Music, lect.: 3 hrs.

Designed for students taking a General degree course in a field other than music. An introduction to the present musics of the world, with emphasis on that of our Western heritage. Special consideration is given to the listening experience with a view toward developing the capacity for understanding what is being heard. The development of Western music is traced and attention is given to contemporary musical concerns, including jazz and musics of non-Western cultures.

201 The Contemporary Scene: Rock, Its Roots and Relatives, lect.: 3 hrs.

A study of the music of today, including: a history of pop music, jazz and blues; the evolution of rock; musical syntheses and cross cultural influences; some technical, aesthetic and sociological considerations regarding contemporary music, popular and otherwise. Prerequisite: Music 100 or 105 and written permission of the instructor.

300 History of Music, lect.: 3 hrs.

A detailed study of the history of music including the analysis of works of all historical neriods. Prerequisite: Music 100 and 310 or permission of the instructor.

301 Music Outside the Western Artistic Tradition, lect.: 3 hrs.

For students taking a general degree course. Available also to music majors, for whom an additional requirement is the submission of a paper. The class is designed to approach an understanding of folk and non-Western music by means of recordings, films, live demonstrations, and required readings.

Prerequisite: written permission of instructor.

400 Music History, seminar: 2 hrs.

A study of selected topics in music history and including individual research projects. Prerequisites: Music 300 and 310 or permission of the instructor.

Music Theory

210A First-Year Theory (Modal Polyphony), lect.: 2 hrs., lab.: 3 hrs.

Rudiments of music plus two- and three-part writing in strict Renaissance style correlated with introductory sight-singing, ear training and exploratory keyboard work.

106

Prerequisite: Non-majors: written permission of the instructor.

210B First-Year Theory (Elementary Harmony), lect.: 2 hrs.; lab.: 3 hrs.

Four-part writing including the diatonic triads 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; chromatic sight-singing, four-part dictation and keyboard harmony for analysis. Prerequisite: 210B.

310B Second-Year Theory (Tonal Counterpoint), lect.: 2 hrs.; lab.: 3 hrs.

Examination of traditional contrapuntal techniques applied to 18th- and 19th-century counterpoint; non-tonal singing, advanced dictation, and score reading at the keyboard. Prerequisite: 310A.

410 Theory of Music III, lect.: 2 hrs.; lab.: 3 hrs

A study of twentieth-century compositional techniques, including those of the recent avant-garde; laboratory sessions in keyboard skills, sight-singing and ear training. Prerequisite: Music 310.

415 Seminar in Theory and Composition. seminar: 2 hrs.

The study and analysis of representative examples of music of various periods with regard to 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 groupings and full orchestra

Music Education

(Open only to students in Music Education)

235 Classroom Observation

Supervised observation of selected classroom situations (2 credit hours).

330 Elementary Methods, lect.: 3 hrs.

A study of classroom techniques and materials for teaching using the Threshold of Music adaptation of the Kodaly approach, the Orff method and other systems currently in use at the elementary level; the role of the music consultant in elementary education; professional 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 hrs.).

430 Junior-Senior High School 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 hrs.).

436 Practice Teaching (Instrumental Music)

Supervised teaching of instrumental music in the public schools (6 credit hrs.).

Applied Music

Major Applied Study (5 credit hrs.)

Open only to students whose area of concentration is music. One hour of private instruction per week on the student's major applied instrument. The student's work must also include participation in ensembles (173, 273, 373, 473 - see below) at the level of applied study.

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 stud are required to perform in student annually, and in master classes as scheduled addition, a formal recital is required during the

Piano: 150 250 350 450

-	1 12110, 100, 200, 000, 100.
	Harpsichord; 151, 251, 351, 451.
	Organ; 152, 252, 352, 452.
-	Voice; 153,253, 353, 453.
į	Violin; 155, 255, 355, 455.
) 5	Viola; 156, 256, 356, 456.
	Cello; 157, 257, 357, 457.
	Bass; 158, 258, 358, 458.
1	Flute; 160, 260, 360, 460.
	Oboe; 161, 261, 361, 461.
	Clarinet; 162, 262, 362, 462.
5	Saxophone; 163, 263, 363, 463.
: L	Bassoon; 164, 264, 364, 464.
	Trumpet; 165, 265, 365, 465.
	French Horn; 166, 266, 366, 466.
	Trombone; 167, 267, 367, 467.
,	Tuba; 168, 268, 368, 468.
	Percussion; 169, 269, 369, 469.
	Ensemble; 173, 273, 373, 473. (1 credit hour

each). Ensemble participation as designated by the Department is a requirement of all students

whose area of concentration is music. In addition to at least one large ensemble (Chorale, Band and Orchestra), students will be expected to participate in appropriate small ensembles (Vocal Ensemble, Wind Ensemble, String Ensemble, Piano Ensemble, and others as available).

Dalhousie Chorale:

Conductor, Mr. Paul Murray. Membership to include non-majors by consent of the Conductor.

Dalhousie Band:

Conductor, Dr. James Gayfer. Membership 10 include non-majors by consent of the Conductor. Dalhousie Orchestra: Conductor, Dr. James Gayfer. Membership to include non-majors by consent of the Con-

ductor.

eie Chamber Singers:

anductor, Prof. A. G. Scott-Savage Dalhousie Chamber Singers is a selective ble for the study and performance of of the sing of the cipella" singing and the development of individual musicianship within a selected small ndividue. The repertoire ranges from preenseriore to contemporary compositions. voice majors or permission of instructor.

vinor 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 a student's programme of undy, 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.

Rass: 188, 288, 388, 488. Flute; 190, 290, 390, 490.

Oboe; 191, 291, 391, 491. Clavinet: 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. Tuba; 198, 298, 398, 498.

Percussion; 199, 299, 399, 499.

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 hrs. each)

236 Opera Workshop

pera Workshop students study the basic ^{fundamentals} of dramatic interpretation and acting of the operatic role, also the analysis of oles and the various problems that confront the performer in relation to stage ensemble and

the audience. Consideration is given to the acting styles of major historical periods and to the characteristics and influence of period costume on stage movement in the standard repertoire. There are exercises in projection, eve technique, mimicry, gesture, and body movements, etc. Courses are open to qualified students of other departments by consent of the instructors.

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 Basic Conducting Skills Prerequisite: Music 210A and B.

343 Choral Techniques and Repertoire Prerequisite: Music 310A and B, 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. R. M. Martin 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 under- conceivably survive death, or is individual life

graduates 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 Studies.

In addition, one undergraduate class is offered.

200 Introduction to Oceanography, lect.: 3 hrs., R. O. Fournier.

This class will attempt to survey the field of Oceanography in general and to show how the oceans, which account for more than 70% of the earth's surface, function as a dominant environmental force. In addition, consideration will be given to man's impact on this ecological system.

This course is designed to give the student a background or feeling for the ocean, what oceanography is, and what oceanographers do. It is not a good "background to science" course, since little feeling will be obtained for scientific techniques which would otherwise be acquired in a laboratory course. Most of the material which will be covered will be descriptive rather than basic, inasmuch as it is impossible in the time allowed and the material covered to also teach the basic required sciences. Prerequisite: Any first year science course.

Philosophy

Professors A. H. Armstrong (Dept. of Classics) D. Braybrooke J. 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) A. Rosenberg P. K. Schotch

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

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 generalizations from experience? Then there is philosophical theology. Can any reasonable proof be given of God's existence? Finally, there are many problems of an ethical kind. For example, is there an absolute morality or are all ethical standards relative to the society in which they are practised, and the time when they are practised? Related to these questions are certain existentialist questions as to the meaning and purpose of life. How does one deal with the problematic nature of human existence?

The student may already realize that no final dogmatic answer can be given to the above questions. Nor need he be expected to endure a set of formal lectures. It is the aim of all classes of philosophy to proceed by class discussion. As a result of continually discussing the above questions, and many others like them the student will acquire a certain philosophical technique, which will be of great benefit to him, whatever subject he may decide to specialize in.

The Arrangement of the Classes

Students who are interested in taking a beginning 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 or without background in philosophy. This fact 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 to advanced students in philosophy.

Of the classes open to beginners, Philosophy 100 gives a comprehensive introduction to philosophy: Several of the main branches of philosophy are represented in the topics treated and the class is divided into sections small enough to give a good deal of practice, oral as well as written, in basic philosophical skills of analysis and argumentation. Some attention is given to important philosophical authors of the past, both ancient and modern; but Philosophy 100 is not a class in the history of philosophy. Philosophy 230 is; and students primarily interested in history and the history of ideas may find this class the most inviting way to begin philosophy. Philosophy 200, 201, and 202, the classes in logic, are in one sense narrow by comparison, being devoted to one rather sharply defined branch of philosophy; however, 100 An Introduction to Philosophy, 3 discus- Games (vol.1).

skill in this branch is an indispensable advantage in all advanced work in philosophy - as indispensable as, say, the calculus is in physics - so these classes, too, can be looked upon not only as introductions to philosophy, but also as direct entry-routes into the central concerns of the subject. The other 200-level classes are both specialized and less central. However, they are addressed to interests that are uppermost in the minds of many students: religion, treated in two 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 condition of man, treated in Philosophy 217 (on the Continental tradition of philosophy known as "existentialism") and Philosophy 270 (on these questions and related ethical questions as they figure in great literature of the 19th and 20th centuries); and, finally, fundamental questions about the meaning and purpose of education, treated in Philosophy 218

Degree Programmes

General B.A. in Philosophy

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.

B.A. With Honours in Philosophy

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 philosophy should arrange their course in consultation with Professor I. A. MacLennan.

Combined Honours

There are several combined honours programmes:

Philosophy and Economics Philosophy and English Philosophy and Psychology Philosophy and Sociology or other combinations that can be arranged.

Students interested in taking any of these combined honours programmes should consult with Professor I. A. MacLennan.

sion meetings weekly, D. Braybrooke, S. A.M. Burns, W. F. Hare, R. P. Puccetti, A. Ro enberg, P. K. Schotch, R. H. Vingoe.

Students in this class will pursue in some detail four topics, chosen from four of the chi branches of philosophy, and treated so as in illustrate basic principles of philosophical ana llustrate basic primer of the major historical and contributions to philosophy. The four topics taken up in an order varying with different sections, are: (1) arguments for and against the existence

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, he four different professors, as the section changes from one topic to another. Plato, Ansein Aquinas, 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.

200 Symbolic Logic, lect.: 3 hrs.; I. A. MacLennan

Whenever we draw conclusions from premisses in such fields as mathematics, physics, engineering or economics (not to mention the other sciences), we are using a simple deductive system, which it is the aim of this course to develop. By taking a course in logic the student should have a better understanding of how we may derive the correct conclusions from our scientific hypotheses. One easy way of understanding the nature of inference is to create a simple, artificial language, in which the derivative of one formula from another is analogous to playing a game with pencil and paper. The aim of Philosophy 200 is to create this language, and to discover its most useful properties. Although symbolic logic in this course will be sufficiently related to arguments in a natural language, the emphasis will be on the systems themselves. Because many students find this kind of study to be quite new in their academic career, great care will be taken in presenting the material, and in addition there will be five assignments, which, when done, should lead to a fuller understanding of the subject.

The student should realize that the relation of classical two-valued logic to classical mathematics is explored in Philosophy 403. Text: MacLennan, I. A., Structure-generating Bull Logical Forms of Argument, lect. with ion: 3 hrs.; R. M. Campbell.

this class teaches the application of symbolic his class of symbolic of symbolic di arguments expressed in natural langus in philosophy, science, ethics, law and Its principal aim is to develop the wdent's capacity to analyze the logical strucof such arguments so that he can better their validity. Unlike Philosophy 202, class deals extensively with formal manimistions, within a logical system. Unlike pulations, 200, symbolic logic will not be udied for its own sake, or for its relevance to the foundations of mathematics. No previous aquaintance with symbolic logic is presupposed.

Basic Principles of Reasoning, discussions: hrs.; R. M. Martin.

this is a class in applied practical logic. symbolic logic techniques will be avoided as far possible; instead, attention will be paid to the forms of reasoning as exemplified in good bad real arguments, definitions, explanations, etc. The aim is the development of rechniques to produce clear and valid reasoning; and to distinguish this from its opposite.

215 Philosophy and Psychoanalysis, lect. with discussion: 2 hrs.; R. M. Campbell.

The aims of this class are: (1) to analyze some traditional philosophical issues regarding punishment, responsibility, freedom and rationality in the context of psychoanalytic theory; (2) to examine the empirical foundations of the theory; (3) to determine whether mental health functions in the theory as a normative concept. There will be no attempt to relate the theory to existential philosophies or Marxism. No previous acquaintance with philosophy or psychoanalysis is presupposed.

217 Existentialism, lect.: 2 hrs.; I. A. Mac-Lennan

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. ^{F. Hare.} Same as Education 402 Section 3.

(a) In the first term an attempt is made to nalyse some of the crucial concepts in educational theory. What is teaching, and is it distinct training, conditioning and indoctrination? Certain slogans in educational theory, e.g. "We teach children not subjects", and "there's no leaching without learning" are carefully exanined. How is education distinct from teachng, and is it possible to identify criteria which process must satisfy if it is to be considered "ducational? Is there any conceptual conrection between the idea of teaching and that of authority?

These are the kinds of issues discussed though the specific direction depends a good deal on the class.

(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, lect.: 2 hrs.; F. H. Page.

philosophers. Since a general history is apt to An introduction to the philosophy of religion. degenerate into vague and inaccurate generalisa-Since there are many religions, is it possible to identify anything that is essentially religious? tions, students will be asked to present short What sorts of evidence would provide good papers, outlining and evaluating some parts of a given philosopher's writings. reasons for the belief in a divine being? Is the Texts: B. Russell, History of Western Philosoconcept of God a coherent one? Is the notion phy, (Allen and Unwin, Ltd., London, 1961); of divine activity, for example in creation and K. E. Eble, R. E. Helbling (eds.), The Inmiracle, intelligible? Is it possible to have tellectual Tradition of the West, Vols. I and II, knowledge of a divine being? Do revelations and religious experiences reveal more than the (Scott, Foresman and Co., Glenview, Illinois 60025, 1967); D. J. O'Connor (ed.), A Critical mental state of the experiencer? Are faith and History of Western Philosophy, Collierreason alternatives or correlatives? Is the ex--Macmillan Canada Ltd., Toronto, 1964). istence of evil and suffering compatible with the existence of a God who is both omnipotent 270 Philosophy in Literature, lect. with disand morally perfect? Does rationality demand that traditional views of the divine be modified. cussion: 2 hrs.; R. M. Martin. or abandoned? What religious alternatives are This is an introduction to some issues in there? In considering questions like these the philosophy through the reading of some imstudent will encounter many of the issues portant literary works. Much modern literature around which philosophical discussions revolve. He will also gain some acquaintance with the is heavily influenced by philosophical trends; sometimes, in fact, the reader cannot fully views of a variety of philosophers, past and appreciate such works unless he has an underpresent. Hence the class also provides one form standing of the philosophical issues and tradiof introduction to philosophical study as such.

Readings from an anthology by W. P. Alston and paperbacks by W. C. Smith, Ninian Smart, John Hick and Nelson Pike.

225 Religion and Human Behaviour, lect.: 2 hrs.; F. H. Page.

per week there will be optional discussion A study of religion as a form of human meetings at various times to be announced experience and behaviour. Can religion be during the year. Readings will include short plausibly explained in naturalistic terms, for example as a social device or as a merely works by Dostovevski, Melville, Kafka, Beckett, subjective product of human psychology? With Sartre, Camus, Nietzsche, Hemingway, Peter Weiss, and Brecht. what human needs may religious behaviour be correlated? How do religious experience and Note: This class is cross-listed as Comparative behaviour change throughout the life-history of Literature 270; it may be registered for under the individual? How are the concepts of development and maturity to be analyzed when that title. applied to religion? How does the moral 304B Topics in the Foundations of Matheconscience develop in the individual and how is this related to his religious development? What matics, lect.: 2 hrs.; P. K. Schotch. is known about the preconditions and con-This course will review some of the main sequences of a religious conversion? What part themes in the foundations of mathematics. The do so-called peak-experiences play in religious first part of the course will be based upon a development? Are drug-induced states consideration of the paradoxes of Russell, genuinely religious? Are Eastern and Western Richard and Burali-Forti, etc. Various methods mysticism radically different? Why are Western-

ers frequently attracted to the Eastern religions? Are there different types of the religious ideal, for example the mystical, prophetic, priestly, intellectual, saintly? An introductory class; no prerequisite.

Readings from Sigmund Freud, G. W. Allport, R. H. Thouless, William James, W. H. Clark, and others.

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

tions involved. The class is designed for two sorts of students: those with literary interests who wish to learn about and discuss some of the more important philosophical influences on modern literature; and those interested in philosophy who would like to investigate literary occurrences of philosophical ideas. In addition to the two hours of official meeting 110

of dealing with these will be discussed, including axiomatic set theory and the theory of types.

The second part of the course will deal with Gödel's incompleteness theorems, the existence of unsolvable problems, and their impact upon the various foundational programmes.

Prerequisites: Some experience with topics both in mathematics and philosophy while not absolutely required would be helpful to the student. As a minimum prerequisite - at least one full course in logic taken from either department.

305 Epistemology, lect. with discussion: 2 hrs., P. K. Schotch.

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. Ouestions to be raised include: Does knowledge have foundations, and if so, is the basis of knowledge to be found exclusively 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 incomplete? What evidential relation obtains between claims about persons' behavior and claims about their beliefs, emotions, and other mental states. Readings will consist mainly of the work of contemporary authors.

Prerequisite: Philosophy 100 or 200 or 201 or 202 and consent of the Department.

310 Ethics, lect. with discussion: 2 hrs.; R. M. Campbell.

A systematic discussion of traditional topics in moral philosophy: the nature of pleasure and happiness, psychological and ethical egoism, Kant's Categorical Imperative, Hume on moral belief and argument, utilitarianism, moral rules, and justice. The class will consider the relation of these topics to some contemporary problems, such as pacifism and the morality of induced abortion.

Prerequisite: Philosophy 100 or 200 or 201 or 338 History of Medieval Philosophy, lect.: 2 202

319 Descartes and the Search for Indubitable Knowledge, seminar: 2 hrs.; R. H. Vingoe.

This seminar will highlight one extremely influential line of thought: philosophers have often sought indubitable knowledge. In this search Descartes is quite important because his position marks a radical break with ancient and medieval thought and because this break made epistemology the main preoccupation of modern philosophy. The first half of the class will consequently be devoted to Descartes. The second half will range beyond Descartes (e.g., Hume, Moore, and Ryle) to consider alternative 346 Problems of Mind, seminar: 2 hrs.; R experience, self-awareness, logic, and common sense. Students will be expected to present These problems of mind will be explored. (1) experience, self-awareness, logic, and common

Prerequisite: Philosophy 100 or 200 or 201 or 202Texts: R. M. Eaton (ed.), Descartes, Selections,

(Charles Scribner's Sons, 1969); J. R. Weinberg and K. E. Yandell, Theory of Knowledge, (Holt, Rinehart and Winston, 1971).

320 The Philosophy of Hume and Kant, seminar: 2 hrs.; A. Rosenberg.

A close study of Hume's Treatise of Human Nature, Book I, and Kant's Critique of Pure Reason, disclosing parallel problems and alternative responses to them in these works. The class will also consider the accounts of some contemporary commentators, and the relevance of these two classics to present philosophical concerns

Prerequisite: Philosophy 100 or 200 or 201 or 202

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 Plato and Aristotle's Organon. Prerequisite: Philosophy 100 or 200 or 201 or 202.

336 Ancient Philosophy from Aristotle to St. Augustine, lect.: 2 hrs.; A. H. Armstrong/J. A. Doull.

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.

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

Puccetti.

How are a person's corresponding mental an physical states related? Is the concept of person, and particularly of his mental states exhausted by descriptions of his behaviour? by descriptions of changes in certain parts of his nervous system? Or does the concept of person require reference to a third entity, over and above his mental and physical states? (2) What kinds of entities might possibly count as persons other than human persons? Could machines do so? Could organic artifacts? Could non-material entities? How are we to make decisions about the application of mental and personal concepts to non-human entities? (3) What effects upon traditional problems of the mind/body relation are indicated by recent neurophysiological developments, such as brain bisection in humans and investigation of an mal intelligence, e.g., language-learning in climpanzees and dolphin communication?

Prerequisite: Philosophy 100 or 200 or 201 or 202.

Texts: Self-Knowledge and Self-Identity, by Sydney Shoemaker; recent articles on the problem of personal identity; Mentality and Machines, by Keith Gunderson; The Mind/Body Identity Theory, edited by C. V. Borst. Readings in Physiological Psychology, edited by Thomas K. Landauer.

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 requesting 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 as Pennock, Frankena and Hart, and certain papers in Sidney Hook, ed. Determinism and Freedom (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.

355A Marxist Theory and Its Upshot in the World Today, discussion twice weekly: 2 hrs. D. Braybrooke. See also Political Science 355A.

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

economists of the British school, ally Ricardo, gave the thought its cutting as a critique of standing social arrange-The class will spend some time identifyeach of these influences upon Marxist then consider the classical Marxist of capitalism and various attempts, theor which have not come to an end, to accomwhen to developments which Marx appears not to have anticipated in some important respects.

155B Marxism as an Alternative Approach in Contemporary Social Science, (to be given 074-75; not given 1973-74), seminar: 2 hrs.; h. Braybrooke.

this class will discuss the implications for the dudy of politics of contemporary Marxist conomics (by Western writers like Baran and sweezy, Mandel, and Sherman); the critique of mitalist culture developed by philosophers associated with the Frankfurt School; and lean-Paul Sartre's use of Marxism as a methodology for social science.

Prerequisite: 355A or equivalent acquaintance with the works of Marx and their influence.

357B Philosophy of History, (1973-74 and alternative years), seminar: 2 hrs.; D. Braybrooke.

The philosophy of history has both an ancient metaphysical tradition and a much more recent analytical one. Both will be studied in this class, the metaphysical one by means of Karl Löwith's Meaning in History, and the analytical one by use of A. C. Danto's Analytical Philosophy of History. Some attention will also be given to Sir Karl Popper's works The Poverty of Historicism and The Open Society and Its Enenies, which deal with both traditions. Prevequisite: Philosophy 100 or another beginning class in philosophy; or the permission of the instructor. A class or classes in history are of course desirable as preparation.

365A Topics in the Philosophy of Physics, lect.: 2 hrs.; A. Rosenberg, P. K. Schotch.

this course will deal with certain basic problems in the foundations of physics and the mpirical sciences in general. Topics to be treated include the character and interrelation ^{# scientific} theories, and in particular their formalization and appraisal; the analysis of the role of such concepts as causality and determinism in various scientific contexts, e.g. ^{quantum} mechanics, classical mechanics, etc. rerequisite: One full course in philosophy beyond the 100 level or one full course in physics, or consent of instructor.

³⁷⁵³ Philosophy of Science and Experimental ^{byehology}, seminar: 2 hrs.; A. Rosenberg, W. K. Honig.

In examination of methodological and con-"phial issues in experimental psychology.

Topics treated include the character of explanations, general statements, theories and theoretical entities in empirical psychology, as well as particular issues in current research programmes: concept-formation in non-humans; perception studies; computer-simulation. Readings from the works of contemporary psychologists and philosophers. Prerequisite: One full course in philosophy or psychology beyond the 100 level, or consent of instructor.

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 and 201. The main purpose of the course is to show how modern symbolic logic enables us to provide formal proofs of the basic formulas of classical mathematics. The concept of proof plays an exceedingly important part in mathematics, and it is interesting to see how mathematical statements can be derived within a completely formalized proof procedure. As the aim of the course is to develop philosophical and technical aspects of classical mathematics from the beginning, no previous acquaintance with any mathematics is presupposed. In this course the scope of the investigation will be restricted to those aspects of mathematics which are directly useful in the empirical science, particularly physics. Prerequisite: Philosophy 200 or 201; or by permission of the instructor. Text: I. A. MacLennan, Structure-generating Games (Vol. 2).

431A Introduction to the Philosophy of Wittgenstein, seminar: 2 hrs.; S. A. M. Burns.

Central topics in the Tractatus Logico-Philosophicus 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, philosophy of mind, epistemology or metaphysics (in e.g., Plato, Aristotle, Leibniz or Kant).

448A Seminar in Philosophy, Politics, and Economics, seminar: 2 hrs.; D. Braybrooke. See also Political Science 448A and Economics 448A. First term (every year): Public Goods and Political Choices.

The economists' conception of "public goods"

is one promising source for empirical political theory, as the works of Mancur Olson (The Logic of Collective Action) and Norman Frohlich et al. (Political Leadership and Collective Goods), which will be studied in this class, show. The conception of public goods also has important implications for normative political theory (political philosophy) and these implications will be followed up, both in the discussion of the books just mentioned and in the course of exploring the connections between their findings and formal theories of rational choice (to which philosophers have contributed as well as economists and political scientists).

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 subject.

449B Seminar in Philosophy, Politics, and Economics, seminar: 2 hrs.; D. Braybrooke. See also Political Science 449B and Economics 449B. Second Term (1973-74 and alternate years): Applied Social Philosophy: The Logic of Questions, Policy Analysis, and Issue-Processing.

This class will consider the logical character of policies, taking them to be best defined as social rules; and the logical character of issues, regarded as disjunctive questions in which various rules figure as alternative policies. It will then move on to consider various criteria for resolving such questions - criteria in which philosophical concerns with values join up with topical concerns about social indicators. Finally, it will study various aspects of institutional arrangements for defining issues and bringing social indicators to bear upon them. Reading will include Von Wright, Norm and Action; Belnap on the logic of questions; Bauer, Social Indicators; and Lindblom, The Intelligence of Democracy.

Prerequisites: This seminar may be taken without necessarily taking the P.P.E. seminar in the first term. The same advice applies: Students taking the 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 in that subject.

450 Philosophy of Language, seminar: 2 hrs.; R. M. Martin

The elements of language have meaning, but what is the meaning of 'meaning'? Various theories of meaning will be examined. Related issues of philosophical importance will also be discussed (e.g., the analytic/synthetic distinction; synonymy).

Prerequisites: Philosophy 100 or a logic class, and at least one class beyond the 100 level in analytic philosophy; or by permission of the instructor

460 Contemporary Philosophy of Religion, seminar: 2 hrs.; F. H. Page.

A phenomenon of quite recent philosophy is the amount of activity in the field of the philosophy of religion. The seminar investigates examples of this current interest and endeavours to map the salient features. Students will be admitted at the discretion of the instructor. Some acquaintance with the traditional problems of the philosophy of religion together with some familiarity with one or more of: epistemology, ethics, the philosophy of language, the philosophy of mind, twentieth century philosophy, would be an advantage.

Physics

Professors

W. J. Archibald M. G. Calkin E. W. Guptill C. K. Hoyt M. J. Keen (Oceanography and Geology) G. F. O. Langstroth

Associate Professors

D. J. W. Geldart (On leave 1973/74) M. H. Jericho R. D. Hyndman (Oceanography) D. B. I. Kiang W. Leiper R. H. March (Chairman) R. Ravindra (On leave 1973/74) W. L. Silvert

Assistant Professors

B. L. Blackford J. G. Cordes D. F. Goble B. E. Paton P. H. Reynolds A. M. Simpson C. G. White

Instructor

I. A. Fraser

Postdoctoral Fellows

M. C. Jain P. Jena S. D. Jensen Y. Matsumoto D. A. Tindall

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 4. Arts or Science elective, agreement with experimental facts. The lan- 5. Arts elective. guage in which these theories are expressed is mathematics. Students wishing to become professional physicists engaged in original research or in university teaching will normally undertake further study leading to the advanced degrees of M.Sc. and Ph.D. upon completing the honours B.Sc. course.

In order to study the different interactions which occur between matter and energy, the subject is conventionally divided into such topics as mechanics, heat, light, electricity and magnetism. But these are not mutually ex- Year IV clusive categories. The fundamental physical processes occurring are common to several such topics, particularly when viewed in the light of our modern understanding of physical processes at the atomic level. The first year physics classes at Dalhousie are designed to give an introduction to the subject which includes these modern ideas and brings out the underlying unity of approach to seemingly diverse physical situations. Students not concentrating in a physical science and who do not intend to take further classes in physics will normally take Physics 100. Those who are concentrating in a physical science or who intend to take further physics classes will usually take Physics further details from the Department, and 110. The subject matter of the two classes is essentially the same, but Physics 110 employs before the beginning of their second year of more sophisticated mathematical techniques, study. thereby laying the foundations for more advanced study.

In later years students proceed to develop the topics mentioned above within the framework of modern ideas of the nature of physical reality. An important part of the course each year after the first is the laboratory work which establishes a connection between the theore- preparation in physics, and offered primarily tical and mathematical ideas of the lectures and for students in arts, pre-medicine, pre-dentistry, the world of physical reality. In the third and and pharmacy. It will not normally be accepted fourth years the student is encouraged to as a prerequisite to advanced classes in physics. follow his own interests as much as possible, both by designing and carrying out experiments of his own choosing in the laboratory and by selecting suitable classes from amongst the electives available.

Decree Programmes

General Degree/Major in Physics

Students intending to major in physics should include Physics 110 and Mathematics 100 in their first year programme. Physics 100, 120 and 245 may not be included in a 'major' and at least one 300-level class must be included.

B.Sc. with Honours in Physics

All students who intend to take a B.Sc. with Honours in Physics are encouraged to discuss their programme with staff members of the department and to consult with the Chairman of the Department at the beginning of the second year.

Year I 1. Chemistry 110. 2. Mathematics 100. 3. Physics 110.

Year II 6. Science elective.

7-8. Two mathematics classes. 9-10. Physics 211 and 231.

Year III

11. Arts or Science elective. 12. Class in Mathematics. 13-15. Physics 300 and two other physics classes.

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

All manner of combined honours physics programmes can be generated. Two good examples are combined honours with GEOLOGY and with BIOLOGY. These have been worked out with the departments concerned and form a package which might lead a student on to further studies in 'Geophysics' or 'Biophysics' respectively. Students contemplating a combined honours program may obtain should in any case consult the Departments

Classes Offered

100 General Physics, (3 sections), lect.: 3 hrs.: problem session: 3 hrs.; C. G. White, W. J. Archibald, J. G. Cordes.

This is a survey class requiring no previous

The class surveys physics from its beginnings to the present day. The four major topics are: Newtonian mechanics (motion, force, mass, momentum, energy); electromagnetism (charge, 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 under standing of earlier topics. Thus, the four major topics mentionned 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 physics and also for deductive reasoning from

basic ideas. The mathematics used is not dvance of high school algebra and trigonombut some time is spent in the class alty greater facility with high school teveloping greater facility with high school tereneratics. It must be stressed that matheal formulae are not used simply for putter in" numbers; rather, the emphasis is on a thorough understanding of the placen and range of applicability of the formulae.

larte part of the class consists of developing inderstanding of physical principles through recific problems. For this reason, there is a 3 but session each week during which students to problems with the assistance, when required, the lecturer and graduate students. The roblems 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 iscuss the problems with each other as they ork. There are no laboratory experiments in this class.

fext: K. R. Atkins, Physics, 2nd ed., Wiley,

110 General Physics, lect.: 3 hrs. (2 sections); ntorial: 3 hrs.; E. W. Guptill, R. H. March.

this class introduces the student to the dementary 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 essential

lext: F. Beuche, Introduction to Physics for cientists and Engineers, McGraw-Hill, 1969.

¹²⁰ Science and Heresy, lect.: 3 hrs.; W. Silvert.

This class is primarily for non-science majors,

and no prior knowledge of science or mathematics is required. The object of the class is to

show students how scientists think, how they

do research, and how they have profoundly affected our culture and our society. The method is to study in detail a limited number of revolutionary developments in physics with strong emphasis on the philosophical, historical, political and religious problems involved.

The first part of the class deals with space, time, and motion, starting with Aristotelian physics and continuing through the Copernican revolution to the mechanistic theories of Newton. Then we leap from the 17th to the 20th century to study special and general relativity. The next part of the class deals with electricity, magnetism, and the nature of light. Finally we study the theory of elementary particles, which includes some elements of quantum mechanics. After the first part of the class (space, time, and motion), the development of ideas is logical rather than historical thus the existence of magnetism is seen to be a direct requirement of special relativity, and quantum mechanics appears as a logical consequence of Newton's optics.

The recurring theme of the scientist as heretic is emphasized throughout the class. Many revolutionary developments in science have had profound cultural consequences - these include the Copernican revolution, which overturned biblical cosmology, and Darwinism, which did away with man's unique role in the universe. As a consequence, scientists have often been branded as heretics - Galileo was forced to recant his theories, Bruno was burned at the stake, Stalin purged geneticists and Hitler outlawed relativity. A central question of this class is whether this recurrent pattern is only a series of aberrant episodes, or whether it reflects a basic characteristic of science itself.

There is no scheduled laboratory in this class. However, each student must carry out an experimental research project each term, on the theory that one learns physics by doing it. Text: L. N. Cooper, An Introduction to the Meaning and Structure of Physics, Harper & Row, 1968, and several supplementary paperhacks

211 Mechanics, lect.: 3 hrs.; lab.: 3 hrs., A. M. Simpson.

and

231 Electricity, lect.: 3 hrs.; lab.: 3 hrs., I.A. Fraser

These two classes are intended to be complementary, and for second-year honours students. Unless the circumstances are unusual. they should be taken together. The classes have a common laboratory, i.e. work done in the laboratory periods is included in the grade for both classes.

Prerequisites are also common: Physics 110 and Mathematics 100. (Statistics have shown that a lab.: 3 hrs.; C. K. Hoyt. student with less than a "B" grade in Physics 110 can be expected to have difficulty with This class is intended mainly for those who do 211 and 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.

211 Mechanics.

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 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 will be included.

Text: Berkeley Physics Course, Vol. 1 Mechnics, McGraw-Hill, 1965; Berkeley Physics Course, Vol. 3 Waves and Oscillations, McGraw-Hill, 1965.

231 Electricity.

The material discussed in this class forms part of the Berkeley 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 leading to the solution of circuit problems involving capacitance and inductance. By considering the electric field of a moving charge in the light of the theory of relativity, the nature of the magnetic field is introduced and its properties discussed. 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.

Students are expected to have an introductory knowledge of the nature of electric charge, electric field, magnetic field, and of electrical current as developed in Physics 110.

Text: Berkeley Physics Course. Vol. 2 Electricity and Magnetism, McGraw-Hill, 1965.

221 Waves and Modern Physics, lect.: 3 hrs.;

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 and Modern Physics, McGraw-Hill, 1968.

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 and nuclear radiations are explained and the 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 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.; W. L. Silvert.

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: to be announced.

231 Electricity.

See description with Physics 211.

245 Planetary Science and Astronomy, lect.: 3 hrs., P. H. Reynolds, R. H. March, R. D. Hvndman.

This course is aimed at developing an understanding of our physical environment, both on the scale of the solar system and on the scale of the universe. We shall use some of the major findings of geophysics and oceanography to study the Earth as a planet. We shall discuss the contributions made by the space program – for example, the Apollo flights to the Moon and the Mariner flights to Mars. The constitution, age and origin of our solar system will be considered as will the interactions of its component parts (for example, Earth-Moon and Solar-planetary interactions).

The second part of the course will consider stars - their origin, constitution and evolution with time; the structure and age of our Galaxy and the universe of galaxies; pulsars, quasars and other recent interesting developments in optical and radio astronomy; and finally, various cosmological models. Prequisite: one first-year science course.

Texts: One or more will be selected.

250 Astronomy, lect.: 3 hrs., P. H. Reynolds.

This is a basic course designed primarily for students who may wish to pursue more advaned studies in astronomy or in astrophysics.

Students will be given the option of either writing one or two major term papers or doing an equivalent number of laboratory experiments. The latter may involve some telescope observing.

I. The Solar System: the Earth, Moon, meteorites and planets; planetary motions and celestial coordinate systems; the origin and age of the system.

II. The Stars: their distances and motions; the motion of the Sun; magnitudes, luminosities, colours and stellar spectra; building stellar models - the Sun as a star; variable stars; binary star systems; clusters of stars; interstellar gas and dust; stellar evolution.

III. The Galaxies: structural features and dynamics of our Galaxy; particular features of the exterior galaxies.

IV. 'Gee-Whiz' Astronomy: pulsars (neutron stars); black holes; guasi-stellar objects (quasars); an introduction to cosmology. Prerequisite: Physics 110 or Physics 100. Text: Wyatt, Principles of Astronomy (Second

Edition), Allyn and Bacon, 1971.

300 Experimental Physics, lab.: 6 hrs.; lect.

A course in experimental physics designed in give students a chance to do non-set expenments and thereby encounter and solve on their own the problems of experimentation. As the own the protones is small (four to six) students should achieve a real understanding of a few physical phenomena. Topics for experimental study cover a wide range of fields such as atomic physics, mathematical physics, solid state physics and electronics. A measurement of

one of the fundamental constants such as c. C or e is required and other than this the student is free to choose the field of experimental study. Prerequisite: The class is designed for honour 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.; D. Kiang,

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 Physics, Wiley & Sons.

320 Thermodynamics, lect.: 3 hrs.; B. L. Blackford

This class studies the basic principles of statistical mechanics and the relation that they have to thermodynamics together with the application of these principles to the study of ideal gases and certain physical systems. Prerequisite: Some knowledge of partial derivatives: Mathematics 200, which may be taken concurrently with the class. Text: Reif, Principles of Statistical and Thermal

Physics, McGraw-Hill, 1965.

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.

Topics treated: network reduction, the 4 terminal network and solutions by matrix methods, non-linear systems, modulation, demodulation and rectification, carrier transport in semi-conductors, properties of diodes and transistors; electromechanical analogs and analog computation methods, feedback and control systems, stability criteria, nature of information and noise, properties of distributed

Prerequisite: Physics 230 or Physics 231. Mathematics 220 or 228 to be taken concurrently.

Text: Milman and Halkias, Electronic Devices and Circuits, McGraw-Hill, 1967.

Advanced Physics Laboratory, lab.: 6 hrs.; Levin, S. T. Nugent.

this is a physics and engineering-physics laboraclass in which students in groups of two ork largely on their own initiative. The work inential work covers nuclear disintegraand beta spectroscopy and absorp-100, Bassurements, proton spin quantitative uon inements and Planck's constant determinaureas thermionic emission and ionization experinons using a vacuum pumping and instrumenttion system; properties of solid state semicondevices; experiments on the spectral noise distribution of transitors and the of analysis systems; experiments with a dium-Neon laser, holography, etc. If they wish, students may do experiments in other areas, such as acoustics, optics, fluid dynamics. report, on a topic to be agreed with the instructor, is required as part of this class. Prerequisite: Fourth-year standing in physics or

engineering-physics or permission from the instructor.

102B Special Topics in the History and Philosophy of Science, seminar 3 hrs.; (Not offered in 1973/74)

410 Advanced Classical Mechanics and Electrodynamics, lect.: 3 hrs.; M. G. Calkin.

In the first term the class will study Lagrangian and 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 problems, Hamilton's equation of motion, transformation, the Hamilton-Jacobi equation, and small oscillations.

In the second term the class will study electrodynamics, covering topics such as electromagnetic waves, radiation from antennas and from moving charges, energy loss of charged particles passing through matter, plasma physics, semi-classical theory of radia-

Texts: Goldstein, Classical Mechanics, Addison-Wesley; Jackson, Classical Electrodynamics,

411B Special Relativity, lect.: 3 hrs.; D. F.

lopics discussed include: experimental basis of the Lorentz transformation relativistic kinematics: space-time; introduction to tensor ^{calculus}, relativistic dynamics; relativistic electrodynamics.

Prerequisite: Physics 211, 231 and 315 or the permission of the instructor.

Text: Rindler, Special Relativity, 2nd ed., (Oliver and Boyd).

eferences: Taylor & Wheeler, Spacetime Physics, (Freeman).

415 Quantum Mechanics, lect.: 2 hrs.; D. F.

opics discussed include: concepts and for-

mulation of quantum mechanics, harmonic oscillator, potential well and barrier, angular momentum and the central force problem, perturbation methods, scattering theory. Prerequisite: Physics 315. Students should be familiar with elementary wave mechanics and with the mathematics necessary to discuss the Schrodinger wave equation, Text: TBA.

416 Mathematical Methods of Physics, S. T. Nugent.

Topics discussed include: ordinary differential equations, complex variables, integral transforms, special functions, partial differential equations, eigenfunctions, eigenvalues, Green's functions, perturbation theory, integral equations, calculus of variations and tensor analysis. Prerequisite: Registration requires prior departmental consent.

Texts: Arfken, Mathematical Methods for Physicists (2nd ed.), Mathews and Walker, Mathematical Methods of Physics (2nd ed.).

421 Nuclear Physics, lect.: 3 hrs.; W. Leiper.

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.; A. M. Simpson.

King.

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.

433B Materials Science, lect.: 3 hrs.; H. W.

This course applies the principles of solid state physics to the study of real materials. Physical properties are shown to have intrinsic symmetry which interacts with the symmetry of the crystal structure of the material, thereby defining the number of coefficients necessary to completely describe the property. The concept of thermodynamic equilibrium. governed by diffusion in the solid state, is discussed as the basis for a description of the microstructure of metals and alloys. Although solid state properties such as electron transport, magnetism, semiconductors, superconductors and the optical properties of dielectrics and semiconductors owe their existence to the quantum properties of electrons, it is shown topics.

constant lines and filters.

that in practice, the magnitude of these properties is strongly influenced by microstructural effects such as solid solution alloying, crystal defects, grain boundaries, textures and plastic deformation.

Prerequisite: Physics 315, preferably Physics 423A, and permission from the instructor. Registration requires prior departmental consent.

Text: Hutchinson and Baird, Physics of Engineering Solids, Wiley 1968.

Reference: Nye, Physical Properties of Crystals, Oxford Univ. Press, 1969.

435A Advanced Electronics, lect.: 3 hrs.; A. Levin.

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.

444A Optics, lect.: 3 hrs.; C. H. 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. Prerequisites: A class in basic thermodynamics 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, global geophysics - continental drift and sea-floor spreading.

Taught concurrently with Geology 445. 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.

462 Applied Geophysics, lect.: 3 hrs.; P. H. Reynolds.

This will be a theoretically-oriented course designed for senior undergraduates and for graduate students. Substantial background in mathematics and physics will therefore be required.

Topics: Fundamentals of elasticity theory and the wave equation, plane seismic waves in layered media, seismic interpretation theory. potential field theory, reduction and interpretation of gravity data, reduction and interpretation of magnetic data, the resistivity method, electromagnetic induction theory, methods and interpretation.

Taught concurrently with Geology 462/562. See also geophysics courses offered in the Geology and Oceanography Departments. Prerequisite: Interested students should consult with instructor.

Text: Grant and West, Interpretation Theory in Applied Geophysics, McGraw-Hill, 1965.

Other geophysics classes are also offered in the Departments of Geology and Oceanography.

Physics 470, Topics in Biophysics, lect.: 3 hrs., M. H. Jericho. Times to be arranged.

The purpose of the course is to introduce students with a background in physics to the field of Molecular Biophysics. After a review of basic cell structure the energetic and statistical relations in the living cell will be discussed. Other topics that will be covered include: Information content of biological systems, physical methods of determining the sizes and shapes of molecules, X-ray analysis of molecular structures, intramolecular and intermoleculor forces, as well as topics in radiation Physics.

A background in biology will be helpful but is not essential. The main reference books for this course are "Molecular Biophysics" by R. B. Setlow and E. C. Pollard and "Molecules and Life", by M. V. Vol'kenstein.

(such as Physics 300), some background preparation in Modern Physics and Quantum Mechanics and the permission of the instructor.

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) J. M. Beck D. Braybrooke K. A. Heard (Chairman-elect) M. K. MccGwire

Associate Professors

A. P. Pross (Coordinator, Public Administration Programmes) D. W. Stairs (Academic Director, Centre for Foreign Policy Studies)

Assistant Professors

- P. C. Aucoin (On leave 1973-74) R. Boardman D. M. Cameron R. L. Dial W. R. Mathie J. D. McNiven D. J. Munton D. H. Poel T. M. Shaw
- J. A. Wouk
- **Special Lecturers** K. Antoft

R. K. Daley C. J. Gardner

Foreign Policy Research Fellows

G. R. S. Hawkins (Executive Director, Centre for Foreign Policy Studies) J. Jorgensen

J. McDonnell J. McDougall K. M. Sharma

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.

as the study of decision-making. With some important exceptions, they are not interested in studying how private individuals reach de-

cisions: rather, they are concerned with how groups of human beings come to decision about matters of common interest. about matters of a source sour as the family, the business corporation as the failing, the university, the trade union, the business office, the university, the trade union the tennis club, and their "governments" 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 ruler 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.

Since to govern is to make decisions binding on groups, since power relationships come into play in the making of these decisions, and since the voter in the polling booth participates in the selection of those who are to make them, decision-making and power relationships are covered when political science is defined as the

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. The government of the state is the core of the subject. There are good reasons for this concentration on the government of the state. One is that in our time the state plays a constantly expanding role in economic and social life; the great dangers inherent in modern inter-state relations constitute another. But an Some political scientists define political science even more important one is the fact that the state claims supremacy over all other groups within its boundaries and normally possesses

the great preponderance of coercive power disposal of the state that more than thing else marks off the study of the state as special importance.

Foreign policy decisions are among those taken the governments of states and the outcome international politics is decisions binding on we or more states and their citizens. The study sternational politics, therefore, falls squarewithin the domain of political science.

we state has been the subject of serious study least since the time of the ancient Greeks. Many of the greatest thinkers of the past have woted much attention to it. To follow and inally to understand their thought is to timulate one's own thinking about the state ad to guard against the peril of thinking one is riginal when one is not. Consequently, politicphilosophy, which includes the study of the history of political thought, is the third of the lepartment's principal areas.

sudents who wish merely to attain a deeper inderstanding of democratic government and nolitics in general of Canadian Government and politics in particular will be most interested in Political Science 100 and 200. The scope of the whilect, however, is so large that students in the general course are advised, and those taking honours in it are required, to concentrate on one of the four principal areas. While it is impossible in an undergraduate programme of three or four years to become a complete political scientist, it is the aim of the department to present undergraduate students as far as possible with a unified central view of the full range of political science in its present development.

Specialization in political science affords an excellent preparation for many positions in the public service, journalism and for the study of law. Many students who have specialized in political science are now found teaching in high schools

Degree Programmes

Students concentrating in Political Science may take a one-year, two-year, or honours programme. The specific courses to be taken in each individual programme are chosen in ^{consult}ation with a faculty advisor from the Department, in accordance with the general requirements listed below. Undergraduate programmes may consist of specialization in one ^{subfield} of Political Science or a general ^{selection} of courses from a number of sub-fields ^{of Political} Science or a general selection of ^{rongrses} from a number of sub-fields. These subfields are noted below.

quirements

one-year programme will consist of not less ¹ ³ nor more than 4 classes in Political ^{Science} in addition to a 100-level class.*

^{ese} classes must be drawn from at least two

of the four sub-fields under which the 200-level Undergraduate Programme in Public Adminisand 300/500 level classes are listed.

The Certificate in Public Administration requires the completion of six classes which may A one-year programme will normally consist of be taken on a part-time basis. Further informa-200-level classes but may include one or more tion may be obtained from the Co-ordinator of at the 300-level. the Programmes in Public Administration, De-*NOTE. The requirement of a 100-level class partment of Political Science.

for a one-year programme may be waived, especially for third-year students.

100-level class and not less than 4 nor more than 7 additional classes in Political Science.

Classes at the 200-level must be drawn from at programme in African studies. least two sub-fields.

In the 2nd year of a two-year programme as many classes as possible should be at the 300-level. At least one of the student's classes must be at the 300 level.

An honours programme will normally consist of a 100-level class and not less than 8 nor more Selection: A student wishing to have a member

It will include, minimally, (i) two classes in two sub-fields at the 200-level.

(a) enroled in a 100-level class and contemplating a Programme in Political Science (in which case the advisor will normally be the instructor of that class, or (b) registered for a (ii) four classes at the 300-level (two of these may be taken as 500-level classes), programme in Political Science, Upon entering the programme a student may indicate a choice (iii) and an honours essay. of advisor. Normally the advisor will be a faculty member teaching in the student's The honours essay will be worth one-and-onesub-field of concentration (if any). The stuhalf credits. It will be prepared during the dent's choice will be respected unless the fourth year under the supervision of a faculty member chosen is unable to serve in this capacity. For the student who has no premember. The essay will be expected to show the student's ability to develop a systematic ference, or whose choice cannot be honoured. argument with reference to pertinent literature the Department's Undergraduate Studies Comand such other data or analytical materials as mittee will assign an advisor on the basis of the may be appropriate. student's apparent interests and the present advisory load of the members of the Depart-D. Interdepartment programmes will be ment.

worked-out with the individual student and his advisor in consultation with the appropriate people in the other departments.

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.

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 Diploma in Public Administration and to the degree of Master of Public Administra-

study of government.

enough coercive power to make its claim good.

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Undergraduate Programme in African Studies The Department offers courses which may A two-year programme will consist of a contribute towards a BA degree in African studies. Further details of this interdisciplinary programme are available in a calendar section above and from the co-ordinator of the

Undergraduate Advisory System

The advisory system in the Department of Political Science is intended to assist the student in designing a specific program in accordance with his own interests and the requirements of the Department.

than 10 additional classes in Political Science. of the Political Science Department as undergraduate advisor must be either:

> The advisory relationship may be ended by the student or the advisor at any time and for any reason. One faculty member may continue to advise the same student throughout his programme.

> Role of the Advisor: Basically, the advisor is intended to be available to the student throughout the year as a consultant on broad academic matters. The advisor is not, however, a tutor with regard to specific classes.

> Prior to registration (or, in any event, before the time for class changes has ended) the student must contact the advisor to discuss his/her choice of courses for that year.

Classes Offered

Graduate Studies. Programmes leading to a (A) supplement to this list of classes containing additions and possibly minor changes will be issued by the Department in the summer of tion are also available through the Départment. 1972. Students in their second and subsequent

years are advised to obtain a copy of the supplement from the Department.)

General Information

A. 100-level classes are intended as introductions to the field of Political Science and to the study of politics in the broadest sense. No student may take more than one 100-level class in Political Science.

B. 200-level classes are intended as introductions to specific fields of enquiry in Political Science. The departments' offerings at this level are organized into four general areas: National and Comparative Political Systems, Political Philosophy, International Politics, and Public Administration. There are no prerequisites for 200-level classes

C. 300/500-level classes are seminars for both upper-level undergraduate and graduate students. Graduate students will, and 4th-year honours students may, register in these classes at the 500-level. Individual instructors vary in the degree (if any) to which they differentiate formal requirements for 300 and 500-level students. In general, it is expected that 500level students will produce written and oral work of a quality that reflects their greater academic experience.

Admission to 300/500-level classes is at the discretion of the instructor. The prerequisites listed with each class are intended to show the sort of preparation the instructor anticipates. The instructor retains the right to judge the suitability of each prospective student's qualifications for successful completion of, and contribution to, these seminar classes.

Note: Classes will be listed under the following headings:

(i) Introductory

(ii) Political Theory and Methodology

(iii) Comparative and National Political Systems

(iv) International Politics and Foreign Policy

(v) Public Administration

(i) Introductory

100 Introduction to Politics and Government The basic introductory course in Political Science is offered as a number of different sections, with different instructors and different emphases. These sections are described below.

Sections 1 & 2, Democratic Government and Politics, lect.: 3 hrs.; J. H. Aitchison.

The core of the two sections of Political Science 100 offered by Professor Aitchison will be a comparative study of the institutions, processes and problems of government in western democracies. Attention will be paid mainly, but not exclusively, to the political

systems of Great Britain, Canada and the United States but with much greater emphasis on Canada than will be the case in other sections of Political Science 100.

The emphasis on Canada is for those who, at least initially, do not intend to take further classes in Political Science, and who wish to become more knowledgeable about the federal democracy of Canada and its problems. The scope of the sections, however, will be sufficiently broad to provide a foundation for those who wish to proceed to higher level The aim of this class is not to impart a classes in Political Science.

Section 3, Democratic Government and Politics, lect.: 3 hrs.; J. M. Beck.

The class 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. 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? This will be followed by an examination of the operative ideals of liberal democracy, fascism and communism, and a discussion of the conditions that are likely to be prerequisite for the successful working of liberal democracy. The basic part of the class will be a comparative study of the governmental institutions of Great Britain, the United States, and Canada, especially designed to acquaint the student with some of the basic problems in the working of modern liberal democracy.

Section 4. Introduction to Government and Politics, lect. and discussion: 3 hrs.; R. Boardman

Three major fields of political science will be introduced in this class (1) political philosophy, concepts being studied in the work of Hobbes. Rousseau and other writers, and in some twentieth-century novels; (2) comparative politics, including an introduction to the workings of politics in Canada, the United States, and the USSR in particular; and (3) international relations, taking in the role of the super-Powers and less developed countries.

Section 5, Political Realities for Beginners, seminar: 2 hrs.; J. A. Wouk.

The focus of this class will be on the main features of current political affairs at the national level. More attention will be paid to the means by which political issues are handled than to the substance of the issues themselves.

The structure and workings of the Canadian "political system" will be introduced, and will serve as a basis for noting, through comparison with the Soviet Union and the United States, the variety of ways in which "politics" can be organized to accomplish essentially similar things. There will be a systematic examination of the major contemporary approaches to political action: opportunism, dogmatism, sentative government, and the ideological

cynicism, naive idealism, rationalised prejudio. and sophisticated pedantry. Attention will he paid to the question "Why don't they pay more attention to Political Scientists?" Finally, stu dents will be introduced to characteristics of the media and other sources from which we derive our-knowledge of public affairs, and derive our knowledge (in an informed man ner) about the implications of these characteris. tics for the political behaviour of people in socieites larger than villages.

sophisticated understanding of politics, bui to provide a foundation on which one may be built (perhaps, in part, through a programme in Political Science). Requirements: A moderate amount of reading

to include newspapers, popular magazines pamphlets, novels, scholarly articles and books about six very short papers; one (Spring) term paper. There will also be required oral presentations to seminar sessions

Section 6, Introduction to Politics, seminar: 3 hrs.; W. R. Mathie.

The aim of this class will be to explore the significance and character of the political dimension of our existence as members of those political communities to which we belong Attempting finally to determine whether politics is a necessary evil, an unnecessary evil. or an opportunity for some kind of human fulfillment, we will consider a number of concrete issues generated by Canadian political life, past and present. We will examine, in turn, the purposes and shape of the Canadian political community, comparing our own form of parliamentary democracy with other forms of democratic and non-democratic government; federalism, as it concerns the relation between the size and character of collective life; and the problems posed for government and statesmanship by the need to reconcile what is necessary for the survival of the community against internal and external threats to its continued existence, with what contributes directly to achieving the aims of the community. A variety of primary and secondary materials including records of debates, memoirs, biographies, and newspapers will be employed in exploring these issues in Canadian political life. In considering the more general implications of these issues frequent use will be made of Aristotle's Politics and Hobbes' Leviathan.

Section 7, An Introduction to Politics and Government, lectures and seminar: 3 hrs.; H Aucoin,

An examination of political debate and b haviour and the organization and role o governments is undertaken in this class. The first major objective is to introduce students to the major features of political life in contemporary communities with some emphasis on Canada. Nationalism, law and authority, freedom, autonomy, and participation, rights, equality, and justice, democracy and repre-

sebate over the distribution of goods and will be among the matters considered An analysis of the structures and proof governmental systems and the probof policy-making, also with reference to the Canadian experience, constitutes the second the concern. The topics to be dealt with in his regard include executive control and the roblem of coordination, the position and province of bureaucracies and pressure groups, the importance of legislatures, and the roles of rovernment in the community. The course is resigned to expose students to the basic restions and problems of politics and government as found in both analytical and descripive political science literature.

the class will include lectures, group dismisions, and individual/group projects. Students will be evaluated on their written mesentations and class participation.

Political Theory and Methodology

201 Justice, Law and Morality, seminar: 2 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: Pol. Sci. 100, or an introductory course in Philosophy, or, in the absence of either of these, the consent of the instructor.

207 Mediaeval Political Philosophy, lect.: 3 hrs.; J. H. Aitchison.

This 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 teaching 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.

^{4.1A/541A} The Political Philosophy of Plato, (Not offered in 1973-74).

³⁴³B/543B Max Weber and the Foundations of Contemporary Theory in the Social Sciences, (Not offered in 1973-74).

^{345/545} Man, Society, and Politics: the Concept of Community, seminar: 3 hrs.; W. R.

Ancient and modern political philosophy differ radically in the problems that each treats as central to political science and political life. Ancient political science was concerned to assess the justice of various claims to rule in the city and to consider the nature of the various forms of community that corresponded to those claims. Modern political philosophy is concerned to account for and justify the obligation of individuals to political authority, to establish how government can be based on consent, and to determine the proper relation between "state and society". In this class we will explore this transformation in the character of political science especially in as much as it can be understood in terms of a changed conception of the *political* community, or more generally of the political dimension of human existence. Texts that will be considered include Aristotle's Politics and Nicomachean Ethics, Hobbes' Leviathan and De Cive, Locke's Second Treatise, Montesquieu's Spirit of the Laws, Rousseau's Social Contract, Marx's "On the Jewish Problem", and Tonnies' Community and Society.

351A/551A - The Nature of Findings, Explanations. and Theories in Political Science, seminar: 2 hrs.; D. Braybrooke; (Not offered in 1973-74)

352/552 Introduction to Research Methods and Data Analysis, seminar: 2 hrs.; D. Munton.

A knowledge of the promises and pitfalls of social science research is as important today to the average citizen as it is to the administrator or researcher. This seminar is intended to be a broad, non-technical introduction to the assumptions, procedures, and problems of empirical investigation in political science. The five major stages common to all such research theory, research design, data-collection (surveys, simulation, aggregate data, etc.) measurement, and analysis - are explored using substantive readings from various sub-fields of the discipline.

The major assignment in the course will be a research project of the student's own choice and design. It is not expected that students will have any background in statistics or computer programming, but it is hoped that all are or can become excited by the joys of disciplined discovery.

353B/553B Contemporary Empirical Theory: A Survey, seminar: 3 hrs.; P. C. Aucoin and W. R. Mathie; (Not offered in 1973-74).

448A/548A Seminar in Philosophy, Politics, and Economics: Public Goods and Political Choices, seminar: 2 hrs.; D. Braybrooke.

The economists' conception of "public goods" is one promising sourse for empirical political theory, as the works of Mancur Olson (The Logic of Collective Action) and Norman Frohlich et al. (Political Leadership and Collective Goods), which will be studied in this class, show. The conception of public goods also has

important implications for normative political theory (political philosophy) and these implications will be followed up, both in the discussion of the books mentioned above and in the course of exploring the connections between their findings and formal theories of rational choice to which philosophers have contributed as well as economists and political scientists. (Same as Philosophy 448A/548A and Economics 448B/548B).

449B/549B Seminar in Philosophy, Politics, and Economics: Applied Social Philosophy -The Logic of Questions, Policy Analysis, and Issue-Processing, seminar: 2 hrs.; D. Braybrooke

This class will consider the logical character of policies, taking them to be best defined as social rules and the logical character of issues, regarded as disjunctive questions in which various rules figure as alternative policies. It will then move on to consider various criteria for resolving such questions - criteria in which philosophical concerns with values join up with topical concerns about social indicators. Finally, it will study various aspects of institutional arrangements for defining issues and bringing social indicators to bear upon them. Readings will include von Wright, Norm and Action; Belnap on the logic of questions; Bauer, Social Indicators: and Lindblom. The Intelligence of Democracy. (Same as Philosophy 449B/549B and Economics 449B/549B).

355A/555A - Marxist Theory and Its Upshot in the World Today, seminar: 2 hrs.; D. Brayhrooke

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 Ricardo, gave the thought its cutting edge as a critique of standing social arrangements. The class will spend some time identifying each of these influences upon Marxist theory; then consider the classical Marxist analysis of capitalism and various attempts, which have not come to an end, to accommodate it to developments which Marx appears not to have anticipated in some important respects.

355B/555B - Marxism as an Alternative Approach in Contemporary Social Science, seminar: 2 hrs.; D. Braybrooke. (Not given in 1973-74)

This class will discuss the implications for the study of politics of contemporary Marxist economics (by Western writers like Baran and Sweezy, Mandel, and Sherman) - the critique of capitalist culture developed by philosophers associated with the Frankfurt School; and Jean-Paul Sartre's use of Marxism as a methodology for social science.

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(iii) Comparative and National Political Systems

(a) Canadian

202 Canadian Politics and Government, lect.: 3 hrs.; D. Cameron.

The purpose of this class will be to reach an understanding of the principal features of political life in Canada. Assigned readings, research projects, and class discussion will be used to pursue this goal. The major topics for consideration by the class will be: (1) Canada as a national political community and an independent nation-state; (2) Canada as a federal political system; (3) parliamentary government, political authority, and political freedom, (4) the role of the state in the Canadian community; (5) the structures and processes of parliamentary democracy; and (6) the structures and processes of policy-making.

313/513 - Intergovernmental Relations in Canada, seminar: 2 hrs.; D. M. Cameron.

This class will examine concepts and issues relevant to the territorial division of governmental power, the nature and substance of relations between governments in Canada (federal, provincial and local) and the intergovernmental system as a factor in the formulation of policy.

314A/514A - The Policy Process in Canada, seminar: 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.

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 politics 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 334A/534A Local and Regional Government in 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? Oue veut le Ouébec, 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 Politics in Nova Scotia Since Confederation, seminar: 2 hrs.; J. M. Beck (Not offered in 1973-74).

319B/519B - The Budgetary Process, seminar: 2 hrs.; D. M. Cameron.

This class is designed for students specializing in Canadian government and public administration. While the content of the seminars will remain flexible to accommodate the interests of the participants, major attention will be focused upon two areas: the development of the budgetary process in Canada, and the models and techniques for analysis and/or reform of the budgetary processes in general.

330B/530B - Canadian Political Parties, lect.: 3 hrs.; J. M. Beck.

The Canadian party system will be viewed as an integral part of the entire political system and. among other things, the following questions will be explored: To what extent have various factors, economic, geographical, regional, ethnic, religious, constitutional and social, determined the character of Canadian parties and the party system? How valid are the findings of Michels, Ostrogorski, Duverger, and R. T. McKenzie with respect to the internal organization of political parties, and do they constitute a serious limiting effect on Canadian democracy? In other words, do the Canadian parties contribute towards genuine participating democracy? How useful are the theories of Horowitz, Macpherson, Lipset, and Pinard in explaining the rise of third parties in Canada? Does Cairns overemphasize the effect of the electoral system on the functioning of Canadian parties and the party system? Are Porter and Horowitz correct that the old-line political parties have outlived their usefulness? Is a resort to some other means of interest articulation likely to make the existing party system redundant?

332A/532A Science, Technology and Public Policy, seminar: 2 hrs.; P. C. Aucoin. (Not offered in 1973-74).

333C/533C Research Seminar: Maritime Political Systems. A. P. Pross. (Not offered in 1973-74).

Canada, seminar: 2 hrs.; K. Antoft

This class will deal with the origins, develop. ment, 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 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.

373B/573B Urban Problems, seminar: 2 hrs.: 1 D. McNiven.

Each year this seminar will be oriented toward a theme related to Canadian urban polities chosen after consultation with the Institute of Public Affairs. Topics related to the theme will then be investigated by the class, through library and fieldwork.

375A/575A - The State and the Economy seminar: 2 hrs.; J. D. McNiven.

The aim of this course is to explore the interaction between governments and economic organizations, especially businesses, from the viewpoint of political science. Topics include the nature of government regulatory policies and problems related to multi-national corporations. Others centre upon the role of government as a stimulus to economic activity, especially in the developmental and technological fields. Finally, discussion will include some evaluation of the impact of political ideologies, democratic socialism for instance, upon businesses and the economy as a whole. The implications of these topics for Canadian society will be of prime concern.

(b) Comparative

202 West European Comparative Politics, lect. and discussion: 2-3 hrs.; R. Boardman.

The political systems of West Europe will be examined in this class, including the four larger EEC powers - France, West Germany, Italy and the United Kingdom - the Scandinavian and smaller states, and the southern and Mediterranean countries. The class will investigate the global position of this group of nations, including relations with the two super-Powers and with former colonies; their political parties. including a study of the nature of European socialism; legislative bodies and government bureaucracies; the role of the State in social and economic planning, and problems of regional development; political issues connected with economic integration; and a number of related questions. We will also look, by way of comparison, at some of the distinctive features of East European political systems.

205: The American Political System, lect.: D. H. Poel.

American Political System is a survey of the major domestic features of the merican politics. There are three broad offure, (2) Structures, Processes and Be-(upur, and (3) Politics, Policies and Evalua-The textbook currently used adopts an litest perspective for its analysis, while a book "readings" provides some "pluralist" conof the third lecture hour, students il be expected to carry on independent work in area of their choice. This may take the form of group research projects and/or the use of the computer to do secondary analyses of U.S. national survey research projects.

208 Comparative Government and Politics of the Far East, lect. and discussion: 3 hrs.; R. L.

this class will deal in a comparative fashion with the socio-political development of Modern Fast Asia. The survey will pick up on China, Japan, Korea, and Vietnam at roughly the mid-nineteenth century mark, and trace the patterns of development and modernization through to the present day.

This course is open to students without prerequisite. There will be one lecture $(1\frac{1}{2})$ hours) per week. In addition the class will be divided into discussion groups of reasonable size, and each group will meet with the instructor for an additional session weekly.

209 Nationalism & Nationalist Movements, lect.: 2 hrs.; J. A. Wouk.

The aim of this class is to develop a better understanding of the issues, political and social dynamics, and future prospects of Québec nationalism (& separatism) and Canadian nationalism. This aim is pursued through an examination of "nationalism" as a political force in the internal development of states and in international relations. Among the phenomena to be explained in detail are

(i) The Unification of Italy (1850's & 60's) (ii) The Unification of Germany (1830's-1871)

(iii) Sinn Fein and Irish Independence (1905-23)

(iv) Zionism and the Establishment of Israel (1897 - 1948)

(v) The National Socialist (Nazi) Revolution in Germany (1921-34).

Requirements: a minor (about 300 pages a month) amount of reading, lectures, two final exams, two mid-term exams. Students un-^{acquainted} with the political history of Québec and Canada will probably feel impelled to do additional readings.

No prerequisites.

²³⁵: Public Opinion and Voting Behaviour, eet. and discussion: 2 hrs.; D. H. Poel.

he traditional title given is really an excuse to look at a broader area which might be called

micro-politics. The most general concern of the class is with the questions of how individuals perceive, relate to and participate in political systems. Public opinion and voting studies are obvious subsets of micro-politics, as are areas of political socialization, personality and political culture.

Since much of the literature in this area is quantitative in nature, considerable attention will be given to quantitative methods in political science. This considerable attention will, however, not be at such a sophisticated level to scare off students who can add 2 and 2 together and get the same answer three times in a row. This class is not a substitute for a class in statistics.

Last year the class content consisted of four distinct modules: I - Canadian Content, II -Introduction to Quantitative Political Science, III – Talking to the Computer, IV – Looking at Robert Lane's Political Man. The content of Module IV will change from year to year to examine different areas of micro-politics. The other modules will remain fairly stable except for obvious improvements.

305C/506C Comparative Provincial and State Political Systems, seminar: 2 hrs.; D. H. Poel. (Not offered in 1973-74).

317B/517B Politics in Africa South of the Sahara, seminar: 2 hrs.; K. A. Heard.

As part of the Departments' offerings in Comparative Political Systems, this course constitutes (a) a different area for the study of politics which may be compared, e.g., with European or Asian politics, and (b) a basis for comparison among African states themselves. The course concentrates on the domestic problems of the new African states - e.g. problems of nation-building and of social and economic change - and the various strategies, both ideological and institutional, that have been adopted in response to these problems. As well, some attention will be given to the particular policies and institutions operating within the Republic of South Africa. Particular notice will be paid in this course 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 offered in 1973-74)

324A/524A Problems of Development: The Politics of New States, lect. and discussion: 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; industrialization; urbanization and socialization; communication; ideology and nation-building; economic problems and policies; the role of the undertake discussion of a particular social

military; stability and instability of political systems.

It is intended primarily for graduate students, but senior undergraduates may be admitted on application to the instructor.

324B/524B Problems of Development: New States in a Stratified International System, seminar: 2 hrs.; T. M. Shaw.

New states are relatively open and underdeveloped actors in the global system; this class examines their attempts to maximise national control and to achieve equivalence with selected models. We will focus primarily on the external dimensions of change, and will begin by reviewing theories of underdevelopment, stratification and imperialism. Our focus will be, therefore, on the interactions of political development at the national, regional and global levels.

The seminar will include such topics as: international stratification; subordinate state systems; nonalignment and self-reliance; Third World diplomacy, and international law and organisation, race and ethnicity; economic nationalism; imperialism and interdependence; aid and dependence; the implications of new states for world order; selected case studies of new state foreign policy-making; and, technical change and peripheral states.

326A/526A Sinology - The Study of Chinese Politics 1840-1950, seminar: 2 hrs.; R. L. Dial.

This class is designed for three purposes. The first is to reach a better understanding of this period of Chinese political development through expanded and more detailed readings. However, of equal importance will be the epistemological assessment of the various "theories and models of history" put forward by the authors; what underlying assumptions the writers have and share, and how might their conceptualizations be made better and more useful in understanding the subject matter.

A third and related objective of the class will be to assess the relative merits of four mediums of explanations: the chronological text, the research monograph, the biography, and the novel

This is a very heavy reading seminar. Students not able to keep up on a weekly basis should definitely not attempt the class. The seminar is open to students without previous work in Chinese politics, provided they are prepared to pursue additional readings on their own to compensate for their lack of background.

326B/526B Sinology - The Study of Chinese Politics 1950-1972, seminar: 2 hrs.; R. L. Dial.

This class will seek to define the existing paradigm in the study of Chinese politics and to locate the causes and areas of changing thought about the subject. Each week the class will

science approach, its effects on the larger paradigm, and its utilities and disutilities in explaining particular phenomena. The readings will cover the application of the following models to the Chinese case: communication theory, rural marketing systems, Maoist mobilization theory, organization and bureaucratic concepts, management concepts, radical economic theory, the concepts of political culture, urban sociology, and totalitarianism.

326A/526A is NOT a prerequisite for this class.

338B/538B The Politics of the Environment. lect.: 2 or 3 hrs. To be announced.

A discussion of the policy process as it relates to issues in the "environment crisis". Special attention will be directed to the evolution of socio-cultural values (e.g., the recent growth in importance of wilderness areas) and their impact on the policy process as a dynamic interaction, media, political parties, pressure groups (including spontaneous protest groups), socialization processes and administrative organizations.

(iv) International Politics and Foreign Policy

223 Techniques of Statecraft and Problems of Order in International Politics, lhct.: 2 hrs.; D. W. Stairs

This class is designed as a basic introduction to the study of foreign policy and international relations, and its primary purpose is to equip students with rudimentary concepts and tools for analyzing the actions and inter-actions of the various participants in international affairs. There are perhaps as many approaches to the study of international political phenomena as there are questions to which the phenomena give rise. In this particular case, two general perspectives are employed, and these serve to divide the class material into two main parts.

The first part is concerned primarily with the formulation of foreign policy, and it seeks to deal with such questions as: What are the principal processes and ingredients of foreign policy decision-making? How do these processes and ingredients affect the content of the decisions that are made? What instruments do the decision-makers have at their disposal in pursuing their objectives in international affairs? Under what conditions are the various instruments likely to be effective or ineffective? And, what criteria are employed in selecting one "mix" of instruments as opposed to the other available combinations? These and similar issues are discussed under a variety of headings, including in particular: (a) Intelligence and Foreign Policy Decision-Making; (b) The Planning of Foreign Policy; (c) Negotiation as a Foreign Policy Instrument; (d) Propaganda as a Foreign Policy Instrument: (e) Economic Manipulation (including various forms of economic sanctions as well as such positive devices as foreign aid); (f) Informal Penetration, or Subversion; and (g) Military Force.

The second part approaches the study of international relations not from the perspective of individual actors and their capabilities. But from that of the international community as a whole. It involves consideration of a variety of "theories" of international politics, but the core problem around which the readings and class discussions are arranged is the problem of the maintenance of international order, and of conditions which permit the resolution of conflict by peaceful means. The various influences and mechanisms which contribute, or are alleged to contribute, to the performance of this function are discussed under a number of headings, including (a) International Law; (b) Disarmament and Arms Control; (c) Concert Systems; (d) Balance of Power and Alliance Systems; (e) Collective Security; (f) Peacekeeping; (g) Public Opinion; and (h) Regional Functional Organizations. It is obvious that these mechanisms, taken singly or in combinations, often fail, and an attempt is therefore made to explain the nature of their respective limitations.

There is no single text, and students are required to read selections from a variety of sources

228 Comparative Foreign Policy, lect. and seminar: 2-3 hrs.; R. Boardman.

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. Study of these countries will, however, be organised around a central common framework, which will emphasize such factors as the role of political parties and interest groups in the formulation of foreign policy, the impact of broader considerations such as geographical location or history or economic growth, the demands made by other governments in alliance-systems, the part played by ideology and military capability, the central organization of top-level decision-makers, and so on. States examined will include Canada, the United States, the USSR, China, and Britain, and a number of African States.

317A/517A Foreign Policies of African States. lect. and seminar: 2 hrs.; T. M. Shaw.

This study examines the four levels of international interaction in Africa: the foreign policies of contrasting African national actors. regional subsystems, African continental politics, and Africa's impact on the global system. New states have produced novel discontinuities in the international system and we are concerned with the diplomatic, developmental and methodological implications of African participation. After a theoretical introduction to the behaviour of new state actors and Third World organisations in the international milieu, we turn to an examination of particular issues and states, from alternative African ideologies to the external linkages of diverse actors.

This range of topics will include: African autonomy – socialism and self-reliance; African unity – the OAU and ECA; African integration unity – incorrection - EAC, the Entente, Arab States and OC_{AM} Africa's inherited problems - underdevelop ment, border conflicts and refugees; Africa and race – human rights and Southern Africa African foreign policies – Tanzania, Ghana the African Joregal, Poulos and Botswana; the Ivory Coast, Senegal, Egyyt and Botswana; and conflict and cooperation in Southern Africa

320/520 Conceptual Development in the Sudof International Politics, lect. and discussion hrs.; R. L. Dial (and staff).

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 and assessed are: systems analysis and alliance theory, integration theory, field theory, learning and perception approaches, organization and decision making approaches, interest group theory, game theory, crisis behavior models, et. al.

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.

321/521 International Regional and Transnational Organisations, lect. and seminar: 2 hrs.; T. M. Shaw.

Non-state actors play increasingly important roles in the international system, this class will focus on three types of multinational institutions. We will investigate their origin, goals and effectiveness after an historical, theoretical and empirical overview of such international subsystems. In particular, we will examine their effect on global, regional and functional integration and analyse their impact on sovereignty, peace and development. The range of cases will include the UN and its specialised agencies, military alliances, continental political structures, regional economic arrangements, and transnational relations, such as the multinational corporation, churches and guerilla groups.

22/522 Canadian External Relations, seminar:

this seminar focuses on the sources, formulaand content of Canadian foreign and e policy from 1918 to the present. The defense is both descriptive and analytic in content. the greatest emphasis will be devoted to the ad since the Second World War.

224B/524B Problems of Development: New satus in a Stratified International System, minar: 2 hrs.; T. M. Shaw.

eee description under Section 2(b) above)

w7A/527A The Formulation of U.S. Foreign Policy, seminar: 2-3 hrs., J. A. Wouk.

tovernmental policy is, in large measure, tected by the mechanics of the decision moress as well as by the explicit aims of policy makers. This class will study the foreign policy formulation process under the Nixon Adminitration. It will seek to understand the present astem in terms of the development since World War II of the agencies involved in this process. the weekly seminars will be built around readings pertaining to both the formulation of s foreign policy and to aspects of administrative and organizational behaviour in general. Requirements: Seminar readings and presentations. Also probably: one term paper, one final exam, short seminar papers. (These are potential requirements. The actual requirements will be worked-out at the first class meeting.)

Prerequisites: Some knowledge of US Governments and of the history of US foreign relations, especially since 1945. All students will be required to have met with the instructor prior to the second class meeting to ascertain their eligibility in terms of these prerequisites.

327B/527B Ideological Foundations of US Foreign Policy seminar: 2-3 hrs.; J. A. Wouk.

Seminars will, initially, deal with writings by US policy-makers and academics, which appear to provide insight into the motivations for major features of recent US foreign policy. The application of these ideas, as modified by characteristics of the policy process, will be examined through the Pentagon Papers and short studies of policy formulation in the Nixon Administration. Requirements: See 327A.

Prerequisites: See 327A. 327A is not a preequisite, but (i) it will be useful for the second half of this class, (ii) preference for admission ^{lo} this class will be given to those who have taken 327A.

^{362/562} The Politics of the Sea, seminar: 3 ^{ITEL; G.} S. Hawkins and M. K. MccGwire.

^h the past, the sea has been important primarily as a transportation medium for people, goods and military force. But during the last two decades, technological advances have caused the sea and its bed to become

important as resources in their own right. Through sea-borne deterrent systems and their counter-systems, the oceans have become an arena for continuous and direct tactical naval confrontation. The sea now carries pollution to innocent shores, and its vital role in the ecological balance is itself in danger. For these and other reasons, established conventions about the freedom of the seas, the control and exploitation of maritime resources, territorial rights, international ownership, and various related matters, are all being re-thought. About one-third of the course will consider the environmental factors, and the remainder will concentrate on the policy implications, with particular concern for the legal implications, strategic considerations and the effect on international relations.

364/564 Military and Strategic Studies, seminar: 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.

365B/565B Chinese Foreign Policy, seminar: 3 hrs.; R. L. Dial.

This class shall cover the causes, policy formulation processes, and behavioral outputs of Chinese external affairs. Though there will be some lecturing, the class will focus on discussions of article length readings. There will be from 4-6 such readings weekly, and these will be chosen as representative of conflicting schools of thought on given aspects of Chinese foreign affairs. It is the objective of the class to transfer the hidden debates in the literature into the classroom, and hopefully the students' minds.

366/566 Theories of War and Peace, lect, and discussion: 2 hrs.; D. Munton.

Perhaps the most important problem that has always faced human civilizations is whether or not they were able to live in peace with their neighbours. Many theories exist as to the causes of war: some emphasize man's inherent nature, others the structure of the nation-state, and others the anarchistic nature of the international system. Likewise, there are numerous

theories about how to achieve peace, including deterrence, alliance, negotiation, and passive resistance. Each of the theories of war suggests a means to achieve peace; for example, if one thinks war is caused by the lack of a central authority in the international system, then the "solution" is to create a world government. Correspondingly, each theory of peace assumes a particular cause of war. The aim of this course will be to explore the assumptions, implications, and weaknesses of these theories through traditional theory, historical cases, and recent empirical research.

(v) Public Administration

311/511 Introduction to Public Administration, lect.: 3 hrs.; J. D. McNiven.

This course is designed to introduce students to the basic concepts of organization theory and administrative behaviour within the context of the operation of governments at the federal and provincial levels. Emphasis is placed upon the relationship between theory and actual practices. This course will attempt to give students a general overview of most of the behaviours and techniques he is likely to encounter in more advanced courses or in administrative situations.

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. Normally the class would not be offered in 1973-74. Students may be admitted with the permission of the instructor.

331A/531A Public Administration Practices, seminar: 2 hrs.; C. J. Gardner.

Emphasis in this course is on the "machinery" of government. While most of the illustrations will refer to the Government of Canada, some reference will be made to local, provincial and international bodies. A brief outline is: -

1. Government organization structure as compared to that of private bodies, and its relationship to organization theory.

2. Administrative functions as performed through the Legislature, Judiciary and Executive. Attention will be focussed on the roles of Parliamentary Committees, the Auditor-General, Public Service Commission, Ombudsman, Privy Council and Prime Minister's Offices, Treasury Boards, Cabinet Committees, Crown Companies, Commissions and Boards of Inquiry, Ministers, Deputy Ministers and Central Service Departments.

3. Recent developments and their effectiveness will be assessed.

339A/539A Public Administration Techniques, seminar: 2 hrs.; C. J. Gardner.

This is an introduction to techniques which are being used increasingly in the public sector and which, in themselves, are becoming subjects of specialization. It is important that the public administrator should know (a) the principal characteristics of these techniques, (b) the areas of possible application in public service activities and (c) the circumstances in which the application can be most effective.

The subject matter covered includes: Organization and Methods Services; Organization Analysis; Position Classification and Description; Programme and Performance Budgeting; Procedures and Methods Analysis; Communication and Reporting Systems; Mechanization and Data Processing; and Forecasting and Planning, including an elementary and non-mathematical introduction to Cost-Benefit Analysis and **Operations** Research.

540C - Colloquium in Public Administration, seminar: 2 hrs.; J. D. McNiven.

The course will consist of an ongoing series of meetings and activities designed to provide first-year MPA students and other graduate students with opportunities to exercise their organizational capabilities. The goal of those involved will be to develop and present a coherent intellectual and practical program on topics related to the field of public administration.

571B - Research Project in Public Administration, seminar: 2 hrs.; A. P. Pross.

Intended for senior graduate students in public administration, the course may be treated as a vehicle for undertaking original research in public administration or as a means of bringing together a group of students to undertake a practical project 'commissioned' by a local public body. Practical projects are intended to provide the student with an opportunity to apply the knowledge acquired in the Public Administration Programmes and to expose them to evaluation by non-academic bodies.

PS 574B - Advanced Public Administration, A. P. Pross.

This class requires a high level of knowledge of political systems and of the Canadian political system in particular. (Students in the M.B.A. programme can substitute for this a familiarity with administrative theory.) The course concentrates on an examination of the behavioral aspects of administration, particularly the relationship between bureaucracy and society and the development of organization theory.

576C Public Administration Practicum, seminar; Faculty in Public Administration.

A reading course associated with part-time or summer employment in a public agency. Open only to senior graduate students in Public Administration, the class requires that the student obtain the agreement of his employer to an 'internship' scheme designed to facilitate the students' exposure to administrative processes. Students will be expected to attend periodic seminars and to complete reading assignments intended to complement on-the-job learning experience.

Psychology

Professors W K Caird W. K. Honig J. A. McNulty (Acting Chairman) R. S. Rodger

Izaak Walton Killam Research Professor P. H. R. James

Associate Professors

- J. W. Clark P. J. Dunham B. Earhard
- M. Earhard G. V. Goddard
- V. Lolordo
- B. R. Moore S. Nakajima

R. L. Rudolph M. Yoon

Assistant Professors T. R. Anders E. O. Boyanowsky D. E. Mitchell F. J. Mortenson G. B. Peterson

J. P. Wincze

Research Associates and Postdoctoral Fellows

D. N. W. Doig G. Hall

Men see and hear, get hungry and fall asleep, and for an instant remember in great detail events which have just happened to them. Sometimes they hear but do not listen; often they remember only a fraction of what happened five minutes previously. They make love and play dangerous games, solve problems and go mad, drink far more than they need to quench their thirst; and they fight. Animals behave in the same way; if we knew the reasons why they did so we would have gone a long way towards understanding ourselves.

Psychology is an experimental science, and almost all the work which is done in the subject is done in the laboratory; its purpose is to discover the conditions which control the activities of animals and men, to measure these conditions and the responses they produce, and to use this knowledge to invent ways of predicting behaviour and changing it. It is a subject for inventive rather than imitative men. better suited to those who want to find out for themselves than to those who want to be told what to believe. Although it has been the major achievement of psychology in the past two or three decades to discover the remarkable precision with which the behaviour of animals and men is controlled by their internal and external environments, - and as a student you

will be expected to master the technology which has made these discoveries possible this achievement has increased, not diminished the challenge. We know for certain that there are at least two memory systems in the h of vertebrates, but we do not know how these systems are linked together; we know (contrary to common sense) that things look larger the further away they seem to be, but no one further away us, understands why the moon on the horizon looks larger and closer than it does in the sky there is reason to believe that at least some of the mental diseases are not diseases at all, but forms of behaviour which are learned like habits – yet we do not understand why some people learn these disordered behaviours while others escape scot-free.

The laboratory facilities of the department are amongst the best in Canada, and students who are willing to learn the necessary technical skills, and whose initiative is tempered only hy a sense of compassion for other creatures, will 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., three year) degree programme must take a minimum of six classes beyond the introductory level in their areas of concentration. In addition to meeting the university requirements for the General B.A. or B.Sc., students in psychology should take at least four classes beyond psychology 100. Required classes are listed below, together with one additional class which is open to students in their final year. All students who intend to major in psychology should consult with Dr. R. L. Rudolph,

Year I Psychology 100.

Year II

Psychology 200 and two of Psychology 201A, 202B, 203A.

Year III

One of Psychology 304, 305, 307, or 313; one of Psychology 308, 309, 310, or 312; Psychology 300 (Optional).

B.A. or B.Sc. with Honours in Psychology (Major Programme)

In the major honours programme students must take the nine psychology classes beyond Introductory Psychology that are listed below. All students who intend to take an honours degree in psychology should consult with Dr. R. L. Rudolph.

Year I Psychology 100.

Year II

Psychology 304; Psychology 357; one of Psychology 308, 309, 310, or 312.

ology 305, Psychology 307; one of Year III ology 300, 308, 309, 310, 312, 313, 356, Psych 158, 450, or 464.

rear 1, 465; Psychology 470; one of Bichology 300, 308, 309, 310, 312, 313, 356, 450, or 464.

om bined Honours

is possible for students to take an honours legre combining psychology with a related or science subject. In such a combined programme the student must take eleven classes beyond the 100 level in his two reas of specialization, with not less than four dasses in either area. The student in the ombined honours programme will normally write a thesis (or the equivalent) in the area that he elects as his major and in which he takes he majority of his classes. The following programme is based on the assumption that the undent is taking the maximum number of classes in psychology. Any student intending to uke a combined honours degree should consult with the two respective departments to arrange the details of his programme.

Year I

Psychology 100.

Vear II

Psychology 304; Psychology 357; one of Psychology 308, 309, 310, or 312.

Year III

Psychology 305, one of Psychology 307, 308, 309, 310, 312, 313, 356, 358, 450 or 464.

Year IV

Psychology 465; Psychology 470.

Other Programmes

A variety of other programmes are available in co-operation with other departments. These programmes are designed to meet the needs of students whose specific interests may lie in areas other than those covered by the major and honours programmes offered by the department. Interested students should contact Dr. R. L. Rudolph for further information.

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. Earhard.

Classes Offered

¹⁰⁰ Introduction to Psychology, lect.: 3 hrs.; lutorials, 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 behaviour

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 characteristics 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 new environments.

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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"? Ouestions like these have been studied 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

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 January 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.

Prerequisites: Psychology 100; restricted to major and honours students, but other students will be admitted with the consent of the instructor.

201A Applied Psychology: Behaviour Modification, lect.: 3 hrs.; J. P. Wincze.

The class will examine behaviour therapy procedures applied to the modification of problems in human behaviour. The emphasis of the class will not be on abnormal behaviour but rather on techniques derived from the principles of learning theory which may be used to modify problem behaviour. Discussion will cover the historical roots of behaviour therapy and will compare the behavioural 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, modelling, implosion therapy, and contingency contract therapy for family problems such as marital conflict Prerequisite: Psychology 100.

202B Applied Psychology: Social Issues, lect.:

3 hrs.; E. O. Boyanowsky.

The class 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 behaviours 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. Prerequisite: Psychology 100.

203A Applied Psychology: Psychological Testing, lect.: 3 hrs.; 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-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 textbook: class notes will be prepared by the instructor. Prerequisite: Psychology 100.

300 Selected Research in Modern Psychology, seminar and lab.: 4 hrs.; R. L. Rudolph.

This class is designed primarily for students who wish to gain further experience and understanding of contemporary psychological research. A student who enrolls in the class is assigned to a member of staff who will serve as his class advisor throughout the academic year. Contemporary research will be discussed and evaluated, and the student will be expected to conduct independent research of his own under the supervision of his class advisor.

Prerequisites: Previous or concurrent enrollement in two other 300-level classes; and may be registered for only with the prior consent of the

304 Learning and Motivation, lect.: 2 hrs.: lab. 2 hrs.; R. L. Rudolph, W. K. Honig.

Psychology 304 deals with the fundamental principles of learning derived from research with animal and human subjects. Since most of these principles have been discovered and investigated in experiments using animal subjects, primary emphasis is placed on animal learning. The discussion of human learning emphasizes those aspects of behavior that are unique to man - language and abstract thinking - in addition to more general phenomena such as transfer and forgetting. Motivation is not studied as a separate topic but is discussed in terms of its effect on learning and performance

Laboratory session involve (a) experiments with animals and human subjects, (b) discussions of the applicability of learning principles in everyday behavior, and (c) an occasional film Prerequisite: Psychology 100 (honours students); Psychology 200 or two of 201A, 2028 203A (general students).

305 Perception, lect.: 2 hrs.; lab.: 3 hrs.; D.F. Mitchell.

Psychology 305 considers the way in which information about the world is provided by the senses and how we use this information in our behaviour. The material covered in the class falls into four sections:

1. The methodological and theoretical problems peculiear to the study of sensation and perception:

2. The transformation of physical stimulus energy into neural energy, and the processing of this information achieved by the nervous system:

3. The psychological analysis of sensations and their relation to the known facts of sensory physiology:

4. The effects of higher processes, such as recognition, attention, and memory, on the way in 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 consists 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.

ite: Psychology 100 (honours stu-Psychology 200 or two of 201A, 202B. profe (general students).

Physiological Psychology, lect.: 2 hrs.; lab.: 307 Fuys. Nakajima, G. V. Goddard.

physiological psychology is an attempt to hehaviour from a biological point of The class begins with a review of the ieW. ares and functions of the central nervous and of the sensory and motor systems. continues with an analysis of anatomical, hysiological, and biochemical mechanisms aderlying perception, motivation, and learn-

Iwo types of background knowledge are recessary to understand physiological psychology. First, students should have general knowledge in biology, which can be obtained taking Biology 1000. Second, they should familiar with the concepts and methods of sperimental psychology.

Perchology 307 is recommended for anyone planning to do graduate study in psychology, and for students intending to study biology and medicine.

Prerequisite: Psychology 100 (honours students); Psychology 200 or Biology 1000 or two of Psychology 201A, 202B, 203A (general .nudents).

308 Social Psychology, lect.: 2 hrs.; lab.: 1 hr.; F. O. Bovanowsky.

This class concerns the study of individual behaviour as a function of social stimuli with emphasis on extensive student research projects and class presentations. The class develops from discussion of research designs and methods to the study of basic processes such as person perception, social comparison, and social influence, including behaviour within groups and the relations between 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 gainst members of other ethnic groups are all lopics which will be considered.

Prerequisites: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, ²⁰³A (general students).

³⁰⁹ Developmental Psychology, lect.: 2 hrs.; ab.: 1 hr.; T. R. Anders.

the developmental psychologist is concerned with the question of how behaviour is acquired, ustained and altered over time. The answers to hese questions have practical importance in child rearing, education and guidance, but the alerest 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 psythologists to basic studies about activity and ^{lujescence}, attentiveness, and indifference, and ^{tactions} to positive and negative consequences.

It leads others to questions about the development of intelligence, what sensory experiences, 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 stu-

ders, lect.: 11/2 hrs.; tutorial: 11/2 hrs.; W. K. Caird, J. P. Wincze.

A child enters this world without a memory, thought or language - with only the requiredents); Psychology 200 or two of 201A, 202B, ment that certain basic needs be satisfied. 203A (general students). Within two years, a child has a well-developed memory for people, events, and words, as well 312 Experimental Analysis of Behaviour Disoras 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 Psychology 312 is concerned with an examinacharacter of mechanisms that must underly tion of neurotic and psychotic disorders from such human abilities. Cognitive psychologists an experimental psychological point of view. ask such questions as: How does an individual The general purpose of the class is to present to recognize an object when it is in different the students current psychological thinking regarding behaviour disorders; what the major contexts or orientations, when each shift in position or orientation produces a different problems are and the ways in which attempts pattern of stimulation on the eye? How much are being made to solve them. It is primarily of daily experience is committed to permanent intended for honours students and those inmemory, and by what processes is it memortending to do advanced work in psychology. ized? 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.

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.

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 two of 201A, 202B, 203A.

313 Cognitive Processes, lect.: 3 hrs.; B. Earhard.

Prerequisite: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, 203A (general students).

353B Philosophy of Science and Experimental Psychology, seminar: 2 hrs.; W. K. Honig, A. Rosenberg.

An examination of methodological and conceptual issues in experimental psychology. Topics treated include the character of explanations, general statements, theories and theoretical entities in empirical psychology, as well as particular issues in current research programmes: concept-formation in non-humans; perception studies; computer-simulation. Readings from the works of contemporary psychologists and philosophers.

Prerequisites: One full course in Philosophy or Psychology beyond the 100 level, or consent of 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 motivation

Prerequisite: This class is primarily intended for honours students, but other students will be admitted 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.

The emphasis in this seminar class is on the evolution of thought about a number of psychological issues that have been of central concern throughout the history of psychology: the localization of function in the brain, the principles of association in learning, the nature of intelligence, the evolution of behaviour, the measurement of sensation, the development of perception, the causes of abnormal behaviour. etc. Speculation on such issues is traced from antiquity to the emergence of experimental psychology in the nineteenth century, and their development is examined in the work of the

major psychologists. Structuralism, functionalism, behaviorism, Freudianism, Gestalt psychology - the systematic viewpoints of psychology's first century - are also examined in the writings of their proponents.

Prerequisite: This class is intended for honours students, but other students will be admitted with the consent of the instructor.

450 Physiological Mechanisms in Animal Behaviour (Sensory Physiology), lect.: 1 hr.; lab.: 4 hrs.; M. G. Yoon.

This laboratory class provides first-hand knowledge of sensory mechanisms in perception and in nervous control of behavior. Emphasis is on understanding of functional neurophysiological principles and application of modern electrophysiological techniques to the study of sensory system.

Prerequisites: Consent of instructor.

464 Ethology, lect.: 2 hrs.; lab.: or field work: 3 hrs.; 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. Prerequisites: Honours and qualifying year students, or consent of instructor.

465 Honours Thesis, Members of the Department.

Psychology 465 is designed to acquaint the student with current experimental problems and research procedures in experimental psychology. Each student is assigned to a staff member who advises the student about research in his major area of interest, and closely supervises an original research project which is carried out by the student. Each student is required to submit a formal report of the completed research before the first of May. The final grade is based upon the originality and skill displayed by the student in designing his project and upon the submitted report. Prerequisite: Restricted to honours students in

470 Animal and Human Learning, lect.: 2 hrs.;

their graduating year.

B. R. Moore.

This class deals with selected aspects of Pavlovian and operant conditioning, avoidance conditioning and punishment, discrimination learning, short-term memory, interference effects and forgetting. The techniques and control problems of the various areas are examined in sufficient detail to allow the student to evaluate critically the experimental literature. Certain of the areas are considered within the context of contemporary theories; in other cases the approach is theoretical.

The format of the class varies. Lectures, brief student presentations, extended presentations and group discussion are intermixed according to the nature of the material to be covered. No formal text is used; all of the readings are $f_{r_{0m}}$

The seminar is required of all senior honous and qualifying-year graduate students, and and quanying-joint others. The enrolling student who has not taken a previous class learning and conditioning should prepare h reading The Psychology of Learning by J. Deen and S. H. Hulse (McGraw-Hill, 1967), or comparable work. A detailed knowledge such a text is not assumed, but the studen should be familiar with the technical vocable lary and the major techniques and phenomen described.

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 sha dents.

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 Studies.

Religion

Professor

Wilfred Cantwell Smith (Chairman)

human history is the attempt to know and to interpret the data of religious life. The aspiration is to achieve such knowledge and such interpretation as will do justice simultaneously both to the meaning that the data have had for those persons to whom they have been religiously significant, and to the academic tradition within which the university study of religion lies. The intellectural understanding of a more than intellectural reality in human life constitutes a challenge; a successful rising to it would enhance human self-consciousness al perhaps its most central point.

100 Introduction to Religious Man, lect.; 3 hrs.; W. C. Smith.

A synoptic presentation of the major religious traditions of mankind, and an attempt to interpret the faith inspired by them; with some attention to representative and significant minor traditions. Prehistoric man and modern "primitives"; the Hindu tradition and the Buddhist; other religious aspects of China and Japan; the ancient Near East; and the Judaic, Christian, and Islamic traditions.

W Faith and Belief: A Comparative Study, 2 hrs.; W. C. Smith.

consideration of the possibility of a generic "faith" as intellectualizing an apuniversal human quality. Faith as rentry rath as a replualized classically in Buddhist, Hindu, and Christian instances will be ex-Idamic, and religious belief as conceptualized plore and in modern Western thought. Through there and contrasts the possibility will explored of perhaps understanding faith as a litorm human (or religious) constant.

mited enrolment. Prerequisite: knowledge of least one classical scriptural language tebrew, Greek, Arabic, Sanskrit, Chinese, (tc), and preferably two; some philosophy or story of religion, preferably both.

Asociate Professor ene Coffin, Chairman

Russian

sistant Professors Nicholas Maloff Natan Nevo

the Russian language has the same origins as Fuglish, French and German, and it is, in eneral, neither easier nor more difficult for the foreigner to than the other languages which are commonly taught in university. Students who use 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 n Pravda and appreciate some of the satire in Krokodil. By taking more advanced classes, one an become fluent in the language, and thus have direct access to Russian literary, political The study of religion as a phenomenon in and scientific thought. The advantages of being ible to find out for oneself what the representalives of some 200 million people say are obvious.

Degree Programmes

Combined Honours

Russian may be taken in a modern languages combined programme with French, German or Danisk

he language laboratory is open more than 50 ours a week (including some evenings) and thudents have a wide selection of times at which their oral assignments can be completed. Additional conversation classes are offered for udents who wish to speak Russian fluently. Students of the Russian Department are en-^{ouraged} to participate in the activities of the ^{lussian} Club (drama, singing and dancing).

Classes Offered

Elementary Russian, lect.: 3 hrs.; Irene ^{offin/Natan Nevo/Nicholas Maloff.}

This class is designed for students who have no prepare a paper on a literary topic. previous knowledge of the Russian language. Prerequisite: Russian 200 or 201 or any Since Russian is an inflected language, the study of grammar is introduced along with oral equivalent achieved at any other university and recognized by Dalhousie University. work so that the student begins to speak right away. Reading Russian does not create any difficulty since the alphabet is phonetic. 304 Russian Culture and Civilization, 2 hrs.;

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 Nevo.

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 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 which enlarges their vocabulary. Prerequisite: Russian 200 or 201, or by arrangement with the instructor.

302 and 303 Russian Literature, (offered in alternate years), lect.: 2 hrs.; Natan Nevo.

This is a general class in Russian prose, poetry and literary criticism, whose purpose is to help the student who has mastered the fundamental structure of the Russian language to deepen his knowledge of it and its literature and to strengthen his audiolingual skill.

The class will acquaint the student with biographical sketches and selected works of well known Russian authors of the 19th and 20th centuries. Discussions will be held in both Russian and English. Essays will be given during sky", said D. S. Mirsky.

This is a continuation of Russian 100. The

the year. Each student will be required to

Nicholas Maloff, offered in 1974-75.

This class traces the development of Russian culture and folklore from their earliest origins to the present day and their influence on art, architecture and music. Numerous masterpieces will be illustrated with slides, film stripes and recordings.

305 Soviet Literature, (offered in 1974-75), 2 hrs.; Nicholas Maloff.

This class is designed to acquaint the student with the best works of the Soviet authors to the present day.

306/A Dostoevsky, (New course offering for 1973-74), lect.: 2 hrs.; N. Maloff. Open to students in all departments. No prerequisites.

This course is designed to give the student an insight into Dostoevsky's creative work through an analysis of his major works. Classes are conducted in English.

"Man is a mystery: if you spend your entire life trying to puzzle it out, then do not say that you have wasted your time. I occupy myself with this mystery, because I want to be a man." From Dostoevsky's letter to his brother (1839).

Dostoevsky takes his rightful place among the great writers of world literature: Dante, Cervantes, Milton, Pascal and Tolstov, Long before Freud and the school of psychoanalysts, Dostoevsky analysed the depths of the subconscious. Yet psychology for him was not an end but a means. He remarked: "I am called a psychologist; this is not true, for I am a realist in the highest sense, i.e. I depict all the depths of the human soul."

The existence of God has also "tormented" his entire life and he foresaw history in the light of the Apocalypse to be culminated in the transfiguration of the world by the "new and last Resurrection".

306/B Tolstoy, (New course offering for 1973-74), lect.: 2 hrs.; N. Nevo. Open to students in all departments. No prerequisites.

This course is designed for students wishing to become acquainted with Tolstoy's thoughts and ideas through an analysis of his major works. Classes will be conducted in English.

Tolstoy and Dostoevsky are the two great columns, standing apart in the proplaeum of the Russian literature "Golden Age" temple. It seems Tolstoy has been given to the world for the purpose of being "contrasted with DostoevIndeed Dostoevsky is considered the "surgeon of the human soul" and Tolstoy a "doctor of humanity".

Tolstoy's talents and genius enabled him to capture the search for identity in 19th century Russia and to interpret it through his own solipsism - a sense of being the great world he writes about. For him self-awareness among all people should be based on "reason, that is, good".

400 Advanced Russian Conversation and Composition, 3 hrs.; Nicholas Maloff.

This class is conducted as a seminar and is a continuation of the Russian 301. Prerequisite: Russian 300 or 301, or by arrangement with the instructor.

Sociology and Anthropology

Sociology

Professors S. D. Clark

J. J. Mangalam

Associate Professors

D. Q. Brodie D. F. Campbell D. H. Clairmont D. H. Elliott I. L. Elliott H. V. Gamberg J. G. Morgan (Part-time) V. Thiessen

Assistant Professors G. D. Bouma

P. G. Clark D. J. Grady N. W. Poushinsky R. E. Schliewen

J. D. Stolzman

Visiting Professor L C Freeman

The sociologist is concerned in general with the growth and development of societies to modern, complex industrial units. Within any particular society, sociologists may analyze the distribution of wealth, power and prestige, problems of conformity and non-conformity, and social problems such as crime, racism, suicide, overpopulation, or the development of personality.

As part of a liberal arts education, sociology teaches the student to think critically about problems which are part of his own society. His or her willingness to think about the reasons for racial prejudice, poverty, or war, should be 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 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 tailored for students who do not intend to concentrate in sociology. Enrollment in one of these latter classes does not preclude later entry into advanced classes, 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 students.

Anthropology

Professors L. Kasdan W. N. Stephens

Assistant Professors J. H. Barkow R. R. Larsen

Research Associate C. R. Hallpike

Anthropology consists of four subfields: archaeology, anthropological linguistics, physical anthropology, and social/cultural anthropology. 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 several 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 "participant observation" and comparing aspects of culture and social structure. In recent years, anthropology has applied its methodological and theoretical perspectives to such diverse areas as mental institutions, urban life, and governmental regulatory agencies.

A background in anthropology provides a broad view of the human animal, his diverse cultures and his biological background. Such an orientation is an antidote to provincialism degree. and an invaluable 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 the department offers honours programmes in quired, preparation for most advanced work in students are invited to contact the Under graduate Advising Committee (sociology) and anthropologists on staff (anthropology) for detailed advice on application and requirer rent for both programmes. Normally, an application for honours study is made on the basis of the results of the second year, i.e., towards the end 105 nm. of your fourth semester. Study space and limited financial support are available for honours students.

B.A. with Honours in Sociology

The nine sociology classes above the in. troductory level required for the honours remainder of the course will primarily be degree should include statistics (301), research concerned to show how the study of sociology methods (310), two classes in theory (401A selevant to an understanding of the structure 405A/B), and the honours seminar 450. The seminar paper produced in 450 will be ex. sciety. This class is offered for arts and science amined as an honours thesis, to be presented in audents who do not presently intend to pursue an open meeting. This will fulfill the university in the study in sociology. The class is not open requirement that a student pass a comprehen. to students who have previously taken sive examination covering his honours work in sociology 100, 110, or Anthropology 100. order to receive an honours degree.

Combined and Unconcentrated Honours

The combined honours programme can be taken with economics, political science, philosophy, and psychology. For this programme as well as the unconcentrated honours programme (cf. p. 12), an early consultation of sociological approach to human behavior. The instructors and the Undergraduate Advisor is remaining portion of the class will then essential.

B.A. with Honours in Anthropology

Nine credits in anthropology above the introductory level, including Anthropology 451, 452, 453, and 459. Anthropology 459 carries two credits and consists of the writing under supervision of an honours thesis. The thesis must be acceptable to at least two members of the anthropology staff. Applicants to the programme are asked to contact Professor L. Kasdan, its coordinator. Admission is based upon a personal interview and the examination of any paper which the applicant feels best demonstrates his writing ability. Following admission to the programme, each honours student must select one faculty member to serve as his principal advisor. In accordance with university regulations, a student must pass comprehensive examination covering his а honours work in order to receive an honours

Sociology Classes Offered

100 Introduction to Sociology, lect.: 2 hrs. tutorial: 1 hr.; G. D. Bouma, P. Clark, N Poushinsky, R. Schliewen.

Sociology 100 is designed to provide both a general introduction to the discipline

w as well as a foundation for more lized study in the field. Emphasis in this will be placed on basic sociological proved fields for concentration. In addition date the nature of the sociological perspecthe logic of social inquiry, and recurrent sociology and anthropology. An horioun the rocal and methodological problems of the degree is recommended, and frequencies in addition, students will be exposed degree is recommended, and frequently re. the decretication and dition, students will be exposed directly re. the decretication for most advanced work and the decretication of the major fields within discipline with the exposed sociology and anthropology. Interested werk in the general province of sociology. Students who students are invited to contact the little sociology are concentrate in sociology who are to concentrate in sociology who are pan about their long-range interest in weiology are advised to enroll in this class ther than 105 or 110.

Human Societies, lect.: 2 hrs.; tutorial: 1

critical introduction to sociology as a iscipline. The first half of the course will present an overview of the concepts, problems, ind theoretical perspectives which are central to the sociological mode of analysis. The and dynamics of contemporary Western

110 Principles of Sociology, lect.: 3 hrs.; D. Campbell.

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 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.

202 Comparative Analysis of Social System, (Not offered in 1973-74).

203 Deviance and Social Control, lect.: 2 hrs.; lutorial: 1 hr.; D. Campbell.

Groups make formal and informal rules in an attempt to regulate and make predictable the behavior of their members. Violations of these nles occur in many different ways and stem from various causes. The purpose of the class is ¹⁰ examine both the processes by which groups make rules and the reasons why these rules are volated. Specific issues such as crime, deinquency, narcotic addiction, alcoholism, prostitution, suicide, and minority group relations are discussed in this context.

²⁰⁴ Social Stratification, lect.: 2 hrs.; dis-^{nussion}: 1 hr.; P. Clark, H. Gamberg.

^{his} class analyzes the principal aspects of inequality in modern, industrial society. the formation of classes, status groups and the ^{nganized} political expressions are considered.

Questions of the distribution of power and will be placed upon an analysis of Canadian minorities. wealth in society, the existence of power elites or governing classes, the impact of bureaucracy 213A Complex Organizations, lect.: 2 hrs.; on class relations, the extent to which major tutorial: 1 hr.; R. Schliewen. economic inequalities have been reduced in this century, problems of the mobility of in-This class makes a critical study, from the dividuals and groups through the stratification comparative point of view, of theoretical system and the impact on social structure are dealt with. Theoretical discussions in the class models for the analysis of complex organizations. Students will examine the classical, are largely concerned with the ideas of Karl structural-functionalist, and management-Marx and Max Weber, but attention is also paid science approaches to organizations. The class to contemporary theoretical approaches to will entail a systematic survey of the sociologistratification. cal literature on this subject, with special concentration on organizational structure, 205 Sociology of Religion, lect.: 2 hrs.; strategy and decision-making.

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.

206 Social Change and Modernization, (Not offered in 1973-74).

207 Socialization, (Not offered in 1973-74).

215 Mass Society, lect.: 2 hrs.; lab.: 1 hr.; D. H. 208 Communities, lect.: 2 hrs.; seminar: 1 hr.; Elliott. P. G. Clark.

This class deals with the origin of modern, Sociology 208 examines a wide variety of post-industrial "mass society." Problems asterritorially based residential groupings. The emphasis in the first term is on such features of sociated with industrialization, cybernation, leisure, technology, and environmental degredanatural communities as the ecology, neighbortion are examined in detail. Various attempts at hood social networks, the power structure, and behavior in public settings. Both the rural solution of these problems are analyzed. The rise of the "expert" and of counter-cultural village and the metropolis is dealt with, in movements are given particular attention. addition to such sub-communites as ethnic ghettos, slums, suburbia, and bohemia. Theoretical and methodological innovations for "future forecasting" are introduced. The grade Emphasis in the second term is on intentional for the class will be based upon two examinacommunities such as utopian colonies, communes, company towns, and religious comtions and several papers. This course is not open munities. Students are expected to design a to students who have previously taken Sociomodel of an intentional community. logy 215A or 215B.

211 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

214B Industrial Sociology, lect.: 2 hrs.; tutorial: 1 hr.; J. D. Stolzman.

Recommended preparation: Sociology 204 or 213A. This class will examine the social relations of industry at both the micro- and macrosociological levels of analysis. The course will deal primarily with the productive system and attendant industrial institutions of advanced capitalist society. Major topics for investigation include the industrialization process, the social structure of industry, the development of trade unionism, and the sociology of work relationships. Evaluation will be based on examinations and a term paper.

216B Sociology of Occupations, lect.: 2 hrs.; tutorial: 1 hr.; G. D. Bouma.

This class analyzes several social processes basic to occupational careers, professionalization and formal organization of occupations. These processes are treated in the context of their implications for the relations between occupations and both social structure and human behavior. A term paper is required.

217 Political Sociology, lect.: 3 hrs.; D. J. Grady

This class 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, utilizing the general perameters of political power in national political

systems with applications designed for the political experience of Nova Scotia and the Atlantic region.

220 Sociology of the Family, lect.: 2 hrs.; tutorial: 1 hr.; J. J. Mangalam.

Family in one form or another is an aspect of all societies. It is the most important agent of early socialization and personality formation. The first part of the course will be devoted to a consideration of some of the cross-societal characteristics of family in general, and of the extended family as found in traditional societies in particular. The second term will be devoted to a consideration of family characteristics in urban-industrial societies, concentrating on the nuclear family. An attempt will be made to understand the processes by which family's structures and fuctions have changed through time as societies evolved from a traditional to an urban-industrial social organization.

222 Social Psychology, lect.: 2 hrs.; tutorials: 1 hr.; V. Thiessen.

An intensive consideration of selected problems concerning how individuals relate to groups. Theoretical and methodological issues will be equally stressed in an integrated fashion.

224 Sociological Theory - An Introduction, lect.: 2 hrs.; tutorials: 1 hr.; J. G. Morgan, R. Schliewen.

The class provides a systematic introduction into major topics in sociological theory. Part 1 (Morgan) treats classical concepts with reference to theorists up to 1920 (Saint-Simon, Marx, Weber, Durkheim, Pareto, etc.). Part 2 (Schliewen) outlines more recent developments in the same and some related topics (Parsons, Homans, Dahrendorf, 'formal' theorists). Boundary problems between sociology and other social sciences will be identified, and ways in which theorizing has informed empirical research will be discussed.

301 Statistics, lect.: 3 hrs.; N. W. Poushinsky.

This class is designed to give the student some experience at an elementary level with those branches of statistics which are most frequently used in the social sciences. In particular the student will learn when and how to use non-parametric tests. He will also be given a general introduction to factor analysis.

303 Social Problems and Social Policy, seminar: 3 hrs.; D. H. Clairmont.

This seminar focuses on the policy implication of research into various social problems. It addresses the issue of moving from delineation of a social problem, to doing the necessary research, to the development of policy relevant to the problem and considers issues in problems of implementation of policy.

306 Sociocultural Change, Modernization, and Development, (Not offered in 1973-74).

307 Socialization Processes, seminar: 3 hrs.; V. 319B Social Movements, seminar: 3 hrs.; D.

An analysis of how individuals and groups develop and change their behavior, thought, attitude and emotional patterns.

308 Experimental Analysis of Social Behavior, (Not offered in 1973-74).

310 Research Methods, lect.: 3 hrs.; D. O. Brodie.

This class is concerned with the construction and testing of "grounded theory." A detailed survey of the basic methods explored at various stages of social research is presented. The topics discussed in the class include the construction of theory, the formulation of a research problem, research designs, measurement, methods of data collection, and analytic theory testing. Special attention is given to the sample survey as one of the main methods of social science research. Practical experience in survey methods is proved through a class project. Class organization: During the first half of the class material is presented in two lecture sessions and then discussed in a laboratory session. During the second half of the class participants participate in research team approach to a problem. Method of evaluation: First term; two examinations and laboratory assignments. Second term; participation and discussion and a final research paper.

311 Sociology of Leisure, (Not offered in 1973-74).

312 Social Conflict Theories, (Not offered in 1973-74).

313A Sociology of Health and Illness, seminar: 3 hrs.; J. L. Elliott.

Beliefs and attitudes surrounding disease concepts and treatment will be examined in primitive and contemporary societies. In addition, the social organization of medicine will be analyzed with respect to the following: the health professions, the hospital as a complex organization, and the larger society.

315 Urban Sociology, (Not offered in 1973-74).

316 Sociology of Higher Education, (Not offered in 1973-74).

317A Comparative Political Sociology, (Not offered in 1973-74).

318A Issues in the Theory of Society, seminar: 3 hrs.; H. Gamberg and J. D. Stolzman.

This seminar will consider a select number of theoretical issues which beset modern social theory. The substantive focus of the course will be on the social basis of politics in the contemporary world. All students enrolled in the course will be expected to make one seminar presentation.

Grady.

This seminar examines both conventional (formal) and contemporary (action) approaches to social movements - viewed as efforts hu individuals and groups to challenge culture values, social institutions and/or a political order. Focus is upon participant observation with particular attention to developments in Nova Scotia and the Atlantic region,

320 Social Change and the Canadian Society seminar: 3 hrs.; S. D. Clark.

The primary interest of this course is in an examination of the way in which the Canadian society has changed, particularly in the year since the Second World War. Before under. taking such an examination, however, an effort is made to develop a general framework for the stability and meaning of propositions in a analysis of the process of change in society Change in the Canadian society is thus examined within such a framework: how the "old order" of Canadian society became established how powerful forces of change in the society developed after the Second World War; the shape now being taken by the society. Students are advised to read in advance S. D. Clark, The Developing Canadian Community.

Sociology is the study of the processes and products of human interaction. Demography is the study of population, emphasizing factors of birth, death and migration. Thus social demography is the study of the interdependent relationships between the processes and products of interaction on one hand, and factors of birth, death and migration on the other. An attempt will be made to include in the discussions such topics as world population, population control, family planning, and sociocultural factors influencing population size.

325 Sociology of Science and Ideas, lect.² hrs.; tutorials: 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

relopment of social science. The class evaluadepend upon both papers and exin tions. This class is not open to students ave previously taken Sociology 209A or

Seminar on Family and Socialization, (Not d in 1973-74).

History of Sociological Thought. Staff.

Contemporary Sociological Theory I.

Contemporary Sociological Theory II.

60 Honours Seminar in Sociology. Staff.

the class has two parts; part one covers basic ancepts of philosophy of science, such as erial science. Part two applies these concepts concrete research project of the student's hoice. The emphasis will be on oral presentafon of assignments and repeated mutual review d proposals and papers.

151A Readings in Sociology, Staff.

ISIR Readings in Sociology, Staff.

452R Readings in Sociology, Staff.

a reading course the student is assigned to a member of staff for regular meetings to discuss radings in a selected area. Papers and research projects will be expected.

Anthropology Classes Offered

100 Introductory Anthropology, lect.: 3 hrs.; R. Larsen, W. Stephens.

this course is intended to introduce students to sub-fields of anthropology and is intended for those planning to take additional courses in the field. In the first term, students will be introduced to man's evolutionary past, his ^{relationship} to other species of primate, his physical structure, and some of the biological actors involved in his socio-political behaviour. the second term, cultural evolution will be baced from hunting bands, through tribes, angdoms, and agrarian civilizations, to modern adustrialized states. The primary mode of malysis will be ecological, i.e., how the development of these societies has been pardetermined and limited by the environ-^{ment} and their food getting adaptation to it. In both terms films will be used to present ^{ancrete} examples for analysis.

²¹⁰B Cultural Ecology, lect.: 3 hrs.; R. Larsen.

^{Ocus} of this course will be the contribuons ecological factors make to variations in thures and patterns of social organization. elationship between subsistence patterns ocial organizational choices will be exand attention will be directed to

problems of understanding how complexes of cultural traits operate in maintaining a balance between a population and its subsistence resources. The emergence of particular complexes of traits and their existence at specific points of time and place will also be discussed. Class will be a combination of lectures and seminar, and two term papers are required.

220 Social Anthropology, lect.: 3 hrs.; L. Kasdan.

An examination of alternative ways of anasocial behaviour, sex differences, and the lysing culture and society. Illustrative case biology of politics. The format of the class will studies will be used which represent a variety of be a combination of lecture and seminar, and geographical areas, types of society (i.e., from grades will be determined on the basis of either simple band to urban industrial) and theoretical two term papers or a research project. perspectives. Since different theoretical perspectives have been applied to specific institu-316 Africa: Ethnography and Modernization, tions (economic, political, religious, kinship, seminar: 3 hrs.; J. Barkow. etc.), such institutions will be examined where appropriate.

222 Psychological Anthropology, lect.: 3 hrs.; J. Barkow.

This class deals with the areas of overlap between psychology and anthropology. Topics to be covered include: culture and personality; methodology; culture and mental health; enthnopsychiatry; culture change and mental health; evolution of psychocultural capacity; and biosocial psychological anthropology. During the Spring semester special attention will be paid to the anthropological study of religion. A paper will be required. Prerequisite: Anthropology 100 or permission of instructor.

225 Anthropological Theory, (Not offered in 1973-74).

231A North American Indians, lect.: 3 hrs.; W. Stephens.

This course 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 course grade will be based on several quizzes, and on two term papers.

Prerequisite: Anthropology 100 or Sociology/ Anthropology 105.

301 Peasant Society and Culture, lect.: 3 hrs.; L. Kasdan.

A comparative examination of peasant societies around the world. Problems of defining salient characteristics which distinguish peasant from other types of societies are dealt with. Various models for describing and analyzing the behaviour of peasants (economic, political, religious, psychological, etc.) are examined. The role of peasants in modern social change is a major focus.

321B Social Demography, seminar: 3 hrs.; J. J. Mangalam.

307 Biosocial Anthropology, lect.: 3 hrs.; R. Larsen.

The theme of this course is that many human characteristics, both individual and social, are species traits and are the product of an evolutionary process. Although the range of topics proposed for discussion is eclectic, the core of the course is a focus on the biological bases of socio-political organization. Topics to be discussed include evolutionary principles, the evolution of man and other primates, primate sociology, the biological substrata of

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 ethnic units or geographic regions. Topics to be discussed during the autumn semester will include general background, family and social organization, economics and livelihood, politics and government, and personality and socialization. During the spring semester our focus will be on contemporary, rather than colonial or pre-colonial Africa. The major topic will be the influence of modernization on urban and rural life. A paper will be required.

Prerequisite: Anthropology 100 or written permission of instructor.

320 Readings in Anthropology, Staff. Prerequisite: written permission of instructor.

330 The Family and Socialization in Crosscultural Perspective, (Not offered in 1973-74).

331 Cross-cultural Study of Socialization, lect.: 3 hrs.; W. Stephens.

In this course the student will (1) be introduced to the cross-cultural research method, i.e., the testing of general hypotheses on large samples of ethnographic cases, with the analysis, in lectures and in readings, of selected crosscultural studies of socialization; and (2) become expert on the ethnographic literature on one of the world's major culture areas (Latin America, Europe, Middle East, Africa, Southeast Asia, or whatever) as it treats the problem - the effect of modernization on adolescence - which will be the class research problem for 1973-74. The student will write at least one major paper, and participate in one or more (probably two) cross-cultural investigations.

Prerequisite: Anthropology 100 or permission of the instructor.

451 Proseminar in Anthropology, Staff.

Intensive examination of major issues in anthropology. The first part of the class is devoted to a survey of major issues current in the field.

drawing and theatre construction; and part of it involves directed work in the various technical phases of stagecraft.

280 Acting 1, 6 hrs.

The first full time class involving work in movement, improvisation, role playing, voice and speech, and scene study.

301 Introduction to Film, 3 hrs.

An introductory class for students with no background in film. The class is run with weekly screening and analysis of film. It involves an examination of film history, genre, and techniques, and requires extensive viewing of films outside those shown in classes.

360 The Playwright in the Theatre, 6 hrs.

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 incorporated 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.

371 Design 2, 6 hrs.

An examination of two dimensional design, colour composition, perspective, and three dimensional design.

380 Acting 2, 6 hrs.

Advanced work in acting involving movement, role playing, character study, and scene work.

450 The Modern Theatre, 3 hrs.

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 Directing, 6 hrs.

The procedures that lead to theatrical events are analysed in this class. Specific theories are explored and tested. The work in the class involves directing scenes and one production.

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, 3 hrs.

All of 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 hypothese 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 become 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.

UNIVERSITY OF KING'S COLLEGE

CALENDAR 1974/75

