

# DALHOUSIE

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U N I V E R S I T Y



**ARTS & SOCIAL SCIENCES, EDUCATION,  
HEALTH PROFESSIONS, MANAGEMENT,  
AND SCIENCE CALENDAR**

**1994/95**

**DALHOUSIE**  

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**U N I V E R S I T Y**

**ARTS AND SOCIAL SCIENCES  
EDUCATION  
SCIENCE  
HEALTH PROFESSIONS  
MANAGEMENT**

**1994/95  
CALENDAR**



## **A Statement of the Aims of Undergraduate Education at Dalhousie**

Dalhousie University offers undergraduate education enriched by a longstanding institutional commitment to research and to graduate and professional education. The University tries to assist all its undergraduate students to become independent thinkers and articulate communicators, knowledgeable about their chosen disciplines or professions, conversant with a reasonable body of general knowledge, and committed to learning throughout their lives.

Dalhousie assists its students to learn how to think for themselves. Students in all disciplines and professions can expect to develop skills and attitudes crucial for logical and independent thought. The faculty strives to teach students how to think, rather than what to think, and to enable them to make fair-minded enquiries in their fields of study and into the broader ethical, cultural and social issues that shape our lives. An educated person thinks carefully, reconsiders received ideas, and leads an examined life. The development of these habits of mind is the primary goal of undergraduate study.

Dalhousie assists its students to learn to express themselves, orally and in writing with clarity, precision and style. It does so, not only because communication skills permit the efficient transfer of information, but also because they make possible dialogues which lead to new ideas and to deeper appreciation of existing knowledge. Because a communal effort to exchange ideas and information is at the heart of university life, students in all disciplines and professions need opportunities to develop their skills in writing and in speaking at all levels of the undergraduate curriculum.

Dalhousie assists its students to master a combination of specialized and general knowledge. The specialized knowledge acquired by undergraduates at Dalhousie varies from discipline to discipline and even from student to student. Such knowledge should include, not only data skills, but also an understanding of the theories, structures and processes central to the discipline or profession in question, and an awareness of their practical applications and ethical consequences. Undergraduate students at Dalhousie should become familiar with a significant body of general knowledge as well. All should become acquainted with concepts central to our own culture and those of others. All should acquire basic quantitative skills and some knowledge of the principles of science and technology. All should share a sense of history and an appreciation of achievements in literature, philosophy and the arts. Such general knowledge helps us not only to confront the practical demands of work and life, but also to comprehend more fully our experience of the human condition.

Dalhousie assists its students to develop the capacity for commitment to learning throughout their lives. Their educational experiences within and outside the classroom should be rich and diverse. By providing social, cultural, recreational and other opportunities for student involvement and leadership, Dalhousie acknowledges responsibility for promoting both personal and intellectual growth.

## **IMPORTANT NOTICES**

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

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

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

Inquiries should be directed to:

The Registrar  
Dalhousie University  
Halifax, Nova Scotia  
Canada  
B3H 4H6  
Tel: (902) 494-2450  
Fax: (902) 494-1630

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# Schedule of Academic Dates

## 1994-95

Classes offered at Dalhousie have one of the letters "A", "B" or "R" following the number. "A" classes are given in the first term of any session, "B" classes are given in the second term of any session, and "R" classes are given throughout the entire session.

### 1994

#### May

- 2 Classes begin, Commerce Co-op Summer session  
Level I fieldwork (second year, 4 weeks) and Level II fieldwork (third year, 8 weeks) begins, School of Occupational Therapy  
Clinical Practice, 2nd year, begins, School of Physiotherapy
- 4 Last day to register without late fee, Spring & Co-op Summer sessions
- 9 Classes begin, Spring session  
Outpost Nursing Internship begins
- 13 Last day to cancel registration in or to add "A" and "R" classes, Spring session  
Last day to register with late fee, Spring session
- 17 Last day to cancel registration in or to add "R" classes Commerce Co-op Summer session.  
Last day to register with late fee, Commerce Co-op Summer session
- 18 Last day to withdraw without academic penalty from "A" classes, Spring session
- 23 Victoria Day - University closed
- 24-27 Spring Convocations
- 25 Last day to withdraw from "A" classes, Spring session

#### June

- 1 "A" classes end, Spring session
- 2 "B" classes begin, Spring session
- 3 Last day to withdraw without academic penalty from "R" classes, Spring session
- 8 Last day to cancel registration in or to add "B" classes, Spring session
- 13 Last day to withdraw from "B" classes without academic penalty, Spring session
- 14 Last day to withdraw from "R" classes, Spring session

- 16 Clinical Practice, 3rd year - 2nd session, begins, School of Physiotherapy
- 17 Last day to withdraw from "B" classes, Spring session
- 20 Last day to withdraw from "R" classes without academic penalty, Commerce Co-op Summer session
- 24 Classes end, Spring session
- 29 Last day to register without late fee, Summer session

#### July

- 1 Canada Day - University closed
- 4 Classes begin, Summer session  
Last day to apply to graduate in October  
Fieldwork Level III (8 weeks) begins, School of Occupational Therapy
- 8 Last day to cancel registration in or to add "A" and "R" classes, Summer session  
Last day to register with late fee, Summer session
- 13 Last day to withdraw without academic penalty from "A" classes, Summer session
- 15 Last day to withdraw from "R" classes, Commerce Co-op Summer session
- 18 Clinical Practice, 3rd year - 3rd session, begins, School of Physiotherapy
- 20 Last day to withdraw from "A" classes, Summer session
- 26 "A" classes end, Summer session
- 27 "B" classes begin, Summer session
- 29 Last day to withdraw without academic penalty from "R" classes, Summer session  
Classes end, Commerce Co-op Summer session

#### August

- 1 Halifax/Dartmouth Natal Day - University closed
- 2 Examinations begin, Commerce Co-op Summer session
- 3 Last day to cancel registration in or to add "B" classes, Summer session
- 6 Examinations end, Commerce Co-op Summer session
- 8 Last day to withdraw from "B" classes without academic penalty, Summer session
- 9 Last day to withdraw from "R" classes, Summer session
- 12 Last day to withdraw from "B" classes, Summer session
- 15 Classes begin, Outpost Nursing
- 19 Classes end, Summer session

#### September

- 5 Labour Day - University closed

- 6 Classes begin, Outpost Nursing and Dental Hygiene
- 9 Last day to register without late fee, Regular session  
First instalment of fees due
- 12 Classes begin unless otherwise specified, Regular session  
Last day for refund on first instalment of fees - limited enrolment programmes
- 26 Last day to cancel registration in or to add "A" and "R" classes, Regular session  
Last day to register with late fee  
Last day to apply for Honours Programmes  
Last day to change from Dalhousie to King's and vice versa

**October**

- 3 Last day to apply to graduate in February
- 10 Thanksgiving Day - University closed
- 15 Fall Convocation
- 24 Last day to withdraw from "A" classes without academic penalty  
Last day to change "A" classes from credit to audit and vice versa  
Last day for partial refund of first term fees

**November**

- 11 Remembrance Day - University closed
- 14 Last day to withdraw from "A" classes
- 15 Last day to apply for admission to Winter term

**December**

- 1 Last day to apply to graduate in May
- 6 Classes end
- 8 Examinations begin
- 17 Examinations end

**1995**

**January**

- 2 University closed
- 3 Last day to register without late fee, second term  
Payment of second term fees due  
Classes resume, second term begins  
Fieldwork (4th year) begins, School of Occupational Therapy  
Internship begins, Outpost Nursing  
Classes resume, Outpost Nursing
- 16 Last day to cancel registration in or to add "B" classes, (except fourth year, Occupational Therapy)  
Last day to withdraw from "R" classes without academic penalty  
Last day to change "R" classes from credit to audit and vice versa

- 31 Last day for partial refund of regular session fees  
Second installment of regular session fees due

**February**

- 3 Munro Day - University closed
- 13 Last day to drop "B" classes without academic penalty (except fourth year, Occupational Therapy)  
Last day to change "B" classes from credit to audit and vice versa  
Last day for partial refund if registered in second term only
- 20 Study break begins
- 27 Classes resume  
Clinical practice, 4th year, begins, School of Physiotherapy

**March**

- 6 Last day to add "B" classes, 4th year, Occupational Therapy (except 4418B)
- 13 Last day to withdraw from "B" and "R" classes (except fourth year, Occupational Therapy)  
Last day to drop 4th year Occupational Therapy "B" classes without academic penalty (except OT 4418B)
- 20 Fieldwork Level II (8 weeks) begins, Occupational Therapy

**April**

- 7 Classes end, Regular session
- 12 Examinations begin, Regular session
- 14 Good Friday - University closed
- 24 Intra-session clinical practica begin, School of Nursing  
Summer clinical practicum begins in the School of Physiotherapy, third year
- 27 Examinations end, Regular session  
Last day to withdraw without academic penalty, three days after practicum begins, School of Physiotherapy

**May**

- 1 Summer clinical orientation, second year, (4 weeks) begins, School of Physiotherapy
- 23-26 Spring Convocations

## Definitions

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

**Academic Dismissal:** A student's required withdrawal from a programme due to unsatisfactory academic performance.

### Academic sessions:

Regular session: .....September - April

First term: .....September - December

Second term: .....January - April

Spring session: ..... May - June

Summer session: ..... July - August

Coop summer session: ..... May - July

**Audit Student:** A student permitted to attend classes but not expected to prepare assignments, write papers, tests or examinations. Credit is not given nor is a mark awarded for classes. Classes appear on the transcript with the notation "Aud". Audit students must apply, select classes and register in the normal way.

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

**Co-requisite:** Requirement which must be fulfilled concurrently with the class being considered.

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

**Credit:** A unit by which University class work is measured. A full year class is normally worth one credit.

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

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

For definition for fee assessment see fee schedule.

**Good Standing:** Students who meet the required G.P.A. are considered to be in good academic standing. (see Academic Regulation 19)

**Grade Point Average (GPA):** Weighted sum of the grade points earned, divided by the number of classes enrolled.

**Sessional GPA:** Classes taken in a single session.

**Cumulative GPA:** All classes taken while registered in a program.

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

**Mature Student:** A person who is at least 23 years old, does not meet the usual admission requirements and has been absent from full-time high school study for at least four years.

**Part-time Students:** Students registered for fewer than three full-credit classes or the equivalent of three half-credit classes in either first term or second term. A full credit class is equivalent to 6 credit hours.

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

**Probation:** Warning to students that their academic performance is unsatisfactory and that they will be dismissed from their programme unless their performance improves by the end of the next regular session. (See Academic Regulation 20)

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

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

**Undergraduate:** Students who are candidates for an undergraduate degree, diploma or certificate.

**University Explorers:** Students admitted under the mature students category who are not candidates for a degree.

**Visiting Student:** A person permitted to take classes at Dalhousie for transfer of credit to another university.

### Course Codes

#### Numbers

1000 level classes are introductory

2000 - 4000 level classes are advanced level

5000 - 6000 level classes are Graduate level

#### Term Codes

R - Sept. to April, Spring or Summer session

A - Sept. to Dec. or first half of a Spring or Summer session

B - Jan. to April or second half of a Spring or Summer session

06 credit hours = 1 full credit

03 credit hours = 1/2 credit

## Dalhousie University

For over 129 years, Dalhousie University has played a crucial role in Nova Scotian higher education. Building upon a strong undergraduate base, the University has developed internationally recognized programmes of graduate and professional studies. The scope of its research is far-reaching, as is its public and community service. The range of the University's programmes, and in particular the obligations it has assumed for professional and graduate education, give it a unique role in higher education in Nova Scotia and in the Maritime region.

Dalhousie's enrolment stands at over 11,500 students. To accommodate them, Dalhousie occupies more than 80 acres in a residential area of Halifax. University facilities include buildings for teaching and research, libraries, residential housing for students, a Student Union Building; an Arts Centre for music, theatre, and an art gallery and facilities for physical recreation. The Nova Scotia Archive building, the Atlantic Regional Laboratory of the National Research Council, major provincial hospitals, and the Dr. D.J. MacKenzie Laboratories are located close to the University. Dalhousie benefits from a variety of arrangements for teaching and research collaboration with hospitals and federal and provincial research laboratories.

The University of King's College, situated adjacent to Dalhousie campus, is an affiliated institution, and its students in Arts and Science receive Dalhousie degrees in the name of both institutions. By agreement with Mount Saint Vincent University students have access to various courses and services. Cooperative arrangements for engineering and computer science studies have been made with the Technical University of Nova Scotia. By arrangement with the Nova Scotia Teachers College, graduates of that institution may complete education degree requirements at Dalhousie. Cooperation in a number of academic programmes, in administrative services, and in use of library resources is provided for in working arrangements with Saint Mary's University and other institutions in Halifax. Degrees in agriculture, awarded to students of the Nova Scotia Agricultural College, are awarded by Dalhousie in cooperation with the College.

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

## Executive Officers

### President and Vice-Chancellor

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

### Vice-Presidents

#### Academic and Research

Deborah W. Hobson, BA, MA, PhD

#### Finance and Administration

Bryan G. Mason, BA

#### Student Services

Eric A. McKee, BA, MA

#### External

Henry Eberhardt, AB

### Associate Vice-President Research

Robert O. Fournier, BSc, MA, PhD

### Deans of Faculties

#### Arts and Social Sciences

Graham D. Taylor, BA, PhD

#### Dentistry

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

#### Graduate Studies

Judith Fingard, BA, MPhil, PhD

#### Health Professions

Lynn McIntyre, MD, MHSc, FRCP(C)

#### Law

Joseph A. Ghiz, BComm, LLB, LL.M., LL.D.

#### Management

James D. McNiven, BA, MA, PhD

#### Medicine

John Ruedy, MDCM, FRCP(C), FACP

#### Science

W.C. Kimmins, PhD

#### Henson College of Public Affairs and Continuing Education

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

#### School of Education

K.C. Sullivan, BSc, BEd, MEd, PhD, Director

#### College of Arts and Science

W.C. Kimmins, PhD, Provost

## Administrative Officers

### University Secretary and Legal Counsel

Brian C. Crocker, QC, BA, LLB

### University Librarian

William F. Birdsall, BA, MA, PhD

**University Registrar**  
Gudrun E.L. Curri, MA

**Executive Directors**

**Computer and Information Services**  
H.S. Peter Jones, BSc, MSc, FBCS, FIMA

**Instructional Development and Technology**  
W. Alan Wright, BA, MA, PhD

**Lester Pearson Institute**  
Barry D. Lesser (Acting)

**Office of Institutional Affairs**  
Brian Christie, BSc, MA, Assistant to the President for Planning

**Directors**

**Alumni Affairs**  
Elizabeth Flinn, BSc

**Arts Centre**  
Robert C. Reinholdt

**Athletics and Recreational Services**  
F.A. (Tony) Martin, BSc, MA

**Counselling and Psychological Services**  
Judith Hayashi, BA, MA

**Development**  
Charlotte Sutherland, BA, MEd

**Environmental Health and Safety**  
William J. Louch, PhD

**Financial Services**  
Ian Nason, BComm

**Health Services**  
Joyce Curtis, MD

**Housing and Conferences**  
Heather Sutherland, BSc, MEd

**Personnel Services**  
Michael J. Roughneen, CPIR, BA, MSc, FIPM

**Physical Plant and Planning**  
William Lord, BASc, PENG

**Public Relations**  
Marilyn MacDonald, BA, MA

**Student Resources**  
A. Susan McIntyre, MPA

**Board of Governors**

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

the University is the primary concern of the Senate, subject to approval of the Board of Governors.

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

**Chancellor**  
H. Reuben Cohen, QC, BA, LLB, LL.D

**Chancellor Emeritus**  
Lady Beaverbrook, LL.D

**Officers**  
Dr. Howard C. Clark, BSc, MSc, PhD, ScD, President & Vice-Chancellor  
Mr. Allan C. Shaw, Chair  
Mr. James S. Cowan, Vice-Chair  
Miss Barbara Walker, Vice-Chair  
Mrs. Ann Petley-Jones, Honourary Secretary  
Mr. John C. Risley, Honourary Treasurer

**Members**  
Mr. David J. Almon  
Dr. D. Wayne Bell, M.D.  
Mr. Dov Bercovici  
Mr. Peter Bryson  
Mr. Aubrey D. Browne  
Mr. Robin N. Calder  
Mr. Daniel M. Campbell  
Dr. Mona L. Campbell  
Mrs. Charlotte Cochran  
Mr. J. Dickson Crawford  
Her Worship Mayor Moira Ducharme (ex officio)  
Dr. Kenneth A. Dunn  
Mr. Brian Felming  
Mr. Fred Fountain  
Mrs. Cynthia Gorman  
Dr. Margaret M. Hansell  
Dr. William Hare  
Chief Justice T. Alex Hickman  
Mr. Lewis Jacobson  
Ms. Carolyn Johnson  
Mr. Donald A. Kerr  
Dr. Patricia Lane  
Mr. Thomas E.G. Lynch  
Ms. Bernadette Macdonald  
Mr. George W. MacDonald  
Ms. Suzan MacLean  
The Hon. Jacqueline R. Matheson  
Dr. Carmen F. Moir  
Dr. Sharon Oliver  
Dr. Norman G.O. Peralta  
Mr. George C. Percy  
Mr. Jefferson Rappell  
Ms. Josie Richard  
Dr. Cedric E. Ritchie  
Mrs. Patricia Roscoe  
Mr. Kenneth C. Rowe  
Mr. Byron G. Sarson  
Dr. Donald C.R. Sobey  
Ms. Tina Sweeney  
Ms. Maxine N. Tynes

Information

Mrs. Carol Young  
Mr. Robert Zed

**Secretary**

Joann Griffin

**Observer for Faculty Association**

Dr. Collin Stoddard, BA (Mod), PhD

**Senate**

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

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

**Chair of Senate**

Kenneth A. Dunn, BSc, MSc, PhD

**Vice-Chair of Senate**

Raymond W. Carlson, BA, MSW, PhD

**Secretary of Senate**

Robert N. Bérard, BA, BEd, MA, PhD

## Academic Programmes

### Degrees, Diplomas, and Certificates

#### College of Arts and Science

**Bachelor of Arts**

Major 3 years, Advanced Major 4 years, Honours 4 years

**Bachelor of Science**

Major 3 years, Advanced Major 4 years, Honours 4 years

**Bachelor of Education (Sequential)**

1 year post BA, BM, BSc

**Bachelor of Education (Integrated)**

4 years for BA or BSc with BEd, 5 years for BPE with BEd

**Bachelor of Music**

4 years

**Bachelor of Music Education**

4 years

**Certificate in Costume Studies**

2 years

**Diploma in Costume Studies**

3 years

**Diploma in Engineering**

2 years

**Diploma in Meteorology**

1 year

#### Faculty of Management

**Bachelor of Commerce**

Major and Honours 4 years

**Certificate in Public Administration**

1 year

#### Faculty of Health Professions

**Bachelor of Physical Education**

4 years

**Bachelor of Recreation**

3 years of Recreation following 1 year of Arts and Sciences

**Bachelor of Science (Health Education)**

4 years

**Certificate in Health Services Administration**

1 year

### **Bachelor of Science (Kinesiology)**

4 years

### **Bachelor of Science (Nursing)**

4 years

### **Bachelor of Science (Nursing) with previous RN**

3 years

### **Diploma in Outpost and Community Health Nursing**

BN, 9 months; RN, 15 months

### **Bachelor of Science in Pharmacy**

4 years of Pharmacy following 1 year of Arts and Science

### **Residency Programme Pharmacy (post BSc Pharm)**

1 year

### **Bachelor of Science (Physiotherapy)**

3 years Physiotherapy following one year of Arts and Science or minimum 2 years post Diploma programme)

### **Bachelor of Science (Occupational Therapy)**

3 years Occupational Therapy following one year of Arts and Science

### **Bachelor of Social Work**

3 years Social Work study following one year general study, a wide choice permitted

## **Faculty of Dentistry**

### **Doctor of Dental Surgery**

4 years

### **Diploma in Dental Hygiene**

2 years Dental Hygiene following one year of Arts and Science

## **Faculty of Law**

### **Bachelor of Laws**

3 years

### **Bachelor of Laws with Master of Business Administration**

4 years

### **Bachelor of Laws with Master of Public Administration**

4 years

### **Bachelor of Laws with Master of Health Services Administration**

4 years

### **Bachelor of Laws with Master of Library and Information Studies**

4 years

## **Faculty of Medicine**

### **Bachelor of Science (Medical)**

4 years

### **Doctor of Medicine**

4 years

### **Intern Year**

1 year

### **Residencies**

various programmes ranging from 2-8 years post-Intern

### **Doctor of Medicine with Doctor of Philosophy**

7 years

## **Faculty of Graduate Studies**

### **Master of Arts**

1 or 2 years with thesis in: Classics, Computing Science, Economics, Education, English, French, German, Health Education, History, Leisure Studies, Mathematics, Philosophy, Political Science, Psychology, Sociology, and Social Anthropology

### **Master of Science**

1 or 2 years with thesis in: Agriculture, Anatomy and Neurobiology, Atmospheric Science, Biochemistry, Biology, Chemistry, Community Health and Epidemiology, Computing Science, Earth Science, Human Communication Disorders (3 years) (Audiology or Speech Pathology), Kinesiology, Mathematics, Microbiology and Immunology, Oceanography, Oral and Maxillofacial Surgery (4 years), Pathology, Pharmacology, Pharmacy, Physics, Physiology and Biophysics, Psychology, and Statistics, also Neuroscience (combined with Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology and Biophysics, and Psychology).

### **Doctor of Philosophy**

2 or 3 years, with thesis in: Anatomy and Neurobiology, Atmospheric Science, Biochemistry, Biology, Chemistry, Classics, Earth Science, Economics, Education, English, French, History, Interdisciplinary Studies, Mathematics, Microbiology, Oceanography, Pharmacology, Pharmacy, Philosophy, Physics, Physiology and Biophysics, Political Science, Psychology and Statistics, also Neuroscience (combined with Anatomy and Neurobiology, Biochemistry, Pharmacology, Physiology and Biophysics, and Psychology)

### **Doctor of Philosophy with Doctor of Medicine**

(Doctor of Philosophy thesis in: Anatomy, Biology, Microbiology, Pharmacology, Physiology, Biophysics)

7 years

<b>Doctor in the Science of Law</b>	2 years, with thesis
<b>Master of Arts In Teaching (French)</b>	2 years
<b>Master of Business Administration</b>	2 years
<b>Master of Business Administration with Bachelor of Laws</b>	4 years
<b>Master of Education</b>	1 year
<b>Master of Environmental Studies</b>	1 or 2 years
<b>Master of Health Services Administration</b>	2 years
<b>Master of Health Services Administration with Bachelor of Laws</b>	4 years
<b>Master of Laws</b>	1 year
<b>Master of Library and Information Studies</b>	2 years
<b>Master of Library and Information Studies with Bachelor of Laws</b>	4 years
<b>Master in Marine Management</b>	1 year
<b>Master of Public Administration</b>	2 years
<b>Master of Public Administration with Bachelor of Laws</b>	4 years
<b>Master of Development Economics</b>	2 years
<b>Master of Nursing</b>	2 years
<b>Master of Social Work</b>	1 or 2 years
<b>Diploma in Aquaculture</b>	1 year
<b>Diploma in Public Administration</b>	1 year

## College of Arts and Science

### Introduction

The College of Arts and Science, established in 1988, consists of the Faculty of Arts and Social Sciences, the Faculty of Science, and the School of Education. The College of Arts and Science meets to discuss matters of concern common to its units, in particular those relating to academic programmes and regulations. The Dean of Arts and Social Sciences and the Dean of Science alternate, year by year, as Provost of the College. The Provost chairs College meetings and prepares the agenda for those meetings. Administrative responsibility for what is decided in College meetings remains in the two Faculties and School of Education. There are thirteen Departments and several interdisciplinary programmes in the Faculty of Arts and Social Sciences, and eleven Departments in the Faculty of Science. The School of Education is dedicated to the professional training of schoolteachers and to the study of education as an academic discipline. There are several interdisciplinary programmes of instruction in the College, the responsibility for which is shared among members from different Departments.

The College of Arts and Science is responsible for the curriculum of Bachelor of Arts, Bachelor of Science, Bachelor of Education, Bachelor of Music and Bachelor of Music Education degree programmes, for diploma programmes in Engineering, Meteorology, and Costume Studies, and for certificate programmes in Costume Studies and Educational Administration. The College is also responsible for the establishment of regulations governing students registered in its programmes.

The College of Arts and Science consists of several groups: some 5,500 undergraduate students who typically spend three or four years in the College, nearly four hundred full-time teaching and research faculty and staff as well as a number of part-time teachers and teaching assistants, and a support staff of secretaries and technicians. The student's academic role is to learn - from teachers, from laboratory experience, from books, from other students, and from solitary contemplation. Students learn not only facts but concepts, and what is most important, they learn how to learn.

Through intellectual interaction with other members of the academic community, undergraduate students should gain the background knowledge, the ability and the

appetite for independent discovery. Their acquisition of these components of liberal education is marked formally by the award of a Bachelor's degree. The academic faculty has two equally important roles: to teach the facts, concepts, and methods that the student must learn; and to contribute to the advancement of human knowledge through research and through scholarly or artistic activity.

BA and BSc degree programmes in the College are of three types: the four year or twenty credit degree with Honours; the four year or twenty credit degree with an Advanced Major; and the three year or fifteen credit degree with a Major.

The goal of the Bachelor's degree is to produce educated persons with competence in one or more subjects. Such competence includes not only factual knowledge but, more importantly, the ability to think critically, to interpret evidence, to raise significant questions, and to solve problems. A BA or a BSc degree often plays a second role as a prerequisite to a professional programme of study.

The College is particularly proud of the Honours programmes that it offers in most subjects to able and ambitious students. The BA or BSc with Honours is distinguished from the BA or BSc with Major or Advanced Major in that a higher standard of performance is expected, a greater degree of concentration of credits in one or two subjects is required, and at the conclusion of the programme each student must show a grade which is additional to those for the required twenty classes. Frequently Honours students obtain this grade by successfully completing an original research project under the supervision of a faculty member. Completion of a BA or BSc with Honours is an excellent preparation for graduate study at major universities throughout the world. Dalhousie is distinguished among Canadian universities in offering BA programmes with Honours in most subjects in which it also provides BSc Honours programmes and in providing BA and BSc degree programmes with Combined Honours in an Arts and a Science subject.

## Provost of the College

G.D. Taylor, BA, PhD (Penn)

## Faculty of Arts and Social Sciences

Location: 3rd Floor, Arts & Administration Building  
Telephone: (902) 494-1440  
FAX: (902) 494-1957

## Introduction

The Faculty of Arts and Social Sciences was established on July 1, 1988. It consists of the Arts and Social Science Departments in the old Joint Faculty of Arts and Science. In these broad categories are units that study and teach in the humanities, languages, social sciences, and the performing arts. In addition there are interdisciplinary programmes of study leading to the BA degree. The Faculty of Arts and Social Sciences (FASS), together with the Faculty of Science and the School of Education, form the College of Arts and Science.

The central role of the Faculty of Arts and Social Sciences is the education of those wishing to comprehend the heritage of the past, recognize the complexities of the present, and use that understanding to plan for the future. The undergraduate programmes of the Faculty stimulate and refine the processes of critical analysis, disciplined speculation, and artistic expression. To understand more fully the conventions, history, and traditions of one's society is to understand more about oneself. Study and teaching in the Faculty of Arts and Social Sciences frequently involves questioning and analysing why things are as they are, as well as understanding what they are. Some Departments in FASS teach and evaluate performance. The values associated with study and research in the Faculty of Arts and Social Sciences have long been recognized as central to a liberal education.

## Officers of the Faculty

### Dean

G.D. Taylor, BA, PhD (Penn), Professor of History

Telephone: (902) 494-1439

### Associate Dean

M.E. Binkley, BA, MA, PhD (Tor), Professor of Sociology and Social Anthropology

Telephone: (902) 494-1254

### Assistant Dean (Students)

R.D. Byham, BM, MM (Ill. Wesleyan), Associate Professor of Music

Telephone: (902) 494-1440

### **Assistant Dean (External)**

A. Higgins, BA (Conn), MA (McG), MA (Mass), PhD (Yale), Associate Professor of English

Telephone: (902) 494-6912/6925

### **Secretary**

P.G. Clark, BA, MA (McM), PhD (UBC), Assistant Professor of Sociology and Social Anthropology

Telephone: (902) 494-6750

### **Administrator**

D.G. Miller, BCom (Acadia)

Telephone: (902) 494-1441

## **Departments and Programmes of the Faculty of Arts and Social Sciences**

- Canadian Studies
- Classics
- Comparative Religion
- Contemporary Studies
- English
- French
- German
- History
- International Development Studies
- Music
- Philosophy
- Political Science
- Russian
- Sociology and Social Anthropology
- Spanish
- Theatre
- Women's Studies

## **Faculty of Science**

**Location:** 3rd Floor, Arts and Administration Building

**Telephone:** (902) 494-2373

**FAX:** (902) 494-1957

### **Introduction**

Dalhousie's Faculty of Science, the primary centre in the region for science education and research, is part of the College of Arts and Science and consists of eleven Departments. The principal mission of the Faculty is the discovery, organization, dissemination and preservation of knowledge and understanding of the natural world. The Faculty is dedicated to excellence in the pursuit of this mission. Students in the Faculty of Science are assisted to develop the capacity for inquiry, logical thinking and analysis, to cultivate the ability to communicate with precision and style, and to acquire the skills and attitudes for lifelong learning.

Undergraduate students in the Faculty of Science normally develop these abilities by concentrating their studies in one or two of the following fifteen subjects: biochemistry, biology, chemistry, computing science, earth sciences, economics, engineering, marine biology, mathematics, meteorology, microbiology, neuroscience, physics, psychology, and statistics. Both BSc and BA degree programmes are available in most of these subjects. Details concerning particular programmes of study are found in the departmental entries.

### **Officers of the Faculty**

#### **Dean**

W.C. Kimmins, PhD (London), Professor of Biology

Telephone: (902) 494-3540

#### **Associate Dean**

R.L. Mazany, BSFS (Georgetown), PhD (UBC), Associate Professor of Economics

Telephone: (902) 494-3421

#### **Assistant Dean (Student Affairs and Space)**

G.F.O. Langstroth, BSc (Alta), MSc (Dal), PhD (London), Professor of Physics

Telephone: (902) 494-2373

#### **Secretary of Faculty**

S. Swaminathan, MA, MSc, PhD (Madras), Professor Emeritus (Mathematics)

Telephone: (902) 494-2373

**Administrator**

D.P. Chase, BSc (Queen's)

Telephone: (902) 494-1443

**School of Education**

Location: Education Building  
 Telephone: (902) 494-3724  
 FAX: (902) 494-2319

**Departments of the Faculty of Science**

- Biochemistry (also in the Faculty of Medicine)
- Biology
- Chemistry
- Earth Sciences
- Economics
- Engineering
- Mathematics, Statistics and Computing Science
- Microbiology and Immunology (also in the Faculty of Medicine)
- Oceanography
- Physics
- Psychology

**Introduction**

As part of the College of Arts and Science, Dalhousie's School of Education offers programmes designed to enable students to take a critical approach to Education as a field of study. The professional preparation of school teachers is a primary goal of the school. Specific areas of study to which students are admitted include: Drama, English, French, Math, Science, Geography, Social Studies, and Music. Details concerning particular programmes are provided in the School of Education section of this calendar.

**Officers of the School****Director**

K.C. Sullivan, PhD (Alta), (902) 494-3724

**Undergraduate Coordinator**

H.J. Murphy, EdD (Virginia), (902) 494-6480

**Assistant Undergraduate Coordinator**

A. Young, (902) 494-3300

**Administrative Assistant**

J. Riggs, (902) 494-3577

# Faculty of Health Professions

# Faculty of Management

Location: 6152 Coburg Road  
Telephone: 494-2582

## Introduction

The Faculty of Health Professions consists of the School of Nursing, College of Pharmacy, School of Recreation, Physical and Health Education, School of Physiotherapy, School of Occupational Therapy, School of Human Communication Disorders, the Maritime School of Social Work and the School of Health Services Administration. The various undergraduate programmes are described in the College and School sections of this Calendar. Details of the graduate programmes offered in the College and the Schools are described in the calendar of the Faculty of Graduate Studies.

## Officers of the Faculty

### Dean of the Faculty of Health Professions

Lynn McIntyre, MD, MHSc, FECP(C)

### Administrator

Cole, Lorna J.

### Administrative Coordinator

Read, Della H.

## Introduction

The Faculty of Management includes four schools - School of Business Administration, School of Public Administration, School for Resource and Environmental Studies, and School of Library and Information Studies. Undergraduate programmes are offered in the School of Business Administration in Commerce (BComm) and in the School of Public Administration (CPA). As of September 1991, the Bachelor of Commerce has been changed to a mandatory co-operative education programme.

Students wishing to enrol in programmes offered by the Faculty should address themselves directly to the Schools concerned for further information or for help in planning courses of study.

## Faculty Officers

### Dean

James D. McNiven  
6152 Coburg Road, Telephone 494-2582

### Assistant Dean (External)

Jan Grude  
6152 Coburg Road, Telephone 494-1812

## Directors

### School for Resource and Environmental Studies

Raymond Côté  
1322 Robie Street, Telephone 494-3632

### School of Library and Information Studies

Mary E. Dykstra  
3621 Killam Library, Telephone 494-3656

### School of Public Administration

Dale H. Poel  
1229 LeMarchant Street, Telephone 494-3742

### School of Business Administration

Leonard C. MacLean  
6152 Coburg Road, Telephone 494-7080

# Special Institutes

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

## Atlantic Institute of Criminology

**Director:** D.H. Clairmont, BA, MA, PhD

The Atlantic Institute of Criminology has been established to provide a centre for research in the areas of criminology, policing, and other concerns of the justice system. In this focus and in its contribution to the associated career development, the Institute is equivalent to those existing in other regions of the country. Research awards for graduate students in Criminology are available. Seed funding is also available for research relating to the justice system.

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

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

## Atlantic Region Magnetic Resonance Centre

**Director:** Chair, Department of Chemistry

**Manager:** D.L. Hooper, BSc, MSc, PhD

Established in 1982 with assistance from the Natural Sciences and Engineering Research Council, the Centre is concerned with teaching and research programmes in magnetic resonance. The Centre has modern nuclear magnetic resonance (NMR) and electron spin resonance (ESR) instruments including Bruker AC 250 and AMX 400 NMR instruments and a Bruker MSL 200 NMR for solid state studies.

In addition to providing well-equipped laboratories and instrumentation for resident and visiting faculty, research scientists and students, the Centre provides NMR spectra and expertise to scientists of eleven universities and research institutes in the Atlantic Region.

## Atlantic Research Centre

**Director:** H.W. Cook, MSc, PhD

Established in 1967, the Centre conducts basic biomedical research and population studies in the fields of human genetics, cell membranes, neurobiology, and developmental nutrition. It also provides education in these

fields to undergraduate and graduate students and the general public. Special tests and consultative services for the prevention and treatment of diseases causing metabolic disorders and mental handicap are provided by the Centre. The Centre's professional staff hold appointments in various departments of the Faculty of Medicine. Its work is supported by grants from agencies such as the Medical Research Council of Canada, the Dalhousie Medical Research Foundation, the governments of the three Maritime provinces, and the Network of Centres of Excellence on Neural Regeneration, and by private donations.

## Centre for African Studies

**Director:** J.L. Parpart, MA, PhD

This Centre, established in 1976, coordinates instruction, publication, research and development education programmes in African Studies. Associated faculty hold appointments in departments and units concentrated in the social sciences and humanities. The Centre organises academic and informal seminars and public policy conferences on Africa and encourages interdisciplinary interaction at all levels on African subjects and issues. It cooperates with the International Development Studies programme and with the Pearson Institute and International Students Centre.

## Centre for Foreign Policy Studies

**Director:** T.M. Shaw, PhD

Established in 1971 the Centre is concerned with teaching, research, publication, policy advice and other professional activities in the various aspects of foreign policy, security studies and international politics. It is funded through the Military & Strategic Studies Programme of the Department of national Defence and other foundations, government agencies and contracts.

The Centre's work is concentrated in the area of Canadian and comparative maritime policy and strategy but it also deals with international political economy and regional and global development. Its geographical specialisations include foreign policy in Canada, Europe, Third World (especially Africa, Asia and the Caribbean), and the U.S. The Centre encourages activities in these areas by Research & Doctoral fellows and advances communication among local and international communities in these fields through seminars, workshops, conferences and colloquia, often co-sponsored by local, national and/or international organizations. It publishes occasional papers and monographs plus a monthly Defence Newsletter on Canadian defence and security policy issues.

The Centre is an integral part of the Department of Political Science. Centre faculty offer courses through the Department in foreign and defence policy, international relations and development, and maritime affairs at both undergraduate (majors & honours) and graduate (MA and PhD) levels. They also supervise masters and doctoral theses in these fields.

**Centre for International Business Studies**

**Director:** M.R. Brooks, BOT, MBA, PhD

The Centre was established in 1975 and is funded by External Affairs and International Trade Canada. Its purposes include the provision of specialist training in international business studies, research and outreach activity in international business. It carries out these functions within the administrative framework of the School of Business Administration.

**Centre for Marine Geology**

**Director:** Paul T. Robinson, BSc, PhD

The Centre for Marine Geology was founded in 1983 to promote the interdisciplinary study of the continental margins and the sea floor. The Centre draws on the faculty and resources of the Departments of Geology, Oceanography and Physics and others. The objectives of the Centre are: (1) to expand the university's leading role in international studies of the oceanic crust, (2) to participate with industry and government in the geological aspects of oil and gas development on Canada's east coast and (3) to continue research on sedimentation and the recent history of the Canadian offshore.

**Dalhousie Health Law Institute**

**Director:** Robert G. Elgie, QC, BA, LLB, MD, FRCS(C)

**Assistant Directors:** Stephen G. Coughlan, BA, MA, LLB, Ph.D., Diana E. Ginn, BA, LLB, LLM

The Health Law Institute is an interdisciplinary institute which conducts and coordinates research and teaching in the Faculties of Law and Medicine, and in Dentistry and Health Professions as well. Supported by the Donner Canadian Foundation and the Law Foundation of Nova Scotia, the Director and his Faculty Associate are cross-appointed to the Faculties of Law and Medicine. They work with an advisory board and with colleagues in those and other Faculties on grant and contract funded research, teach and coordinate the teaching of law as it applies in the broad field of health to students in Dentistry, Health Professions,

Law and Medicine, supervise graduate students and conduct continuing education courses for health professionals on a contract basis. The initial focus of the Health Law Institute is on aspects of health law of particular relevance to aging.

**Lester Pearson Institute for International Development**

**Interim Director:** B. Lesser, BComm, MA, PhD

**Assistant Director:** P. Rodes, BA, MBA

The Lester Pearson Institute for International Development (LPI) was founded in 1985 to promote Dalhousie's involvement in international development activities. In mid-1987, LPI was merged with the Centre for Development Projects and was given responsibility for oversight of all externally financed development programmes and projects at Dalhousie. In addition to its administrative functions within the university, LPI undertakes major activities such as a development education programme for the campus and local community, a lecture and seminar series, conferences, research, a publications programme, and input to public policy on Canada's role in international development. Although LPI does not participate directly in academic degree programmes, it encourages and supports the study of international development issues and houses the Lester Pearson Chair in Development Studies.

**Neuroscience Institute**

**Interim Director:** I.A. Meinertzhagen, BSc, PhD

The Neuroscience Institute was founded in 1990 to promote and coordinate research in neuroscience, the modern interdisciplinary study of the brain and nervous systems. The development of the Institute parallels the establishment of many such institutes throughout the world and marks dramatic recent progress in understanding the workings of the brain, as signalled for example by U.S. President Bush's declaration of the 1990's as the Decade of the Brain.

Currently housed in the Life Sciences Centre, the Institute serves as an umbrella organization to foster research and training in neuroscience at Dalhousie. A major objective is to increase understanding of the functions of the nervous system in health and disease and, to this end, the Institute coordinates the activities of neuroscientists in the Faculty of Medicine and of Science, facilitating collaboration between clinical and basic scientists in the two Faculties. Some foci of current research activity include: the autonomic nervous system; development and plasticity of the nervous system; and, sensory physiology. The Institute also provides a

vehicle to seek new sources of funding, and will encourage new initiatives in all areas of neuroscience research at Dalhousie. In addition, the Institute promotes and coordinates training programmes in neuroscience currently offered through constituent departments at both the undergraduates and graduate levels. Associated with the latter it sponsors a seminar series annually.

### **Oceans Institute of Canada/Institut canadien des océans**

**Executive Director:** Judith Swan, BA, LLB, LL.M.

The Oceans Institute of Canada/Institut canadien des océans is a federally incorporated, non-profit organization established in 1976 and dedicated to promoting responsible management of the world's oceans.

The Institute serves the public and private sectors at national and international levels. Work is carried out by a permanent staff and experts drawn from a multidisciplinary panel of associates.

The location of its head office in Halifax promotes full collaboration with many other establishments concerned with ocean affairs, including Dalhousie University. The Institute has a Pacific Office in Vancouver.

### **Trace Analysis Research Centre**

**Director:** L. Ramsley, BA, MA, PhD

With the assistance of a grant from the National Research Council, the Centre was established in 1971 to train analytical chemists and, through research, to contribute to the advancement of analytical chemistry. A major facility of the Centre is a low-power nuclear reactor (SLOWPOKE) which is available to researchers within Dalhousie and elsewhere.

## **Continuing Studies**

### **Henson College of Public Affairs and Continuing Education**

**Note:** For general information, particularly with regard to credit studies and degree programmes, students may call the Centre for Community Education, 494-2375.

**Henson College offers Adult and Part-time Students:**

- assistance in planning credit and degree programmes
- non-credit, general interest and pre-university classes
- training for public and private sector administrators
- community outreach
- distance education courses in business
- and much more ...

The creation of Henson College signals Dalhousie's commitment to make itself more accessible to those who have special educational needs: those who can study only on a part-time basis; those who cannot attend classes during the working day; those who are returning to study after an absence from formal education; those seeking to improve skills and qualifications through credit, non-credit or special programmes.

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

Henson College is located at the corner of University Avenue and Seymour Street. The main telephone number is 494-2528.

## **Officers**

### **Dean**

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

### **Associate Dean**

Mary Morrissey, BA (Western), MSW (Dal),  
MPA (Harvard)

### **Advanced Management Centre**

Director: Greg Trask, BComm (SMU), MBA  
(Dal)

Associate Director: Ann O'Neill, BCom, MBA  
(Dal)

### **Centre for Community Education**

Director: Stephen Frick, BA (Tor), PhD  
(Cornell)

Associate Director: Lloyd Fraser, BA, BEd  
(MtA), MEd (Dal), EdD (OISE)

### **Community Development and Outreach**

### **Centre for Public Management**

Director: Jack Novack, BComm, MPA (Dal)

Associate Director: Roger MacMillan, BA,  
MPA (Dal)

### **Distance Education Courses**

The Centre for Public Management has contributed to the quality of public sector management through a variety of educational programs and services since 1985. These presently include:

- Municipal Race, First Nations, and Multicultural Relations Program
- Introduction to Police Management
- Diploma in Public Management
- Certificate in Public Sector Management
- Certificate in Volunteer Fire Service Leadership
- Certificate in Fire Service Administration
- Certificate in Municipal Governing
- Certificate in Local Government Administration
- Consulting

Through the provision of distance education programs, seminars, workshops, and conferences, the Centre continues to meet the professional development needs of public sector administrators at all levels of government across Canada. As well, the home-study educational programs offered by the Centre for Public Management help those interested in public sector management obtain such positions for the first time.

For a full description of the training and professional development opportunities available at the Centre for Public Management, please contact the Program Registrar at (902) 494-8838 and ask for a free program calendar.

The Advanced Management Centre, in cooperation with Dalhousie's School of Business Administration, has developed a series of non-credit distance education courses in over 15 areas of business

administration: accounting, business law, marketing management, finance, plus many others. Call the Advanced Management Centre at 494-2410 or 494-2526.

### **Transition Year Programme**

In 1982, the Transition Year Programme became a department in the Faculty of Arts and Science. In 1988, it became an independent department. TYP is a one-year pre-university programme designed for Black and Native students, and is now part of Henson College.

While preparing its members for admission to regular programmes at the beginning of their second year on campus, the Programme introduces students to the University in a variety of ways. Its curriculum, which includes a variable number of credit classes, can be adapted to individual needs and objectives. Most students take classes in Black and Native Studies, Student Skills, English and Mathematics. They also choose a regular first-year elective that is of personal interest to them. Classroom instruction is complemented by an orientation week, special lectures, tours, workshops, and field trips.

The Programme's staff are drawn from the Dalhousie University Community as well as the Nova Scotian Black and Native Communities.

Black, non-status Indian and Metis students accepted into the Programme are eligible for bursary support during their transition year. If they successfully complete this qualifying year, they become eligible for continued partial support as long as they remain in good academic standing and progress towards a first degree. Please not income tax information under "Scholarships and Financial Aid".

Status Indian students attending the Programme are fully funded through the Department of Indian Affairs' "University and College Entrance Preparation Programme", or the Mainland Confederacy, or from their individual band counsels.

Enrolment is limited to ensure that each student receives considerable personal attention. However, highly motivated Native and Black students of all ages and educational backgrounds are encouraged to apply. The TYP welcomes applications from student who did not complete high school or the courses required for university entrance and students who completed a general or mixed high school programme.

The admission criteria are somewhat flexible, and the Admissions Committee considers each case comprehensively on its own merits. The candidate's overall maturity and seriousness of purpose are vitally important.

For further information or application forms, please contact:

Director, Transition Year Programme  
Dalhousie University  
Halifax, N.S. B3H 3J5  
(902) 494-3730

*Deadline for receipt of applications for the following September: March 15th.*

## Academic Credit Programmes

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

## Scholarships and Financial Aid

Certain awards and scholarships are available for part-time students who qualify. Details may be found in the appropriate section of this calendar.

Please note that any monies which the University may make available is to be reported to the Department of National Revenue. Students are reminded to retain letters of award (e.g., bursaries, prizes or scholarships) in order that students can readily respond to governmental audits concerning Income Tax.

## Non-Credit Courses

A wide variety of non-credit courses is available in such areas as computers, language programmes, (Mini-Immersion In French, plus a variety of self-instructional programmes), the arts, law, health, social issues, career development and career change. Call the Centre for Continuing Studies at 494-2375.

# Resources and Services

## Advisory Committee on Sexual Harassment

Dalhousie University is committed to an environment free of sexual harassment. A policy and procedures exist to deal with complaints of sexual harassment. Sexual harassment can take many forms, from constant joking to physical or sexual assault. It may involve threats that you will fail in class or that you will lose your job. It may make your work or study environment uncomfortable through continued sexual comments, suggestions, or pressures. Harassment is harassment, whether it's by a professor, a teaching assistant, a staff member, a student, or even a patient or customer.

If you believe you are being sexually harassed at Dalhousie you are encouraged to discuss your questions or concerns with the Sexual Harassment Advisor, 1226 La Marchant, 494-1137, or phone the Sexual Harassment Information Line, 494-1659. Advice and information is available about what can be done. All discussions will be kept confidential, and nothing is done without your consent.

Members of the university community found guilty of sexual harassment can be subject to a range of penalties, up to and including expulsion from the university or termination of employment.

## Alumni Association

The Alumni Association is composed of over 56,000 former students. Chapters scattered across the world keep alumni informed and involved with the Association. It coordinates a number of programmes including homecomings, reunions, branch meetings, sports events, information lectures, a Student Alumni Association, a Student Leadership Conference, Scholarships and Bursaries, and the Alumni Award for Teaching Excellence and the Outstanding Alumnus Award. The Association publishes the Dalhousie Alumni Magazine which is sent to all alumni and friends.

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

## Athletics

Athletics and Recreational Services offers a wide range of programmes for every Dalhousie student. More than fifty clubs and intramural programmes offer fun, fitness and companionship while 13 varsity sports provide excitement for players and spectators.

alike. For those who prefer less competitive activities, there are a great number of fitness, leisure and aquatic instructional programmes.

Recreation facilities on campus include: Dalplex—offering a 50,000 sq. ft. fieldhouse, olympic-size pool, two weight rooms, two hardwood basketball courts, numerous "no-fee" racquet courts, and an indoor jogging track; the Dalhousie Memorial Arena, Studley Gym, and The F.B. Wickwire Memorial Field. For details on fitness and recreation at Dalhousie contact Dalplex at 494-3372 or the Intramural Office at 494-2049.

### **Black Students**

The Black Student Advising Centre is available to assist and support new, prospective and returning Black Students (African, American, Canadian, Caribbean, etc.) The Advisor may organize programme activities which assist Black students in developing contacts with other Black students both on campus and in the Black Community. The Centre is intended to foster a sense of support and community among the Black students, with other students and to increase intercultural awareness.

The Advisor will provide confidential services and programmes individual and/or group assistance, impartial observation, relevant resource materials, along with a referral service which may benefit your academic, personal and social development on and off campus. There is a small lounge area for meeting, peer support, reading and/or studying. Awards, scholarships, employment, community information and upcoming events are also made available.

The position of the Black Student Advisor was created by Dalhousie University to provide information to prospective students, increase access and promote retention of indigenous Black students.

The Centre may be beneficial to all students, faculty and staff as a means of increasing awareness of Black students within the University community.

For further information contact: Office - Black Student Advisor, Student Union Building, Halifax, Nova Scotia, B3H 4J2 (902) 494-8648.

### **Chaplaincy at Dalhousie**

The University provides facilities for chaplains appointed by various churches. There are five chaplains at Dalhousie, representing the Anglican, Baptist, Roman Catholic, Lutheran, and United Church traditions. In addition, contact ministers are designated by the Jewish, Presbyterian, and Orthodox traditions and can be reached through the Chaplains' Office on campus. The Chaplains' Office is located on the fourth floor

of the Student Union Building, telephone 494-2287. Office hours are Monday to Friday 9 - 4. Appointments can be made for other convenient times. The chaplains are available at any time for emergencies. Outside office hours, chaplains may be reached by calling the answering machine at 494-2287 to hear emergency numbers.

### **Counselling and Psychological Services**

The Counselling and Psychological Services Centre offers programmes for personal, career and educational concerns. Counselling is provided by professionally trained Counsellors and Psychologists. Strict confidentiality is ensured. Counselling is available both individually and on a group basis. Topics covered by regularly offered group programmes include Study Skills, Career Decision Making, Exam Anxiety Reduction, Public Speaking Anxiety Reduction, Assertiveness, Resume Writing and Job Search Skills. Information on a wide variety of careers and academic programmes is available in the Frank G. Lawson Career Information Centre. Students wishing to get a first hand view of careers they are considering entering, may contact alumni willing to discuss their career experiences through the Centre's Mentors and Models programme. Interest testing is also available to students.

The Counselling and Psychological Services offices and its Frank G. Lawson Career Information Centre are located on the 4th Floor of the Student Union Building. Inquire or make appointments by dropping in or calling 494-2081.

### **Dalhousie Arts Centre**

Designed as a multipurpose facility, the Dalhousie Arts Centre is home to four University departments: Dalhousie Arts Centre (Administration), Dalhousie Art Gallery, and the two academic departments of Music and Theatre. The Arts Centre remains, after twenty-one year, an integral part of the cultural experience in our community and stands as the only arts complex of its kind in Nova Scotia.

Of the numerous performing arts spaces in the Dalhousie Arts Centre, the Rebecca Cohn Auditorium, or "The Cohn", as it is affectionately called, is the most familiar and prestigious. The 1040 seat concert hall is the home of Symphony Nova Scotia, as well as the venue of choice for a wide variety of performers ranging from The Royal Winnipeg Ballet to Blue Rodeo, The Chieftains, and Reven! to name a few. Other performing and visual arts space in the Arts Centre include: The Sir James Dunn Theatre (240 seats), the David MacK. Murray Studio, Studio II, The MacAloney Room, and the Art Gallery.

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

Further information on the Music and Theatre Departments can be found in their separate listings.

## Dalhousie Student Union

Every Dalhousie student is automatically a member of the Dalhousie Student Union. The Student Union is recognized by an agreement with the University Administration and by an Act of the Nova Scotia legislature as the single voice of Dalhousie students. All student activities on campus are organized through the Student Union, and the Student Union is the focus of all student representation. The business of the Student Union is conducted by a Council made up of 40 members. Every student is represented by one or more representatives of their faculty, elected within their faculty in the spring. As well, students who live in residence and international students also elect their own representatives because they are uniquely affected by certain university policies. Also on the Council are the student representatives elected to the Senate and Board of Governors.

One of the most important resources of the Student Union is the Student Union Building located on University Avenue between Seymour and LeMarchant Streets. The SUB, which is exclusively operated by the Student Union and is paid for through Student Union fees, was opened in 1968 as a centre for student activity on campus. Every student has the opportunity to take advantage of the Union's financial, physical and organizational resources. To use that opportunity you should know who represents you on Council and who are the members of the Executive. The Student Council office is located on the second floor of the SUB and is open from 8:30 a.m. to 4:30 p.m. Monday through Friday, phone number 494-1106. Council members have mail boxes located in that office. Union Executive officers also have offices in the SUB.

## Housing/Residence Services

For the 55 per cent of Dalhousie University students whose homes are outside the Halifax Metropolitan area, where to live while attending university is a major question. The supply of University owned housing does not meet the demand and the vacancy rate in the various private, commercial units is low. It is therefore very important that students planning to attend Dalhousie think well in advance about their accommodation needs.

Students should be aware of the following points in reference to residence accommodation. You must indicate your

interest in residence accommodation on your Application for Admission to a programme of study. Upon admission to a programme of study, those students who have indicated an interest will receive a Residence Application Form. It is important to return the Residence Application Form promptly as the applications will be considered as they arrive. Residence Application Forms will not be distributed to, nor received from, individuals who have not gained admission to a programme of study.

Students with disabilities are encouraged to contact the Residence Office at (902) 494-1054, for information and assistance.

The traditional style residences at Dalhousie are chiefly for undergraduate students; very few graduate spaces are allocated and in many cases students pursuing advanced degrees are not prepared to live with the exuberance of first and second year students.

The information below gives a description of A. traditional on-campus residences, B. off-campus housing owned by the university and C. the services offered by the off-campus housing office listing service. For information on housing fees, see the Fees section of the Calendar.

**Please Note:** Academic acceptance by the University, i.e., admission to a course of study, DOES NOT GUARANTEE admission to University Housing or provision of off-campus accommodation.

It is the responsibility of the individual student in all cases to make separate application for the university housing of her/his choice, or to avail him/herself of the listing services provided by the Off-Campus Housing Office.

Early application for university residences and housing is strongly recommended. However, no decisions regarding residence accommodation will be made until April 1, when the Department of Housing and Conferences is advised of students who have been offered early academic acceptance.

### A. Traditional Style On Campus Residence

#### Howe Hall

Centrally located on campus, Howe Hall, provides accommodation for 520 undergraduate students. The sprawling, grey ironstone complex is divided into five houses: Henderson, Cameron, and Studley are for men only; Bronson and Smith Houses are co-ed. Each house has its own distinctive identity and student government. The ratio of seniors to first-year students is approximately 50/50, except in Henderson house which is predominantly for first year students.

The houses offer both double and single rooms with the singles generally reserved for senior undergraduates and the doubles for

first-year students. Facilities include two dining rooms, lounges, television rooms in each house, a canteen, games room, squash courts, weight room, study areas, laundry rooms and computer room.

#### **Shirreff Hall**

The women's residence on the Dalhousie campus, Shirreff Hall, provides accommodation for 445 female students. Located in a quiet corner of the campus, it is minutes from classes, the library, Dalplex and other facilities as well as from the scenic Northwest Arm. It is divided into three houses - Newcombe, Old Eddy and New Eddy (which includes the Annex). Old Eddy and New Eddy have both single and double rooms while Newcombe has single rooms only. The Annex houses only 14 senior students and is distinct from the remainder of Shirreff Hall in that it has a separate outside entrance and is not directly accessible from the main residence.

Shirreff Hall offers a dining room, an elegant library and visitors' lounge, study hall, study area, games room, television lounges, exercise room, kitchenettes, canteen, laundry room and reception desk. Students have access to two pianos.

#### **Eliza Ritchie Hall**

Opened in 1987, Eliza Ritchie Hall is a co-ed residence. It provides traditional residence accommodation for 84 students in predominantly single rooms.

The three-storey building of powder blue clapboard is located close to the Dalplex and to Shirreff Hall, where students take their meals. Facilities include study rooms, a multipurpose room, reception area, laundry facilities and leisure lounges with kitchenettes.

### **B. Off Campus, University Owned Housing**

#### **Fenwick Place**

Dalhousie's 33-storey Fenwick Place offers students the privacy and some of the independence of apartment living. Located in Halifax's south end, it is only a 15-minute walk or a short bus ride from the campus. Because Fenwick houses both single and married students, the mix of people provides a harmonious living environment.

Many of the 252 apartments in Fenwick Place are furnished to accommodate students in groups of two, three or four. Priority is given to students who apply in groups and who are currently living in a Dalhousie residence. Each of these apartments has a full kitchen and bathroom, furnished living room and dining area and a balcony. Bedrooms have desks and a mats-style bed. Heat, hot water, electricity, and satellite television are included in the residence fee.

Fenwick also has a number of unfurnished bachelor, one and two-bedroom apartments which are rented to married and single students. Each of these apartments has a full kitchen and bathroom. Heat, hot water, and satellite television are included in the rent.

Laundry facilities are available on every floor of Fenwick Place. The front desk is open 24 hours a day with staff available to provide security, information and advice to students.

#### **Glengary Apartments**

Located on the campus on Edward Street, Glengary Apartments is a four-storey brick building offering co-ed accommodation to 52 students. Preference is given to students in second and third year and especially to those who apply in groups of four.

Glengary has 12 furnished apartments, each with space for four students. The apartments feature two single rooms, double room, kitchen, living room and bathroom. There are also four bachelor apartments which are always in high demand. Laundry facilities are located in the basement, where there is also a limited amount of storage space.

Coordinators are available for security and administrative services and also act as a resource for students who may need advice or assistance.

#### **Co-ed Apartment Units**

Dalhousie has two co-ed apartment buildings which are open to students in graduate programmes. Located on University Avenue, on the main campus, the buildings include bachelor, one and two-bedroom apartments and accommodate a total of 20 students.

Each apartment has a living area and kitchen facilities with a fridge, stove and sink, a full bathroom and ample cupboard space but is otherwise unfurnished. A laundromat is located in the neighbourhood. Heat and hot water are included in the rent.

#### **Residence Houses**

Dalhousie also has 13 residence houses, five of which are now co-ed. All were once single family homes, and have their own kitchens, living rooms and bathrooms. The character of these homes has been maintained as much as possible. The houses are all on campus. Although they are generally occupied by students in graduate programmes or professional schools, a few of the 90 spaces are reserved for undergraduates.

Two of the houses are designated as 24-hour quiet areas for students who want a particularly quiet environment in which to live and study. One of the houses is designated as

a French house, reserved for male and female students who would like to live in a French-speaking environment.

All of these houses have both single and double rooms, each with a bed, dresser, study desk, lamp and chair. Linen, cooking utensils and small appliances are not provided. Students share kitchen and living room areas which are maintained by the cleaning staff. A trained senior student acts as a house coordinator and liaises with the Howe Hall Residence Co-ordinator and Facility Manager to provide administrative and resident-related services.

### Living Off-Campus

Dalhousie's Off-Campus Housing Office assists students who do not want to live on campus or who have been unable to find a place in residence or in University apartments and houses. Located in the Student Union Building, this office is designed to help students find privately-owned accommodation.

The Off-Campus Housing Office provides centralized information on available housing in the Halifax metro area, including apartments, rooms, condos and houses. Up-to-date computerized printouts of these listings are available for viewing as well as telephones for calling landlords and material such as maps and transit schedules.

Although the housing staff cannot arrange, inspect or guarantee housing, they will do everything they can to help students find accommodation that is pleasant, inexpensive and close to campus.

Because of the low vacancy rate in Halifax, it is advised that students start looking for off-campus housing well ahead of the academic year.

### General Information

- Application forms must be accompanied by an application fee and a deposit in Canadian funds, payable to Dalhousie University. Deposit amounts are listed on the application form.
- Acceptance into an academic programme does not mean that application for a place in residence has been approved.
- To live in any of the University-owned buildings, students must maintain full-time status at Dalhousie throughout the academic year.

For further information on living at Dalhousie, or for additional copies of the residence application form, do not hesitate to contact:

Director of Housing and Conferences  
Room 122, Student Union Building  
Dalhousie University  
Halifax, N.S. B3H 4J2

(902) 494-3365

For Howe Hall, Eliza Ritchie Hall, Shirreff Hall, Glengary Apartments and the Residence Houses:

Residence Office

Howe Hall

Dalhousie University

8230 Coburg Road

Halifax, N.S. B3H 4J5

(902) 494-1054

For Fenwick Place and Co-ed Apartment Units:

Accommodation Office, Fenwick Place

Dalhousie University

5599 Fenwick Street

Halifax, N.S. B3H 1R2

(902) 494-2075

For Off-Campus Housing Assistance:

Off-Campus Housing Office

Student Union Building, Room 120

Dalhousie University

6136 University Avenue

Halifax, N. S. B3H 4J2

(902) 494-3831

## Instructional Development and Technology

The Office of Instructional Development and Technology (OIDT) is mandated to initiate, lead, and coordinate activities which encourage reflection upon and improvement in teaching and learning at Dalhousie.

**Workshops** - To fulfil this primary goal, the OIDT develops and presents a variety of sessions and workshops to faculty and teaching assistants at Dalhousie. Annual events include the Orientation to teaching at Dalhousie for new faculty and the Graduate Teaching Assistant Orientation for new GTAs. During the year, workshops are presented monthly or bi-monthly and are open to the Dalhousie community. The OIDT also cooperates with other universities in Nova Scotia to disseminate information about teaching improvement.

**Publications** - Focus on University Teaching and Learning, the OIDT newsletter, is published five times a year. Three other publications - Recording Teaching Accomplishment: A Dalhousie Guide to the Teaching Dossier; University Teaching and Learning: An Instructional Resource Guide for Teaching Assistants At Dalhousie University; Learning Through Writing: A Compendium of Assignments and Techniques - may be purchased or borrowed from the OIDT. The extensive bibliography of materials available for loan includes both print and video

resources on topics related to teaching. These may be borrowed by faculty, teaching assistants, and students.

**Instructional Media Services** - To complement its primary goal, the OI DT also has responsibility for the provision of instructional media services to the campus (excluding Medicine and Dentistry). These services include audiovisual equipment, videotaping, photography, and graphics. Facilities for borrowing discipline-specific audio and video tapes are located in the Learning Resource Centre in the basement of the Killam Library.

**Distance Education** - Through its support for the development of distance education courses, primarily in the Health Professions, the OI DT assists Dalhousie to respond to the needs of those who wish to upgrade their education. General inquiries about these courses should be directed to the Registrar's Office.

Information, teaching resources, and private consultations are available through the Office of Instructional Development and Technology. The Office is located in the Killam Library Courtyard (494-1622).

## International Student Centre

The International Student Centre provides services and programmes for Dalhousie's students from around the world. It is a resource and activity post for international students, and is dedicated to ensuring that international students make the most of their stay in Canada.

The Centre provides information and advice on financial, legal, immigration, employment and personal matters and acts as a referral point to other services on campus. It organizes reception and orientation programmes that assist international students in adjusting to the new culture and in achieving their educational and personal goals. A variety of social, cultural and educational programmes are also held throughout the year. The Centre coordinates activities that facilitate fostering of relationships with the university and city communities.

The Centre has a lounge where students can meet and a reading room where students can study or read international publications. For further information, contact: The Advisor, International Student Centre, Dalhousie University, Halifax, N.S., Canada, B3H 3H6 or phone (902) 494-7077.

## Libraries

The Dalhousie University Library System is organized to accommodate the needs of the undergraduate teaching programmes, graduate and faculty research projects, and

professional schools. The system is made up of the following components: the Killam Memorial Library - Humanities, Social Science, and Sciences, the Sir James Dunn Law Library, and the Kellogg Health Sciences Library.

As of April 1, 1993, the total Dalhousie University Library System holdings include over 1,456,500 volumes of books, bound periodicals, documents, and bound reports, 485,600 microfiche microcards, maps, and other media. Approximately 9,000 serials titles are currently received, and dead title holdings number over 11,000.

Dalhousie libraries participate in Novanet, a network which shares a single automated online catalogue of the holdings of the member libraries (Mount Saint Vincent University, Nova Scotia College of Art & Design, Saint Mary's University, Technical University of Nova Scotia, University College of Cape Breton, University of King's College, and the Atlantic School of Theology). Users borrow from Novanet libraries upon presentation of their University ID card.

## Ombud's Office

The Dalhousie Ombud's Office offers assistance and advice to students experiencing problems while at Dalhousie, including difficulties associated with finances, academics, or accommodations. The Ombud's Office can help students resolve particular grievances and also attempts to ensure that existing policies are fair and equitable. Jointly funded by the University and the Dalhousie Student Union, the Ombud can provide information and direction to students on any University-related complaint. Students retain full control over any action taken on their behalf by the Ombud's Office, and all inquiries are strictly confidential.

The Dalhousie Ombud's Office is located in the Student Union Building, Room 403. Regular office hours are posted on the door at the beginning of each Semester. The Ombud's Office can also be reached by calling 494-6583. In no one is available to take a call, students are requested to leave a message on the answering machine.

## Registrar's Office

The office is responsible for high school liaison, admissions, awards and financial aid, registration, maintenance of student records, scheduling and coordinating formal examinations, and convocation. Of greater significance to students, however, is the role played by members of the staff who provide information, advice, and assistance. They offer advice on admissions, academic regulations and appeals, and the selection of programmes. In addition, they are prepared to help students who are not quite sure what

sort of assistance they are looking for, referring them as appropriate to departments for advice about specific major and honours programmes or to the office of Student Services or to specific service areas such as the Counselling Services Centre.

Among the staff are people with expertise in financial aid and budgeting who are available for consultation.

The summer advising programme for first year students in Arts and Social Sciences, Management, Engineering and Science is directed from the Registrar's Office. Prospective students may arrange a tour of the campus through this office.

The fact that the Registrar's Office is in contact with every student and every department means that it is ideally placed to provide or to guide students and prospective students to the source of the advice or assistance they need.

## Services for Students with Disabilities

Dalhousie University is committed to providing an accessible environment in which members of the community can pursue their educational goals. Ongoing efforts consistent with a reasonable and practical allocation of resources are being made to improve accessibility and provide special services.

The Advisor provides support and advocacy for students with disabilities. In co-operation with faculty, staff, and other student services at the university, the Advisor endeavours to provide appropriate support services as needed by the student. Students are encouraged to contact the Advisor as early as possible, (902) 494-2836.

## Student Advocacy Service

The Student Advocacy Service was established by the Dalhousie Student Union and is composed of qualified students from the University. The main purpose of the Service is to ensure that the student receive the proper information when dealing with the various administrative boards and faculties at Dalhousie. An Advocate may also be assigned to assist students with appeals or in a disciplinary hearing for an academic offence. Our goal is to make the often unpleasant experience of challenging or being challenged by the University less intimidating.

The Advocates may be contacted through:  
Student Advocacy Service  
Room 402  
Dalhousie Student Union Building  
Telephone: (902) 494-2205

## Student Clubs and Organizations

Students seeking information on clubs and societies should call the GET INVOLVED LINE 494-3527.

Extracurricular activities and organizations at Dalhousie are as varied as the students who take part in them.

Organizations range from small informal groups to large well organized ones; they can be residence-based, within faculties, or university-wide.

Some are decades old with long traditions, others arise and disappear as students' interests change.

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

## Student Employment Centre

The main function of the Dalhousie Student Employment Centre is to aid Dalhousie students in their efforts to obtain permanent, summer, or part-time employment. It is located on the fourth floor of the Student Union Building, and operates Monday through Friday from 9:00am to 4:30pm. Telephone: (902) 494-3537.

The Employment Centre also has useful information on résumé preparation, interview techniques, and job-search skills.

Interviews for graduating students are arranged with over 80 employers who visit Dalhousie each year (mid-October to mid-November are usually the busiest months).

Summer employment listings are received as early as October, while new part-time jobs are posted daily for both "on campus" and "off campus" locations.

## Student Services

Located in Room 410 of the Student Union Building, Student Services provides a point of referral for any student concern. The Vice-President is the chief Student Services officer and coordinates the activities of Athletics and Recreational Services, the Dalplex, the Bookstore, Student Counselling and Psychological Services, Health Services, Housing and Conference Services, Office of the Registrar, Writing Workshop and the Ombud Office. Student Resources including Black Student Advising, Advising for Students with Disabilities, Chaplaincy, International Student Centre and the Student Employment Centre are coordinated out of this office as well. Students who experience difficulties with their academic programmes or who are uncertain about educational goals, major selection, workload management, social or personal matters affecting their academic performance, inadequate study skills, or

conflicts with faculty and regulations can seek the assistance of the Academic Advisors in the Vice-President's office.

## University Bookstore

The University Bookstore, owned and operated by Dalhousie, is a service and resource centre for the university community and the general public. The Bookstore has all required and recommended texts, reference books and supplies, as well as workbooks, self help manuals and other reference material. The general book (trade) department has on of the largest selections in the city, including classics, bestsellers, new releases, and books by Dalhousie authors.

The Health Sciences department has the largest and most complete medical book section in Atlantic Canada, with over 2000 titles in stock. Thousands of other titles are specifically ordered annually, and the department ships out books to medical personnel and hospitals throughout the region.

The Stationery department carries all necessary and supplementary stationery and supplies, including scientific and engineering items. The Campus shop carries gift items, mugs, clothing and crested wear, cards, jewellery, posters, class rings, backpacks, novelties, briefcases, and general University paraphernalia. A Special Order department is available to students and is located in the office area.

The Bookstore is situated on the lower level of the Student Union Building on University Avenue, and is open year round, Monday to Friday.

## University Computing and Information Services

University Computing and Information Services (UCIS) provides computing and communication services for students, faculty, and staff for instructional, research, and administrative purposes. It is responsible for all centrally managed computing and communications facilities.

UCIS manages a campus-wide communications network which interconnects office systems, laboratories systems, departmental computers, and central facilities. This network is connected to the Nova Scotia Technology Network, which in turn is connected to the national network CA\*net which has worldwide connections. UCIS is also responsible for University telephones.

Central computer systems include digital VAX4500 which is used primarily for academic purposes; an Alliant FX/2816, which is a very powerful parallel processing system used for research; an IBM 4381 supporting the university's central administrative systems; and a SUN

minicomputer providing UNIX services for undergraduates. UCIS also manages numerous micro computer teaching laboratories which are situated throughout the campus, including laboratories in the School of Business, Engineering, English, Sociology, Law, Physics, Biology, Earth Sciences, Dentistry, Psychology, and at the central Computer Centre in the basement of the Killam Library.

All students may have access to these computing facilities on an individual basis or in conjunction with the classes that they take.

UCIS also manages the campus computer store (PCPC); provides short, non-credit computer related courses in conjunction with Henson College; and offers a hardware maintenance service for micro-computers.

## University Health Services

The university operates an out-patient service, in Howe Hall, at Coburg Road and LeMarchant Street staffed by general practitioners and a psychiatrist. Further specialists' services are available in local hospitals and will be arranged through the Health Service when indicated. All information gained about a student by the Health Service is confidential and may not be released to anyone without signed permission by the student.

Appointments are made during the clinic's open hours, from 9 a.m. to 10 p.m. In the event of emergency, students should telephone the University Health Service at 494-2171 or appear at the clinic in person. The university maintains health services on a 24-hour basis with a physician on call.

All students must have medical and hospital coverage approved by the Health Service. All Nova Scotia students are covered by the Nova Scotia Medical Services Insurance. All other Canadian students must maintain coverage from their home provinces. This is especially important for residents of any province requiring payment of premiums. All non-Canadian students must be covered by medical and hospital insurance prior to registration. Details of suitable insurance may be obtained from the University Health Service prior to registration. Any student who has had a serious illness within the last 12 months, or who has any chronic medical condition, should contact and advise the Health Service, preferably with a statement from the doctor.

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

## Writing Workshop

The Writing Workshop programme recognizes that students in all disciplines are required to write clearly to inform, persuade, or instruct an audience in term papers, laboratory reports, essay examinations, critical reviews and more. This English language resource centre offers classes in language and writing, a tutorial service, guidelines for acceptable standard language usage, and provides information about sources for reference. For more information about the Writing Workshop, please call 494-3379.

# 26 Degree Options

	One Year Programme	Two Year Programme	Three Year (15 credit) Major	Four Year (20 credit) Adv. Major	Four Year (20 credit) Honours	Five Year Program
<b>Arts and Social Sciences</b>						
Classics	--	--	BA	BA	BA	--
Comparative Religion	--	--	BA	BA	--	--
Contemporary Studies	--	--	--	--	BA++++	--
English	--	--	BA	BA	BA	--
French	--	--	BA	BA	BA	--
German	--	--	BA	BA	BA	--
History	--	--	BA	BA	BA	--
International Development Studies	--	--	BA	BA	BA	--
Musio	--	--	BA	--	BA++++	--
Philosophy	--	--	BA	BA	BA	--
Political Science	--	--	BA	BA	BA	--
Russian	--	--	BA	BA	BA	--
Sociology & Social Anthropology	--	--	BA	BA	BA	--
Spanish	--	--	BA	BA	BA	--
Theatre	--	--	BA	BA	BA	--
Women's Studies	--	--	BA	BA	--	--
Music, Music Education	--	--	--	BMus, BMusEd	--	--
Costume Studies	--	Certificate	Diploma	--	--	--
Dentistry	--	--	--	--	--	--
Dental Hygiene	--	Diploma+	--	--	--	--
Education	--	--	--	--	--	--
Integrated BA or BSc/BEd	--	--	--	BA or BSc/BEd	--	--
Integrated BPE/BEd	--	--	--	--	--	BPE/BEd
Integrated BMusEd/BEd	--	--	--	--	--	BMusEd/BEd
BEd (sequential)	BEd+++	--	--	--	--	--
<b>Health Professions</b>						
Nursing	--	--	--	BScN	--	--
Nursing for Registered Nurses	--	See specific admission requirements on page 13				
Outpost and Community Health Nursing	--	See specific admission requirements on page 13				
Pharmacy	--	--	--	BSc(Pharm)+	--	--
Physical Education	--	--	--	BPE	--	--
Recreation	--	--	BRec+	--	--	--
Health Education	--	--	--	BSc(HE)	--	--
Health Services Admin.	Certificate	--	--	--	--	--
Kinesiology	--	--	--	BSc(Kin)	--	--
Occupational Therapy	--	--	BSc(OT)+	--	--	--
Physiotherapy	--	--	BSc(PT)+	--	--	--
Social Work	--	--	BSW+	--	--	--
<b>Management</b>						
Commerce	--	--	--	BComm++	BComm	--
Public Administration	Certificate	--	--	--	--	--
<b>Science</b>						
Biochemistry	--	--	--	BA, BSc++	BA, BSc++	--
Biology	--	--	BA, BSc	BA, BSc	BA, BSc	--
Chemistry	--	--	BA, BSc	BA, BSc	BA, BSc	--
Computing Science	--	--	BA, BSc	BA, BSc++	BA, BSc++	--
Economics	--	--	BA, BSc	BA, BSc	BA, BSc	--
Earth Sciences	--	--	BA, BSc	BA, BSc	BA, BSc++	--
Marine Biology	--	--	--	BA, BSc++	BA, BSc++	--
Mathematics	--	--	BA, BSc	BA, BSc++	BA, BSc++	--
Microbiology	--	--	--	BA, BSc	BA, BSc	--
Neuroscience	--	--	--	--	BA, BSc	--
Physics	--	--	BA, BSc	BA, BSc++	BA, BSc++	--
Psychology	--	--	BA, BSc	BA, BSc	BA, BSc	--
Statistics	--	--	BA, BSc	BA, BSc++	BA, BSc++	--
Engineering	--	Diploma	--	--	--	--
Meteorology	Diploma+++	--	--	--	--	--

+ following one year of appropriate university studies

++ Co-operative Education programs are available. These programs include all the work required for honours together with several work terms. At least four to four and one half years are required for completion. (See pages four and five for more details.)

+++ following an appropriate bachelor's degree

++++ Combined Honours only

## Final Dates for Receipt of Applications for Admission

### Regular Session

#### College of Arts & Science

Foreign Students (except USA) .....	April 1
BEd Programme .....	April 1
Students entering from Canada or USA <sup>1</sup> .....	June 1
Returning Dalhousie Students .....	August 15

#### Health Professions

Pharmacy .....	February 1
BSc (Nursing), Outpost and Community Health Nursing, Occupational Therapy, Physiotherapy, Pharmacy, Social Work .....	March 1
BSc (Nursing) for Post RN <sup>1</sup> , Recreation <sup>1,7</sup> , BSc (Kinesiology) <sup>7</sup> , Physical and Health Education <sup>1,7</sup> .....	June 1

#### Management

Foreign Students (except USA) .....	April 1
Students entering from Canada or USA <sup>1</sup> .....	June 1

#### Internal Transfers<sup>5</sup>

Fall term .....	September 27
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#### Dentistry

DDS .....	December 1
Dental Hygiene .....	February 1

#### Medicine

MD .....	November 15
Post-Graduate <sup>1</sup> .....	December 1
Law .....	March 1

Graduate Studies <sup>4</sup> (except as below) .....	June 1
Non-Canadian Students (Graduate Studies) .....	April 1
Law (doctoral level) .....	January 1
Environmental Studies .....	February 15
Human Comm. Disorders, Marine Management and Social Work .....	March 1
Nursing .....	April 1
Health Ser. Admin. and Law (master's level) .....	May 1
Oral and Maxillofacial Surgery <sup>2</sup> .....	June 1

### Winter Term

Diploma/Outpost & Community Health Nursing for RN's .....	October 1
BA and BSc programmes only <sup>3</sup> .....	November 15
Returning Dalhousie Students <sup>6</sup> .....	November 15

<sup>1</sup> Late applications may be considered up to August 1.

<sup>2</sup> Of year preceding commencement of programme

<sup>3</sup> Part-time and transfer students only

<sup>4</sup> All supporting documentation must be submitted by the appropriate deadline.

<sup>5</sup> For students currently registered at Dalhousie wishing to change degree programmes.

<sup>6</sup> For students returning to BA or BSc programmes, or attending as Special Students in any faculty.

<sup>7</sup> Effective for students applying for admission for September of 1995, the deadline will be April 1 for all programmes in the School of Recreation, Physical and Health Education, including Kinesiology.

**Note:** In order to be considered for entrance scholarships, applications for admission (from high school students) must be received by April 1.

## Admission Requirements

Dalhousie University is an affirmative action and equal opportunity educational institution.

**Please note:** Not all courses listed in the calendar are offered each year. Please contact the Registrar's Office for a timetable of available classes for each term.

### Acceptable Classes

#### Students from Nova Scotia high schools

Students wishing to study at Dalhousie should take at least five university preparatory classes designated as 44° or 54°. Course distribution should be as follows:

- Category 1: English
- Category 2: At least two of Biology, Chemistry, French, German, History, Latin, Mathematics or Physics.
- Category 3: The remaining classes may be from those listed above or from Comparative Religion, Computer-Related Studies, Economics, Geography, Geology, Law, Modern World Problems, Music, Political Science, Sociology, Spanish, or Theatre.

Any special or experimental class must have been previously approved by Dalhousie if it is to be used as one of the credits needed for admission.

Special attention will be paid to grades in English and Mathematics. Students are expected to have an overall minimum average of 70%.

For admission requirements to specific programmes, please refer to the Basic Requirements listed below. Please note: students must meet prerequisites for classes as laid out in the course description section of this calendar.

#### Students from outside Nova Scotia

Students are accepted from other provinces and countries with preparation as shown below. The distribution should be as for Nova Scotia.

Newfoundland and Labrador, New Brunswick, Prince Edward Island, Manitoba, Saskatchewan, Alberta and British Columbia: Grade 12.

Quebec: First year CEGEP with 70% minimum average in academic subjects.

Ontario: Five O.A.C. or Grade 13 credits.

U.S.A: Strong B average in Grade 12; Submission of SAT scores of 1100 or better is required.

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

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

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

**Note:** This standing is not sufficient for admission to the sequential BEd programme at Dalhousie.

Regions not mentioned above: Write to the Registrar's Office, Dalhousie University, Halifax, N.S., B3H 4H6, for further information.

#### Mature students and others lacking usual admission requirements

If you are at least 23 years old and have been out of full-time high school study for at least four years and have not attended university, you may apply for the University Exploration Programme under the "mature student" category. Dalhousie's Henson College provides a wide variety of services to mature and/or part-time students and welcomes the opportunity to discuss your special needs with you. Contact Henson College at (902) 494-2526. If you apply as a mature student, you should enclose a letter indicating your activities since leaving high school and your reasons for expecting to successfully complete a university programme if you are admitted.

#### Transfer Students

Students wishing to apply for transfer credit should consult Academic Regulation 8 in this calendar as well as any additional requirements that may be listed herein under the appropriate degree heading. Certified copies of original documents, or relevant sections of documents (e.g., calendar pages) are acceptable in lieu of originals. Certificates in languages other than English or French must be accompanied by certified translation into English.

## International and Exchange students attending Dalhousie from elsewhere

International students must meet the following requirements:

- (a) Be in good academic and financial standing at the home institution.
- (b) Have written academic approval from the appropriate Department Head or Dean to undertake course work at Dalhousie.
- (c) Have the required student visa to study in Canada
- (d) Provide official proof of English language proficiency if the first language is not English. A score of 580 on the Test of English as a Foreign Language (TOEFL) or 90 on the Michigan English Language Assessment Battery (MELAB) is required.
- (e) Provide proof of adequate health insurance for the duration of the stay in Canada.

Students studying for less than one full academic year are not able to take "R" courses. See Definitions and Course Codes, page 3)

Marks for completed coursework will be forwarded to the home institution according to the regularly scheduled reporting dates.

## Application submissions

It is the responsibility of each applicant to ensure that the application file is complete. The following must be submitted by each applicant to the Office of the Registrar.

- (a) a completed application form; forms not properly completed will delay processing,
- (b) the appropriate application fee for the programme, either \$30.00 or \$50.00
- (c) an official record of high school work,
- (d) an official transcript of the record of work done at previous post-secondary institutions (if applicable),
- (e) evidence of competency in English for applicants whose native language is not English (see below),
- (f) supplementary information as required for specific programmes, and
- (g) mature applicants should also enclose a letter as indicated in the preceding section.

## January Admissions

Admission is normally for classes beginning in September. The university does not admit full-time, first-year students in January because the number of "B" term classes available is very limited at the introductory level. Part-time students and transfer students, however, may be admitted

for classes beginning in January. The deadline for application for January admission is November 15.

## Response to applications

Dalhousie will respond to your application as promptly as possible and will advise you of any documentation still required.

When documentation is complete, applications are placed in the hands of the appropriate admissions committees. Although every effort is made to have decisions made quickly, there will be some delay at times, particularly in programmes where competition for places is keen.

As soon as decisions are made, whether admission, deferral or rejection, applicants will be advised.

Please note that admission to many programmes is limited. Therefore, possession of minimum requirements does not guarantee admission.

## Early acceptance

Applicants currently attending high school, who have good records, i.e., a strong B average, may be given early acceptance, conditional on satisfactory completion of work for which they are currently enrolled.

## Final acceptance

Applicants must successfully complete high school classes in the required subjects with a minimum B average. Admission will then be offered in Bachelor of Arts, Bachelor of Science, or Bachelor of Commerce programmes provided there is space.

## English Language Tests

Dalhousie accepts minimum TOEFL results of 580 and minimum MELAB results of 90. Information may be obtained by writing to the English Language Institute, Testing and Certification Service, Ann Arbor, Michigan 48104, USA OR TOEFL Box 899, Princeton, New Jersey 08540, USA.

## International Baccalaureate and Advanced Placement classes

If you are taking any of these classes, you may qualify for advanced standing. Contact the Registrar's Office for specific information.

## Basic Admission Requirements

### Faculty of Arts and Social Sciences

#### Bachelor of Arts

- minimum of 65% in Grade 12 English
- distribution as outlined under Acceptable Classes section above.

## Bachelor of Music and Bachelor of Music Education

Students wishing to enrol in a degree programme offered by the Department of Music must fulfill the following admission requirements:

- satisfy the requirements for admission to the Faculty of Arts and Social Sciences
- demonstrate their proficiency as instrumental or vocal performers in an audition-interview
- demonstrate knowledge of the basic rudiments of music theory (equivalent to Grade II Theory, Royal Conservatory of Music in Toronto) and aural dictation: each is assessed through written diagnostic tests as part of the audition-interview.
- submit the supplementary application form for the Department of Music. It is recommended that students apply early for purposes of admission, audition, and music scholarship consideration. Audition dates are listed with the supplementary application form. All audition procedures should be completed no later than June 30.

Applicants who, in the estimation of the Auditioning Committee, show considerable musical talent but are in need of more emphasis on preparatory skills will be required to take some foundational classes. Applicants with severe background deficiencies will be advised to prepare again through private instruction before reapplying.

Students wishing to transfer from another institution into the second or third year of their chosen Music programme must take validation examinations in history, theory, aural and keyboard skills, and their applied major instrument before transfer of credits can be considered. Failure to pass an examination will necessitate enrolment in the appropriate first or second year class. Validation examinations must be written at the same time as the audition-interview. Transfer applications are subject to the deadlines stated in the preceding paragraph.

**Note:** All students entering the first and second years of Music Studies are required to register in the Bachelor of Music programme. Upon successful completion of the two-year core curriculum, students may either proceed to the third year of BMus or apply to the BMusEd or BMusEd/BEd programmes.

### Certificate in Costume Studies (2 years), Diploma in Costume Studies (3 years)

- minimum of 65% in Grade 12 English
- distribution as outlined under Acceptable Classes above.

## Faculty of Science

### Bachelor of Science and Bachelor of Science Co-op

- minimum of 65% in English and Mathematics 441 or equivalent
- distribution as outlined under Acceptable Classes above
- programme may be combined with a Diploma in Engineering

### Diploma in Engineering

- Grade 12 Chemistry and Physics
- minimum of 65% in English and Mathematics 441 or equivalent
- distribution as outlined under Acceptable Classes above.
- programme may be combined with a major in an Arts or Science subject (BA or BSc degree)

### Diploma in Meteorology

BSc with major in Physics or other appropriate subject is required; strong background in Mathematics and Physics is necessary, and classes taken should also include Statistics and Computing Science. Specific recommended classes for admission to the Diploma in Meteorology include:

- Physics 1100.06, 2000.03A, 2005.03A, 2010.03B, 2015.03B, 3160.03A/3170.03B;
- Math 1000.03A/1010.03B, 2000.06, 2030.03A/2040.03B, 2070.03A/2080.03B, 3110.03A/3120.03B; and
- Computing Science 1400.03A/1410.03B.

## School of Education

### Bachelor of Education (sequential)

Along with the regular undergraduate application, applicants must submit:

- supplementary application form for the Department of Education
- two reference forms: one academic and one professional

After initial consideration of the applications by the Admissions Committee, interviews are arranged with promising candidates.

Final selection is based on:

1. Academic record: Applicants must have a BA or BSc by September in the year of application. As space in the programme is limited, applicants presenting a 3 year BA or BSc degree may not be competitive. Successful candidates often have breadth of academic preparation as represented by a 4 year degree, an honours degree or some type of further study. Candidates

with other bachelor degrees should contact the Secretary of the BEd Programme.

- Candidates for the BEd secondary programme normally should have a minimum of a "B" average in their major subject, comprising at least five full credit classes (four beyond the 1000-level). This major should be in a "teachable" subject, i.e. English, Drama, Mathematics, Science, French, Social Studies, or Music. Psychology and Sociology are not teachable subjects.
- Individual methods/field experience professors may have more specific requirements for admission. For example, candidates for French and Music must pass an audition/interview in their area. Candidates should consult the Calendar (under Field Experience), the School of Education Programme Planning Guide or the relevant professor.

2. References;
3. Responses to questions on supplementary application form; and
4. Interview

#### BPE/BEd Integrated

BPE students may apply for admission to the School of Education at the end of their second year. Specific requirements include:

- the completion of a minimum of one full credit above the 1000-level in the teachable subject with minimum a of B average obtained,
- an overall B average in Arts and Science courses, and
- a C or better average in PE/KIN subjects.
- recommendation of the School of Recreation, Physical and Health Education

Secondary level students must complete four full credits in their teachable subject before they may take the methods course. Students in the elementary track must complete a minimum of five full classes from English, History, Mathematics and the Sciences. It is recommended that courses be selected from each area.

#### BMusEd/BEd Integrated

- two years of BMus at Dalhousie with at least a B average

### Faculty of Management

#### Bachelor of Commerce Co-op

- minimum of 65% in English and Mathematics 441 or 442 or equivalent
- in addition to courses listed in category three, the following university preparatory courses will be accepted:
  - Accounting
  - Business Organization and Management

- Admission to the Bachelor of Commerce Co-op will not be allowed after second year.
- The work term requirements of the Bachelor of Commerce Co-op may involve placement problems for visa students. Subject to approval by the School, students may be permitted to arrange their own work term positions. Notwithstanding, the best interests of most visa students may be better served by seeking admission to a university which does not have a mandatory Co-op programme.
- Please be advised that students who transfer into the BComm programme will be assessed a co-op transfer fee. Please refer to the Fees section of this calendar for further details.

#### Certificate in Public Administration

The programme leading to the Certificate in Public Administration is available to persons who meet the undergraduate admission requirements of Dalhousie University and who are not enrolled in a programme leading to a first degree. Those not meeting the formal admission requirements may apply for admission under the "mature student" category. Prospective students should submit the following documentation to the Admissions Committee:

- application for admission
- letter outlining work experience and other activities
- high school transcripts
- an interview may be required.

### Faculty of Health Professions

Some of the programmes in the Faculty of Health Professions have been established to meet the needs of the Maritime or Atlantic provinces. Admission of applicants outside the preferred region is either severely limited or, in the case of Physiotherapy not granted.

#### Deposit

Due to the large numbers of applicants to limited enrolment programmes in the Faculty of Health Professions, a non-refundable deposit of \$200.00 (applicable to tuition fees) is required from accepted students as proof of intent to register. The \$200.00 is payable within three weeks of notification of acceptance.

**Note:** This applies to all programmes within the Faculty of Health Professions, excluding the Bachelor of Recreation.

### School of Nursing

#### Bachelor of Science (Nursing) - Basic

- Grade 12 English, Chemistry and Mathematics.

## 32 Admission Requirements

- Grade 10, 11 or 12 Biology (at least one high school level biology).
- A 70% overall average and 70% in the required subjects.
- Mature applicants require GED, Grade 12 Chemistry, and Grade 12 Mathematics.
- Applicants whose native language is not English will be required to pass either the TOEFL exam with a score of 580 or the MELAB exam with a score of 90.
- Transfer Students:

Students transferring from other university programmes must have a minimum grade point average of 2.5 (using the Faculty of Health Professions formula to calculate the grade point average).

Priority consideration will be given:

- first to permanent residents of Nova Scotia
- second to permanent residents of other Canadian provinces.
- third to all other applicants.

### **Bachelor of Science (Nursing) - for Registered Nurses**

The requirements for admission to the BScN for registered nurses are as for the BScN basic programme with these additional conditions:

- nurse registration as an active practicing member in Nova Scotia or province/country of residence
- successful completion of RN examination or equivalent
- Mature applicants will be considered on an individual basis. Upgrading in certain required subjects, e.g. Chemistry, Mathematics, may be recommended.

### **Outpost and Community Health Nursing (Diploma)**

- Nova Scotia Grade 12 or equivalent;
- Current registration in a province or territory in Canada or recognized equivalent;
- At least one year of work experience as a registered nurse, recent acute-care hospital experience is desirable;
- Demonstrated leadership potential

Admission preference is given to nurses currently employed by Medical Services Branch, Health and Welfare Canada or the government of the Northwest Territories. Other nurses are considered for admission if they agree to employment in a Canadian outpost setting upon completion of the programme. All applications must be approved by the Medical Services or the Northwest Territories' Government Education Leave Committee;

### **School of Occupational Therapy**

#### **Bachelor of Science (Occupational Therapy)**

Students considering Occupational Therapy should consult with the School of Occupational Therapy before their first registration. In Arts and Science at Dalhousie University the required first-year classes are:

- Psychology 1000.06, 1010.06 or 1500.06
- Sociology 1000.06, 1050.06, 1100.06, or 1200.06
- one elective (writing class)
- two classes in different subject areas from: Biology 1000.06, 1001.06; Chemistry 1010.06, 1020.06, 1030.06, 1040.06, or Physics 1100.06 or 1300.06
- Although not a requirement for admission, it is recommended that students complete Statistics 1060.03 (or equivalent) prior to admission.

Students who complete the equivalent prescribed first-year programme at any recognized university will be given equal consideration for transfer into the School of Occupational Therapy.

Since enrolment in the programme is limited, applicants should note that admission is on a competitive basis with preference given to residents of the Atlantic Provinces. The provincial quota system currently allocates 9 positions to New Brunswick, 8 positions to Newfoundland, 16 positions to Nova Scotia, and 2 positions to Prince Edward Island. Selection is based on completion of prerequisites, academic achievement and personal suitability for occupational therapy. Selection procedures may require an interview and personal evaluation.

A completed application for the School of Occupational Therapy consists of the required submissions, with the exception of an official record of high school work, listed under "Basic Requirements" earlier in this section as well as:

- an autobiographical letter as described in the supplementary application material available from the Registrar's Office.
- one confidential assessment by a class professor (as described in the supplementary application materials) sent by the professor to the Registrar's Office.

### **College of Pharmacy**

#### **Bachelor of Science (Pharmacy)**

Applicants to the College of Pharmacy must fulfill the requirements of a first year BSc student at Dalhousie University as outlined in the Degree Requirements section of this calendar. Equivalent subjects from other universities will be given equal status for purposes of determining admission.

Classes required for admission are the following Dalhousie classes:

- Chemistry 1010.06 or equivalent;
- Mathematics 1000.03 and 1010.03 or equivalent (one full year) Calculus;
- One of Physics 1000.06, 1100.06, 1300.06 or equivalent OR Biology 1000.06 or equivalent;
- One Humanities or Language;
- One Social Science

One of the above classes must be a writing class as described in the "Degree Requirements" section of this calendar. The same class/subject cannot be used to satisfy both the Humanities/Language and the Social Science requirement. Examples of Humanities/Language and Social Science classes are given in "Degree Requirements" section of this calendar.

Information regarding credit for advanced classes may be obtained from the Registrar. Incomplete applications and applications submitted after the deadline indicated in the Final Dates for Admission section will not be considered.

#### Selection Criteria:

The selection criteria used by the Admissions Committee include:

- place of residence,
- academic performance,
- scores on the Pharmacy College Admissions Test (PCAT), and
- interviews

A maximum of 60 admission points is assigned to academic performance, 10 admission points to PCAT, and 30 admission points to interviews. The top 66 applicants constitute the first year class and the next 12 applicants are placed on the waiting list.

#### Place of Residence:

Because this is the only College of Pharmacy for the Maritimes, preference is given to Maritime applicants. Attendance at a Maritime university does not, by itself, constitute having established residence in the Maritime provinces.

Applicants are considered to be from the Maritimes if:

- the principal residence of the applicant's parent(s) or guardian is located in the Maritime provinces, or
- the applicant (or spouse) has been employed full-time in the Maritime provinces for the preceding 12 consecutive months.

Applicants whose parent(s), guardian or spouse do not meet the residency requirements as a direct result of a recent employment transfer either into or out of the Maritime provinces would not necessarily be expected to conform to the above guidelines.

Exceptions to the above guidelines will be considered on an individual basis. Residency will be determined for each applicant on February 1st of the year for which admission is being sought.

No more than three students from outside the Maritimes are accepted into the first year class each year.

#### Academic Performance:

Academic grades of applicants and/or the university classes chosen form the basis of the evaluation of academic performance. Applicants should note that admission is on a competitive basis so that the ability to obtain consistently better than average grades would definitely be an asset for the applicant. An academic record containing failures or poor grades makes the prospect of admission very unlikely.

#### Pharmacy College Admission Test:

Applicants must write the Pharmacy College Admission Test (PCAT). Information on test dates, testing centres and test format may be obtained from the Registrar's Office or by writing to PCAT, Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204. Applicants are required to write the test no later than the October sitting in the year prior to which the applicant is seeking admission (e.g. October 1994 for admission September 1995).

#### Interviews:

Only those applicants who have obtained a high level of academic performance are invited for an interview.

In the interview, the following non-academic criteria are assessed.

- Motivation;
- Ability to Relate to Others;
- Self-Appraisal;
- Maturity; and
- Professional Attitude.

#### Notification:

Applicants will be informed of the status of their applications no later than late July. Those applicants who are put on the waiting list may expect to hear about acceptance as late as two weeks into the start of the academic term.

#### Deposit Fee:

In addition to the deposit requirement outlined on page 31, the following guidelines have been established for the College of Pharmacy: If the deposit is not received, the place will be offered to another applicant without any further notice. Students who have paid their deposits but who have not appeared at the College by the third day of

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classes will be considered to have withdrawn from the College unless they have written permission from the Admissions Committee.

## Special Cases:

In exceptional circumstances, special consideration may be given by the Admissions Committee to applicants who do not meet all the admission requirements.

## School of Physiotherapy

### Affirmative Action Policy

The School has an affirmative action policy to increase the number of qualified physiotherapists who belong to the Black, Mi'kmaq or Inuit groups of the Atlantic region.

### Bachelor of Science (Physiotherapy)

The minimum academic requirement for entry into the first professional year of the BSc (Physiotherapy) programme is successful completion of first year in Arts and Science at Dalhousie University or the equivalent at another University (see Academic Requirements). Students studying at universities other than Dalhousie are requested to ensure that the prerequisite courses they are taking are equivalent to the courses listed below by contacting the Registrar's Office.

- Two courses from Chemistry, Physics, or Biology. Acceptable courses are: Chemistry 1010.06, 1020.06, 1030.06, 1040.06; Biology 1000.06 or 1001.06; Physics 1100.06 or 1300.06.
- One course from Psychology or Sociology and Social Anthropology. Acceptable Dalhousie University courses are Psychology 1000.06 or 1010.06 or 1500.06; Sociology and Social Anthropology 1000.06 or 1060.06 or 1100.06 or 1200.06.
- The equivalent of two full Arts or Science electives. A course in introductory Physics is recommended.
- CPR (Cardiopulmonary Resuscitation) Certification must be completed by the end of Year 2.
- A limited number of places may be made available for students who already possess a graduate degree in a discipline considered by the Admissions Committee to be relevant to Physiotherapy and whose course work may not include the prerequisite courses as described above. Such candidates are evaluated on an individual basis.
- The Admissions Committee will determine each year which applicants will be interviewed. A limited number of interviews will be conducted.
- All applicants must sign a declaration regarding their physical and emotional suitability to undertake Physiotherapy.

Since the demand for admission exceeds the number of places available, candidates are judged on a competitive basis. The decision of the admissions committee is final.

### Quota System:

The School of Physiotherapy at Dalhousie University is the only School serving Atlantic Canada. Due to the shortage of physiotherapists in the Atlantic provinces, a provincial quota system has been implemented. The provincial quota system means that a specified number of places will be allocated to each Atlantic province. 16 positions are allocated to Nova Scotia, 18 to New Brunswick, 10 to Newfoundland, and 3 to Prince Edward Island, 1 to be determined by the Admissions Committee, for a total of 48 positions.

Residency must be established by March 1 in the year for which application is being sought.

### Transfer Students:

- Students who wish to transfer to the School of Physiotherapy from another University course in Physiotherapy must submit a written request for transfer to the Chair of the Admissions Committee of the School of Physiotherapy and enclose official transcripts from all colleges and universities attended as well as the calendar descriptions of all courses taken. Such requests are assessed on an individual basis. Admission is subject to the availability of a place. In order to obtain the BSc (Physiotherapy) degree from Dalhousie University, any transfer student admitted into the School must conform with Faculty Regulations.
- Students with previous elective academic work seeking exemption from classes are assessed on an individual basis. Prospective candidates are strongly advised not to include classes of similar description and content as those offered in the second, third, and fourth (professional) years.

## School of Recreation, Physical, and Health Education

### Bachelor of Physical Education

In addition to the distribution as outlined under Acceptable Classes above, admission from high school requires an average of 70% or better in five grade XII subjects including:

- English 441
- a minimum of two of Biology, Chemistry, Mathematics and Physics
- Students applying to the BPE/BED programme and selecting the second secondary track must have the appropriate Grade XII credit in their second teachable subject.

**Note:** Mathematics 441 is a required pre-requisite for many classes in Mathematics, Science and Computing Science at Dalhousie University.

The remaining classes may be from those listed above or from the classes listed in Category 3 at the beginning of this section. In addition, a senior class in Physical Education may be considered for admission to the BPE/BEd programme.

#### Admission with Advanced Standing:

Students may be admitted to the undergraduate programme with advanced standing if they have completed Arts and Science classes at Dalhousie or at a recognized university.

#### BPE/BEd (Integrated)

- Students are reminded that this is a limited enrolment programme.
- Students may apply to this programme at the end of their second year. For consideration, students must have met the BEd admission requirements, plus have completed the first two years in Physical Education. In particular, PHSE 1195.03 and PHSE 2295.03 must have been completed, as well as the Arts, Social Science and Science electives listed in the first two years. Applications must be submitted to the Co-ordinator of the Field Experience Program in Physical Education by the end of February of the second year for consideration that Spring. Please refer to the BEd section for specific requirements.
- **Advanced Standing:** Students who have completed the three year Associate degree at the Nova Scotia Teachers' College, Truro, may be admitted with advanced standing, provided they satisfy the usual admission requirements for the Bachelor's Degrees in Physical Education and Education at Dalhousie. The decision on granting credit depends on whether an acceptable level of accomplishment has already been demonstrated in a comparable class.

#### Bachelor of Recreation

The minimum requirement for entry into the Bachelor of Recreation programme is:

- successful completion of one year of university with a grade point average of 2.3 or higher

High school students or new students wishing to pursue a career in the field of recreation administration should apply for admission into either the Faculty of Arts and Social Sciences or the Faculty of Science. The following courses are recommended for the first year of study:

- Psychology 1000.06 or 1010.06 or 1500.06 or equivalent

- Sociology and Social Anthropology 1000.06 or 1200.06 or equivalent
- Political Science 1100.06 or Economics 1100.06 or equivalent
- Any two electives
- Note that as per College of Arts and Science Degree Requirements one of the above courses should be designated a writing course (see "Degree Requirements").
- The Bachelor of Recreation programme will normally be completed in three years after entry into the programme. The programme may be longer if the student has not completed the recommended prerequisite courses outlined above.
- Selection will be made as soon as the final grades are available. There will be a limit of 40 places.

The Leisure Studies Division has an affirmative action policy to increase the number of students who have a physical disability or who belong to the Acadian, Black and Native minority groups of the Maritime region.

#### Bachelor of Science (Health Education)

Applicants should have completed Nova Scotia Grade XII (or equivalent) with an average of 70% in five university preparatory subjects, including:

- English and
- Biology or Chemistry.

**NOTE:** Mathematics 441 is a pre-requisite for many classes in Mathematics, Science and Computing Science at Dalhousie.

Students already engaged in university programmes can transfer into the Health Education programme. Experienced persons in the workplace may be admitted as mature students. Inquiries about admission to this programme should be directed to the Head of the Health Education Division.

#### Admission Criteria

Thirty students will be selected yearly for the fall term from applicants who have the following minimum requirements:

1. completion of Nova Scotia Grade XII (or equivalent) with a minimum average of 70% in each of five university preparatory subjects, including English, and Biology or Chemistry; or
2. completion of some post-secondary course work with a minimum grade point average of 2.0 in a 4.3 system;
3. completion of a university degree; or
4. qualification as a mature student.

Applicants are asked to submit, along with their application, a letter to the Head of the Health Education Division indicating the applicant's interest in the BSc (Health

# 36 Admission Requirements

Education) programme, any work (paid or volunteer) experience, any particular career aspirations, and any other information the applicant thinks may have a bearing on his/her suitability to this programme.

Applicants will be accepted during the winter term of each year and applicants will be informed promptly of the Division's decision about admission. Applications will not be considered after June 1st of each year.

## **Bachelor of Science (Kinesiology)**

Generally admission from high school requires an average of 70% or better in five grade XII subjects including:

- English 441
- a minimum of two of Biology, Chemistry, Mathematics and Physics; (Note: Mathematics 441 is a pre-requisite for many classes in Mathematics, Science and Computing Science at Dalhousie).

## **Transfer Students:**

In order to be admitted to the Kinesiology programme, students transferring from other university programmes are expected to have a minimum GPA of 2.3 (using the Faculty of Health Professions formula to calculate the GPA.) The second year program for Kinesiology transfer students is outlined in the Kinesiology section of this calendar.

## **Maritime School of Social Work**

### **Affirmative Action Policy**

The School has an affirmative action policy to increase the number of qualified social workers who belong to the Aboriginal, Acadian and Black minority groups of the Maritime region.

### **Bachelor of Social Work**

To be eligible for admission to the BSW programme, all candidates must meet the following minimum requirements:

- to have at least 5 full credits of general undergraduate study at a recognized university or equivalent institution of higher learning, for which the credits are appropriate for an academic background in Social Work;
- to have a cumulative academic average of at least B- or 85%;
- to show evidence of personal maturity and suitability for Social Work.

The first five university credits may be taken in any subject area other than that of Social Work. The probability of admission is higher for all applicants if more than 5 credits have been completed by the date of application.

A Bachelor's degree with a concentration in the Social Sciences is most appropriate for the study of Social Work. Useful preparation in the first year includes introductory English,

Psychology, Sociology and Political Science. Additional Social Science base content in the second and third years of study is also recommended.

The BSW degree requires a minimum of two additional years of study following the first undergraduate degree.

### **Admission of University Students**

While the completion of the above represents the minimum requirements for admission, acceptance for professional training in Social Work requires a well-developed interest and a willingness to engage in long-term planning. Enrolment is limited to the most qualified candidates. Applicants progressing from high school to university may best prepare for admission by obtaining a BA or BSc degree, with a cumulative B+ or 75% average.

Work and volunteer experience in the social or human services is also an important asset particularly where there is direct personal contact, preferably with on-the-job training and supervision.

### **Admission of Other Persons**

Persons over 25 years of age with related work experience are considered on a combined basis of academic performance and demonstrated ability for Social Work practice. Enrolment is limited to the best qualified candidates only.

Completion of at least five of the general university credits, with the prerequisite B-average or better, is expected prior to the application deadline date. Demonstrated ability for Social Work includes the nature and length of current or previous employment in social or related human services, and a positive work reference. Other experience in community services may also be considered.

### **Application Procedure**

Applications for admission are assessed once a year only. Candidates are considered in relation to all others who apply in the same year. Although the Admissions Committee may request an interview as part of the selection procedure, personal interviews are not conducted.

In the case of credits currently in progress, decisions are made on the basis of Christmas grades; acceptances are conditional on receipt of final transcripts.

### **Dentistry, Law, Medicine, and Graduate Studies**

For information concerning admission into these faculties, consult the appropriate calendar, or contact the appropriate faculty office directly.

## Fees

### 1994 - 1995

#### Student Accounts Office

The Student Accounts Office is located on the basement level of the Arts & Administration building.

**Address:** Dalhousie University, Student Accounts (Financial Services), Room 29 Arts & Administration Building, Halifax, Nova Scotia, B3H 4H6

**Telephone:** (902) 494-3998

**Fax:** (902) 494-1534

**Office Hours:** 10:00 - 4:30 Monday to Friday (or by appointment)

**NOTE:** All the regulations in this section may not apply to Graduate Students. Please refer to the "Faculty of Graduate Studies" section of the Graduate Studies Calendar.

This section of the Calendar outlines the University Regulations on academic fees for both full-time and part-time students enrolled in programmes of study during the fall, winter and regular sessions. A section on University residence and housing fees is also included. Students wishing to register for the Spring or Summer session should consult the Summer School Calendar for information on registration dates and fees. Should you have any questions regarding these regulations or on the payment of fees generally, please contact the Student Accounts Office.

All fees are subject to change by approval of the Board of Governors of Dalhousie University. An Academic Fee Schedule will be available in April. A list of miscellaneous fees is included in Table I.

Students should make special note of the registration deadlines contained in the calendar on pages 1 & 2. Students should also be aware that additional fees and/or interest will be charged when deadlines for payment of fees as contained herein are not met.

#### Mail Registration

For the convenience of students, registration material and non-cash payments are accepted by mail. Registrations with cheques post-dated to September 9, 1994 will also be accepted. Please allow sufficient time to ensure that material sent by mail is received on or before the specified dates. Please note that after August 26th we are unable to retrieve post-dated cheques.

#### General Regulations

The following general regulations are applicable to all payments made to the University in respect of fees.

- Fees must be made in Canadian funds by cash or negotiable cheque.
- If payment is by cheque and returned by the bank as non-negotiable, there will be an additional fee of \$20.00 and the account will be considered unpaid. Furthermore, if the bank returns a cheque that was to cover the first payment of tuition, the student's registration will be cancelled and, if permitted to re-register, a late fee will apply.
- Invoices for fees will not be issued. The receipt obtained from Student Accounts each time a payment is made will show the date and amount of the payment.
- Cash, certified cheque, or money order is required for payment of any account in arrears beyond the current academic year.

#### Admission Deposit

A non-refundable deposit of \$200.00 is required by all new students in Specified Limited Enrolment Programmes within three weeks of receiving an offer of a place at Dalhousie. (Please refer to Table II for the definition of Specified Limited Enrolment Programmes.) Further information on the regulations governing the refund of admission deposits is contained in the section below on Changes, Refunds and Withdrawals (page 42).

#### Foreign Students

Students registering at Dalhousie University who are not Canadian citizens or permanent residents are required to pay an additional fee referred to as a "Differential Fee". Students registering in an existing programme will pay \$1700.00, while students registering for the first time in their programme of study will pay \$2700.00. There is a proportionate charge for part-time foreign students. The differential fee is payable with the first instalment of fees each year.

#### Academic Fees

Academic fees are comprised of:

- (a) the tuition fee;
- (b) an incidental fee comprised of Student Union, Society and Athletic fees.

The complete 1994-95 academic fee schedule is not yet available. The Academic Fee Schedule shows the 1994-95 approved tuition and athletic fees, and the 1993-94 Student Union and Society fees. Once all fees are approved for 1994-95 the complete fee schedule will be made available. The official schedule will be included in the registration package.

For purposes of this section of the Calendar, a full-time undergraduate student is one who is registered for the regular session for more than three full credits (21 credit hours or more), or, if registered for only one term, for more than three one-half credits.

Changes from full-time to part-time and part-time to full-time status often have cost implications beyond what the student expects (see table VI). Any part-time student planning to add classes, or full-time students who are considering part-time status (dropping classes) should consult with Student Accounts to determine the impact these changes will have on the fees assessed.

Students registered in more than one programme are required to pay separate academic fees for each programme. Full-time students taking classes not credited towards their degree or programme will be required to pay additional fees for these classes.

## Registration

The final step in registration is the payment of fees. A student is considered registered only after financial arrangements have been made with Student Accounts.

### All students:

- a) must submit to the Student Accounts Office on or before the specified registration dates the first instalment of academic fees unless they are receiving a scholarship, fellowship, Canada Student Loan, a fee waiver, or their fees are paid by external organizations;
- b) those holding external scholarships or awards paid by or through Dalhousie University must provide at registration documentary evidence of the scholarship or award;
- c) those whose fees are to be paid by a government or other agency must provide a signed statement from the organization at registration. (Please note: upon request, account status information will be made available to the sponsor.)
- d) those whose fees are to be paid by Canada Student Loan must indicate such on the appropriate section of the registration form. (Please note: Students registering by Canada Student Loan must negotiate the Loan or provide the letter of declination issued by Student Aid by September 26. A late registration fee and/or interest may be charged after September 26. Failure to comply or arrange an alternative method of payment may result in deregistration).

- e) those whose fees are paid by a Dalhousie University staff tuition fee waiver must present the approved waiver form and pay applicable incidental fees at time of registration.
- f) those who are Canadian citizens or permanent residents, 65 years of age or over and enrolled in an undergraduate degree programme will have their tuition fees waived but must pay applicable incidental fees.

The completion of the registration process shall be deemed to be an agreement by the student for the payment of the balance of fees unless written notification to withdraw is submitted to the Office of the Registrar. Students withdrawing in person must attend the Office of the Registrar and the Student Accounts Office before the withdrawal process is official. Students in Graduate and Professional programmes wishing to withdraw should initiate formal action to withdraw at the office of the appropriate Dean.

## Payment of Academic Fees

The complete 1994-95 academic fee schedule is not yet available. The Academic Fee Schedule shows the 1994-95 approved tuition and athletic fees, and the 1993-94 Student Union and Society fees. Once all fees are approved for 1994-95 the complete fee schedule will be made available. The official schedule will be included in the registration package.

The payment of academic fees will be received at the Student Accounts Office located on the basement level of the Arts & Administration building.

Fees paid by mail must be received by Student Accounts on or before the deadlines specified below in order to avoid late payment and/or delinquency charges.

The following regulations apply to the payment of academic fees. For further information on regulations regarding withdrawal of registration, please refer to the Changes, Refunds and Withdrawals section. (page 42)

- a) Should students prefer to pay in two instalments, the first instalment is due on or before September 9 and the second instalment is due January 31, or the first subsequent working day.
- b) Students registering for either the fall or winter terms only must pay fees on or before September 9 and January 3, respectively.
- c) Scholarships or awards paid by or through Dalhousie University will be applied to tuition and residence fees.

- d) When Canada Student Loan, Provincial Loan or co-payable bursary is presented at the Student Accounts Office, any unpaid academic, residence fees and/or Temporary Loans will be deducted.
- e) Fees cannot be deducted from salaries paid to students who are employed at Dalhousie University.
- f) Subsequent to August 26, 1994 we are unable to retrieve post-dated cheques.
- g) Any payments received will first be applied to overdue accounts.

**Audit Classes**

Full-time students may audit classes which are related to their programmes without additional fees. Part-time students auditing a class pay one-half of the regular tuition. In such cases, the student is required to complete the usual registration process.

A student registered to audit a class and during the session wishes to change to registration for credit must receive approval from the Registrar and pay the difference in class fees plus a transfer fee of \$25.00. This must be done on or before the last day for withdrawal without academic penalty. The same deadline applies for a change from credit to audit.

**Late Registration**

Students are expected to register on or before the specified registration dates. Students wishing to register after these dates must receive the approval of the Registrar and pay a late registration fee of \$50.00. This fee is payable at the time of registration and will be in addition to the first instalment of fees.

**Changes, Refunds and Withdrawals**

Please consult Student Accounts for all financial charges and the Office of the Registrar for Academic regulations. Refer also to the Academic Fees section (page 43 and Table III, IV and VI.)

A refund of fees will not be granted unless the following conditions are met:

**NON-ATTENDANCE AT CLASSES DOES NOT CONSTITUTE WITHDRAWAL.**

- a) Written notification of withdrawal must be submitted to the Office of the Registrar.
- b) After the approval of the Registrar has been obtained, (In the case of graduate and professional school, the appropriate Dean) application for a refund or adjustment of fees should be requested from the Student Accounts Office immediately. For students withdrawing in person, the withdrawal process is official, on the date that application for withdrawal is made at the Student Accounts Office. Therefore, the

calculation of the refundable portion of fees will be based on this date. (Retroactive withdrawals will not be permitted.)

- c) No refunds will be made for 30 days when payment has been made by personal cheque.
- d) A student who is dismissed from the University for any reason will not be entitled to a refund of fees.
- e) Refunds will not be made to a student who has paid an admission deposit for a Specified Limited Enrolment Programme.
- f) In any Specified Limited Enrolment Programme (See Table II and IV), the first instalment of fees is not refundable after the first day of classes except on compassionate grounds (eg. illness).
- g) Refunds will be made to the Bank if a student has received a Canada or Provincial Student Loan.
- h) Refunds will be prorated on fees paid by Scholarships.
- i) A valid Dalhousie University ID must be presented in order for the student to receive a refund cheque.

**Dates for Refund - Regular Session**

A student withdrawing or changing a class after September 26 will be charged full incidental fees and may receive a refund of tuition fees on a proportional basis. Please refer to Tables III and IV.

A student withdrawing or changing a class in January will be charged the full first instalment of fees.

A student changing from full-time to part-time status before February 1, must have the approval of the Registrar and will then be eligible for an adjustment in tuition fees for the remainder of the session.

*No refunds will be made to students withdrawing after January 31.*

**Dates for Refund - First Term**

A student withdrawing or changing a class after September 26 will be charged full incidental fees and may receive a refund of tuition fees on a proportional basis. Please refer to Tables III and IV.

*No refunds will be made to students withdrawing after October 24.*

**Dates for Refund - Second Term**

A student withdrawing or changing a class after January 3 will be charged full incidental fees and may receive a refund of tuition fees on a proportional basis. Please refer to Tables III and IV.

*No refunds will be made to students withdrawing after February 13.*

## Dates for Refund - Commerce Co-op Summer session

A student withdrawing after May 17 will be charged the BComm Co-op fee and may receive a refund of tuition on a proportional basis. Please contact Student Accounts for complete details.

*No refunds will be made to students withdrawing after June 20.*

## Delinquent Accounts

Accounts are considered delinquent when the balance of fees has not been paid by September 26 (January 3 or the first subsequent working day, for students registered for the winter term only). Where payment in two instalments is permitted, the remaining balance is due January 31 or the first subsequent working day.

Interest at a monthly rate set by the University will be charged on delinquent accounts for the number of days overdue.

At the time of printing the monthly rate of interest is 0.76% (9% per annum).

A student whose account is delinquent for more than 30 days will be denied University privileges including access to transcripts and records of attendance and Dalplex. The student will be reinstated upon payment of the fees outstanding, the arrears interest and a \$50.00 reinstatement fee. Students will not be permitted to register for another session until all outstanding accounts are paid in full. Subsequently, if the bank returns the cheque, the student may be deregistered.

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

Accounts which become seriously delinquent may be placed on collection or further legal action may be taken against the individual. Students will be responsible for charges incurred as a result of such action.

## Canada Student Loans

Students planning to pay the first instalment of fees from a Canada Student Loan should apply to their Province in April or May so that funds will be available in time for registration. The University will deduct fees/charges from the loan at the time of endorsement. Please contact the appropriate provincial office to determine eligibility as well as course load requirements.

## Provincial Bursaries and University Scholarships

These cheques are distributed by the Student Accounts Office. Any unpaid Fees and/or Temporary Loans along with charges, if applicable, are deducted and a University cheque will be issued within one week of endorsement for any balance remaining. A valid Dalhousie University ID and Social Insurance Number must be presented in order to receive these cheques. Please contact the appropriate provincial office to determine eligibility as well as course requirements for Provincial Bursaries. For more information on Student Loans, Bursaries or Scholarships inquiries should be directed to the Awards Office located on the first floor of the Arts & Administration building, Room 125. Telephone (902) 494-2418.

## Income Tax Credit from Academic Fees

The amount of academic fees constituting an income tax credit is determined by Revenue Canada, Taxation. Currently, the tax credit for students is calculated by deducting the following from Academic Fees: Student Union fees, Society fees, and Athletic fee. Seventeen percent (17%) of the remaining balance constitutes the tax credit.

A special income tax certificate will be available at Student Accounts annually no later than February 28. Replacement tax receipts will be provided within 3 weeks of the request for a charge of \$5.00 per receipt. On request, a replacement tax receipt will be provided within 2 days for a charge of \$10.00 per receipt.

## Identification Cards

All full and part-time students should obtain identification cards upon registration and payment of proper fees. If a card is lost, a fee of \$15.00 is charged. Regular academic year ID cards remain valid until the beginning of the following academic year (including summer session).

## Laboratory Deposits

A deposit for the use of laboratory facilities in certain departments is required. The deposit is determined and collected by these departments. Students will be charged for careless or wilful damage regardless of whether or not a deposit is required.

## Athletic Fee

Membership at Dalplex for 1994-95 is included in the athletic fee for all full-time students at Dalhousie and all part-time students at Dalhousie taking a minimum of three full credit classes. Membership in

Dalplex for ALL other part-time students at Dalhousie may be obtained at the office of Dalplex at the prevailing rates.

## Student Union Fee Distribution

Every student registered at Dalhousie is automatically a member of the Student Union and is therefore required to pay a Student Union fee as part of their registration procedure. These fees have been approved by students in referenda and, along with other revenue of the Union, are allocated each year by the Student Council in a budget.

What follows is the breakdown of how Student Union fees are spent. If you have any questions or comments please contact the Student Union Office located in Room 222 of the S.U.B.

Telephone No. 494-2146

## 1993 - 94 Student Union Fee

(For Information Only)

Full-Time (3 credits or more)	General Income
General Operations	\$41.15
Student Health Plan Insurance	44.00
Contributions to DSU	
Capital Campaign	15.00
Capital Payback for	
Student Union Building	10.00
C K D U - FM	9.00
Yearbook Fee	5.00
Canadian Federation of	
Students' Membership	4.00
Students' Union of	
Nova Scotia Membership	2.80
Course Evaluation	1.00
South African Trust Fund	1.00
Public Interest Research Group	4.00
WUSC	.50
Women's Centre Fund	2.00
Accessibility Fund	1.75
<b>TOTAL</b>	<b>\$141.00</b>

## Table I

### Miscellaneous Fees - Quick Reference

Fees	Amount	Payable To
Replacement Tax Receipt	\$5.00	Student Accounts
Priority Replacement Tax Receipt	\$10.00	Student Accounts
Late Registration	\$50.00	Student Accounts
Reinstatement Fee	\$50.00	Student Accounts
Returned Cheque	\$20.00	Student Accounts
Distance Education Fee, per class	\$100.00	Student Accounts
Admission Deposit	\$200.00	Registrar
Application Fee	\$30.00*	Registrar
Confirmation of Enrolment	\$5.00	Registrar
Late Graduation Application	\$50.00	Registrar
Letter of Permission		
per class - maximum \$50.00	\$10.00	Registrar
Reassessment Fee	\$25.00	Registrar
Replacement ID	\$15.00	Registrar
Transfer Credit Assessment	\$25.00	Registrar
Transcript	\$5.00	Registrar
Priority Transcript Fee	\$10.00	Registrar
FAX Fees		
Metro	\$5.00	Registrar
Canadian	\$10.00	Registrar
International	\$15.00	Registrar
Residence Application Fee	\$25.00	Residence

\*Except for the following programmes which require payment of a \$50.00 application fee: Occupational Therapy, Pharmacy, Physiotherapy, Recreation, Social Work, Education (including all combined programmes) and all programmes in the Faculties of Medicine, Dentistry (including Dental Hygiene), Law, and Graduate Studies.

Fees

## Table II

### Specified Limited Enrolment Programmes:

- Master of Business Administration
- Master of Environmental Studies
- Master of Library and Information Studies
- Master of Public Administration
- Bachelor of Education
- All programmes in the following faculties:
  - Faculty of Dentistry
  - Faculty of Law
  - Faculty of Medicine
  - Faculty of Health Professions

**Table III**

**Fee Refunds (Withdrawals)**

All Faculties (except Specified Limited Enrolment Programmes, see Table IV), including Graduate Studies

**Student Union Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**Athletic Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**Society Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**BComm and Science Co-op Fees:** Non-refundable after September 26 (Second Term Jan 17)

**Distance Education Fee:** Non-refundable after September 26 (Second Term Jan 17)

**Differential Fee:** Non-refundable after November 30

**Tuition Fee:** As follows:

Withdrawal Date	Regular	Graduate	Full-Time &	Full-Time &	Part-Time Students <sup>3</sup>			
	Session	Students	Thesis,	Thesis	A	B	C	R
	Full-time <sup>1</sup>	Except	1st Term	2nd Term	Class	Class	Class	Class
Up to Aug 18	100%	100%	100%	100%	100%	100%	100%	100%
Aug 20 - Sept 26	95%	95%	95%	100%	95%	100%	95%	95%
Sept 27 - Oct 24	85%	85%	87%	100%	87%	100%	85%	85%
Oct 25 - Nov 14	70%	70%	0%	100%	0%	100%	70%	70%
Nov 15 - Dec 14	60%	60%	0%	100%	0%	100%	60%	60%
Dec 15 - Dec 31	50%	50%	0%	95%	0%	95%	50%	50%
Jan 1 - Jan 16	40%	40%	0%	95%	0%	95%	40%	40%
Jan 17 - Jan 31	40%	40%	0%	87%	0%	87%	40%	40%
Feb 1 - Feb 13	0%	0%	0%	87%	0%	67%	0%	0%
After Feb 13th	0%	0%	0%	0%	0%	0%	0%	0%

<sup>1</sup> Applicable to undergraduate students registered in regular session (Sept - Apr) taking more than three credits (21 credit hours or more).

<sup>2</sup> Undergraduate students registered in one term only taking more than three one-half credit classes (more than 9 credit hours). Graduate students registered as "Thesis Only" for one term.

<sup>3</sup> Applicable to undergraduate students registered in regular session (Sept - Apr) taking less than three and one-half credit classes (less than 21 credit hours). Undergraduate students registered in one term only taking three one-half credit classes or less (9 credit hours or less).

**Table IV**

**Fee Refunds - Specified Limited Enrolment Programmes**

**Admission Deposit:** Non-refundable

**Student Union Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**Athletic Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**Society Fee:** Non-refundable after Sept. 26 (Second Term Jan 3)

**Tuition Fee:** As follows:

Withdrawal Date	Regular Session	First Term Only	Second Term Only
Up to August 19	100%	100%	100%
August 20 - September 12	95%	95%	100%
September 13 - December 15	40%	0%	100%
December 16 - January 3	40%	0%	95%
January 4 - January 31	40%	0%	0%
After Jan. 31	0%	0%	0%

## ACADEMIC FEES - 1994-95

The complete 1994-95 academic fee schedule is not yet available. In order to provide some indication of the fee requirements, the schedule below shows the 1994-95 approved tuition and athletic fee as well as 1993-94 incidental fees. Once all fees are approved for 1994-95, a complete schedule showing total academic fees and the minimum instalments will be made available. The official schedule will be included in the registration package.

	Approved for 1994-95		(for information only) 1993-94 figures		Approved for 1994-95		(for information only) 1993-94 figures	
	Tuition	Athletic	DSU fee	Society	Tuition	Athletic	DSU fee	Society
<b>Arts &amp; Social Science</b>								
Full-time (1)(8)	2,820	50	141	10				
Full-time term (3)	1,480	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,900	50	141	10				
1 Credit Class	600	-	30	-				
1/2 Credit Class	300	-	15	-				
<b>Science (Except Engineering)</b>								
Full-time (1)	3,225	50	141	15				
Full-time term (3)	1,615	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,980	50	141	15				
1 Credit Class	660	-	30	-				
1/2 Credit Class	330	-	15	-				
Co-op Work Term - fall	400	-	-	-				
Co-op Work Term - winter	440	-	-	-				
<b>King's (Arts &amp; Social Science) (4)</b>								
Full-time (1)	2,920	(4)	-	10				
Full-time term (3)	1,480	(4)	-	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,800	(4)	-	10				
1 Credit Class	600	-	-	-				
1/2 Credit Class	300	-	-	-				
<b>King's (Science) (4)</b>								
Full-time (1)	3,225	(4)	-	15				
Full-time term (3)	1,615	(4)	-	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,980	(4)	-	15				
1 Credit Class	660	-	-	-				
1/2 Credit Class	330	-	-	-				
Co-op Work Term - fall	400	-	-	-				
Co-op Work Term - winter	440	-	-	-				
<b>Education</b>								
Full-time (1)	3,115	50	141	10				
Full-time term (3)	1,560	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,990	50	141	10				
1 Credit Class	630	-	30	-				
1/2 Credit Class	315	-	15	-				
<b>Engineering</b>								
Full-time (1)	3,325	50	141	25				
Full-time term (3)	1,665	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,980	50	141	25				
1 Credit Class	660	-	30	-				
1/2 Credit Class	330	-	15	-				
<b>Management</b>								
<b>BComm - Co-op (8)(7)</b>								
Year of Study 1 & 2	3,370	50	141	30				
Co-op fee	550	-	-	-				
Year of Study 3	1,665	50	141	30				
Co-op fee	275	-	-	-				
Year of Study 4	3,540	50	141	30				
Co-op fee	570	-	-	-				
<b>BComm &amp; CPA</b>								
Full-time (1)	2,950	50	141	30				
Full-time term (3)	1,475	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,800	50	141	30				
1 Credit Class	600	-	30	-				
1/2 Credit Class	300	-	15	-				
<b>Health Professions</b>								
<b>BSW</b>								
Full-time (1)	3,115	50	141	25				
Full-time term (3)	1,560	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	1,890	50	141	25				
1 Credit Class	630	-	30	-				
1/2 Credit Class	315	-	15	-				
<b>Nursing (2)</b>								
Full-time (1)	3,480	50	141	20				
Full-time term (3)	1,740	50	141	20				
<b>Part-time (5)</b>								
3 Credit Classes	2,070	50	141	20				
1 Credit Class	690	-	30	20				
1/2 Credit Class	345	-	15	20				
<b>Occupational Therapy &amp; Physiotherapy</b>								
Full-time	3,645	50	141	13				
<b>Pharmacy</b>								
Full-time	3,645	50	141	65				
Clinical Residence - Pharmacy	645	50	-	-				
<b>Recreation, Physical, and Health Education</b>								
Full-time	3,490	50	141	10				
Full-time term (3)	1,740	50	141	-				
<b>Part-time (5)</b>								
3 Credit Classes	2,070	50	141	10				
1 Credit Class	690	-	30	-				
1/2 Credit Class	345	-	15	-				

For notes to Fee Schedule see next page.

## Notes to Fee Schedule

- (1) Students taking three and one-half credit classes (21 credit hours or more) in regular session (Sept - Apr).
- (2) Nursing students will pay society fee only once per year.
- (3) One term only taking more than 3 classes (1/2 credits).
- (4) King's students may purchase Dalplex membership at an additional cost of \$75.00.
- (5) Undergraduate students taking less than three and one-half classes (less than 21 credit hours) or taking three one-half credit classes or less (9 credit hours or less) in one term only.
- (6) Students transferring into Co-op programme from another faculty pay a transfer fee of \$550.00. This payment is non-refundable.
- (7) BComm and Science Co-op fees are non-refundable after September 26 (second term January 17).
- (8) Subject to approval by Board of Governors of University of King's College.
- (9) In 1994/95 students taking certain classes in Music, Theatre and Costume Studies may be required to pay auxiliary fees. Details will be included in the registration package which will be available in June, 1994.

**Foreign Students** - Students registering at Dalhousie University who are not Canadian citizens or permanent residents are required by Government regulation to pay an additional fee referred to as a "Differential Fee". Students registering in an existing programme will pay \$1,700.00, while students registering for the first time in their programme of study will pay \$2,700.00. There is a proportional charge for part-time foreign students. The differential fee is payable with the first instalment of fees each year. Graduate Students please see Section 4.5 of the Graduate Studies Calendar to determine the number of years a student is required to pay the differential fee.

**Health Insurance** - foreign students (1993-94 rates for information only)

Visa Students	Postgraduate Medicine
Single - \$ 540	Single - \$ 713
Married - \$ 1080	Married - \$ 1426

**Audits** - Students auditing a class pay one-half the regular tuition fee.

**Changes, Refunds and Withdrawals** - For all financial charges contact STUDENT ACCOUNTS, or please refer to Tables III & IV. Please note non-attendance at classes does not constitute withdrawal. Written notification of withdrawal is required. Refer also to Academic Fee section (page 43).

### Table VI

#### Fee Adjustments (Class Changes)

Students contemplating a change in class activity should consider the financial implications as well as academic.

Please contact Student Accounts if you have any questions regarding changes, refunds or withdrawals.

Students changing to part-time<sup>2</sup> from full-time<sup>1</sup> after September 26 will be assessed the same percentage of full-time fees as students withdrawing from the University. Please refer to the refund schedule (Table III) to determine the percentage. Fees for classes remaining will be assessed according to part-time fees less the percentage used to calculate the portion owing for full-time fees.

Part-time students<sup>2</sup> dropping a class will be assessed the same percentage as part-time students<sup>2</sup> withdrawing from the University. Please refer to the refund schedule (Table III) to determine the cost of classes being dropped. Additions are assessed according to the fee schedule.

<sup>1</sup> Applicable to undergraduate students registered in regular session (Sept - Apr) taking more than three credits (21 credit hours or more). Applicable to graduate students with full-time status.

<sup>2</sup> Applicable to undergraduate students registered in regular session (Sept - Apr) taking less than three and one-half credit classes (less than 21 credit hours). Undergraduate students registered in one term only taking three one-half credit classes or less (9 credit hours or less).

## Residence Fees

Please note the following are general statements. Given the diversity of residence facilities, available practices vary slightly from locale to locale.

Applications for accommodation in all residences are accepted on the understanding that the student will remain for the whole academic session.

When students who have chosen to live in residence and have secured a room withdraw from residence before the end of the school year, there are serious financial penalties. Written notice to withdraw is always required by the Residence Co-ordinator or Fenwick Manager. Complete information on withdrawal from residence is available from the Residence Co-ordinator or Manager and is detailed in the residence lease agreement to be signed by all residence students. No refund will be made to any resident who is dismissed for misconduct. Discretionary power in exceptional circumstances remains with the Director of Housing and Conferences or designate. Residence Application Forms will not be distributed until the student has been accepted by the University for the coming session. To be considered for accommodation, a completed Residence Application Form and the \$125.00 residence application fee and deposit must be received. All residents, new and returning, who have accepted a room assignment, will be required to pay a second rent deposit of \$200.00 by July 1 to reconfirm the assigned space. Failure to make a second deposit by July 1 will result in automatic cancellation of room assignment. Once the \$200.00 deposit is paid it (along with the \$125.00) is not refundable; it is our guarantee of your intention to live in residence.

Deposits may be made by cheque, bank draft, or money order in Canadian funds and payable to Dalhousie University. No reservations will be held on post-dated or "NSF" cheques. Deposits cannot be deducted from scholarships, fellowships, or similar awards.

### Payment of Residence Fees

Payment may be made in full at registration, or for an extra charge of \$10.00, in two instalments. Scholarships may be applied to residence charges only after tuition fees for the full session are paid. The first instalment must be paid in full by September 30. Interest at a monthly rate as set by the University will be charged on all accounts outstanding after September 30 and on any second instalment outstanding after January 31. At the time of printing the monthly rate of interest is 0.75% (9% per annum). The student will not be permitted to register for

another session until all accounts are paid in full. A student whose account is delinquent for more than 30 days will be denied university privileges including access to transcripts and records of attendance and Dalplex. The student will be reinstated upon payment of the fees outstanding, the arrears interest, and a \$50.00 reinstatement fee.

For Howe Hall, Eliza Ritchie Hall, Shirreff Hall, Glengary Apartments and the Residence Houses fees are paid at the Student Accounts Office. For Fenwick Place and Co-ed Apartment Units fees are paid at Fenwick Place.

Students should make an appointment as soon as possible with the Associate Director of Residence Life, Fenwick Manager, or the Supervisor of Student Accounts if they are having financial difficulties.

### Regulations and Additional Charges

The room and board session is defined as being from the Wednesday in September before classes begin in the College of Arts and Science to the last day of regularly-scheduled examinations in the College of Arts and Science in April. Please note that, except at Fenwick Place, students must vacate the residence twenty-four hours after their last exam and that residences are closed over the Christmas holidays.

No reduction in the board charge will be made for meals not taken, except that a rebate of \$200.00 per month may be considered in the case of illness or other cause necessitating absence of four weeks or more.

In Fenwick Place the rental period is based on a 34-week period beginning on Labour Day. For more specific details on dates of semesters, students should contact the accommodations office at Fenwick Place.

In all other cases, an additional fee is payable by all residents who are registered in a Faculty where the academic session commences before or continues after the session of the College of Arts and Science. Special arrangements are to be made with the Residence Co-ordinator or Manager for accommodation for periods prior to or following the session as defined above.

# 46 Fees

## RESIDENCE ROOM AND BOARD RATES 1993/1994 (1)

The residence term for Howe Hall, Shirreff Hall, Eliza Ritchie Hall, Glengary Apartments and the Residence Houses cover the time period from the Wednesday in September before classes begin in the College of Arts and Science to the last day of regularly-scheduled examinations in the College of Arts and Science in April (Christmas vacation excluded).

The residence term for Fenwick Place is as follows: First semester - Labour Day to December 31, 1994; and second semester - January 1, 1995, to April 30, 1995.

Note: Those students wishing to stay beyond the residence term may do so for a daily or weekly rate. Please contact the appropriate residence for details.

The student has two alternatives for payment after the first and second deposit have been paid:

- 1) Pay the balance in full by September 30th.
- 2) Pay the balance in two equal parts, first half by September 30th and the second half by January 31st, plus a \$10 service charge.

	FIRST DEPOSIT AND APP. FEE(3)	SECOND DEPOSIT AT JULY 15 (6)	BALANCE IF PAID IN FULL BY SEPT. 30	OR	PAY IN PART BY SEPT. 30	BALANCE DUE BY JAN. 31	TOTAL (4) (Includes \$10 Service Charge)
<b>Howe Hall (2)</b>							
Single Room	\$125	\$200	\$4,425	Or	\$2,215	\$2,220	\$4,760
Double Room	\$125	\$200	\$4,085	Or	\$2,045	\$2,050	\$4,420
<b>Shirreff Hall and Eliza Ritchie Hall (2)</b>							
Single Room	\$125	\$200	\$4,425	Or	\$2,215	\$2,220	\$4,760
Double Room	\$125	\$200	\$4,085	Or	\$2,045	\$2,050	\$4,420
<b>Residence Houses</b>							
Single Room	\$125	\$200	\$2,465	Or	\$1,235	\$1,240	\$2,600
Double Room	\$125	\$200	\$2,110	Or	\$1,055	\$1,065	\$2,445
<b>Glengary Apartments</b>							
Single Room	\$125	\$200	\$2,470	Or	\$1,235	\$1,245	\$2,805
Double Room	\$125	\$200	\$2,135	Or	\$1,070	\$1,075	\$2,470
Bachelor Apts.	\$125	\$200	\$3,530	Or	\$1,765	\$1,775	\$3,965
<b>Fenwick Place (4)</b>							
2-Person (2-Bdrm)	\$125	\$200	\$3,295	Or	\$1,645	\$1,650	\$3,620
3-Person (3-Bdrm)	\$125	\$200	\$2,980	Or	\$1,490	\$1,490	\$3,305
4-Person (2-Bdrm)	\$125	\$200	\$2,630	Or	\$1,315	\$1,315	\$2,955

### Meals Only - Special Rate For Session

3 Meals Per Day	\$1,905
2 Meals Per Day	\$1,840

Meals only plans may be purchased from Beaver Foods Office, Student Union Building.

Please note the following:

- (1) The above fees will be superseded on July 1, 1994, when the 1994/1995 residence fee schedule will be published.
- (2) Howe Hall, Shirreff Hall and Eliza Ritchie Hall rates include a residence council membership fee and a mandatory 21-meal plan.
- (3) For all residences the prepaid deposit of \$125 includes a \$25 non-refundable application fee.
- (4) At Fenwick Place \$100 of the \$125 prepaid is a damage deposit. See application form for details. The \$10 service charge is not applicable.
- (6) The second deposit due on July 15 is a \$200 non-refundable deposit to confirm the room.

## Awards

### Scholarships, Awards, Financial Aid, & Bursaries

The Awards Office within Office of the Registrar is responsible for:

- Undergraduate Scholarships
- University Bursaries
- University Short-Term Loans
- Canada Student Loans
- Provincial Loans & Bursaries
- Awards and Financial Aid Advice & Information
- Canada Scholarships

**IMPORTANT NOTE:** The University is reviewing the policy governing undergraduate awards. Consequently, portions of the following statement of policy may be modified or substantially altered and may be implemented during the course of the academic year of this Calendar.

#### Statement of Scholarship Terms

The above document is given to each awardee at the time of the announcement of a scholarship from the Undergraduate Scholarship Committee. This flyer contains some of the more pertinent policy items for easy reference. Additional scholarship regulations are listed in the following section.

### General Policy

#### Full Class Load

- (a) Entering students to whom an entrance scholarship is awarded must undertake a full class load for the academic year immediately following the award in a designated degree or diploma programme at Dalhousie University proper. A full class load for most such designated programmes consists of not fewer than five full classes (or the equivalent), i.e. 30 credit hours distributed equally between the two terms, unless the prescribed standard credit hour load should be otherwise.
- (b) Continuing regular students are asked to note: To be considered for an in-course scholarship, a student must have carried in the preceding year a full class load (five whole classes or the equivalent, i.e., 30 credit hours, or that stipulated by the designated requirements of the programme).
- (c) Continuing Co-operative Programme students will be considered as are the regular students except that the prescribed period may be either a term or

an academic year depending upon where a given Co-op student is within that programme at the time.

#### Where Scholarships Are Tenable

Dalhousie University scholarships are tenable only at Dalhousie unless the Will or Trust Deed should otherwise permit. (The University of King's College has its own scholarship programme.)

#### Portability of Undergraduate Scholarships

Entrance and In-course Scholarships are portable amongst the following faculties and schools for the eligible degree/diploma programmes as indicated:

##### College of Arts & Science:

Bachelor of Arts; Bachelor of Education (Integrated); Bachelor of Music; Bachelor of Music Education; Bachelor of Science; Diploma in Engineering

##### Faculty of Health Professions:

- College of Pharmacy - Bachelor of Science in Pharmacy (in-course scholarships only)
- School of Nursing; Bachelor of Science in Nursing; Bachelor of Science in Nursing (RN) (for in-course scholarships only)
- School of Occupational Therapy - Bachelor of Science in Occupational Therapy (for in-course scholarships only)
- School of Physiotherapy - Bachelor of Science in Physiotherapy (for in-course scholarships only)
- School of Recreation, Physical and Health Education - Bachelor of Physical Education; Bachelor of Recreation; Bachelor of Science (Health Education); Bachelor of Science (Kinesiology)
- Maritime School of Social Work - Bachelor of Social Work (in-course scholarships only)

##### Faculty of Management:

- School of Business Administration - Bachelor of Commerce

##### Faculty of Dentistry:

- School of Dental Hygiene - Diploma in Dental Hygiene (for in-course scholarships only)

#### When Scholarships Are Tenable

- (a) Undergraduate scholarships to regular full-time students are tenable in the academic year immediately following their award.
- (b) Similarly, undergraduate scholarships to Co-op students are to be taken up in the academic term or year immediately following their award.

## Scholarship Payments and Rebates

- (a) **Payments:** Dalhousie University scholarships are credited towards students' accounts first for tuition and prescribed fees, and secondly for residence fees if and only if you stay enrolled at the University.
- (b) **Rebates:** The portion of such scholarship money in excess of the aforementioned charges will be refunded to the student in one portion. The normal refund time is October, and the refunds are made by the Student Accounts Office.

## Scholarship Duration

Undergraduate scholarships normally are tenable for one year. The reintroduction of renewable scholarships has altered this.

In 1988-89 the University adopted renewable scholarships as the norm for its regular higher value awards. The two top tiers of the three-level scholarship plan are renewable for the normal duration of the programme in which the awardee was enrolled at the time of the award. These scholarships are renewable at the same value provided that the scholar attains a competitive level of academic excellence. The bottom level of award is tenable for one year only.

## Eligible Classes

The Undergraduate Scholarship Committee considers those Dalhousie classes which are taken for credit in a designated degree/diploma programme during the academic year (or term in the Co-op programme). Beginning in 1992 Summer Session classes will also be considered. These will be assessed at the end of the summer if they should constitute part of five classes which heretofore have not yet been considered for in-course scholarships.

Correspondence classes are considered for scholarship purposes.

Please note that classes taken at other institutions are eligible for scholarship assessment.

## Artificial Academic Year

The adoption of the policy of considering full-time and part-time students on the same grounds has necessitated the use of artificial academic years.

Each year of study within each eligible program has a prescribed credit hour load. This figure is used in the calculation of the student's Scholarship Grade Point Average. Please note that the Scholarship GPA and the Sessional GPA differ.

## Academic Year and Assessment Timing

The academic year consists of five sessions: Spring, Summer, Fall, Regular (Fall

and Winter) and Winter. Although the University will assess students' records twice annually, a given student's record will be assessed only once. The time of the year when assessment for scholarship will normally occur is determined by the study status of the student.

For full-time students the University will normally assess records in mid-June (most programmes, the remainder will be done in October). Those co-op students who completed one academic year's studies as of the end of April will be included. For other co-op students, please see the next paragraph.

For part-time and certain co-op students the University will normally assess records in mid-October for those students who at the end of August achieved the minimum threshold level for in-course scholarship consideration.

**IMPORTANT:** Students are urged to arrange for the payment of their fees from sources other than possible scholarships since the autumn assessment period occurs AFTER the deadline for payment of fees. In particular, students on renewable scholarships are alerted to the implication if they should not have completed the minimum course load to be considered in June's assessment.

## Reduced Class Load and Retention of Scholarship

Continuing students to whom an "undergraduate" scholarship has been offered may retain the scholarship whilst undertaking a reduced class load. But, in so doing they are reminded that consideration for subsequent scholarships will occur only after the attainment of sufficient credit hours as determined by the year-of-study and the eligible academic programme.

Students on renewable scholarships are cautioned to ensure that they will complete between September and August the requisite class load to retain eligibility.

Students on Canada Scholarships are reminded that their awards are governed by the Sponsor's rules affecting eligibility through the number of classes, the timing and the percentage of classes which are in acceptable disciplines.

## Record of Scholarships

Awards are recorded on the academic records of the students. The University retains the right to reassign the source funding of a student's scholarship as circumstances may warrant (but there would be no reduction in the amount).

## Graduation and Scholarships

If you hold a renewable scholarship and if you choose to graduate earlier than originally

expected, and then you decide to return for an Honours Certificate or an Advanced Major Certificate, please note that you would FORFEIT eligibility for continuation of said scholarship. In other words, graduation constitutes completion of programme.

### Transfer Students

Please note that transfer students are ineligible for scholarships in the year of transfer. After one year, such students would be considered on the same basis as other students.

### Taxation and Scholarships

Under the Income Tax Act the University is required to report scholarships. On occasion the government may audit your awards. You should therefore retain copies of award letters so that you can readily forward copies for audit or confirmational purposes.

### Student Aid and Scholarships

Provincial Student Aid authorities require that students report their scholarships. On occasion the government may audit your awards. You should therefore retain copies of award letters so that you can readily forward copies for audit or confirmational purposes.

### Withdrawing

If it should become necessary to discontinue studies, it is most important that students do so in a formal manner via the Office of the Registrar. Depending upon the time of withdrawal, students MAY be entitled to a prorated portion of the generic scholarship to be credited towards ACADEMIC FEES. Please note that NO portion of said scholarship may be applied against RESIDENCE FEES if one is withdrawing from the University.

### Government Notification

Holders of Dalhousie University scholarships are to note that the University is required, upon written request, to report its award winners to the respective Provincial Student Aid Authority.

### Entrance Scholarships

Dalhousie University offers scholarships, the values of which range from \$1500 to \$5,000, to outstanding students who are admitted directly from high school to the first year of study. Depending on the value of the awards they are tenable for one or more years. Renewable Entrance Scholarships which are worth either \$5000 or \$3000 are tenable for the duration of the programme to a maximum of four years, provided that the holder achieves a competitive level of academic excellence. Entrance Scholarships worth \$1500 are tenable for one year.

Non-renewable scholarships for subsequent years are also available and they are described under "In-Course Scholarships." Please note that entering students who may not qualify for an entrance scholarship will be considered for an in-course scholarship upon completion of first year (provided they have carried a full course load), funds permitting.

In order that applicants for admission to the University may be considered for scholarships, applicants must arrange with their high school for the submission of a completed Application for Admission Form to be received by the Office of the Registrar - Admissions by 1ST APRIL.

### Criteria Summary

The following is a summary of the essential criteria which are used by the Undergraduate Scholarship Committee for their assessment of records of entering students who wish to be considered for an entrance scholarship.

1. The Application for Admission must be submitted in time to be received by the Admissions section of the Office of the Registrar by 1st April.
2. The USC considers Grade 12 (academic) subjects, their marks, the average (all academic subjects), the rank in class (very important), enriched classes and extra curricular activities.
3. The USC also considers Grade 11 (academic) subjects, average and rank in class.
4. The applicants are assessed on a mutually competitive basis for the available funds.
5. Transfer Students are precluded from entrance scholarship consideration.

In the case of nominations for the Canada Scholarships, the office uses the same criteria and, in nominating Canada Scholars, the University gives first preference to those to whom a Dalhousie scholarship has already been offered.

Please note that these criteria are subject to change without notice. Note also that the foregoing is not a definitive statement of criteria or policy.

### Entrance Scholarship Funds

The following endowments (without an asterisk) make possible the funding of the aforementioned Dalhousie entrance scholarships. Entries marked with an asterisk are selected by bodies other than the Undergraduate Scholarship Committee. Unless otherwise noted, these scholarships are administered by the Office of the Registrar.

**Robert Bruce Scholarships:** The University is a beneficiary of a bequest from the late Robert Bruce of Quebec whereby a portion of

the annual income is to be used for both entrance and in-course scholarships, and for bursaries.

**James and Abbie Campbell Memorial Scholarships:** A bequest from the late Elsie Alma MacAloney of Halifax made provision for the establishment of the James and Abbie Campbell Memorial Fund. The purpose of this fund is to promote the University's music programme through scholarships in music. Academically sound students who have demonstrated competency in music will be selected by the Department for one of several James and Abbie Campbell/Department of Music Scholarships. Other music students will be selected on the basis of their overall academic standing by the Undergraduate Scholarship Committee. The fund provides in-course scholarships also.

**\*Dalhousie Alumni Association Scholarships:** With a gift of \$20,000 in September 1968 the Dalhousie Alumni Association established an endowment from which the net annual income would provide two major scholarships to students of particular merit. These scholarships are open to students entering the University for the first time directly from high school into a course of study leading to an undergraduate degree or diploma. For further information contact the President, Dalhousie Alumni Association, c/o The Alumni Office, Dalhousie University.

**\*Dalhousie Alumni Leadership Scholarships:** A small number of these scholarships are open to entering students who have demonstrated scholastic success in high school while maintaining a healthy extra-curricular involvement. For further information contact the Alumni Office.

**The Dalhousie Club of New York Scholarships:** A fund for this purpose, established by the Dalhousie Club of New York and placed in the hands of the Board of Governors of the University, endows several scholarships open to students entering the University in the College of Arts & Science from high school. The financial need of the candidates will also be considered. The fund provides in-course scholarships as well.

**\*The Frank R. Davis Memorial Scholarships:** These scholarships are made possible by a fund established by Mrs. Davis in memory of her late husband, the Hon. Frank R. Davis, Minister of Public Health in the government of Nova Scotia and a graduate of this University. The scholarship will be awarded by the University to deserving graduates of the Bridgewater High School, on the nomination of the Supervisor of Schools and the Senior High School staff. In selecting candidates, the governing considerations will be scholastic

standing, unselfishness of purpose, and interest in the common good. The fund may also be used for bursaries.

**\*Dover Elevator Scholarship:** One tuition scholarship will be awarded annually to a student entering the first year of the engineering or commerce programme. The recipient will have demonstrated high academic standing combined with a history of community involvement and leadership skills, and shown an interest in pursuing a career in business. The scholarship is renewable through second year, provided the recipient maintains a minimum Grade Point Average of 3.70.

**\*The Rowland C. Frazee Undergraduate Scholarships in Business Administration:** Two scholarships of \$5000 each are to be awarded annually to students entering the Bachelor of Commerce programme. Sponsored by The Royal Bank of Canada, these scholarships honour Mr. Frazee's long and distinguished career with the bank.

**E. Ross Faulkner Scholarships:** The University received from the Estate of Julia L. Faulkner a bequest to provide scholarships in memory of her husband, Dr. Ebenezer Ross Faulkner.

**\*C.D. Howe Scholarships in Engineering:** The C.D. Howe Memorial Foundation has established an endowment to provide annual scholarships of not less than \$5,000 each. The scholarships are open to matriculants from Nova Scotia high schools who have achieved high academic standing and who are enrolled full-time in either the Diploma in Engineering or the BSc/Diploma in Engineering programme. Where candidates are deemed to be of equal merit, preference will be extended to female students. The scholarship is renewable on an annual basis for the duration of the programme provided that the holders maintain high academic standing and remain in the engineering programme. One scholarship will be offered initially; additional scholarships will be offered as the Fund matures.

**The Percy Bertram Jollota Scholarship:** From the Estate of Jean Minerva Jollota came a bequest, the annual income of which is to be used to provide scholarships in memory of her late husband, Percy Bertram Jollota. The awardees must be engaged in studies in engineering or physics.

**The E. John Jordan Scholarships:** Under the Will of the late E. John Jordan a bequest was left to the University for the purpose of funding entrance and in-course scholarships.

**\*The A. Murray MacKey Scholarship:** The North British Society has established an annual scholarship of \$500 which is open to a student entering Dalhousie from Queen Elizabeth High School. The Selection

Committee will consider candidates on the criteria of academic ability, financial need and leadership. The criteria are weighted equally. The late Dr. MacKay was chairman of the School Board at the time when QEH was constructed.

**Frederick A. MacMillan Scholarships:** The late Frederick A. MacMillan bequeathed to Dalhousie University a sum of money, the net income therefrom to be used for scholarships. This fund has been designated for entrance scholarships.

**The Hector McInnes Memorial Scholarships:** In December 1937, an anonymous donor gave the University \$50,000 for undergraduate scholarships as a memorial to the late Mr. McInnes.

**Silvanus A. Morton Memorial Scholarship:** The Silvanus A. Morton Scholarship Fund was established in 1972 to endow one or more awards totalling approximately \$800. The awards are in memory of Silvanus A. Morton, Principal of the old Halifax Academy, predecessor of the Queen Elizabeth High School. The scholarship is to be awarded on the recommendation of the principal to one or more graduates of Queen Elizabeth High School upon entrance to Dalhousie University in the College of Arts & Science.

**The W. M. Nelson Scholarship:** Under the Will of the late Mr. William M. Nelson of Tatamagouche, funds have been made available to provide a scholarship to Dalhousie University open to students attending North Colchester High School.

**Dalhousie-Nova Scotia Teachers' College Scholarship:** Dalhousie provides a scholarship of \$500 to a graduate of the Nova Scotia Teachers' College as recommended by the principal. (under review)

**Harold Oxley Scholarship:** A bequest under the late Mr. Oxley's Will makes possible the funding of a scholarship, which has been allotted to the entrance scholarship plan.

**Arthur S. Payzant Scholarship:** Under the Will of the late Reverend Arthur Silver Payzant a bequest was established for scholarship purposes. The University has allotted this fund to the entrance scholarship plan.

**Pictou Academy Scholarship:** In recognition of the common origin and close relation existing between Dalhousie University and the Pictou Academy, the University in 1917 on the occasion of the hundredth anniversary of the academy established a scholarship.

**The Harold A. Renouf Scholarship:** An endowment has been established to provide an annual scholarship for students entering the Bachelor of Commerce programme.

**The Lois J. Robertson Scholarships:** The University received a generous bequest from the Estate of the late Lois Robertson. This fund has been allocated to undergraduate scholarships.

**\*Shatford Memorial Trust Scholarships:** The J.D. Shatford Memorial Trust have established an endowment to provide assistance with the costs of attendance at Dalhousie University. The University's Fund is independent of any other such trusts.

Candidates must fulfil the following conditions: i) be coming directly to Dalhousie from either Forest Heights Community High School or Sir John A. Macdonald High School; ii) be recommended by the appropriate high school confirming that the applicant has been a bona fide resident of the Bequest Area for at least three years; and be undertaking studies leading to their first baccalaureate degree.

Subject to the availability of funds, these awards are renewable to the first degree (or four years maximum), based on satisfactory academic performance. Please note that the value of a holder's scholarship may vary from year to year.

**\*Alexander Sinclair Scholarship:** Under the Will of the late Evangeline Marion Winn, the University received an endowment for the purpose of providing scholarship awards to qualifying students from St. Mary's Municipality in the County of Guysborough, Nova Scotia. Candidates are recommended by the St. Mary's Rural High School in consultation with the Awards Office.

**Dr. David M. Soloan Scholarship:** Under the Will of the late Dr. David M. Soloan the University received a sum of money. The Board of Governors decided that the gift be used to provide one or more entrance scholarships in the College of Arts & Science.

**Joseph Duncan Stewart Scholarships:** A bequest under the Will of the late Joseph Duncan Stewart has made possible the funding of undergraduate scholarships.

**\*The I.C. Stewart Trust Fund:** From the Estate of Georgie M. Stewart came a trust fund, the annual income from which is to be used for I.C. Stewart Scholarships to qualifying students from St. Mary's District in the County of Guysborough, Nova Scotia. Candidates are recommended by St. Mary's Rural High School in consultation with the Awards Office.

**The J. Douglas Vair Scholarship:** This scholarship is available to students entering the University for the first time from Pictou County, Queen's County, and rural Halifax County, and, failing a candidate from these areas, to a student from other areas of the Province of Nova Scotia at the discretion of

the Scholarship Committee. The award shall be based on scholarship and need, making it possible for a promising student to obtain a university education. The scholarship may be continued beyond the first year to students from the three preferred areas if standing is maintained, but only if there is no first-year student eligible for the award.

**The Women's Division of the Dalhousie Alumni Association Scholarships:** This fund provides up to three scholarships of \$1,000 each. Of the two entrance scholarships, one is named the Margaret Florence Newcombe Scholarship, which commemorates the 100th anniversary of the graduation of the first woman graduate of Dalhousie University in 1885. This scholarship includes a financial need component and consideration of extra curricular activities, in addition to the attainment of high academic standing. The second scholarship is named the Ruth Skelton Murray Scholarship, in memory of a dedicated alumna of the Dalhousie Women's Division. (The third award, the Christine Irvine Scholarship, is open to returning students.)

**The Lockward Memorial Scholarships:** These scholarships have been established from an endowment by the late Reginald and Anne T. Lockward of Liverpool, N.S. A number of such scholarships, each valued at \$4,000 will be awarded annually; they are tenable for one year. Candidates for Lockward Memorial Scholarships must be attending, or be graduates of, a high school in Nova Scotia and be eligible for admission to the first year of an undergraduate course of study leading to a first degree at Dalhousie University. Preference will be given to students in Queen's County. High schools outside the preferred area but within Nova Scotia may each recommend one student for consideration. Students will be selected to receive Lockward Memorial Scholarships on the basis of academic standing, character and financial need. A student may not hold both a Lockward and another University scholarship simultaneously. Candidates must be recommended by the principal of their high school. Please use the regular admission form, accompanied by letters of reference. Two letters of reference from members of the community who are familiar with the student's character and activities, should be included. The deadline for receipt of nominations is 1 April. Nomination forms and letters of reference should be sent to: The Director of Awards, Office of the Registrar.

### Canada Scholarships

The federal government's Canada Scholarships Program awards over 2,500 scholarships annually to students entering undergraduate studies in selected natural sciences or engineering studies. The

scholarship can be worth up to \$10,000 received as \$2,500 annually over four years. Furthermore, outstanding Canada Scholars in their third and fourth years of study in certain disciplines may also be recommended by their faculty to receive an additional award sponsored by the corporate sector. For more information, contact your guidance counsellor, the Awards Office within the Office of the Registrar, or:

The Canada Scholarships Program  
Awards Division  
Association of Universities and Colleges  
of Canada  
151 Slater Street  
Ottawa, Ontario  
K1P 5N1  
Telephone: (613) 563-1236

Please note that Canada Scholars who chose early graduation and return (immediately the next year) for either an Honours or an Advanced Major Certificate, are eligible to retain their Canada Scholarship subject to the other criteria. We request that we be included in your plans beforehand so that your scholarship does not automatically become terminated with graduation.

### The Canadian Merit Scholarship Foundation

The program was started in 1989 to identify, recognize and reward well-rounded students who combine distinguished talents with character, leadership potential and a commitment to the community. In 1991 Dalhousie University became a participating member of those institutions where the CMSF National Awards are tenable.

The scholarship consists of \$3,000 (paid by the Foundation) and tuition (paid by the University), renewable to a limit of four years of undergraduate study. The scholarships are renewable on the achievement of a Grade Point Average of 3.30 (B+), plus continued evidence of the qualities of character, leadership and service upon which the award is based.

Participating high schools may each nominate one student and are to forward the requisite documents to the CMSF Area Committee to be received no later than the November deadline.

Details of the process and criteria are available from your high school. Nominees must meet the admission requirements for Dalhousie University and the program which the student wishes to undertake.

### In-course Scholarships

All Dalhousie students in eligible programmes in the participating faculties who

have successfully completed a normal full class load will automatically be considered for scholarships. The normal full class load will depend upon the requirements of specific faculties and schools. The Undergraduate Scholarship Committee decides the awardees and the amounts of money. The amount of money authorized for a scholar may be met wholly or partially by a Dalhousie University Scholarship and/or one of the named scholarships as described in the following sections.

#### (a) General

**The Isabel Brown Scholarship:** The scholarship was endowed in 1982 by the Brown family under the auspices of the Women's Division of the Dalhousie Alumni Association. The interest provides an annual scholarship ordinarily to a student who is entering the final undergraduate year. Note, however, that this scholarship is portable to programmes outside the list of designated undergraduate programmes as listed earlier.

**Minnie F. Burbidge Scholarships:** In her Will the late Minnie F. Burbidge bequeathed the residue of her estate to Dalhousie University. In 1945 the sum of \$18,000 was endowed to provide undergraduate, usually in-course, scholarships.

**George H. Campbell Memorial Scholarship:** In 1917 Mr. and Mrs. G.S. Campbell established the George H. Campbell Scholarship Fund to provide annual scholarships in memory of their late son, George Henderson Campbell.

**Marjorie F. Ellis Scholarships:** The late Marjorie F. Ellis bequeathed one-half of the remainder of her estate to Dalhousie University for scholarships to worthy students.

**W.L. Harper Scholarship:** From the Estate of Arta Falconer Harper a bequest to the University makes possible the provision of a number of awards from the annual income.

**Christine Irvine Scholarship:** The Women's Division of the Dalhousie Alumni Association established this scholarship to honour the memory of a former Dean of Women.

**Mackenzie Trust Scholarships:** According to the Estate of Thomas George Mackenzie a Trust Fund was established for Archibald F. Mackenzie, and later bequeathed to Dalhousie University to provide (in-course) scholarships.

**The Hector McInnes Memorial Scholarships:** In December 1937, an anonymous donor gave the University \$50,000 for undergraduate scholarships as a memorial to the late Mr. Hector McInnes.

**The Lois J. Robertson Scholarships:** The University received a generous bequest from

the Estate of the late Lois Robertson. This fund has been allocated to undergraduate scholarships.

**Joseph Duncan Stewart Scholarships:** A bequest under the Will of the late Joseph Duncan Stewart has made possible the funding of undergraduate scholarships.

**The John L. and Glenna E. Towse Scholarship:** A bequest to the University provides for a number of in-course scholarships.

**Sir William Young Scholarship:** This fund was left by Sir William Young for the purpose of endowing scholarships.

#### (b) Arts and Science

**Nathan T. Ashkins Scholarship:** Each year the Nathan T. Ashkins fund provides for a scholarship to a student in Arts & Science who is beyond first year.

**Robert Bruce Scholarship:** Robert Bruce of Banff, Quebec, made a bequest to the University to establish bursaries and scholarships.

**The Charles and Cecelia Zwerling Scholarship:** This fund was created by members of the Zwerling family in memory of Mr. and Mrs. Charles Zwerling for scholarship beyond first year.

#### (c) Arts

**Dr. Frederick J. Gaudet Scholarship:** Dr. Gaudet bequeathed to the University in 1978 a sum of money to provide for a full tuition scholarship in Arts.

**The Hyman I. Jacobson Scholarship:** Under the will of the late Hyman Isaac Jacobson a bequest of \$5,000 was given to the University to benefit the Humanities and Social Sciences.

**The Khaki University Scholarships:** From the Khaki University of Canada and the Young Men's Christian Association Memorial Scholarship Fund, the trustees of Khaki University made a gift to Dalhousie University in 1921 of \$6,500 to endow scholarships.

#### (d) Science

**The Belle Crowe Scholarships in Chemistry:** A bequest by the late Belle Chisholm Crowe, formerly of Truro, and a student at the University in 1885-86, enables a number of scholarships to be offered annually. The Undergraduate Scholarship Committee and the Department of Chemistry (see also) share the net annual income equally. The former awards Belle Crowe Scholarships to students in the Honours Chemistry programme which students have qualified in the yearly competition for in-course scholarships. The

scholarships are directed to the most promising students entering the third or fourth year in the Honours Chemistry programme.

**The L.A. DeWolfe Memorial Scholarship:** A fund has been established under the Will of the late Dr. L.A. DeWolfe to provide undergraduate scholarships in Mathematics or Science.

**The Percy Bertram Joliota Scholarships:** From the Estate of Jean Minerva Joliota came a bequest, the annual income of which is to be used to provide scholarships in memory of her late husband, Percy Bertram Joliota. The awardees must be engaged in studies in engineering or physics.

**The Carl Mushkat Memorial Scholarships:** The Carl Mushkat Memorial Fund was established at Dalhousie University in 1979 as a bequest under the Will of the late Carl Mushkat. The fund provides scholarships to students in Mathematics or Science.

**The Ross Stewart Smith Scholarships:** A significant bequest established these memorial scholarships for students who excel in the sciences or mathematics.

**The Mr. and Mrs. S.H. Solomon Scholarship in Engineering:** This scholarship was made possible by Mr. and Mrs. S.H. Solomon and is to be awarded annually to a student entering the second year of Engineering.

**The C.W. Stairs Memorial Scholarship:** In 1980, William Stairs, Son & Morrow Limited of Halifax, on the occasion of the 150th anniversary of the firm donated \$10,000 to the University to set up this fund. It provides scholarships to students in Engineering, or in related subjects, who are entering the third year of the course and who, in the opinion of the Committee, are likely after graduation to contribute to the industrial development of Canada.

#### (e) Other

The following scholarships are administered separately from the regular in-course ones.

**Beta Sigma Phi Scholarship to Dalhousie University:** The Halifax-Dartmouth City Council of Beta Sigma Phi sorority has established an endowment of \$2,000 whereby the annual income will provide for a scholarship to a student studying towards a degree full-time or part-time at either the undergraduate or graduate level. The successful candidate will be selected from the following categories, listed preferentially: first, an active Member; secondly, a daughter, son or husband of an active Member; and thirdly, some other student chosen by the Undergraduate Scholarship Committee. **NOTE:**

this scholarship requires a designated application form which must be submitted to the Awards Office by the May deadline.

**The Constance MacFarlane Scholarship:** An endowment fund has been established to provide a scholarship to a deserving student in the second or subsequent year of the Honours programme in either biology or marine biology. Candidates must have completed at least one class in each of ecology and botany.

**The W. Andrew MacKay Alumni Scholarship:** The Dalhousie Alumni Association established an annual scholarship in honour of Dr. W. A. MacKay, a former president of the University. The scholarship is available to a student entering third year who has demonstrated high academic standing (a Grade Point Average of at least 3.30) and who has shown an excellence in qualities of leadership, citizenship and sportsmanship. The award is tenable for one year in the faculties of Arts & Social Sciences, Health Professions, Management (Commerce), and Science. Candidates are to be nominated by each Department or School in the above list. Nominations are to be received by the Office of the Registrar by 15 May. The Undergraduate Scholarship Committee will select at least three candidates for final consideration by the Alumni Office.

**The Alan Pollok Scholarship:** This scholarship of \$750 was established by the North British Society in Halifax in memory of the Rev. Dr. Alan Pollok. The awardee will be the student, in second year in the College of Arts and Science at Dalhousie University, who stood highest in a course load of at least five full classes (or equivalent).

**The George B. Robertson Phi Delta Theta Fraternity Scholarship:** An endowment has been established to provide a scholarship to a student in full-time study in the junior or subsequent years at Dalhousie University. The selection of the awardee is based on several factors including a minimum Grade Point Average of 3.00, demonstrated activity in the Halifax Chapter and financial need.

**Sony Science Scholarship:** On the occasion of the 35th anniversary of the arrival of the first Sony product in Canada, Sony of Canada Ltd. has established an annual scholarship in the amount of \$3000. It is open to outstanding students in science or engineering.

**The Stora Undergraduates Scholarship in Arts & Science:** On the occasion of their 25th Anniversary Stora Forest Industries have established an endowment to provide one undergraduate scholarship open to students in Arts & Science. To be eligible candidates must reside in Nova Scotia, have

demonstrated academic excellence and have exhibited a desire to learn. Students will be considered after one year at Dalhousie.

### Departmental Scholarships

#### Biology

**Hugh P. Bell Scholarship in Biology:** In 1968 the Class of 1928 established the H.P. Bell Fund; the income therefrom is to provide one or more annual scholarships. The Biology Department each year will select the most promising honours biology student who is in Third year and that student shall hold the Hugh P. Bell Scholarship in the fourth year of the honours programme.

**The Sarah M. Lawson Scholarships in Botany:** At the discretion of the Chairman of the Department of Biology, the University may offer scholarships to students who have shown special ability in botany. This award is open to students at Dalhousie University or the University of King's College, and is given to support summer research projects in botany at either the undergraduate or graduate level.

#### Chemistry

**The Belle Crowe/Department of Chemistry Scholarships:** These scholarships are awarded on the basis of academic standing and demonstrated proficiency in chemistry to students in the honours programme.

**The E. Walter Todd Scholarship:** A bequest from the Estate of Mabel E. Todd in 1958 established a fund to provide a scholarship (and inscribed volume) in memory of her brother, E. Walter Todd, who was for many years a member of the Department.

#### Earth Sciences

**Amoco Canada Undergraduate Scholarship in Earth Sciences:** Amoco Canada Petroleum Geology Limited offers an annual scholarship of \$1500 to a deserving student of outstanding merit in the Fourth and final year of an Honours BSc programme with a major in earth science. In addition to scholastic achievement, other criteria may include keen interest in earth science, participation in University and community affairs and economic need.

**Canadian Institute of Mining and Metallurgy Earth Science Scholarship for New Brunswick Students:** This is awarded to a student entering second or subsequent year in an earth science discipline. Applicants must have been in New Brunswick or resided in New Brunswick for seven years, or have his or her immediate family resident in that province.

**Canadian Society of Exploration Geophysicists Scholarship:** This scholarship is available to a student applicant who is pursuing a course of studies directed toward a career in exploration geophysics in industry, teaching or research.

**Chamber of Mineral Resources of Nova Scotia Scholarship:** Senior students from Acadia University, Dalhousie University, St. Francis Xavier University, Saint Mary's University or Technical University of Nova Scotia in a geology or mining-related bachelor degree programme are considered for this scholarship. The selection is based upon the student's contribution to the development of the province's mineral resources sector as well as scholastic achievement.

**The James L. Hall Scholarship in Earth Sciences:** This scholarship is awarded on the joint recommendation of the Chairs of the Departments of Engineering and Earth Sciences, to a student who has completed his/her first year, who is planning on a career in the field of Mining Geology.

#### Economics

**Professor W. Russell Maxwell Memorial Scholarship:** Friends and colleagues of Professor Maxwell have established a fund to provide scholarships to outstanding students entering the second, third or fourth year of the General Degree or Honours Degree programme in Economics. Preference will be given to candidates entering the fourth year of the Honours programme.

#### Engineering

**John R. Kaye Memorial Scholarship:** The Founder of this scholarship gave a benefaction of \$10,000 to be invested. From the annual income therefrom, one (later more) scholarship may be awarded to a suitably well qualified Dalhousie graduate who is continuing studies in an accredited programme in engineering at the Technical University of Nova Scotia. The holder shall be a resident, native-born Nova Scotian who has completed the requirements for the Diploma in Engineering. The Selection Committee shall consider good marks, motivation, diligence, capability for making a contribution to the profession, and financial need. The amount of each scholarship shall approximate tuition fee (maximum of \$1,000) in the programme the awardee is to pursue. The scholarship will be paid upon presentation of proof of registration at TUNS.

**John Frederick Knodell Engineering Scholarship:** An annual award of \$5,000 has been established to honour the memory of J.F. Knodell, a graduate in electrical engineering from Dalhousie and Nova Scotia Technical College. The scholarship is awarded to a male Dalhousie engineering

diploma graduate who was born in Nova Scotia and attended schools in the province. The recipient must have achieved excellent academic standing and demonstrated significant improvement from the first to second year of the engineering diploma programme.

## School of Education

**John Frederick Knodell Education Scholarship:** An annual award of \$5,000 has been established to honour the memory of J.F. Knodell, a graduate in electrical engineering from Dalhousie and Nova Scotia Technical College. For several years he taught science and mathematics in Halifax city schools as a teacher and a principal. The scholarship is awarded to a female graduate in the Integrated baccalaureate in education programme at Dalhousie who was born in Nova Scotia and attended schools here. The recipient must have achieved excellent academic standing and demonstrated significant improvement between her Freshman and Senior years.

## English

**Allan and Lura Bevan Memorial Scholarship:** Colleagues and friends of the late Allan Bevan have established a memorial scholarship fund. The scholarship selection in the first place is to be made by the Department of English to a student majoring in English either at Dalhousie or King's. In the absence of a suitable candidate from English, the selection will be made by the Department of Music.

**The Archibald MacMechan Chapter/IODE Scholarship in English:** In 1948 the Archibald MacMechan Chapter of the IODE gave the University a scholarship fund. This award is intended for students who have shown special ability in English and who are looking forward to further study in the field. Provided that suitable candidates apply, preference will be given to graduates who intend to study for a Master's Degree in English. Application should be made to the Chairman of the Department of English not later than 31 March.

## French

**The Ruth Murray Scholarship for French Studies:** An endowment fund has been established to honour the memory of Mrs. Ruth Murray by providing scholarships to students in the Department of French. These scholarships are open to undergraduate students who are academically sound and who are participating in one of the following:

- (a) a programme of study at the University of Aix-en-Provence, France, or

- (b) an off-campus summer course in a francophone environment arranged and directed by the Department of French.

In any year when there are no students participating in these programmes, the income may be disbursed as scholarships to academically sound students majoring in French at Dalhousie.

## History

**The George E. Wilson Memorial Scholarship:** On the occasion of the 50th anniversary of the graduation of the Class of 1930, a representative announced the establishment of a scholarship fund. The scholarships, in honour of Professor Wilson, are open to students in history.

## Mathematics, Statistics & Computing Science

**The Ralph and Frances Lewis Jeffery Scholarship:** From the Estate of Frances E. Jeffery came a bequest in 1979 to endow a scholarship which is to be awarded to a student who has completed the final year of an honours course in Mathematics, and who has maintained at least a second-class standing during the first three years of the course.

**The I.P. Sharp Associates Limited Scholarship:** This scholarship is awarded annually to a outstanding student in either mathematics or computing science (with some experience in software development). The scholarship includes a job offer during the summer following the award presentation. Ordinarily the scholarship will be awarded when the student has two years before graduation. The job would be for the summer before the student's final year in the programme.

## Music

**The James and Abbie Campbell Memorial Scholarships and the James and Abbie Campbell/Department of Music Scholarships:** The Undergraduates Scholarship Committee and the Department of Music make selections of winners for undergraduates. See entry under Entrance Scholarships.

**Honourable L.D. Currie Memorial Scholarship in Music:** The North British Society established this scholarship in memory of the Honourable Lauchlin D. Currie in 1971. An annual scholarship in the amount of \$750 is available to a Canadian in any year of Music. The successful student, will have demonstrated competence in vocal or instrumental performance. (under review)

**Halifax Ladies Music Club Scholarship:** The Halifax Ladies Music Club sponsors an annual scholarship of \$300 for a first-year student in Music at Dalhousie.

**Elisabeth Meyerhof Scholarship in Music:** An annual scholarship of at least \$1,500 awarded to the student entering the Fourth Year of his or her undergraduate degree programme in Music who has achieved a high average in the music classes of the first three years and who in the opinion of the Department has demonstrated exceptional promise for a professional career as an instrumentalist in the performance of classical music (including early music). If no instrumentalist qualifies, a voice student would be considered.

**The Effie May Ross Scholarships in Music:** An endowment fund of \$25,000 was established under the Will of the late Effie May Ross. The income is to be used to establish yearly scholarships to (a) the most promising vocalist student from the Maritime Provinces or Newfoundland who requires financial assistance; and (b) on recommendation of the Senate of Dalhousie University to the most promising Maritime or Newfoundland student in the playing of the Piano, Organ, Violin or Cello who is in need of financial assistance. Scholarships range in value and in number.

**The Don Wright Scholarships in Music Education:** The Don Wright Charitable Foundation of Toronto established a generous endowment with which to fund these two scholarships. One scholarship is allocated to Classroom Vocal Music. Recipients of this award must fulfill the following criteria:

- a) be enrolled in the classes in classroom teaching methods and field experience at either the elementary or secondary level
- b) be studying voice
- c) have shown outstanding teaching skills and choral techniques in the Class, Music 4460A, and in choral practice in the classroom setting, Grades Five to Nine inclusive.

A second scholarship is allocated to Instrumental Music. Recipients of this award must fulfill the following criteria:

- a) be enrolled in classes in instrumental technique, teaching methods and field experience as well as classroom teaching methods and field experience at either the elementary or secondary level
- b) be studying a band or orchestral instrument; and c) have shown outstanding achievement in the above classes.

## Spanish

**Sonia Jones Scholarship:** The first claim upon the expendable income of the Fund is to provide scholarships to advanced students of Spanish (Honours or Major) who are studying abroad in programme approved by the University.

## Health Professions

### College of Pharmacy

**The Burroughs Wellcome Scholarship:** This scholarship of \$500 is available to an undergraduate student of outstanding merit in the second-year class.

**The Ralph H. Jenkins Memorial Pharmacy Scholarship:** This scholarship is awarded by the Prince Edward Island Pharmaceutical Association to a student from Prince Edward Island who has achieved a high academic standing.

**The Col. J.D.B.F. MacKenzie Scholarship:** This scholarship of \$500 is awarded by the New Brunswick Pharmaceutical Society to a student from New Brunswick who obtains the highest academic standing in the first-year classes of the Pharmacy course.

**The Dr. Jessie I. MacKnight Scholarship:** This scholarship of \$500 is awarded by the New Brunswick Pharmaceutical Society to the student from New Brunswick who obtains the highest standing in the second-year classes of the Pharmacy course.

**The New Brunswick Pharmaceutical Society Scholarship:** This scholarship of \$500 is awarded by the New Brunswick Pharmaceutical Society to the student from New Brunswick who obtains the highest standing in the third-year classes of the Pharmacy course.

**Searle Summer Research Scholarship:** This scholarship in an amount of \$1,650 is made possible by funds from G.D. Searle & Co. of Canada, Limited and is to provide financial support for one undergraduate pharmacy student to take research training during the summer months under the supervision of a faculty member of the College of Pharmacy.

**The Upjohn Company of Canada Scholarship:** This scholarship of \$500 is provided by the Upjohn Company of Canada to a student in the first-year class. An engraved plaque is also awarded to the recipient.

### School of Physiotherapy

**Isabel M. Jackson Scholarships:** Miss Ida P. Jackson of Middleboro, Massachusetts, established this fund in memory of her sister, Isabel M. Jackson, in 1967 for the purpose of benefiting students with bursaries or scholarships. The fund's current use is the

provision of scholarships to those students who have been accepted into the first physiotherapy core year from other universities. Assessment is based on the students' mid-semester examinations at Dalhousie.

**Hazel Lloyd Foundation Scholarship:** The Hazel Lloyd Foundation has been established by Miss Aphra Lloyd in memory of her sister, Miss Hazel A. Lloyd (1930-1985), Associate Professor, School of Physiotherapy. Friends, associates and alumni have made additional contributions. One purpose of the Foundation is to provide financial support to final year students attending Dalhousie University School of Physiotherapy for studies that will develop physiotherapy services in geriatrics and gerontology, one of Professor Lloyd's areas of interests. Occasionally, the Foundation will support other types of endeavours with an annual award. Written applications for the scholarship and the other types of award submitted to the School of Physiotherapy will be reviewed twice yearly (31st March and 30th September) by the administration committee of the Hazel Lloyd Foundation.

## School of Recreation, Physical and Health Education

**The Freda N. Wales Memorial Scholarship:** This is an in-course award given to a student entering the third or fourth year of study. The student must have a commitment to pursuing a programme specializing in outdoor leadership at Dalhousie University. Selection will be based on academic achievement and professional ability. *Note:* A special application form, available from the Awards Office, is required.

**The Vllth Pan American Wheelchair Games Scholarship:** This is an in-course award given to a student entering the third or fourth year of study in the School of Recreation, Physical and Health Education. The student must be committed to pursuing study in the area of recreation and leisure for the disabled. Selection is based on academic and professional capability.

## Maritime School of Social Work

### Bachelor of Social Work

**The M. Caroline Prince Scholarship:** Under the Will of the late M. Caroline Prince the sum of \$5,000 was bequeathed to the University for endowment purposes to benefit the Maritime School of Social Work. The Faculty have decided that the endowment should fund one or more scholarships to students who are engaged either in full-time or part-time study leading to the baccalaureate degree.

## Management

### Bachelor of Commerce Programme

#### (a) Scholarships through the School

**Acadian Lines Limited Scholarship:** Acadian Lines Limited has established a fund to provide a scholarship to a student, beyond first year, who has demonstrated superior academic performance in the preceding year(s) of the commerce programme and, who has demonstrated outstanding leadership in the University's programme of intercollegiate athletics.

**The Wilfred Berman Scholarship:** A scholarship is offered to the student in Commerce who at the end of the second year has attained the highest average mark in Commerce 1101, 1102, 2111. The endowment for this scholarship was provided by friends and co-religionists of the late Professor Berman.

**Ernst and Young Scholarship:** A scholarship of \$600 will be awarded to a third-year student in Commerce who has obtained a high standing on the basis of his/her average marks for a full year's course, of which one class must be in accounting.

**E.J. McConnell & Associates (Atlantic) Scholarship:** A scholarship in the amount of \$2000 is to be awarded annually to a student entering the Third or Fourth Year in the Commerce degree programmes. The recipient will have demonstrated high academic standing and an interest in the investment field.

**Ronald G. Smith Scholarship:** In 1981 the Nova Scotia Power Corporation established this scholarship in recognition of the distinguished service rendered by Ronald G. Smith as a member of the Power Corporation's Board of Directors from 1959 to 1981. An amount of \$400 will be awarded to a Nova Scotia student entering the fourth year of the Bachelor of Commerce programme based upon academic achievement, leadership ability and qualities of personality and character.

**Deloitte and Touche Scholarship:** A scholarship of \$400 will be awarded annually to a second-year student in Commerce obtaining a high standing in the course and who plans to enter articles with a practicing firm of Chartered Accountants.

**Woolco-Woolworth Scholarship:** The F.W. Woolworth Company Limited sponsors a scholarship of \$750 to the student (or students) who is (are) entering the final year of study and who has (have) demonstrated scholarship standing, leadership qualities and interest in retailing.

**(b) Scholarships through the USC**

**Stewart Lockie Gibson Scholarship in Commerce:** Several scholarships of varying amounts will be awarded annually to third- and fourth-year students of scholarship standing and good character who are proceeding to a degree in Commerce.

**Samuel S. Jacobson Scholarship:** Beginning in 1976 the Samuel S. Jacobson Fund has provided one or more scholarships or bursaries as determined by the selection committee. Preference is to be given to Nova Scotian students who are proceeding towards the Bachelor of Commerce degree.

**The Harry Margolian Scholarships in Commerce:** A bequest of the late Harry Margolian, of Yarmouth, Nova Scotia, enables one or two scholarships per year to be awarded to students working towards degrees in Commerce. These will normally be awarded to students in their third or fourth years.

**McCurdy Printing and Typesetting Limited Scholarship:** The Halifax firm of McCurdy Printing and Typesetting Limited established an endowment in 1985 to provide annually for a scholarship in the School of Business Administration. The Scholarship is open to a student, beyond first year, who has distinguished himself or herself scholastically during the preceding year(s) of study in the Bachelor of Commerce programme.

## Undergraduate Prizes, Medals, and Awards

### General

**Alumni Swimming Award:** A fund has been established to provide awards to deserving Dalhousie University varsity swimmers. Recipients will be members of the Dalhousie Varsity Swimming Team who have demonstrated leadership and dedication to competitive swimming. They are to have completed at least one year of their academic programme and to have demonstrated above average academic ability. Two awards of equal value will be presented to varsity swimmers, one to a female and one to a male. The Selection Committee will recommend to the Undergraduate Scholarship Committee by 31st May, where appropriate, two candidates for each award. The awards will be tenable the following academic year.

**The Annie L. Bear Prize:** Under the will of the late Mrs. Thomas (Annie L.) Bear of Charlottetown a bequest was established at Dalhousie University. The net income from the fund provides for an prize which is to be awarded to the youngest student from Prince

Edward Island who enters this University in each year. The Awards Section of the Office of the Registrar selects the winner.

**Black and Gold Awards:** Each year the Dalhousie Black and Gold Club funds a limited number of awards that recognize the contribution to University life that student athletes make. Candidates must be beyond first year study at Dalhousie, must have a minimum Grade Point Average of 2.00 in four whole classes (or equivalent) and must have participated on a varsity team during the previous year of study. A number of awards up to \$1500 will be offered each year. For information and application forms contact the Department of Athletics, Dalplex. Completed application forms are to be returned to that Department to be received by May 15th. The Department of Athletics will forward nominations to the Selection Committee, which will make announcements through the Awards Office.

**Dalhousie Student Development Awards:** A limited number of awards of up to \$1,500 will be offered annually. The awards are open to entering or continuing Dalhousie students. Applicants must be engaged in full-time studies, have achieved a minimum Grade Point Average of 3.00 and must have demonstrated leadership ability. Applications forms are available from the Department of Athletics. Completed applications and supporting documents are to be submitted to the Director of Awards, Office of the Registrar, to be received by the end of August.

**The Honourable W.H. Dennis Memorial Prizes for Literary Compositions in English:** Two Prizes known as the Joseph Howe Prizes are offered each year, a first prize of \$200 and a second prize of \$100, for a poem or collection of poems of any length greater than about one hundred lines. Two prizes known as the James DeMille Prizes are offered each year, one of \$150 for an essay, the other of \$150 for a prose short story. The attention of candidates for these prizes is drawn to the following regulations adopted by the Senate to govern the awards:

1. Candidates for these prizes must be registered full-time undergraduate or graduate students at Dalhousie University.
2. (a) Three copies of each composition must be sent in by the competitor.
- (b) These compositions must be typewritten, double spaced and on one side of the paper only.
- (c) A pseudonym is to be typed at the end of each typescript and after the pseudonym a statement as to whether or not a first or second or no prize has been previously awarded to the writer.
- (d) Compositions are to be accompanied by a sealed envelope bearing the same pseudonym in typewriting to the Jury

of Award for either the Joseph Howe Prize or for the James DeMille Prize, as the case may be.

- (e) The envelope shall contain in typewriting the pseudonym, the titles of the entries and the candidate's full name and address.
  - (f) Candidates submitting more than one prose entry must use the same pseudonym for each; different pseudonyms may be used for prose and poetry.
3. Candidates for the DeMille Prize may submit one entry in each of the essay and short story sections.
  4. The winner of a prize in the poetry contest is not debarred from competing in the prose contest, and vice versa.
  5. In the poetry contest no winner of a first prize is eligible to compete again, and no winner of a second prize is eligible for a second prize in a subsequent year.
  6. In the prose contest no winner of a first prize is eligible to compete again, and no winner of a second prize is eligible for a second prize in a subsequent year.
  7. Entries must reach the Department of English on the designated deadline.
  8. Entries are adjudicated by a panels of Judges which includes a professional writer. The decision of the Judges is final.
  9. No prize will be awarded for any composition that does not attain to a sufficiently high standard of merit.
  10. *The Dalhousie Review* will be offered the first option to publish winning compositions. A copy of each winning composition is deposited in the University archives. Contestants retain ownership of copyright.
  11. Contestants are urged to retain a carbon or photostat copy of their typescript(s) since the copies cannot be returned.

**The Clare Murray Foosee Poetry Prize:** One or more prizes will be awarded for the best poems, of any length, submitted by Dalhousie undergraduates. Total prize money approximates \$400, which is the net income from a fund established by friends in memory of the poetess Mrs. Clare Murray Foosee, BA (1924). Up to five poems may be submitted by each writer. Previous winners are ineligible. No award will be made unless a poem submitted is deemed to be of sufficient merit. Entries should reach the Chairman of the Department of English by 1 March.

**The SLT Bruce Galloway Memorial Prize:** Friends, family and shipmates of Sub-Lieutenant Bruce David Galloway, a member of the Ship's Company of H.M.C.S. Fraser and a 1983 Arts graduate of Dalhousie, have established a memorial fund. The prize is to be awarded to the student, male or female, attending Dalhousie

University on the University Training Plan Men who attained the highest academic standing (not less than a passing standing) in the programme in which he or she is enrolled. A prize is to be awarded in each year in which there is a student attending Dalhousie on the University Training Plan Men who achieves a passing standing. The Awards Section of the Office of the Registrar selects the winner.

**The Robert and Katherine MacDonald Award:** An endowment has been established to provide an annual prize for Chinese students at Dalhousie. The recipient will be engaged in undergraduate studies and be a member of the Dal-TUNS Chinese Students' Association or its successor. The recipient will have demonstrated good academic achievement combined with leadership qualities and contribution to University life. The Association will recommend a candidate or candidates to the Head of Student Services.

## College of Arts and Science Departmental Awards

### Faculty of Science

**Hewlett-Packard Calculator Award:** Departments in the Faculty of Science may each nominate one candidate for this award. Candidates must have completed first year with excellent academic achievement. Preference will be extended to students in honours programmes. Nominations are to be submitted to the Office of the Dean of Science by February 15.

### Biochemistry

**University Medal in Biochemistry:** The Department of Biochemistry offers a medal to the top First Class Honours graduate in the Biochemistry programmes. The awardee will be the one who has attained the high scholastic standard of the Department.

**Kilmer MacMillan Memorial Book Prize:** This prize is awarded annually to the student who attains the highest aggregate mark for the three half-classes, Biochemistry 3200, 3300 and 3400.

### Biology

**The Aldous Prize:** On the occasion of the retirement of Dr. John G. Aldous, friends, colleagues and students established an endowment to provide for an annual prize to be awarded for the best achievement in Biology 4401. (This entry appears here for the information of Biology students. The Fund is administered by the Department of Pharmacology in the Faculty of Medicine.)

**B'nal B'rith Prize:** Two prizes are available annually to students, one for the highest standing in Biology 1000R and another for the highest standing in Biology 1001R.

**David Durward Memorial Prize:** This prize is to be awarded to the best student in the Physiology of Marine Animals (Biology 3071).

**University Medal in Biology:** The Department of Biology offers a medal to the top First Class Honours graduate in the biology programme in recognition of superior achievement therein.

**University Medal in Marine Biology:** The Department established this medal in 1983-84 to be awarded, where appropriate, to the student who stands highest among the First Class Honours graduates in the Marine Biology programme.

## Chemistry

**The John Hamilton Barrett Prize:** This is the gift of his widow, Mrs. Marjorie Barrett. It is offered annually at the end of the fourth year of the course to a student who has shown exceptional ability in Chemistry or some other science.

**The Canadian Society for Chemistry Silver Medal:** The CSC Silver Medal is provided to each university having a chemistry department and is awarded to the student with the highest standing in chemistry and allied subjects in the penultimate year. The successful student receives a medal and a suitably inscribed certificate.

**Walter J. Chute Prize in Chemistry:** An endowment has been established to provide an annual prize to a chemistry student, with an outstanding record in organic chemistry, entering his or her final year in the Honours Chemistry programme.

**The Hugh Graeme Fraser Memorial Prize in Advanced Chemistry:** This award was founded by members of the Class of 1931. The net interest will be awarded annually to that student at the end of his/her third year, who has, in the opinion of the Department, shown such aptitude for Chemistry as to merit the award.

**Kenneth and Dorothy Hayes Memorial Prize:** This endowment provides an annual prize to the student who has demonstrated interest in physical chemistry. The prize is awarded at the end of the penultimate year in the honours chemistry program to that student who has achieved satisfactory academic standing in Third- or Fourth-Year level classes in physical chemistry.

**Dr. Osvald Knop Prize in Chemistry:** An endowment provides for an annual prize to the top student (or students in the event of a

tie) for the best achievement in both classes and laboratory work in the Second-Year Inorganic Chemistry class.

**The Society of Chemical Industry, Canadian Section, Merit Award:** This award (of an engraved gold key and a subscription to Chemistry and Industry) may be made to the Honours graduate in Chemistry with the highest standing. A minimum average of 75% is required.

**Undergraduate Award in Analytical Chemistry:** The Division of Analytical Chemistry of the American Chemical Society offers a number of gift subscriptions to Analytical Chemistry. These awards are intended to recognize students who have completed the third undergraduate year and who have shown an aptitude for a career in analytical chemistry.

**University Medal in Chemistry:** The Department of Chemistry offers a medal to the top First Class Honours graduate in recognition of superior achievement in Chemistry.

## Classics

**University Medal in Classics:** The Department of Classics offers to the top First Class Honours graduate in the classics programme a medal in recognition of superior achievement in Classics.

## Earth Sciences

**Amoco Canada Petroleum Company Ltd. Award:** The company sponsors an award to a student in the fourth and final year of the Honours Earth Sciences programme who has attained at least a B- average, with a concentration in courses relating to petroleum exploration.

**The David Barlow Memorial Award:** The family, friends and classmates of David Barlow established in 1984 an endowment fund from which to provide an annual prize in his memory. The Dawson Geology Club in consultation with the Departmental Chairman will select a student in Second-Year Earth Sciences who has demonstrated both a good academic record and leadership qualities.

**Canadian Society of Petroleum Geologists Award:** The Society sponsors an annual award consisting of a certificate and a one-year student membership to an undergraduate student who has demonstrated outstanding competence in petroleum geology or closely related fields.

**Canadian Society of Petroleum Geologists Student Industry Field Trip:** The society sponsors a field trip to a third-year Earth Sciences student who has an interest in petroleum geology, sedimentology and stratigraphy. The award consists of travel

expenses and most field expenses for a trip to the Sedimentary Basin and Rocky Mountains of Western Canada.

**G.V. Douglas Memorial Prize in Earth Sciences:** In 1958-59, friends and former students of the late Professor G.V. Douglas, established a memorial fund from which the net interest would provide a prize to be awarded to an outstanding student in first-year Earth Sciences.

**Geological Association of Canada Student Prize:** Based on overall academic standing this prize is awarded annually to a student entering fourth year. The prize will consist of a one-year free membership in the GAC and a GAC "Special Paper" volume to be chosen by the recipient.

**Michael J. Keen Memorial Award:** This award was established to encourage greater participation of women in science. It will be awarded to a female student entering the second year earth science programme who shows an interest in and commitment to the pursuit of a career in science and whose performance is of honours calibre.

**MacEachern-Ponsford Memorial Award:** Family, friends and classmates of Ian Joseph MacEachern and Mark Anthony Peter Ponsford have established a memorial fund. The purpose of the endowment is to provide an annual award from the net income to a student who has completed the second year of a programme majoring in Earth Sciences, whose academic performance is of an honours calibre and who has been an active participant in student activities. The award is to be made on the recommendation of the Chairman of the Earth Sciences Department after consultation with the Dawson Geology Club and departmental staff.

**Mineralogical Association of Canada Student Prize:** This prize is open to an undergraduate student who has completed at least second year and has demonstrated excellence in one of mineralogy, crystallography, geochemistry, petrology and mineral deposits. The recipient will receive his/her choice of one of the MAC Special publications.

**The Mining Society Centennial Scholarship Medal:** The Mining Society of Nova Scotia sponsors annual medals to students who have distinguished themselves during university studies in the mineral, metallurgical or petroleum fields. The Department awards the medal allocated to Dalhousie to the best all round graduating student.

**University Medal in Earth Sciences:** The Department of Geology offers to the top First Class Honours graduate a medal in recognition of superior achievement.

## Economics

**The Anonymous Economics Prize:** This prize, consisting of a book (or books) and a sum of money, is open to the Dalhousie undergraduate who is not in the final year of study and who has shown through an essay during the second year of study of economics, the best promise of successfully applying economics to the solution of human problems as determined by the selection committee.

**University Medal in Economics:** The Department of Economics offers a medal to the top First Class Honours graduate in recognition of superior achievement in Economics.

## Education, School of

**Eric Stanley Hillis Memorial Prize:** The annual net income from a bequest to the University provides a prize in memory of Eric Stanley Hillis to a student in Education as selected by the Director of the School. The prize may consist either of one or more books chosen by the student in consultation with the Director or of a sum of money.

## Engineering

**The Association of Professional Engineers of Nova Scotia Award:** The Association of Professional Engineers of Nova Scotia provides an award which is presented each year to that student graduating in Engineering who best demonstrates promise of using outstanding abilities to serve society in an ethical manner as a Professional Engineer. The award winner will be selected by students of the graduating class in consultation with the Engineering Faculty members. The award will consist of an engraved certificate.

**The Walter P. Copp Memorial Prize:** In 1979 an Anonymous Donor gave the University the sum of \$2,500 to establish an endowment for the purpose of funding this prize. It is awarded annually to the student graduating with the Diploma in Engineering with the highest average in Engineering classes.

**The Kenneth F. Marginson Award:** This prize is awarded annually to the student who achieves the highest standing in the first year of the Diploma in Engineering programme. Only students who are enrolled in University for the first time are eligible to receive this award. Presentation of the award takes place when the student enrole in the second year of the Diploma in Engineering course. This prize is funded from an endowment of \$2,500 which has been established by an Anonymous Donor, in honour of Professor Kenneth F. Marginson, a former Head of the Department.

## English

**Paul McIsaac Memorial Prize:** A memorial gift provides for an annual prize for an undergraduate student, who shows an enquiring and original mind, in the second or third year of study in the Honours or Major programme in English.

**Margaret Nicoll Pond Memorial Prize in English:** This prize will be awarded to the woman graduate of Dalhousie University who leads her class in English.

**The James W. Tupper Graduate Fellowship in English:** This fellowship, of an annual value of approximately \$5,500 is awarded by the faculty of the Department of English to a student who proposes to do graduate work in English at a university approved by the faculty. The award need not be held at Dalhousie. Further information may be obtained from the Department of English.

**The University Medal in English:** Each year the Department of English offers a medal to the top First Class Honours graduate in recognition of superior achievement in the programme.

## French

**Prix du Consulat de France:** The French Consul Prize will be made upon recommendation of the Department of French, to a student graduating with Honours in French.

**Prix de l'Ambassadeur de France:** A prize in books, offered by the French Embassy in Ottawa, is awarded annually to the graduating student standing highest in the advanced French class.

**Prix de l'Ambassadeur de Suisse au Canada:** A prize of books, the gift of the Ambassador of Switzerland in Canada, is awarded to graduating students who have won distinction by their work in the French language.

**University Medal in French:** The Department of French offers to the top First Class Honours graduate a medal in recognition of superior achievement.

## German

**Janet Gwendolyn Coode-Deesauer Memorial Prize:** A prize, consisting of one or more books, will be offered to a deserving honours or graduate student in recognition of achievement in German language studies.

**Prize of the Ambassador of Austria in Canada, Prize of the Ambassador of Switzerland in Canada, and the Prize of the Ambassador of Germany in Canada:** The Austrian, German and Swiss embassies in Canada regularly offer German language books to the Department to be awarded to Dalhousie students whose

achievement in German is outstanding. Awards are made at various levels of proficiency.

**University Medal in German:** The Department of German offers a medal to the top First Class Honours graduate in recognition of superior achievement.

## History

**The Edith and Rose Goodman Prize in History:** Under the Will of the late Mrs. Jeanette Goodman a bequest was made to Dalhousie University to fund a prize (or two prizes) for the highest (or the highest and second highest) standing in the class in Canadian History. The prize is awarded on the recommendation of the Department of History.

**The Dr. George E. Wilson Prize in History:** In 1967 an endowment was established to provide an annual prize to be awarded for the best essay by a First-Year student in a first-year class.

**University Medal in History:** To the top First Class Honours graduate the Department of History offers a medal in recognition of superior achievement.

## International Development Studies

**University Medal in International Development Studies:** A University Medal has been established for the student with the highest standing among those who graduate with First Class Honours.

## Mathematics, Statistics and Computing Science

**Bernoulli Prize:** The Bernoulli Prize will be awarded annually to the student registered in the Co-op Mathematics Programme who has the best cumulative academic record, subject to the restrictions that the prize can be awarded only once to a given individual and that the winner must have performed acceptably in all work term assignments.

**The Katherine M. Buttenshaw Prize:** This prize, being the net interest of an endowment of \$1,000, will be awarded annually to the student standing highest in the advanced Mathematics classes.

**Digital Equipment of Canada Limited Award of Merit:** Under the Annual Awards Programme of Digital Equipment of Canada Limited an award consisting of a Certificate of Merit and \$250 cash is offered annually. The award is open to the best graduating student in Computing Science.

**The Ellen McCaughin McFarlane Prize:** A Fund has been established in memory of Ellen McCaughin McFarlane, Class of 1927. Initially, the Fund is to provide an annual prize to an honours mathematics student who at

the end of his/her first year\* in the honours programme has achieved the highest standing.

\* (Normally, this would be upon the completion of the second year at Dalhousie.)

**Mobil Oil Canada Award:** This is an award to the student enrolled in the Computing Science major or Honours Programme, who shows the best performance in the two third-year core half-courses CS 3690 and CS 3700. The recipient will be chosen on the basis of final grades and on the recommendations of the instructors in the courses and of the Director of Computing Science. Mobil Oil Canada Limited gave the University a gift of \$1,000 to endow this annual prize.

**The Waverly Prize:** This prize, being the net interest of an endowment of \$1,000 for the purpose, will be awarded annually to student standing highest in Mathematics 1010.

**The Sir William Young Gold Medal:** Founded by the bequest of the late Sir William Young, this medal will be awarded on graduation to the student who stands first among those taking First Class Honours in Mathematics. (This is the University Medal in Mathematics)

**University Medal in Computing Science:** In 1983-84 the Department established this medal to be awarded, where appropriate, to the student who stands highest among the First Class Honours graduates in the Computing Science programme.

**University Medal in Statistics:** The Department established this medal to be awarded to the student who stands highest among the First Class Honours graduates in the Statistics programme.

## Microbiology

**University Medal in Microbiology:** The Department of Microbiology offers to the top First Class Honours graduate a medal in recognition of superior achievement in the programme.

## Music

**Dalhousie Women's Alumnae Medal:** This medal is presented to the graduating student who has achieved the highest cumulative average in Music subjects during the four-year Bachelor of Music degree programme.

**James and Abbie Campbell Prize, Campbell Incentive Award:** The Department of Music may from time to time award prizes to outstanding students from the James and Abbie Campbell Memorial Fund. The Campbell Incentive Award may on occasion be awarded under special circumstances.

**The Beatrice Davies Music Prize:** A fund has been established by members of the Dalhousie community to mark Women's

Centennial Year (1985) at this University. The purpose of the fund is to provide an annual in-course prize to a female student in the Bachelor of Music or Bachelor of Music Education programme on the combined basis of high academic standing and performance ability as determined by the Department of Music. The prize is named after the first graduates in music in 1909.

**University Medal in Music:** The Department of Music offers a medal to the highest ranking student of the year who graduates with the equivalent of a First Class Honours degree in the Bachelor of Music programme.

## Philosophy

**The F. Hilton Page Memorial Prize in Philosophy:** This annual prize is normally awarded to the honours graduate whose Honours Essay is judged to be outstanding.

**University Medal in Philosophy:** The Department of Philosophy offers a medal to the top First Class Honours graduate in recognition of superior achievement in the programme.

## Physics

**The Dr. William J. Archibald Prize in Physics:** An annual prize will be awarded to a student who, having completed the first year, is considered by the Physics Department to be the most promising among those entering the Honours Physics programme.

**The Professor J.B. and Mrs. H.H. French Prize:** A prize of \$1,000 is open to a female student at each of the second-, third- and fourth-year levels. An award is to be made only to those maintaining First Class standing in their honours programme. Consideration of candidates entering the third and fourth year will be made during May once final grades become available. Consideration of second-year candidates will occur in the fall.

**The Dr. E.W. Guptill Memorial Prize:** This is to be awarded to the undergraduate student who best exemplifies the qualities of Dr. E.W. Guptill in showing initiative, experimental skill, leadership and enthusiasm for Physics, thereby making an outstanding contribution to Physics in this University. This prize will not necessarily be awarded every year.

**The Dr. George Henderson Prizes in Physics:** Several prizes are awarded to students who have shown special aptitude in Physics.

**The James Gordon MacGregor Memorial Prizes:** Relatives of the late Dr. J.G. MacGregor contributed to the James Gordon MacGregor Memorial Fund which now provides awards to both undergraduates and

graduates in the study of Physics. The undergraduate awards are in the form of prizes.

**The Dr. A. Stanley MacKenzie Prizes in Physics:** These prizes will be awarded by the Department of Physics to the most promising students in the first two years of the Honours Physics programme. The fund was established under the Will of the late Miss Mary Alice Smith.

**The Burgess McKittrick Prizes in Physics:** Four prizes of \$100 each will be awarded to undergraduate students achieving the highest standing in each of the four classes, Physics 1000, 1100, 1300, and Physics 2110 and 2120 combined. No student may receive more than one such prize in any one year. The funds for these prizes come from the estate of F.J.A. McKittrick who graduated in 1894 with Honours in Mathematics and Mathematical Physics. He was the first Dalhousie graduate to receive the 1851 Exhibition Scholarship. The prizes are in memory of his brother, Burgess McKittrick, who was graduated in 1877.

**Darrell Montgomery Memorial Prize:** An endowment has been set up to provide an annual prize to the Third-year student in honours physics who is deemed to have shown a love of experimentation, the qualities of leadership and participation in student activities in physics related areas.

**The University Medal in Physics:** The Department of Physics offers to the top First Class Honours graduate a medal in recognition of superior achievement in the Physics course.

## Political Science

**The James H. Aitchison Award:** In 1979 colleagues of Dr. J.H. Aitchison established a fund from which an annual prize would be awarded in recognition of the best undergraduate honours essay. The fund was established to honour Professor Aitchison who was instrumental in founding the Department.

**The Eric Dennis Gold Medal:** Founded by Senator William Dennis and Mrs. Dennis, this medal will be awarded on graduation to the student who stands first among those taking First Class Honours in Government and Political Science. (This is the University Medal in Political Science.)

**The H.B. McCulloch Memorial Prize in Political Science:** This prize will be awarded annually to the student who, among all the first and second year students registered in Introductory classes in Political Science, is judged to have written the best essay in the second term.

## Psychology

**Brimer Memorial Prize in Psychology:** The Charles J. Brimer Memorial Fund was established during 1971 in memory of the late Dr. Brimer, Acting Chairman of the Department of Psychology. The income from this fund is awarded to a third-year Honours student. Students enrolling for the Honours certificate in Psychology in the year equivalent to the fourth year of the Honours Psychology programme are also eligible for the prize. The Brimer Memorial Prize is restricted to Dalhousie Honours Psychology students and is not open to Joint Honours students from other departments or other universities. The prize will be given to the student who shows the greatest potential as a researcher in experimental psychology.

**Frances L. Stewart Memorial Prize in Psychology:** A fund has been established to provide a prize to a Fourth Year honours student who shows outstanding potential as a scientist/practitioner in clinical psychology.

**University Medal in Neuroscience:** To the top graduating student with First Class Honours in the programme the Department of Psychology offers a medal.

**University Medal in Psychology:** The Department of Psychology offers to the top First Class Honours graduate a medal in recognition of superior achievement.

**Dr. Lilyan E. White Prize:** A bequest from the Estate of Dr. Lilyan E. White established an endowment to fund a prize to an undergraduate student in Psychology. The Department has assigned the prize for use in recognizing the best performance of a student in second-year.

## Russian

**University Medal in Russian:** The Department of Russian offers to the top First Class Honours graduate a medal in recognition of superior achievement in the programme.

## Sociology and Social Anthropology

**The Rev. S.H. Prince Prize in Sociology:** A bequest under the will of the late Dr. S.H. Prince established a fund to provide an annual prize to be available to students at either Dalhousie or King's.

**University Medal in Social Anthropology:** The Department of Sociology and Social Anthropology offers a medal to the top First Class Honours graduate in the Social Anthropology programme in recognition of superior achievement.

**University Medal in Sociology:** The Department of Sociology and Social Anthropology offers a medal to the top First

**Class Honours graduate in the Sociology programme in recognition of superior achievement.**

## Spanish

**The de Carteret Memorial Prize:** The de Carteret Memorial Prize is payable from the net annual income of a fund which was provided as a gift in the memory of the late Norman S. and Helier S. de Carteret and their sister, Phyllis de Carteret Nielsen. The prize is to be awarded on the recommendation of the departmental chairman to an outstanding student in the Department of Spanish.

**University Medal in Spanish:** The Department of Spanish offers a medal to the top First Class Honours graduate in recognition of superior achievement in the Spanish programme.

## Theatre

**University Medal in Theatre:** The Department of Theatre offers to the top First Class Honours graduate a medal in recognition of superior achievement.

**Women's Division - Dalhousie Alumni Association Medal in Costume Studies:** This medal is presented annually to the graduating student with the highest cumulative grade point average in the Costume Studies Programme.

## Transition Year Programme

**Morris Saffron Prize:** A bequest under the Will of the late Morris Saffron established an endowment to provide an annual prize to a student in the Transition Year Programme who is judged to have made the greatest academic achievement during the year.

## College Awards

**Note concerning top medals and prize:** The Undergraduate Scholarship Committee adopted the following policy concerning the top medals and top prize, effective with the 1986-87 academic year:

In the event of a student taking a second degree at Dalhousie, then in order to be considered for the Governor-General's Gold Medal (since replaced by the Governor General's Silver Medal, 1988), the University Silver Medal or the Avery Prize, such a student must have completed at least 12 new classes at Dalhousie in the second degree programme and in the calculation of the student's average, only these new classes will be counted. Furthermore, any disciplinary action by the Senate Discipline Committee, which action is recorded on the student's transcript, shall be deemed sufficient cause for such a student to be ineligible for the aforementioned top medals and prize.

**The Avery Prize:** This prize, being the net interest on the sum of \$500 bequeathed for this purpose by J.F. Avery, MD, will be awarded on graduation to the student standing highest among those being graduated from the general course.

**The Governor-General's Silver Medal:** Offered by his Excellency the Governor-General of Canada, it will be awarded to the undergraduate student who has achieved the highest academic standing among graduates of baccalaureate programmes. This is interpreted to apply to those students in Honours programmes who are graduated with First Class Honours. (Under review)

**The University Silver Medal:** This medal is awarded to the student who is judged to be the leading First Class Honours graduate of the year in either the arts or the sciences, in whichever field the Governor-General's Silver Medal was not presented. (Under review, depending upon terms of Governor-General's Silver Medal)

(Please note that Commerce students are eligible for the above three awards and that such students are grouped with Arts students in the assessment process.)

## Faculty of Health Professions

### College of Pharmacy

**BMS Pharmacy Award:** This award of \$500 is presented annually to the student with the highest standing in second-year classes.

**The Dean George A. Burbidge Memorial Award:** This prize is awarded by the Nova Scotia Pharmaceutical Society to a student completing third year, from Nova Scotia, for outstanding qualities of character and pharmaceutical ability at the College of Pharmacy.

**The R. Frank Chandler Award:** A fund was established by Ortho Pharmaceutical (Canada) Limited in 1989 to support this Award. It will be presented to a student entering the final year of study at the College of Pharmacy. The candidate must have high qualities of character and spirit, must have well developed interpersonal skills, must show an aptitude and proficiency for the profession, must show promise of making future contributions to the profession of pharmacy.

**The F.R. Clayden Prize:** This prize, in the form of a book, is presented in memory of Mr. F.R. Clayden (Class of 1912) to a deserving student completing the first-year classes of the pharmacy course.

**Clinical Pharmacy Award:** This award of \$150 is presented to a student in the fourth year therapeutics class. The student must

have an aptitude for clinical pharmacy practice and must have achieved a high level of performance during the clinical clerkship.

**The Dean J. Esmonde Cooke Award:** This award of \$500 is to be given annually to a student who has successfully completed one or more years of the course leading to a degree in pharmacy and who is enrolled in pharmacy at the University for the coming year. Candidates must have attained a good academic standing and must show promise of making future contributions to the profession of pharmacy. The student must be a graduate of a high school in Nova Scotia and should not be the recipient of other concurrent awards. The Selection Committee may also consider the financial need of the candidate. This award is sponsored by the Pharmacy Association of Nova Scotia.

**Robert G. Crowell Memorial Pharmacy Award:** This award of \$1000 is open to a student who is a resident of Nova Scotia who is entering the fourth year of study at the College. The candidate must have attained a satisfactory academic standing and show promise of making future contributions to the profession of pharmacy. The Selection Committee may consider financial need in the determining of an awardee. The award, sponsored by Crowell's Pharmacy Ltd., honours its founder for his contributions to pharmacy in the province.

**Dale Daley Pharmacy Award for Excellence:** This award was introduced in 1990 by Shoppers Drug Mart to recognize the many contributions of Dale Daley to the profession of Pharmacy. It is awarded annually to a third year pharmacy student who has demonstrated a good academic standing and whose contributions to undergraduate life at the university excel. The award is valued at \$3,000.00.

**The Dalhousie Student Pharmacy Society Book Award:** A trust fund from various donations has been established in the name of the Dalhousie Student Pharmacy Society. The interest accrued each year is used to purchase a suitable book for presentation to a student completing the first year at the College of Pharmacy. The first-year students are asked to select the student who has contributed in an exceptional way to the life and spirit of their class. The main factors for consideration are active participation in student affairs and a keen interest in the profession of Pharmacy.

**Robert C. Dickson Memorial Award:** This award is presented to a student from New Brunswick on the basis of academic achievement, financial need and participation in student activities at the College of Pharmacy. The Award is made available through a bequest of the late Mr. Charles D. Dickson.

**The Sister Frances dePaul Award:** This award, consisting of a reference book or a subscription to a *professional journal*, is offered annually by the Nova Scotia Branch of the Canadian Society of Hospital Pharmacists and is presented to the student who attains the highest standing in the hospital pharmacy class. To be eligible for this award a student must have achieved a GPA of at least 3.00.

**Drug Information Award:** This award, in the form of a reference book or professional journal subscription, is to be awarded to a worthy student in The Drug Information Class, Pharmacy 4900.03B.

**J.G. Duff Pharmacy Award:** This award, in the form of a medal, was established by Dr. Duff's former students and associates in recognition of his contribution and devotion to pharmaceutical education in the Maritimes. The award will be presented to a student entering the senior year for outstanding leadership and satisfactory scholastic attainment. A Senior Stick, bearing the names of the recipients, will be kept in trust by the Dalhousie Student Pharmacy Society. The recipient of the award will be selected by the student body.

**The Charles E. Frost Award:** This award of \$1000 is presented by Merck Frost Canada Inc. to an undergraduate student of outstanding merit in the third-year class.

**The Charles E. Frost Medal:** This medal is presented by Merck Frost Canada Inc. to the student who achieves the highest academic standing in the third-year class.

**Hoechst-Roussel Canada Inc. Award:** An award of \$1,500 is presented annually to an outstanding pharmacy student who has successfully completed one or more years at the College of Pharmacy.

**Home Prescription Services Prize:** This prize of \$200 is awarded annually to the student who obtains the highest standing in Physiology 4403.06R. To be eligible for this prize a student must have at least a GPA of 3.00.

**The Frank W. Horner Medal:** This medal is awarded to the pharmacy student who has attained the highest standing in the third year dispensing class.

**The William Killorn Award:** This award has been established by Shoppers Drug Mart Associates and the pharmaceutical industry to pay tribute to Bill Killorn in honour of his 46 years of service to pharmacy in Atlantic Canada. The award is presented annually to a pharmacy student who, in the view of the College after consultation with the Killorn family and the pharmaceutical industry,

demonstrates strong leadership skills and excels in academic and extracurricular activities.

**The Honourable John J. Kinley Pharmacy Award:** In order to be considered for the award, candidates must have satisfactory academic standing and show promise of contributing to the profession. The financial need of the applicant may also be considered by the Selection Committee. The net income from an established fund will be used to provide a monetary award as well as a book.

**Eli Lilly Book Award:** The firm of Eli Lilly Canada Inc. provides an award for a deserving student in either first or second year pharmacy. The award consists of the sum of \$200 and the current edition of Martindale's Extra Pharmacopoeia.

**Dr. Jessie I. MacKnight-Miss Mona W. Fleming Award in Hospital Pharmacy:** This award is administered annually to a student from New Brunswick and to a student from Nova Scotia who have completed outstanding work in the hospital portion of the practical training programme (Pharmacy 3000.00B) and in the third year dispensing laboratory class (Pharmacy 3100B). It is desirable that the recipients demonstrate an interest in hospital pharmacy practice.

**The Donald R. MacLeod Prize:** This prize of \$50, offered in memory of Mr. Donald R. MacLeod, a former pharmacist of New Glasgow, Nova Scotia (Class of 1930), is awarded to the student of the first year who attains the highest academic standing in the first-year classes of the Pharmacy course. The purse of the prize is paid directly from the sponsor.

**The Helen Corston Marshall Award in Pharmacy:** This award is to be given annually to a student (or students) who has successfully completed one or more years of the course leading to a degree in pharmacy and who is enrolled in pharmacy at the University for the ensuing year. Candidates must have attained a satisfactory academic standing and must show promise of making future contributions to the profession of pharmacy. Financial need may be considered.

**Medis Atlantic Medal:** This medal is awarded annually to the student on graduation who has obtained the second highest aggregate mark during his/her four years at the College of Pharmacy.

**Merck Sharp and Dohme Pharmacy Award:** This award, consisting of \$1000 and the books, The Merck Index and The Merck Manual, is presented to the student entering the final year who has attained the highest standing in the pharmaceutical chemistry classes.

**New Brunswick Pharmaceutical Society Centennial Medal:** In conjunction with its 100th anniversary of incorporation, the Society has established this commemorative medal to be presented annually to the New Brunswick student who has attained the highest aggregate mark during his/her four years at the College of Pharmacy.

**The Nova Scotia Association of Certified Dispensers Prize:** This prize, in the form of a book, will be awarded annually to the top student in the first year dispensing laboratory. The prize was established in 1984 with the gift of funds to provide the initial award and to set up an endowment to provide subsequent awards.

**The Nova Scotia Pharmaceutical Society Centennial Awards:** In conjunction with its 100th anniversary of incorporation, the Society has established two awards. Candidates will have a satisfactory academic standing and show aptitude for the profession. The financial need of the student may be considered in selecting recipients for the awards, each of which is \$500.

**Nova Scotia Pharmaceutical Society Memorial Award:** The Society has established this award in memory of past members and friends of the Society. It is available to a qualifying student who possesses good academic standing and aptitude for the profession. The financial need of the student may be considered in selecting the recipient for the award of \$1000.

**Novopharm Pharmaceuticals Award:** This award of \$500 is presented annually to the student who obtains the highest combined standings in the following classes: Physical Pharmacy (second year), Biopharmaceutics (second year) and Pharmacokinetics (third year).

**The Parke-Davis Prize:** A prize of \$500 is presented annually to the student with the highest standing in the first-year classes of the pharmacy course.

**Practical Training Programme Prize:** A prize is presented to a student completing the College of Pharmacy Practical Training Programme who has achieved a high level of performance during the programme. Assessment will be based primarily on submitted assignments.

**The B. Trevor Pugsley Memorial Pharmacy Award:** This award was established by a bequest from the Estate of B. Trevor Pugsley for an undergraduate student who has completed one or more years of the pharmacy course. The criteria for the selection of the recipient are based on academic standing, aptitude for pharmacy and qualities of character. Financial need may also be considered.

**The Mrs. Vera B. Pugsley Award:** This award of \$500 will be presented annually to a student who has successfully completed one or more years of the course leading to a degree in pharmacy and who is enrolled in pharmacy at the University for the ensuing year. Candidates must have attained a satisfactory academic standing and must show promise of making future contributions to the profession of pharmacy.

**John J. Ryan Pharmacy Administration Award:** This award of \$200 and a suitable memento is presented annually to the student earning the highest mark in Pharmacy 4700.03A. This Award was made possible through income from the John J. Ryan Fund.

**Sandoz Prize in Pharmacy:** This prize is presented annually to the graduating student who obtains the highest standing in fourth year pathophysiology and therapeutics class (Pharmacy 4500R). The prize consists of an engraved plaque, a cheque for \$250 and a reference book.

**The Laigh Sempie Memorial Award:** An endowment has been established to provide an annual award to a third-year pharmacy student who has demonstrated strong academic ability and involvement in student activities.

**Dr. Samar B. Singh Prize in Anatomy:** An endowment fund has been established for the purpose of providing from the net annual income a prize to the highest standing student in Anatomy 101 among Nursing and Pharmacy enrollees. The prize, consisting of a book or books to the approximate value of \$100, is a memorial to Dr. Singh, a long-time member of the Department of Anatomy. The awardee will be selected by the Head of the Department.

**SmithKline Beecham Pharma Inc. Award:** Two awards of \$500 each will be presented annually to a student from Nova Scotia and a student from either New Brunswick or Prince Edward Island who have successfully completed one or more years of the course leading to a degree in pharmacy and who are enrolled in pharmacy at the University for the ensuing year. Candidates must have attained a satisfactory academic standing and must show promise of making future contributions to the profession of pharmacy.

**Pharmacy's Canada Centennial Award (External):** This award enables a student who is completing the third year to participate in the Canadian Pharmaceutical Association Conference and to visit governmental and industrial institutions. The award is based on acceptable academic achievement, participation, and leadership in student activities. The award is sponsored by the Canadian Pharmaceutical Association,

Shoppers Drug Mart, and the Maritime provincial pharmaceutical societies and association.

**University Medal in Pharmacy:** This medal is awarded annually to the graduate who has obtained the highest academic standing in the pharmacy programme provided that she or he meets the requirements as set by the Faculty.

**Wamer-Lambert Self-Medication Award:** An award of \$500 is presented by Wamer-Lambert to recognize the pharmacy student who achieves the highest standing in course work related to over-the-counter drug products.

**Wyeth Award of Excellence in Pharmacy Research:** An Award of \$200 and a certificate will be presented to a fourth year student at the College of Pharmacy who completes the best research project in a given academic year. The research will usually be done in Pharmacy 4000.06R, 4010.03A, 4020.03A or B, or 4030.03R, but any paper completed by a fourth year student, which is deemed by the primary supervisor to be worthy of consideration for this Award, will be included in the competition. Each primary supervisor may submit no more than one paper. A committee will evaluate the research presentations in both a written and verbal form.

## School of Nursing

**Alumnae Award (Nursing):** This award is open to graduating students in the Basic or Post-RN programmes. The recipient will have achieved a Grade Point Average of 3.00 or better and have demonstrated clinical competency in the area of medical/surgical nursing in a hospital setting.

**Dalhousie Basic Degree Certificate and Dalhousie Post-RN Degree Certificate:** Information concerning these certificates may be obtained from the School of Nursing.

**Final-Year Degree Award:** A prize is awarded to the student in the graduating class who has achieved the highest academic standing. (On account of computer space limitations the older name has been retained on the code directory. In the School of Nursing this award is known as Prize for the Highest Academic Achievement in the Undergraduate Degree Programme.)

**The Grace Maternity Medical Staff Association Award for Excellence in Maternal Nursing:** Open to graduates from the Basic programme, the recipient of this award will be one who demonstrates excellence in the area of maternal nursing as determined by the faculty member teaching the N3210.04 course or its equivalent.

**Halifax Children's Hospital Alumnae Prize:** This prize is given by the Izaak Walton Killam Hospital for Children to the student who meets the approval of the criteria as established by the School of Nursing and the Izaak Walton Killam Hospital for Children in recognition of the student's work in the paediatric sector of the community.

**R.M. MacDonald and R.C. Dickson Prize in Outpost Nursing:** A prize is awarded for the student achieving the highest academic record in the graduating class of Outpost Nursing students.

**C.V. Mosby Book Prize:** This award is given in recognition of a student's high academic standing and participation in the School.

**Anna Trenholm Memorial Prize:** A cash award has been donated by the family of the late Anna Trenholm (Diploma in Outpost Nursing, 1970; BN 1976). The prize is to be awarded annually to the student graduating from the Outpost Nursing Programme whose achievement in clinical practice has been outstanding.

**W.B. Saunders Award (Nursing):** This prize is presented to the student in the graduating class who has demonstrated progressive academic achievement and general proficiency. It is a one-year subscription to Nursing Clinics of North America.

**Dr. Samar B. Singh Prize in Anatomy:** An endowment fund has been established for the purpose of providing from the net annual income a prize to the highest standing student in Anatomy 1010 among Nursing and Pharmacy enrollees. The prize, consisting of a book or books to the approximately value of \$100, is a memorial to Dr. Singh, a long-time member of the Department of Anatomy. The awardee will be selected by the Head of the Department.

**The Stern Award:** This prize was established to recognise the contribution of a graduating student to increased knowledge and participation of School members in an interdisciplinary international role.

**Universality Medal in Nursing:** This medal is awarded annually to the graduate who has obtained the highest academic standing in the Nursing programme provided that she (or he) meets the requirements as set by the Faculty.

## School of Occupational Therapy

**The Canadian Association of Occupational Therapists Book Prize:** This prize is awarded annually to the graduating student with the highest academic standing in the theory of occupational therapy.

**Foundation Travel Award:** This award was established to recognise the founding of the School of Occupational Therapy. Presented

annually to the President of the Dalhousie Occupational Therapy Student Society, the award provides funding to cover the cost of attending the annual Occupational Therapy Atlantic Conference. Funds for the award are provided by the professional organizations of occupational therapists in the four Atlantic provinces.

**New Brunswick Association of Occupational Therapists Award for Achievement in Fieldwork:** This prize is awarded annually to the graduating student who has shown outstanding achievement in fieldwork.

**PEIOTS and PEIAOT Award:** This prize is awarded annually to the graduating student with outstanding academic achievement in Advanced Professional Practice (OT 4419.06R) as well as an interest and involvement in community practice.

**1992 Tenth Anniversary Award:** This award will be presented annually to a graduating student who has demonstrated an outstanding level of personal growth and professional development while in the occupational therapy program.

**Nova Scotia Society of Occupational Therapists Student Society Award:** This prize is awarded annually to the graduating student who has contributed most to the Occupational Therapy Student Society.

**Newfoundland and Labrador Association of Occupational Therapists Book Prize:** This prize is awarded annually to the student entering fourth year who achieved the highest standing in third year Therapeutic Procedures classes (OT 3305.02B, OT 3306.02A, OT 3307.04R and OT 3308.03R).

**Nova Scotia Society of Occupational Therapists Book Prize:** This prize is awarded annually to a student entering third year who has been selected by classmates on the basis of outstanding contribution to activities in both the School and the community, interpersonal skills and general scholarship proficiency.

**Dalhousie Women's Alumnae Medal:** The Women's Division of the Dalhousie Alumni Association sponsors an annual medal to be awarded to the graduating student with the highest cumulative grade point average in the occupational therapy program.

**W.B. Saunders Book Prize:** This prize is presented annually to the graduating student with the second highest cumulative grade point average in the Occupational Therapy programme.

**Williams and Wilkins Book Prize:** This prize is awarded annually to the entering fourth year with the highest academic standing.

**C.V. Mosby Book Prize:** This prize is awarded annually to the graduating student with the second highest standing in the final year of the Occupational Therapy programme.

**The Sammons Award:** This prize is awarded annually to the graduating student with the highest overall standing in statistics (Math 1060.03A), research methods (OT 4407.03A) and Independent Study (OT 4421.06R). Mr. F. Sammons gave the University a gift to be used at the discretion of the School, which decided to endow an award for a graduating student.

**Sammons Research Award for Clinical Tutors:** An endowment has been established to provide an annual prize to the clinical tutor who has assisted the graduating student who won the Sammons Award for their independent research project.

**Class of '85 Award:** This prize is awarded annually to a graduating student (as chosen by the members of the graduating class) who has made an outstanding contribution to activities of the class, School, University and community.

**The Cardwell/Robinson Prize:** An endowment has been established from which the net annual income will support a prize. The award is presented to a student entering fourth year who has achieved the highest standing in courses dealing with psychiatry and mental health (OT 3302.05R and OT 3307.04R).

**The Norma Caseldy Prize:** This award is presented annually to a student entering fourth year with the highest academic standing in Therapeutic Procedures (Rehabilitative, OT 3306.02A).

**Dalhousie Occupational Therapy Student involvement Award:** This award was established by the Occupational Therapy Student Society from a donation by the Dalhousie Student Union through their Capital Campaign pledge. The prize will be presented annually to a student entering the fourth year who shows financial need and who has been actively involved in the Occupational Therapy Student Society and other School activities. One award of \$500 will be made from income generated by the endowment.

**School of Occupational Therapy Prize in Kinesiology:** This prize will be presented annually to the student entering Third Year with the highest standing in class OCCT 2210.03R (Kinesiology).

**University Medal in Occupational Therapy:** This medal is awarded annually to the graduate who has obtained the highest academic standing in the occupational therapy programme provided that she or he meets the requirements as set by Faculty.

## School of Physiotherapy

### Fourth Year

**Canadian Physiotherapy Association Award:** A certificate and first-year membership in the Canadian Physiotherapy Association constitute this annual award. It is presented to the graduating student who has achieved the highest aggregate percentage in academic and clinical physiotherapy subjects during the entire programme.

**Canadian Physiotherapy Cardiorespiratory Society Book Prize:** A book prize to the approximate value of \$80.00 is offered to the third-year Physiotherapy student who has achieved the highest standing in the Cardiorespiratory class, PT 3050.04.

**The Patricia Stanfield Covert Award in Physiotherapy:** An endowment has been established to provide an annual prize to a physiotherapy student who is entering the final year of the programme. The recipient is to be nominated by classmates on the basis of extra curricular activities, interpersonal skills and scholarship proficiency.

**Morris B. Kohler Award in Physiotherapy:** This prize is awarded to the student in the graduating class who has demonstrated the greatest interest in the treatment of long-term rehabilitation patients, while attending the Nova Scotia Rehabilitation Centre.

**Hazel Lloyd Foundation Book Prize:** The Hazel Lloyd Foundation has been established by Miss Aphra Lloyd in memory of her sister, Miss Hazel A. Lloyd (1930-1985), Associate Professor, School of Physiotherapy. Friends, associates and alumni have made additional contributions. The purpose of the Foundation is to foster interest in geriatrics and gerontology, Professor Lloyd's major areas of interest. The Hazel Lloyd Foundation will award an annual Book Prize to the student with the highest marks in PT 4120.03A, Gerontology and Geriatrics.

**Jean McAloney Memorial Prize:** This prize is awarded annually to the student in the graduating class who has demonstrated the highest clinical standing. The prize is sponsored by the New Brunswick Association of Physiotherapists.

**Newfoundland and Labrador College of Physiotherapists Prize:** This prize is awarded to the physiotherapy student who has attained the highest standing in Orthopaedics. It is sponsored by the Newfoundland and Labrador College of Physiotherapists.

**Newfoundland and Labrador Physiotherapy Association Prize:** This prize is awarded to the member of the graduating class who has attained the highest standing in Neuroscience. It is sponsored by the Newfoundland and Labrador Physiotherapy Association.

**Nova Scotia College of Physiotherapists Book Prize:** The College sponsors an annual cash prize for books to the third-year physiotherapy student who has demonstrated the greatest degree of leadership within her/his class during the second and third years within the School of Physiotherapy.

**Nova Scotia Neurosciences Section Book Prize:** The Nova Scotia Section of the Neurosciences Division of the Canadian Physiotherapy Association established a prize of \$50, effective with the 1984-85 session. The prize will be presented to the fourth-year Physiotherapy student with the highest combined grade from (1) the practical exam in third-year neurology course and (2) the average grade of the third-year and fourth-year clinical neurology placement(s). The recipient will be selected by the Dalhousie Professor who is managing the neurology course.

### Third Year

**Nova Scotia Physiotherapy Association Prize:** This prize is awarded annually to the student who shows the greatest overall improvement during the third year of the BSc Physiotherapy programme.

### Second Year

**Prince Edward Island Physiotherapy Association Prize:** This prize is awarded annually to the student who has attained the highest academic standing in Gross Anatomy.

**University Medal in Physiotherapy:** This medal is awarded annually to the graduate who has attained the highest academic standing in the physiotherapy programme, provided that he or she meets the requirements approved by the Senate of Dalhousie University.

## School of Recreation, Physical and Health Education

**Beaver Foods Awards:** Under the sponsorship of Beaver Foods Limited the School of Recreation, Physical and Health Education is able to offer a limited number of entrance awards between \$500 and \$1000 to students registering in this School for the first time. Winners will be selected from applicants who possess a strong background in academic performance, leadership activities and extra-curricular activities, especially varsity athletics. Further information may be obtained from the Director of the School of Recreation, Physical and Health Education.

**Anthea Bellemare Award for Excellence in Student Teaching:** The School selects for this award the graduating student in the Bachelor of Physical Education/Bachelor of Education

programme who has demonstrated the highest degree of performance in student teaching activities.

**The E.G. Belzer Jr. Prize:** In 1986 colleagues and former students of Dr. E.G. Belzer Jr. established a prize that is to be awarded to the undergraduate health education major who is adjudged to have written the best paper among those submitted to health education courses. The adjudication is held annually, at mid-April. The prize will be a book chosen by Health Education Division faculty members. The prize is also open to graduates.

**Canadian Society for Exercise Physiology:** The CASS provides an annual medal to the School to be awarded to an outstanding student in the Bachelor of Science in Kinesiology programme. The recipient will be the graduating student who has achieved the highest cumulative Grade Point Average over the duration of her/his academic record.

**Canadian Association for Health, Physical Education and Recreation Student Award:** This award is presented to a second- or third-year student who has demonstrated a significant involvement in the SAPHER organization and by so doing has demonstrated a commitment to the advancement of professional principles supported by CAPHER.

**The Dr. M.J. Ellis Award:** This award was established to give recognition to a graduating student who demonstrated exceptional interest and ability in research in one of the four undergraduate degree programmes.

**Duane Ervanowitz Memorial Award:** This memorial book prize is awarded to the graduate in the Recreation programme who is deemed to have an exceptional interest in and dedication to conservation and outdoor recreation.

**Health Education Awards:** Consisting of one-year subscriptions to a Health Education Journal of the student's choice, there are two awards, one for each of years One and Two of the BSc Health Education programme. The awards are made to the student in each year who has achieved the highest GPA.

**Leisure Research Congress Award:** The Fifth Canadian Congress on Leisure Research set up an endowment to provide an annual award to a student who has graduated from the Bachelor of Recreation programme. The recipient will have attained a cumulative Grade Point Average of 3.00 or higher and will have demonstrated an aptitude for research related to recreation and leisure. The awardee must be planning to register in a graduate programme in Leisure Studies at Dalhousie University in the academic year following receipt of the award.

**The Dr. Hugh A. Noble Award:** This award is given to a graduating student from one of the four undergraduate degree programmes in the School of Recreation, Physical and Health Education. The awarding is based on academic accomplishments, qualities of citizenship as shown by involvement outside the University, leadership qualities as demonstrated in activities inside the University, and an estimate of the candidate's potential for contributing to the profession.

**Thomas Family Prize:** The Nova Scotia Heart Foundation and the Thomas family have established an award which is open to graduating students in the Health Education programme (BSc or MA). Candidates will have shown dedication to the field of heart health through volunteer work in community health promotion, demonstrated a commitment to a healthy lifestyle, and achieved a commendable level of academic performance.

**University Medal in Recreation, Physical & Health Education:** This medal is awarded annually to the graduate who has obtained the highest academic standing in the physical education programme provided that she or he meets the requirements as set by the Faculty.

**The Women's Division of the Dalhousie Alumni Association RP&HE Medals:** Four awards are available to students in the School of Recreation, Physical and Health Education. For the students who achieve the highest standing in each of the Bachelor of Physical Education, the Bachelor of Recreation, the Bachelor of Science in Health Education and the Bachelor of Science in Kinesiology degrees, the Women's Division sponsors of a medal.

**The A.J. "Sandy" Young Award:** This award is open to the graduating student who makes the greatest contribution each year to the advancement of "Nova Scotia Sport Heritage". Both undergraduate and graduate students are eligible.

### Maritime School of Social Work

**Dalhousie University Women Alumnae Medal:** This medal is presented annually to the graduating student with the highest cumulative grade point average in the baccalaureate programme in the Maritime School of Social Work.

### Faculty of Management

#### Commerce

**The Wilfred Berman Memorial Prize:** The Wilfred Berman Memorial Prize is payable from the income of a fund provided by former students of the late Professor Wilfred Berman to the student obtaining the highest mark in the class in first-year Accounting.

**Commerce Alumni Association Awards:** The Commerce Alumni Association sponsors four annual awards to recognize academic achievement. There is one award for each of Accounting, Finance, Management and Marketing.

**The Stewart Lookie Gibson Memorial Prize:** The School of Business Administration offers a prize to the graduating student in the general Bachelor of Commerce programme who has achieved the highest standing.

**University Medal in Commerce:** The School of Business Administration offers to the top First Class Honours graduate in the Bachelor of Commerce programme a medal. The awardee will be one who has fulfilled the high scholastic standard for this award.

## Financial Aid, Loans, and Bursaries

### Government Student Loans

#### Addresses of Provincial Student Aid Authorities

Canadian students, other than Quebec residents, are to apply for government assistance to the appropriate agency in that province or territory in which the applicant is a bona fide resident. The addresses for Canada Student Loan authorities of those provinces and territories participating in the plan are listed below:

#### Alberta:

Alberta Students' Finance Board  
10th Floor, Baker Centre  
10025-108 Street  
Edmonton, Alberta  
T5J 1G7  
(403) 427-2740

#### British Columbia:

Student Services Branch  
Ministry of Advanced Education,  
Training and Technology  
2nd Floor, 1108 Cook Street  
Victoria, British Columbia  
V8V 3Z9  
(604) 387-8100/8101

#### Manitoba:

Student Financial Assistance Branch  
Manitoba Education and Training  
Box 6, 893 Taylor Avenue  
Winnipeg, Manitoba  
R3M 3T9  
(204) 945-8321/8322

#### New Brunswick:

Student Services Branch  
Department Of Advanced Education and  
Training  
P.O. Box 6000  
Fredericton, New Brunswick

# 74 Awards

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**E3B 5H1**  
**(506) 453-2577**  
**1-800-667-5625**  
(Atlantic Provinces, Ontario and Québec only)

**Newfoundland:**  
Department of Education  
Student Aid Division  
Thompson Student Centre  
Memorial University of Nfld.  
St. John's, Newfoundland  
A1C 5S7  
(709) 729-4235/5849

**Northwest Territories:**  
Manager-Student Services  
Department of Education  
Government of the Northwest Territories  
Yellowknife, Northwest Territories  
X1A 2L9  
(403) 873-7190  
or  
1-800-661-0793

**Nova Scotia:**  
Student Aid Office  
Department of Advanced Education and  
Job Training  
P.O. Box 2290, Station M  
Halifax, Nova Scotia  
B3J 3C8  
(902) 424-8420  
1-800-566-8420  
(Street location: Trade Mart Building 2021  
Brunswick at Cogswell Streets Halifax, N.S.)

**Ontario:**  
Student Support Branch  
Ministry of Colleges and Universities  
P.O. Box 4500  
Thunder Bay, Ontario  
P7B 6G9  
(807) 343-7260

**Prince Edward Island:**  
Student Aid Office  
Department of Education & Human Resources  
P.O. Box 2000  
Charlottetown, Prince Edward Island  
C1A 7N8  
(902) 368-4640

**Saskatchewan:**  
Student Financial Assistance Branch  
Saskatchewan Education  
1855 Victoria Avenue  
Regina, Saskatchewan  
S4P 3V5  
(306) 787-5620

**Yukon Territory:**  
Students' Financial Services  
Department of Education  
P.O. Box 2703  
Whitehorse, Yukon Territory  
Y1A 2C8  
(403) 667-5310  
or  
(403) 667-5929

The above authorities also administer provincial bursary and loan plans in conjunction with the Canada Student Loan, if applicable.

**Québec:**  
Residents of Québec Province are to apply to:  
Ministère de l'enseignement supérieur  
et de la Science  
Direction générale de l'aide financière  
aux étudiants,  
1033, rue de la Chevrotière  
Québec, Québec  
G1R 5K9  
(418) 643-3750  
(514) 864-4505 (24-hour automated service)

## Short-Term Loans

### For Dalhousie Students Generally

**Temporary Loans:** The University has established a temporary loan programme to assist registered Dalhousie students with certain types of short-term financial difficulty when no other reasonable resource is available. Students must provide at the time of application documentary proof of their ability to repay the loan within the time period. (Such loans are not made for fee payment, however.) These loans have a short interest-free period, after which interest will be charged. Refer to the information sheet attached to the Temporary Loan Application for further details. Applications may be picked up in the Office of the Registrar, Room 133, A&A Building and handed in to the Information Centre, Room 123, A&A Building.

### For Occupational Therapy Students

**Short-Term Loans for Occupational Therapy Students for Fieldwork:** Full-time students in Third Year or Fourth Year are eligible to apply for loans up to \$500. The first priority is for Third-Year students who are about to undertake fieldwork 4420 A or B; the second priority is for Fourth-Year students who are about to undertake fieldwork 4421R. Students who seek such assistance are to apply to: Office of the Registrar, Awards, and to present a letter of support from either the Director of the School or the Fieldwork Co-ordinator of the School. Further information is available at the Awards Office or the School of Occupational Therapy.

## Dalhousie Bursaries

Students who are eligible under the Canada Student Loans Act must have applied for a Canada Student Loan in order to be considered for a Dalhousie bursary.

Application forms are available at the Office of the Registrar, Room 133, Arts & Administration Building, after October 1st, until the end of the regular session (April 30th).

Students may apply for University bursaries during the Summer Session beginning May 1st. and ending August 31st.

Please submit your completed, documented and signed bursary application forms to the Information Centre, Room 123, Arts and Administration Building. You will be apposed by message on the computers in the information Centre of the decision. Bursary applications are batched and assessed on a comparative basis for available funds.

Please note that most University undergraduate bursaries are restricted to Canadian citizens and permanent residents.

It should be noted that Canada Student Loans (with or without provincial bursaries and/or loans) are expected by provincial authorities to meet the financial deficiencies of the students. Bursaries subsequently awarded by the University must be reported and are liable to be deducted (in part or in whole) from the amounts originally allocated under the Canada Student Loan Plan or provincial aid programme.

The University has at its disposal funds which are selectively awarded as bursaries to students who may unexpectedly find themselves in need of financial assistance. While these bursaries are awarded primarily on the basis of demonstrable need, satisfactory academic standing is also expected. Except under exceptional circumstances, bursaries will not be awarded to fulltime students who have not availed themselves of assistance under the federal/provincial student aid programmes.

in the event that the applicant may be eligible for a restricted bursary, he/she should annotate the application.

#### Government Notification

Holders of Dalhousie University bursaries are to note that the University is required, upon written request, to report its award winners to the respective provincial Student Aid Authority.

#### Arts & Science Specified as to Year

##### First Year

**Alfred George Darville Memorial Bursary:** This fund provides one bursary to a qualifying Dalhousie student. Applicants must be matriculants of Halifax West High School, be enrolled in first-year studies in an undergraduate programme (as commonly understood), and demonstrate financial need to the satisfaction of the Selecting Body.

**The John Dunlop Memorial Bursary:** An endowment was established to provide bursaries in first year.

**The Rev. Kenneth Mackenzie Bursary:** Mrs. Harriet Mackenzie Morrison of Stornoway, Scotland, daughter of the Rev. Kenneth Mackenzie of Pictou County, bequeathed \$1,000 to the university in 1887 to be used as a bursary fund. Candidates of the name of Mackenzie, MacLean, or Fraser are to be given preference.

**Elizabeth McKenna Bursaries:** The Elizabeth McKenna Scholarship Fund was established in 1928 for the purpose of providing what are known today as bursaries. Applicants must be bona fide residents of one of the Maritime Provinces and be entering the first year in the College of Arts & Science.

**North British Society Bursaries:** Eight major bursaries are open to candidates from provincial high schools who have been accepted for full-time study in the College of Arts and Science. The Selection Committee will assess candidates on the basis of the following criteria: academic achievement, extracurricular participation and demonstrated financial need. Applicants may obtain the designated application form at the Awards Office, and are to return the completed forms to this office by the May deadline. The bursaries are provided by the North British Society which for many years has been dedicated to the preservation of the Scottish tradition in Nova Scotia. The association between the Society and Dalhousie University derives in particular from the role of Scots in the foundation and development of the University during its first sesquicentennial. The following bursaries each in the amount of \$500 are available: the Sir Joseph A. Chisholm Bursaries (two), the NBS Centennial 1868 Bursary (one), the NBS 1968 Bursary (one), the NBS 1963 Bursaries (two), and the NBS 1984 Bursaries (two). (under review)

##### Fourth Year

**Prof. W. Russell Maxwell Memorial Bursaries:** Any residual income remaining in the Fund after the annual scholarships have been determined may, after consultation with the Department of Economics, be used to fund one or more bursaries for deserving students entering the fourth year of the Honours programme in Economics.

##### Unspecified as to Year

**Ernest Brehaut Memorial Bursaries:** These bursaries were established by the gift of Mrs. Ernest Brehaut of Colorado Springs, USA, in memory of her husband, a distinguished graduate of Dalhousie, Harvard and Columbia. These bursaries are to be awarded by the Awards Office of the University, which will take into consideration any financial need of the applicant, to students from Prince Edward Island. Preference is to be given to relatives of the late Dr. Brehaut. The bursaries are to be

continued throughout the courses of the students if they maintain creditable academic standing and show genuine need.

**The Robert Bruce Bursaries:** Several bursaries tenable in the third year of an Arts or Science course, will be awarded to students of promising abilities but of straitened circumstances.

**James and Abbie Campbell Bursaries:** Dalhousie students who are engaged in studies in one of our music programmes are eligible for consideration for a bursary from this fund.

**David Andrew Dougall Memorial Bursary:** The intent of this award is to encourage and assist one or more students whose academic and financial status merit consideration. The Department of Biology administers the fund.

**Wilfred E. Hillis Bursary:** The late Mrs. Olga Munro Hillis made provision for the establishment of the Wilfred E. Hillis Bursary Fund. The income derived therefrom is to be used as bursaries for worthy Arts and Science students who are in need of financial assistance.

**Annie S. MacKenzie Class of 1911 Bursary:** Under the Will of the late Emelyn L. MacKenzie the University has been given a bequest to provide bursaries in Arts & Science, Dentistry and Law. One-third of the net income is allotted to the College of Arts and Science for the purpose of funding a bursary to one or more students. The recipient must be a bona fide resident of and domiciled in the County of Victoria (as defined by the boundaries then extant in AD 1900), Nova Scotia. Character and financial need are the main criteria.

**John David and Ellen Matheson Allen Endowment Fund:** The bursaries to be known as John David and Ellen Matheson Allen bursaries, are in memory of John David Allen and his wife, Ellen Margaret Allen, both graduates of the Department of Education of the University. The bursaries are for students in the Arts and Science faculties and the School of Education of Dalhousie University. In the selection of the recipients of the bursaries, priority is to be given to Canadian Indians and Inuit, but where no such persons apply, the bursaries are to be given to other applicants as determined by the appropriate office of the University.

**The Kenneth and Lloyd McDonald Bursary:** A gift of the McDonald family in 1978 makes possible the funding of an annual bursary to a deserving and needy student.

**Reverend J.W.A. Nicholson Bursaries:** This Fund was established in commemoration of the unselfish life of a distinguished Dalhousie graduate (BA 1897). One of his concerns was

to help young people discover their talents. About half the annual income is used to assist Nova Scotia Blacks who are full-time students in the College of Arts & Science at Dalhousie, and the balance is added to the fund's capital. Awards are made at the discretion of the Awards Office.

#### Divinity Candidates

**Dr. Alexander E. Kerr Bursary:** The Alexander E. Kerr Foundation Fund was established to provide a biennial bursary of \$500 to qualifying students to continue their theological studies within three years of having been graduated from Atlantic School of Theology and Dalhousie University. A Committee on Awards shall select one person from the applicants who must have been accredited candidates for the Ministry of the United Church of Canada. Each bursary shall be for one academic year. Additional information is available at Atlantic School of Theology and the Awards Office at Dalhousie University. Applications must reach the Director of Awards, Office of the Registrar by the first Monday in April. [Under review]

**Robert Archibald MacDonald Bursaries:** Candidates must be properly qualified students taking the Arts course in Dalhousie with a definite intention of proceeding to Theology at the Atlantic School of Theology in preparation for a ministry in the United Church of Canada. The bursaries are awarded by a committee of Dalhousie and Pine Hill representatives. First preference will be given to students from Cape Breton and then to those from Pictou Presbytery. [Under review]

**R.B. and Annie J. MacLennan Bursaries:** Candidates must be registered as students at Dalhousie University and must be certified as intending to pursue their studies in Theology at the Atlantic School of Theology in preparation for a ministry in the United Church of Canada. Those students who are awarded a bursary may be eligible for a renewal of the award in a succeeding year. [Under review]

**The Ross Miller Bursary:** Under the will of Dr. Ross Miller the sum of \$10,000 was bequeathed to the Board of Governors in trust to set up a bursary to be awarded annually. It is stipulated that "Other things being equal the recipient shall be an undergraduate in Arts or Letters who is qualifying himself for the Ministry of the Presbyterian Church in Canada by taking the Arts or Letters degree at Dalhousie." The Synod of the Presbyterian Church in the Maritime Provinces will present the names of the candidates to the Awards Office, and the necessary scholastic requirements will be decided either at the matriculation examinations or by ability as shown by the sessional examinations.

## Faculty of Health Professions

### College of Pharmacy

Please note that the College administers the following bursaries except the one listed as University Bursaries.

**Boehringer Ingelheim (Canada) Ltd. Pharmacy Bursary:** This bursary of \$500 is awarded to a pharmacy student entering third- or fourth-year classes who demonstrates financial need.

**The Bert and Betty Collins Bursary:** A fund has been established to award an annual bursary to a deserving pharmacy student from New Brunswick who demonstrates financial need and who has attained a satisfactory academic standing.

**The Jack Kidd/ANCA Bursary:** This award was established (as a scholarship until 1986-87) in 1982 to recognise 43 years of service of Mr. Jack Kidd, a pharmaceutical sales representative, with Anca Inc. It is awarded to a student from New Brunswick or Prince Edward Island who has successfully completed one or more years of the course leading to a degree in pharmacy and who is enrolled in pharmacy at the University for the ensuing year. The student must have a satisfactory academic standing and demonstrate financial need. Applications are available at the College of Pharmacy and must be submitted by 1 May.

**Lawton's Bursary:** This bursary of \$500 is awarded to a second, third or fourth year student from the Atlantic Provinces, who has attained a satisfactory academic standing and who demonstrates financial need. Applications are available from the College of Pharmacy and must be submitted by 1 May.

**George MacDonald Bursary:** This Bursary is awarded to a deserving pharmacy student, from the Atlantic Provinces who has satisfactorily completed at least one year of study at the College of Pharmacy and who demonstrates financial need.

**New Brunswick Pharmaceutical Society Bursaries:** The New Brunswick Pharmaceutical Society offers four bursaries to be awarded to the students from New Brunswick completing the first, second, and third years of the Pharmacy course. The amount of each bursary is \$500. The bursaries are awarded on the basis of need to those students whose academic achievement, promise, and character are acceptable. Applications are available from the College of Pharmacy and must be submitted by 1 May.

**F.A.C.E./Apotex Bursaries:** Two bursaries of \$750 each are offered annually by Apotex Inc. for students who have completed at least

one year at the College of Pharmacy. The students must have a satisfactory academic standing and demonstrate financial need.

**The Pfizer Bursary:** This bursary of \$500 is awarded to a deserving student who demonstrates financial need and who has attained a satisfactory academic standing. Applications are available from the College of Pharmacy and must be submitted by 1 May.

**Shoppers Drug Mart Community Pharmacy Bursaries:** Shoppers Drug Mart will sponsor three bursaries of \$600 each to awardees selected by the College. The selection committee will consider candidates on the basis of financial need, student involvement, academic proficiency and potential for contributing to the pharmacy profession. Normally, successful applicants will have completed the first year. Applications are available from the College of Pharmacy and must be submitted by 1 May.

### School of Occupational Therapy

**Phyllis Kennedy Memorial Bursaries:** The Phyllis Aida Daly du Fresne Kennedy Memorial Bursary Fund was established in 1983 to provide from the annual income one or more bursaries to assist a student or students in Occupational Therapy in the fourth year. The applicants must show financial need, must have achieved a minimum GPA of 3.00 in each of the second and third years, and must demonstrate interest in their studies and the School. The Awards Office will assess applicants' needs and forward the name(s) of candidate(s) to the School's Committee on Studies for final selection. The decision will be announced through the Awards Office.

**NOTE:** Students who need assistance with their fieldwork costs are referred to the entry on short-term loans.

### School of Recreation, Physical and Health Education

**The Jeff Bradin Memorial Bursary:** An endowment has been set up to provide bursaries to deserving students. Preference will be given to a varsity athlete at Dalhousie who has successfully completed at least one year of study at this University. In any one year the maximum award given to any student will be \$1,000. Consideration is based on financial need, contribution to varsity sport and academic standing. Apply to the School of Recreation, Physical & Health Education.

**Denton Hurdle Memorial Bursary:** An endowment has been established to honour the memory of Denton Gordon Clifford Hurdle (B.Phys. Ed. '80) by providing a bursary to a student in the School. The student must be a Bermudian citizen and, preferably, a graduate

of Warwick Academy, Bermuda. The student must have achieved an academic average of at least 80% (for the equivalent in the Bermudian School system) in the year in which application is made. The student must have demonstrated a capacity to contribute to the University community through qualities of leadership and athletic ability.

## Maritime School of Social Work

**Hannah G. Matheson Bursaries:** These bursaries are open to students enrolled in studies in the Maritime School of Social Work at either the undergraduate or graduate level.

**Lloyd MacInnis Memorial Bursary:** The Lloyd Y. MacInnis Memorial Award Fund was established to provide an annual bursary to a qualifying student who is continuing his or her studies at the School in the baccalaureate programme beyond first year.

**Jane Wisdom Memorial Bursary:** When Jane Wisdom began her caring work in Halifax shortly before the Great Explosion of 1917, she was truly a pioneer in what has come to be known as Social Work. It is in recognition of her distinguished service that Anonymous Donors in 1977 established an endowment fund whereby one or more annual bursaries to one or more deserving students would be granted to students in the baccalaureate programme of the Maritime School of Social Work at Dalhousie University.

## Faculty of Management

### Bachelor of Commerce Programme

**E.J. McConnell & Associates (Atlantic) Bursary:** This Company sponsors an annual bursary of \$1000 to be awarded to a student in the Bachelor of Commerce programme on the basis of financial need. The recipient will have achieved satisfactory standing.

### Unspecified or Selected Faculties

**The Eva and David Ashkins Memorial Bursary:** The donors established this fund for the purpose of assisting pupils who have matriculated from selected high schools to enter Dalhousie. These high schools are (first) the North Queen's Rural High School or Bridgewater High School, and (secondly) other high schools in the province of Nova Scotia. The recipient may be considered in subsequent years for further assistance.

**The Birks Family Foundation Bursaries:** The Birks Family Foundation has established a plan of annual contributions to the Student Aid Fund of recognized Canadian universities for the creation of the Birks Family Foundation Bursaries. The Bursaries are awarded by the Foundation on the recommendation of the Awards Office and are not restricted to

faculty or year and may be renewed. The number and amount of such awards may vary annually, depending upon the funds available for the purpose from the Foundation.

**The Jotham Blanchard Bursary:** The New Glasgow Literary and Historical Society in 1912 established this bursary in memory of Jotham Blanchard. The bursary will be awarded to a student of meritorious standing who is in the sophomore year of an undergraduate programme.

**George Boyd Bursary:** The income from the George Boyd Trust will provide an entrance bursary. Preference is to be given to a needy student from the Sydney area.

**Enid Heger Clarke Textbook Fund:** A bequest from the Estate has set up an endowment from which to award bursaries to assist students from certain geographic areas of New Brunswick. Students who are domiciled in King's and Saint John counties are eligible under the terms of the bequest.

**The Rebecca Cohn Bursary Fund:** A gift of \$4,000 by the executors of the Estate of the late Rebecca Cohn provides an endowed bursary fund for needy students.

**Lenore Smith Cumming Bursary:** From the Estate of Charles Gordon Cumming came a bequest of US \$10,000 to endow a bursary fund to assist needy students. Mr. Cumming expressed a preference for matriculants from Napanima College in Trinidad should such students attend Dalhousie.

**Dalhousie Alumni Association Bursaries:** The Alumni have established an endowment to provide bursaries for first-year undergraduate students and refugee students at Dalhousie University. Six bursaries of \$500 each will be awarded annually. Four of the bursaries will be awarded to first-year undergraduates who are not in receipt of any other University awards or bursaries and who satisfy the following criteria:

- i) achieved a minimum 75% average in his/her last year of high school;
- ii) shown considerable extracurricular involvement and leadership; and
- iii) demonstrated financial need.

The remaining two bursaries will be awarded to refugee students sponsored by the University. If, in any year, there are no refugee students attending Dalhousie, these two awards shall be made in the same way as the other four. [Note: This fund is administered by the Alumni Office.]

**Dalhousie Leadership Bursaries:** A limited number of bursaries are available annually to students who have exhibited a record of considerable leadership achievement. Candidates must also demonstrate consistent satisfactory academic accomplishment. The Selecting Committee may consider such other

matters as financial need, service to the University and the community, and character. Application forms are available at the Office of the Registrar.

**Dalhousie Memorial Bursary Fund:** From time to time at Dalhousie contributions have been made to the University as a memorial subscription in honour of some student or former student. Until now there has been no proper place into which these funds could be channelled. Because of these occurrences a Dalhousie Memorial Bursary Fund has been established. The existence of the fund will be commemorated by a book of remembrance to be located in a prominent place in the Killam Library. Names of persons in whose memory contributions have been made by relatives, friends, individuals or groups, to the Memorial Fund will be recorded in the book, along with the date of their birth and death. The pages would be turned on a regular basis. All money contributed to the Fund will be invested by the Board of Governors and only the investment income will be awarded. The award will be available to any full-time Dalhousie student, already registered and in attendance at classes, who can show a need for additional support. A student in straitened financial circumstances may be considered for possible assistance by making application on the standard undergraduate bursary application form which is available from the Office of the Registrar.

All contributions to the Memorial Fund are directed through the Dalhousie Annual Fund. For further information please contact the Development Office, Dalhousie University.

**The Frank R. Davis Memorial Bursaries:** The terms of this fund have been revised in consultation with the donor's family. Now income from this fund may be awarded on the basis of financial need. One or more bursaries may be made in consultation with the Supervisor of Schools for Bridgewater, Nova Scotia.

**Annie M. Harrison Bursary:** The annual income from the bequest of \$5,000 from the Estate of Annie M. Harrison provides a number of bursaries.

**Alice M. Haverstock Bursary:** From the Estate of Gertrude H. Fox came a bequest to endow a bursary fund in the name of Alice M. Haverstock.

**Frances Havergal Grant Bursaries:** An endowed bursary fund was established under the Will of the late Constance Patricia Hamilton in the amount of \$18,900, the income from which is to be used to assist students.

**The Annette S. Hill Bursaries:** The University received an endowment under the Will of the

late Annette S. Hill to set up a fund, the income therefrom to be used to assist needy students.

**The Neil and Jessie Matheson Bursaries:** Established under the Will of Miss Margaret J. Matheson, Truro, the income from this fund provides several bursaries. Students from the rural districts of Pictou County are to be given preference.

**Military District No. 6 Provost Corps Bursary:** The Number 6 Provost Mutual Association established this bursary fund to assist descendants of those members of the Canadian Provost Corps who served in Military District No. 6. Applicants must fulfil the Corps' selection criteria, show satisfactory academic progress and demonstrate financial need.

**The Warren Publicover Class '25 Memorial Bursary:** The Warren Publicover Class '25 Memorial Fund was established in memory of Warren Publicover. The annual income from this fund is to be awarded in the form of a bursary for an individual who has successfully completed one year of university work at Dalhousie and is continuing as a full time student at this University. The bursary is to be awarded on the basis of satisfactory academic performance and demonstrated financial need, and is subject to renewal provided that the original requirements are maintained. It is a condition of the gift that applicants for this bursary need not have availed themselves of governmental funding as is usually required by the University.

**3M Canada Bursary:** Since 1980-81 3M Canada Inc. has sponsored an annual bursary of \$500 to assist an outstanding student in commerce or science. The bursary has been assigned to entrance.

**Dr. Gerald Turner Bursary:** An endowment has been established to provide a bursary to assist a needy student from Cape Breton in First Year.

**Women's Division Bursaries:** A number of bursaries, based on financial need, will be offered directly from the Women's Division of the Dalhousie Alumni Association. Application forms will be available at the Awards Section of the Office of the Registrar. Applicants are to forward their completed forms to the Chair of the Scholarship Committee, Women's Division, c/o Alumni Office, Dalhousie University, 6250 South Street, Halifax. Applications are to be submitted by either mid-October or the end of January.

## **Continuing Education Awards and Bursaries**

Students who are engaged in part-time studies for credit are eligible to be considered for awards and financial assistance. Each of these is described briefly below.

**The Frederick Thomas Parker Award for Part-Time Studies:** This award will provide an appropriate and flexible means of encouraging students intending to undertake degree or diploma studies at Dalhousie on a part-time basis. The selection committee will take into account both academic performance and financial need, depending upon circumstances. Applications are available at Henson College.

**Canada Student Loan for Part-Time Students:** This particular federal loan is intended to help students who have a small cash-flow problem at the beginning of their studies. In order to qualify on the basis of class load for a standard academic year, a student must be planning to take not greater than the equivalent of 2.5 whole classes. The application form is available from Nova Scotia Student Aid Office, and is to be completed in part by both the Student Accounts and Awards Offices. Please note that repayment of the loan begins 30 days following the borrowing of the funds, and payment must be completed within 24 months.

**Canada Student Loans Plan:** Some students who are "part-time" by the University criterion are still eligible for the regular Canada Student Loan. The class-load criterion for this loan is to enrol and to maintain a class-load of not fewer than three whole classes or the equivalent. Repayment of the loan normally begins six months after the time one ceases to be a "full-time" student according to governing regulations. During the summer months application kits will be available at the Awards Office on a pick-up basis. (These kits are available for pick-up or mail-out directly from Student Aid throughout the CSL assistance period.) Interested individuals may seek further details from the Office of the Registrar - Awards (telephone 494-2416).

**Dalhousie University Bursaries:** Students who are engaged in part-time studies for credit will be considered for bursaries. Application is to be made at the Office of the Registrar - Awards. Please note that most University bursaries are restricted to Canadian citizens or permanent residents.

**Dalhousie Temporary Loans:** Students who are engaged in part-time studies for credit will be considered for temporary loans. Such loans are intended for short-term needs, and repayment begins after the expiration of a predetermined grace period. Application is to be made at the Office of the Registrar.

## University Regulations

### General

1. The Senate is charged with the internal regulations of the University, including all matters relating to academic affairs and discipline, subject to the approval of the Governors. Within the general policies approved by Senate, academic requirements are administered by the Faculty concerned.
2. All students must agree to obey all the regulations of the University already made or to be made; In addition to the above University regulations, students must also comply with the regulations of the Faculty in which they are registered, and pay the required fees and deposits before entering any class or taking any examinations. Additionally, students are advised that this Calendar is not an all-inclusive set of rules and regulations but represents only a portion of the rules and regulations that will govern the student's relationship with the University. Other rules and regulations are contained in additional publications that are available to the student from the Registrar's Office and/or the relevant Faculty, Department or School.
3. For the purpose of admission to the University, the place of residence of a student is the place of domicile. This is normally presumed to be the place (country, province, etc.) where the parents' or guardian's home is located. That place remains unchanged unless the Registrar is satisfied that a place of residence is established elsewhere. No person under sixteen years of age is admitted to any class except by special permission of the Senate.
4. All students must report their local address while attending the University to the Office of the Registrar, on registration or as soon as possible thereafter. Subsequent changes must be reported promptly.
5. Students taking classes in another Faculty as part of an affiliated course must conform to the regulations of that Faculty with respect to these classes. It should be noted, however, that regulations pertaining to the degree programme are those of the "home" Faculty.
6. In the interests of public health in the University, students are encouraged to have a tuberculin test. This is compulsory for Dental, Dental Hygiene, Physiotherapy and Nursing students. Facilities for testing are arranged by the University Health Services.
7. Except for university purposes, transcripts, official, or unofficial, will be issued only on the request of the student on payment of the required fee. A student may receive only an unofficial transcript. Official transcripts will be sent at a student's request to other universities, or to business organizations, etc.
8. Students withdrawing voluntarily from the University should consult the individual faculty regulations and the Fees section of this Calendar.
9. When the work of a student becomes unsatisfactory, or a student's attendance is irregular without sufficient reason, the faculty concerned may require withdrawal from one or more classes, or withdrawal from the Faculty. If a student is required to withdraw from a Faculty such a student may apply to another Faculty. However, in assessing the application, previous performance will be taken into consideration.
10. Any graduating student who is unable to appear at the convocation is expected to notify the Registrar in writing prior to May 1, for Spring convocations (or October 1 for Fall convocations), giving the address to which the diploma is to be mailed. Students whose accounts are delinquent on May 1 will not receive their degree/diploma parchment nor their transcripts. For October or February graduation the dates are Sept. 1 and Jan. 1 respectively.
11. Students should be aware that certain classes at the University involve required laboratory work where radioactive isotopes are present and are used by students. Since there are potential health risks associated with the improper handling of such radioactive isotopes, Dalhousie University requires that, as a condition of taking a class where radioactive isotopes are to be used, students read and agree to comply with the instructions for the safe handling of such radioactive isotopes. In the event that students do not comply with the instructions for the safe handling of radioactive isotopes, students will receive no credit for the required laboratory work unless other acceptable alternatives are arranged with the instructor. In many cases, alternate arrangements are not possible and students should consider enrolling in a different class.

## Release of Information About Students

### 1. Disclosure to students of their own records

- (a) Students have the right to inspect their academic record. An employee of the Registrar's Office will be present during such an inspection.
- (b) Students will, on submission of a signed request and payment of the appropriate fee, have the right to receive transcripts of their own academic record. These transcripts will be marked "ISSUED TO STUDENT". The University will not release copies of transcripts if students owe monies to the University.

### 2. Disclosure to Faculty, Administrative Officers, and Committees of the University

Information on students may be disclosed without the consent of the student to University officials or committees deemed to have a legitimate educational interest.

### 3. Disclosure to Third Parties

- (a) The following information is considered public information and may be released without restriction:
  - Name
  - Period of Registration
  - Certificates, Diplomas, Degrees awarded
- (b) Information will be released without student consent to persons in compliance with a judicial order or subpoena or as required by federal or provincial legislation.
- (c) Necessary information may be released without student consent in an emergency, if the knowledge of that information is required to protect the health or safety of the student or other persons. Such requests should be directed to the Registrar.
- (d) Other than in the above situation, information on students will be released to third parties only at the written request of the student, or where the student has signed an agreement with a third party, one of the conditions of which is access to her/his record (e.g. in financial aid). This restriction applies to requests from parents, spouses, credit bureaus and police.

## Intellectual Honesty

1. A University should epitomise the quest for intellectual honesty. Failure to measure up to the quest for such a standard can involve either academic offenses at one end of the spectrum or

substandard work warranting lowered or failing grades at the other. The seniority of the student concerned, the presence of a dishonest intent, and other circumstances may all be relevant to the seriousness with which the matter is viewed.

### 2. Plagiarism or Self-Plagiarism

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

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

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

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

### 3. Irregularities in the Presentation of Data from Experiments, Field Studies, etc.

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

### 4. Inaccurate or Inadequate Attribution.

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

The proper use of footnotes and other methods of attribution varies from discipline to discipline. Failure to abide by the standards of the discipline concerned in the preparation of essays, term papers and dissertations or theses can result, at the discretion of the instructor or faculty member involved, in lowered grades. It can also lead to the requirement that an alternative assignment be prepared. Such grading penalties can be involved even in the absence of any INTENTION to be dishonest.

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

diploma or certificate programme, commits an academic offence and is liable to a penalty. Without limiting possible irregularities in evaluation procedures that may be considered by the Senate Discipline Committee, the following examples shall be considered irregular procedures:

## Discipline

1. Members of the University, both students and staff, are expected to comply with the general laws of the community, within the University as well as outside it.
2. Alleged breaches of discipline relating to student activities under the supervision of the Dalhousie Student Union are dealt with by the Student Union. Alleged breaches of discipline relating to life in the residences are dealt with by the appropriate Dean or Director of Residence in consultation with the relevant Residence Council. Senate is charged with the authority to deal with cases of alleged academic offenses (as delegated to the Senate Discipline Committee), as well as with certain other offenses that are incompatible with constructive participation in an academic community.

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

### 3. Examples of Academic Offenses

#### Plagiarism

As indicated above, plagiarism and self-plagiarism are considered serious academic offenses which can lead to loss of credit and suspension from the University.

#### Irregularities in Presentation of Data

As defined above, the presentation of falsified data in reports, theses, dissertations and other presentations is a serious academic offense, equivalent in degree to plagiarism for which the penalties may include revocation of degrees, loss of credits, or suspension or expulsion from the University.

#### Irregularities in Admissions Procedures

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

#### Irregularities in Evaluation Procedures

A member of the University who attempts or who assists any other person in an attempt to obtain, by irregular procedures, academic standing in a course related to any degree,

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

## Official Examination Regulations

1. Candidates will not be admitted to the Examination Room more than thirty minutes after the beginning of the examination. Candidates will not be permitted to leave the examination within the first thirty minutes.
2. Candidates are required to present their valid Dalhousie ID card at all examinations scheduled during the official examination periods and sign the signature list.

3. No articles such as books, papers, etc. may be taken into the examination room unless provision has been made by the examiner for reference books and materials to be allowed to the students. All books, papers, etc. not specified on the printed paper must be deposited with the invigilator. Calculators may be used at the discretion of the instructor.
  4. Smoking is not permitted in the examination room.
  5. Candidates may not leave their seats during an examination except with the consent of the invigilator.
  6. Answers to questions must be written on the right hand pages and properly numbered. The left hand pages may be used for rough work, but no sheets may be detached.
  7. Each question should be started on a separate page.
  8. If more than one book is used, the total number should be marked in the space provided above. The other books should be properly marked and placed inside the first book. All books supplied must be returned to the invigilator.
  9. Candidates found communicating with one another in any way or under any pretext whatever, or having unauthorized books or papers in their possession, even if their use be not proved, shall be subject to expulsion.
  10. After the first thirty minutes have elapsed, students may hand in their examination book(s) to an invigilator and quietly leave the examination room. Candidates may not leave the examination room during the last fifteen minutes of the examination.
- (c) The Senate Discipline Committee, when it finds that a member of the University who is a student has committed an academic offence or irregularity may impose one or more penalties as indicated in 3. below.
  - (d) The Senate Discipline Committee shall report its findings and any penalty imposed to the Secretary of the Senate. The Secretary of the Senate shall forward a copy of the report to any member of the University community whom the Senate Discipline Committee has found to have committed an offence or irregularity and if the member concerned be other than a student a copy shall also be sent to the Vice-President (Academic).
  - (e) If the member of the University found to have committed an offence or irregularity is a student, she/he may appeal to Senate any finding or any penalty imposed by the Senate Discipline Committee by advising the Secretary of the Senate in writing within 30 days of receipt of the report by the student.

### 3. Academic Penalties

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

## Senate Discipline Committee

### 1. Composition

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

### 2. Terms of Reference

- (a) The Senate Discipline Committee is vested with original jurisdiction to consider all complaints or allegations respecting offenses or irregularities of an academic nature, including those relating to admissions procedures and evaluation procedures, and to impose penalties in cases where the Committee finds an offence or irregularity has occurred.
- (b) The Senate Discipline Committee shall assume jurisdiction when a complaint or allegation respecting offenses or irregularities of an academic nature are brought to its attention by the Secretary of Senate.

## Guide to Responsible Computing

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

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

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

## Basic Principles

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

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

## Elaboration

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

They should obey the regulations affecting the use of any computing facility they use.

## Disciplinary Actions

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

Nothing in this Guide diminishes the responsibility of system administrators of computing services to take remedial action in the case of possible abuse of computing privileges. To this end, the system administrators with the approval of the President and with due regard for the right of privacy of users and the confidentiality of their data, have the right, to suspend or modify computer access privileges, examine files, passwords, accounting information, printouts, tapes, and any other material which may aid in an investigation of possible abuse. Whenever possible, the cooperation and agreement of the user will be sought in advance. Users are expected to cooperate in such investigations when requested. Failure to do so may be grounds for cancellation of computer access privileges.

- Passed by Dalhousie Senate, 24 November 1988.

## Academic Regulations

These regulations apply to all students in the College of Arts and Science and the Faculties of Health Professions and Management. Students in the Faculty of Health Professions should also consult the regulations specific to their school or college found in the appropriate sections of this calendar.

**Please Note:**

- a) A student is governed by the regulations in place at the time of initial enrolment as long as the degree is completed within the time permitted (see section 17, p. 92), and that subsequent changes in regulations shall apply only if the student so elects. Students applying the old regulations should consult the calendar of the appropriate year.
- b) It is a student's responsibility to maintain documentation of registration and subsequent changes. For environmental and financial reasons, the Registrar's Office will rely solely upon computer records and will not maintain paper records of changes to a student's registration.

### 1. Definitions

For definitions of some commonly used terms, see page 3.

Within these regulations, reference to the Student Appeals Committee should be interpreted as the Student Affairs Committee in the Faculty of Arts and Social Sciences, as the Committee on Studies and Appeals in the Faculty of Science, the Bachelor of Education Committee in the School of Education, the Undergraduate Committee on Studies in the Faculty of Health Professions, and the Undergraduate Academic Appeals Committee in the Faculty of Management.

### 2. Faculties/Colleges

#### 2.1 College of Arts and Science

- Biochemistry (also in the Faculty of Medicine)
- Biology
- Chemistry
- Classics
- Comparative Religion
- Earth Science
- Economics
- Education
- Engineering

- English
- French
- German
- History
- Mathematics, Statistics and Computing Science
- Microbiology and Immunology (also in the Faculty of Medicine)
- Multidisciplinary Studies Centre
- Music
- Oceanography
- Philosophy
- Physics
- Political Science
- Psychology
- Russian Studies
- Sociology and Social Anthropology
- Spanish
- Theatre

#### 2.2 Faculty of Health Professions

- Nursing
- Occupational Therapy
- Pharmacy
- Physiotherapy
- Recreation, Physical, & Health Education
- Social Work

#### 2.3 Faculty of Management

- Business Administration
- Public Administration

### 3. Class Selection

#### 3.1 Numbering of Classes

Classes are numbered to indicate their general level. Those in the 1000 series are introductory classes at Dalhousie. Classes in the 2000, 3000, and 4000 series are usually first available to students in the second, third, and fourth years, respectively. Often these classes have prerequisites. Some departments/schools/colleges have minimum grade requirements for entry into classes above the 1000-level. Such requirements are listed in the calendar entries for the departments/schools/colleges concerned.

An example of a class identifier is as follows: ENGL 1000.06R

ENGL ..... subject code  
 1000 ..... class number & level  
 06 ..... credit hours  
 R... session in which the class is taught

The letters A and B denote classes given in the first and second terms respectively. The symbol A or B indicates a class may be given in the first term or in the second term. Students should consult the academic timetable to verify whether a particular class

will be offered in the A or B term in a given academic year. The letter R denotes a class spread over both terms (i.e., given for the full academic year). For the spring and the summer sessions, A denotes a class given in the first three and one half weeks, B a class given in the second three and one half weeks, and R a class continuing for seven weeks.

Classes with numbers below 1000 normally do not carry credit.

## 3.2 Academic Advice

At Dalhousie all students are offered academic advice prior to registration. First-year students, particularly those in BA and BSc programmes, may wish to consult with the Office of the Registrar, or with a faculty advisor in an academic department/school/college of particular interest. After the first year, students plan their programmes in consultation with faculty advisors in their major department/school/college. Students complete and submit the Class Selection Form to the Registrar's Office.

Please note that the completion and submission of a class selection form does not constitute registration.

## 4. Workload

### 4.1 Regular Year

#### 4.1.1 College of Arts and Science

Five full credits per academic year shall be regarded as constituting a normal workload for a student. Written permission from the Student Appeals Committee of the appropriate Faculty or School is required if this workload is to be exceeded, or if the planned workload in any term would amount to the equivalent of six half-credits. In no case may the workload exceed this. Applications from students who give good reasons for wishing to take an overload will be considered. Such permission will not normally be granted to any student in the first year of study, or to any student who, in the preceding academic year, earned a sessional GPA of less than 3.00.

#### 4.1.2 School of Business

Six half credits per academic term in the first year, and five half credits per academic term in the following years will be regarded as constituting a normal workload for the BComm Co-op student.

During the work term, the work assignment shall constitute the normal workload.

There are no limitations on the number of credits taken during summer sessions at Dalhousie (subject to normal workload limitations) that may be counted toward the

Bachelor of Commerce Co-op degree. Note that the second and third summers are regular academic and work terms for co-op students.

Students who wish to exceed the normal workload must apply for permission to the Director Academic Programmes, School of Business Administration. Such permission will not normally be granted to any student who is in his first year of study or who, in the preceding academic year, who earned a sessional GPA of less than 3.00.

#### 4.1.3 Faculty of Health Professions

For normal workloads in the Faculty, see the Individual School or College section of the Calendar. Written permission from the School or College Committee on Studies is required if the normal workload is to be exceeded. Applications from students who give good reasons for wishing to take an overload will be considered. Such permission will not normally be granted to any student in the first year of study, or to any student who, in the preceding academic year, obtained a grade point average of less than 3.00.

## 4.2 Spring and Summer Session

Students may normally take one full credit in each of the spring or summer sessions. Exceptions will normally be granted by the Student Appeals Committee of the appropriate Faculty or School with respect to attendance at a university which operates a trimester system or its equivalent. Students in Co-op programmes in Science may increase the workload to a maximum of 2.5 credits by summer school in any one year with a maximum of 1.5 credits in any one summer session. Spring and summer credits are included in the calculation of the cumulative GPA at the end of the next regular academic year. A sessional GPA is not calculated.

## 5. Registration

5.1 Registration material and detailed information will be sent to all eligible students. After the Class Selection Form has been completed students may register, either in person or by mail. Students admitted late must register in person.

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

5.3 The final step in registration is obtaining an ID or validating an existing ID from the Office of the Registrar.

An ID Card gives students access to many campus services and activities.

It is University Policy that every student writing an officially scheduled examination must present a current valid ID Card.

Students requesting the release of funds from the Awards Office must also present their ID Cards.

## 6. Class Changes and Withdrawal

### 6.1 Class Changes

It is recognized that some students may wish to make changes in programmes already arranged. Class changes will normally be completed during the first two weeks of classes. (For Spring and Summer session information, see the Summer School Schedule.) The last dates for adding and deleting "A", "B" and "R" classes without academic penalty are published in the Schedule of Academic Dates at the front of the calendar.

Students may not transfer from full to part-time status by withdrawing from classes after the deadlines listed in the Schedule of Academic Dates. After these dates all classes for which a student remains registered will be recorded. To add or delete a class, students must complete a class selection form which must be approved by the faculty member concerned and submitted to the Registrar. In Health Professions, class selection forms must also be signed by the director, (NOTE: in the case of the School of Recreation, Physical, and Health Education, these are signed by the division heads, not by the Director,) and in the School of Business Administration, by the Director, Academic Programmes. No change is effective until a class selection form, available at the Office of the Registrar, is received by that Office.

### 6.2 Withdrawal

Non-attendance does not, in itself, constitute withdrawal.

Withdrawals are not effective until notification is received at the Office of the Registrar.

In Health Professions students who wish to withdraw from the University must obtain written approval from the School or College and submit the appropriate forms to the Registrar. Students should not discontinue attendance at any class until their withdrawal has been approved.

## 7. Counting of Credits for Two Dalhousie Undergraduate Degrees

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

- (a) Only credits that are applicable to the programme for the second degree may be counted for credit.
- (b) Each credit carried forward must have a grade of C or higher.
- (c) Grade points must be earned in the new credits as required by Regulations 18 & 19 below.

### 7.1 College of Arts and Science

For the Honours degree, a minimum of eleven new full credits are to be taken, in accordance with "Degree Requirements" listed elsewhere in this calendar.

For the Advanced Major (20-credit) degree, a minimum of eleven new full credits, or the equivalent, must be taken. At least six of these are to be beyond the 1000-level in a new major subject, and at least three of the six must be beyond the 2000-level.

For the Major degree (15 credits), a minimum of six new full credits must be taken. At least four of these are to be beyond the 1000-level in a new major subject, and at least two of the four must be beyond the 2000-level. Normally, two of these credits will be in a subject other than the new major.

### 7.2 Management

For the BComm Co-op degree a minimum of 11 new full credits must be taken, of which at least eight must be in the core area and include the three work term half course credits.

### 7.3 Health Professions

For degrees in Health Professions no more than half the credits required for an undergraduate degree may be carried forward from an earlier degree.

## 8. Transfer Students

### 8.1 Transfer Credits - All Faculties

At Dalhousie transfer credits may be granted for classes which are offered by a recognized university or equivalent institution of higher learning and which are judged to be comparable to classes offered at Dalhousie and to be appropriate to a student's academic programme at Dalhousie. Transfer credit grants credit for a class and does not require substitution.

Transfer credits are subject to the approval of the appropriate department/school/college. For classes not within the purview of a Dalhousie department/school/college, the Registrar's Office will assess transfer credits. Students may appeal, in writing, a negative decision and should justify the inclusion of such classes in the student's proposed programme. Photocopies of calendar descriptions are

necessary. Such descriptions are not normally included with university transcripts, and it is the student's responsibility to provide them.

To obtain a first degree or diploma, at least half of the credits, including at least half in the field of concentration, must normally be taken at Dalhousie.

In the Faculty of Health Professions to obtain a first degree, all or most of the advanced work of the programme (i.e. at least half the credits taken in the second and subsequent years of study) must be taken at Dalhousie.

## 8.2 Transfer Credits from Dental Hygiene

Students who have completed the Diploma in Dental Hygiene may receive credit towards a BA or BSc with a major in Biology for Biology 2100.03A or B and Biology 4403.06R. These classes are to be included within the 10 full credits which the Dental Hygiene students are eligible to receive as credit for a BSc or BA degree upon completion of the current diploma requirements. Thus for a BA or a BSc in Biology (16 credit programme), students who hold a diploma will be required to complete 5 additional credits at least 2.5 of which must be Biology classes.

## 8.3 No Transfer Credits

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

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

Credits that are more than ten (10) years old may not be used to fulfil degree requirements unless a waiver is granted.

No classes taken at another institution will be counted towards fulfilment of the concentration requirement of the Bachelor's degree or the principal subject requirement of an Honours programme without specific advance approval from the appropriate department/ school/ college at Dalhousie.

No credit will be given for any classes taken at another university while a student is inadmissible at Dalhousie.

## 8.4 Procedures

As soon as the student's record has been assessed the Office of the Registrar will inform the student which credits have been awarded. The number of credits which have been approved, and which Dalhousie classes may not be taken, will be included in the letter. If more credits have been approved than can be applied to the student's programme, the student will choose the

credits to be used. If the student fails to do so, the Registrar's Office will decide the appropriate transfer credits. Transfer credits awarded on admission appear on a Dalhousie transcript as credits only; no marks are shown.

If by registration time the student has not received written confirmation of transfer credits, the student should check with the Office of the Registrar. Information, although incomplete, may be available and may be helpful in choosing Dalhousie classes.

Before selecting classes the student should consult with the appropriate department(s)/school(s)/college(s) to determine how the transfer credits will fit into the student's specific academic programme at Dalhousie.

## 8.5 Classes Taken at Other Universities on Letter of Permission

A student who wishes to take classes at other institutions while registered at Dalhousie must obtain approval in advance on a form available in the Office of the Registrar. A letter of permission will be provided if approval for the classes is given by the appropriate department/school/college. The workload at the other institution must conform to Dalhousie's limitations. (For details, see Regulation 4.)

The departments of French, German, Russian, and Spanish have special arrangements whereby up to a total of 5 full credits taken at other universities may be considered as part of a student's programme at Dalhousie. (See Regulation 15.)

The class fee will be paid by Dalhousie if:

- the student is registered and has paid fees as a full-time student at Dalhousie,
- the classes are approved as part of the student's programme, and
- the class is not part of a spring/summer school programme.

## 9. Advanced Placement

Students possessing advanced knowledge of a subject will be encouraged to begin their studies in that subject at a level appropriate to their knowledge, as determined by the department/school/college concerned. However, such students must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e. they must complete at Dalhousie the full number of credits required for the particular credential being sought).

## 10. Part-Time Students

Part-time students are reminded of University policy that limits programmes of study to 10 years from the date of initial

registration. Note also, the regulation below concerning the number of credits that must be completed on campus at Dalhousie:

## 10.1 College of Arts and Science

Part-time students are admitted to most of the programmes offered in the College of Arts and Science. Admission requirements and regulations are the same for all students. Part-time students are encouraged to consult with Henson College for advice on their academic programmes and other matters (see Continuing Education).

## 10.2 School of Business

The School is committed to providing students with the opportunity to obtain a degree through full-time study. However, the School will consider applicants for part-time study.

## 10.3 Faculty of Health Professions

Because of the restriction in the duration of undergraduate studies (see Regulation 17), the opportunity for part-time study is limited in the majority of programmes.

The exceptions are the undergraduate programmes in the School of Recreation, Physical and Health Education, the Maritime School of Social Work, the Bachelor of Science (Nursing) programmes for Registered Nurses and the Bachelor of Science (Physiotherapy) for students who hold a diploma in Physiotherapy.

## 11. Audit of Classes

Students who have been admitted to a Faculty may audit many of the classes offered with the permission of the instructor. Students auditing classes will not be eligible to write examinations in the audited class and will not in any circumstance be granted credit for it. For those who are not full-time students, fees are payable as indicated under Fees. A class may not be changed from credit to audit or from audit to credit status after the last date for dropping classes without penalty (see the schedule of academic dates). In order to change from audit to credit prior to the deadline an additional fee is required. It is essential that procedures as given in section 8 be followed.

## 12. Experimental Classes - College of Arts and Science

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

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

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

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

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

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

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

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

## 13. Coordinated Programmes - College of Arts and Science

Students may in their second and third years follow a two-year integrated programme, or two one-year integrated programmes, of study. If two one-year

programmes are chosen, they may be in different departments. All such coordinated programmes have been explicitly approved by the Curriculum Committee of the relevant Faculty or School. A department or group of departments offering coordinated programmes may structure them as it wishes, consistent with sound academic practice and subject to the following guidelines:

- (a) that the equivalent of five credits constitutes 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 permits students at least one credit of their 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/school/college in question, or an equivalent that the department/school/college considers acceptable, and not more than one introductory class in a related subject.

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

## 14. Off-Campus, Summer School, Correspondence Classes Taken at Other Universities

### 14.1 Off-Campus and Correspondence Classes

A maximum of three credits may be taken by off-campus classes, whether offered by Dalhousie or taken from another university under concurrent registration. In the Faculty of Health Professions, up to six credits (36 credit hours) from summer school and correspondence classes may be accepted towards the requirements of a degree. In Health Professions no student may receive more than two full credits (12 credit hours) by correspondence courses. In total, no more than six full credits in summer school and correspondence may count towards a degree.

See section 8.5 for information on classes taken at other institutions on letter of permission.

### 14.2 Spring and Summer Session

Dalhousie currently offers a Spring and a Summer session of approximately seven weeks each, in May-June and in July-August.

See Regulation 4 for permitted work-load. Those interested in the Spring and Summer sessions may request a summer school schedule from the Office of the Registrar, Dalhousie University.

## 15. International/Exchange Programmes

The College of Arts and Science and the Faculty of Management and the School of Recreation, Physical and Health Education offer a number of programmes which enable students to pursue part of their studies in another country and culture, often in a foreign language environment. These include:

- (a) Up to one full year of study in a foreign-language environment. In recent years students have studied at the Université de Provence (Aix-Marseille) in France (consult the Department of French).
- (b) Up to one full year of study at a francophone university in Québec (consult the Department of French).
- (c) One term of study at Colegio de España, Salamanca, Spain (Consult the Co-ordinator in the Spanish Department).
- (d) One term of study at the Moscow Pedagogical Institute or St. Petersburg University (Consult the Administrator of the Russian Studies Programme in the Department of Russian).
- (e) A reciprocal exchange programme with the Chelsea School of Human Movement (U.K.), the Frostburg State College (Maryland, U.S.) and the State University of New York permits students of the School of Recreation, Physical and Health Education to study abroad. Contact the School of Recreation, Physical and Health Education.
- (f) Up to one full academic year at one of eighteen (18) universities in the New England States. Consult the Registrar's Office.
- (g) Up to one full academic year at Instituto Tecnológico Autónomo de México (ITAM). Consult the School of Business Administration or the Registrar's Office.

Students interested in the programmes listed (a) to (e) above should refer to the appropriate departmental listing in this calendar for more details. For details regarding classes taken at other universities see Regulation 19.3. The number of Dalhousie equivalent credits completed may vary for each programme.

## 16. Preparation for Other Programmes

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

**Graduate Studies:** Able and ambitious students are encouraged to consider seriously entering a graduate programme at Dalhousie or elsewhere. The normal requirement for admission to a graduate programme is an Honours degree or the equivalent.

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

**Dental Hygiene:** Completion of 5 full credit university level classes of one academic year's duration in the following: Biology, Psychology, Sociology, a writing class, and one elective. For details, see the Dentistry, Law and Medicine calendar.

**Dentistry:** See the Dentistry, Law and Medicine calendar.

**Design:** Students completing one year in the College of Arts and Science 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.

**Education:** The normal requirement for admission to the Bachelor of Education programme at Dalhousie is a BA or BSc degree with Honours. For details, please see the Education entry in this calendar.

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

**Law:** At least two years of work leading to one of the degrees of BA, BSc, BComm. For details, please see the Dentistry, Law and Medicine calendar.

**Medicine:** A BA, BSc, or BComm degree. For details, see the Dentistry, Law and Medicine calendar.

**Occupational Therapy, Physiotherapy, Pharmacy, Recreation, and Social Work:** One year of work in the College of Arts and Science, or the equivalent elsewhere, is

required for admission to these five programmes. For details, see the Admissions Information section of this calendar.

**Veterinary Medicine:** Normally three years of work at Dalhousie are required for admission to the Atlantic Veterinary College of the University of Prince Edward Island. Dalhousie credits should normally include Computing Science 1400.03A; Mathematics 1000.03A/B and 1080.03A/B; one of Chemistry 1100.06R, 1110.06R, or 1200.06R; Chemistry 2400.06R; Biochemistry 2200.03B; one of Physics 1000.06R, 1100.06R or 1300.06R; English 1000.06R; Biology 1000.03R, 2030.03A/B, 2100.03A/B and 3323.06R; and an additional two and a half credits from the humanities and social sciences.

## 17. Duration of Undergraduate Studies

### 17.1 College of Arts and Science/Faculty of Management

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

### 17.2 Faculty of Health Professions

With the exception of the undergraduate programmes in the School of Recreation, Physical and Health Education and the Maritime School of Social Work to which Regulation 17.1 applies, students in the Faculty of Health Professions are normally required to complete their undergraduate studies within six years of first registration in professional classes or within five years in the post-diploma degree programme in Physiotherapy. This rule applies to such classes for transfer credits as well. The School or College Committee on Studies may grant permission to continue studies beyond this period subject to conditions specified by the Committee.

## 18. Assessment

### 18.1 Method

Examinations may be oral, written (closed or open book) under supervision, or

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

Within two weeks of the first meeting of a class, each instructor shall make available a written description of the method of evaluation to be used in the class.

Within four weeks after the beginning of each term the department/school/college head or programme co-ordinator must report to the Dean the method of evaluation to be used by each instructor in each class.

## 18.2 Examinations and Tests

Tests are normally scheduled during class time. Mid-term tests scheduled outside class time are restricted to one per term between mid-October to mid-November or mid-February to mid-March.

Periods of approximately three weeks in the spring and one and one-half weeks in December are set aside for the scheduling of formal written examinations by the Registrar. Instructors wishing to have examinations scheduled by the Registrar for their classes must so inform the Registrar at the beginning of the third week of classes in the fall and winter terms. Instructors may also arrange their own examinations at times and places of their choosing during the formal examination periods, with the understanding that in cases of conflict of examinations for an individual student, the Registrar's examination schedule takes priority.

No tests or examinations worth more than 50% of the final grade in an "A", or "B" class, or more than 25% of the final grade in and "R" class may be held in the last two weeks of either term, without the explicit approval of the appropriate governing body of the Faculty or School. No tests may be held between the end of classes and the beginning of the official examination period with the exception of those activity modules and laboratory classes in Health Professions in which special facilities are required. Students may contact the Dean's/Director's Office of the appropriate Faculty/School/College for assistance if they are scheduled for more than two examinations on the same day.

## 18.3 Grades

A letter-grade system is used to evaluate performance. There is no formula for converting numeric grades to letter grades. Grades in the A range represent excellent performance, grades in the B range represent very good performance, and those in the C range represent satisfactory performance. A

grade of D represents marginally acceptable performance except in programmes where a minimum grade of C is specified. See the calendar entries for specific programmes where a minimum grade of C is specified. The passing grades are A+, A, A-, B+, B, B-, C+, C, C-, D and P. (C+, C, C-, D not available for graduate classes). Other grades, including INC, FM and F, are non-passing grades (see regulation 19). ILL, assigned for compassionate reasons or illness, is neutral.

## 18.4 Submission of Grades

On completion of a class, the instructor is required to submit grades to the Registrar. Such grades are to be based on the instructor's evaluation of the academic performance of the students in the class in question.

## 18.5 Incomplete

Students are expected to complete class work by the prescribed deadlines. Only in special circumstances (e.g. the death of a close relative) may an instructor extend such deadlines. Incomplete work in a class must be completed by:

Fall term classes (A) .....	Feb 1
Winter and Regular term classes (B or R) .....	June 1
Spring term classes (A, B, or R) .....	Aug 1
Summer term and Commerce Co-op Summer session classes (A, B, or R) .....	Oct 1

Exceptions to this rule will normally be extended only to classes which required field work during the summer months. At present the list of these classes consists of Biology 4800.03A/B/R and 4900.06R; Music 3470.03R and 4470.03R; Education 8490.06R; Health Education 1495.02R, 1595.02B; Leisure Studies 4496.06; Physical Education 3398.06R, and 3402.06R; Nursing 2220.06B, 3240.03B and 3250.03B; Pharmacy 3000.00B; Occupational Therapy 2221.00B, 3319.00B, 3321.00B, and 4420.00A/B; Social Work 3020.06R/B, 4020.15R/B, and 4030.12R/B; and Physiotherapy 3500.00B. Students taking any of these classes in their final year should note that they will not be able to graduate at the spring convocation.

The Office of the Registrar is not permitted to accept a late clearance of INC or late grade changes other than those due to errors. If there are exceptional circumstances, a recommendation should be forwarded to the undergraduate coordinator or the Committee on Studies of the appropriate Faculty/School. Unless INC is changed it counts in the GPA and has a grade point value of 0.00 - it is a failing grade.

## 18.6 Marginal Failure

### Faculty of Health Professions

On re-examination the grade awarded for the class will be recorded on the student's transcript along with a notation that the grade was earned by supplemental examination. The highest grade that can be awarded is C for professional classes and D for other classes. Only the supplemental grade will be included in the grade point average. Supplemental exams will be administered by participating school/college. Students should check directly with their school/college for detailed information on the awarding of FM grades and eligibility for supplemental examinations.

## 18.7 Correction of Errors in Recorded Grades

Students must request correction in the calculation or recording of final grades by March 1 for first-term grades, July 1 for second-term grades, Sept 1 for spring session grades and Nov 1 for summer term grades and grades for the co-op summer session.

## 18.8 Reassessment of a Grade

Students who have questions about final grades that are assigned are encouraged to discuss them with the class instructor. In addition, students may consult the Chair of the Department, Director of the School/College, Dean of the Faculty, the Student Advocate or the Ombud. If their concerns cannot be resolved, students may also use the formal process that follows for the re-assessment of final grades.

Once a final class grade has been submitted to the Registrar, a student who wishes to have a final grade re-assessed should make a written request to the Registrar and pay the requisite fee of \$25.00. The request must identify the specific component which the student wishes re-assessed and the grounds for the request. Such requests must be made by March 1 for first-term grades, July 1 for second-term grades, Sept 1 for spring session grades and Nov 1 for summer session grades and for the co-op summer session. When such a request is received, the Registrar will forward it to the Dean of the Faculty or Director of the School/College offering the class. The re-assessment will be conducted according to procedures developed for the purpose by the Faculty or School/College. These should reflect the nature of the academic disciplines and assessment involved, and should provide for a review of the assessment by a qualified person or persons not responsible for the original evaluation. Once the re-assessment is complete, the Dean or Director will advise the Registrar of the outcome and the Registrar

will inform the student. If the re-assessment results in the assignment of a grade that is different (higher or lower) from the original one, the new grade will replace the original one.

Students who wish information about grade re-assessment procedures should contact their Faculty or School/College office.

## 18.9 Special Arrangements for Examinations, Tests and Assignments

At the discretion of the instructor, alternate arrangements for examinations, tests or the completion of assignments may be made for students who are ill, or in other exceptional circumstances.

Where illness is involved, a certificate from the student's physician will be required. This certificate should indicate the dates and duration of the illness, when possible should describe the impact it had on the student's ability to fulfill academic requirements, and should include any other information the physician considers relevant and appropriate. To obtain a medical certificate, students who miss examinations, tests or the completion of other assignments should contact the University Health Services or their physician at the time they are ill and should submit a medical certificate to their instructor as soon thereafter as possible. Such certificates will not normally be accepted after a lapse of more than one week from the examination or assignment-completion date.

For exceptional circumstances other than illness, appropriate documentation, depending on the situation, will be required.

Requests for alternate arrangements should be made to the instructor in all cases. The deadline for changing a grade of ILL is February 1 for "A" classes and June 1 for "R" and "B" classes for the Regular session. For the Spring and Summer sessions the deadlines are August 1 and October 1 respectively. Requests to change grades after these deadlines must be submitted in writing to the appeals committee of the appropriate school or faculty.

## 19. Academic Standing

Students' academic standing is normally assessed at the end of the Regular session.

BComm Co-op students will be assessed after two consecutive academic terms or after a single academic term which is followed by a work term.

### 19.1 Grade Point Average (GPA)

The Grade Point Average is calculated by summing the values obtained by multiplying the credit points obtained in each class in accordance with the scale in 19.1.1, by the

number of credit hours of each class then dividing that sum by the total credit hours attempted. A Sessional GPA includes only those classes attempted in the prior regular and spring/summer sessions; and the Cumulative GPA includes all classes attempted while registered for the current degree or carried forward from a previous degree.

### 19.1.1 Scale

Grade	Grade Points
A+ .....	4.30
A .....	4.00
A- .....	3.70
B+ .....	3.30
B .....	3.00
B- .....	2.70
C+ .....	2.30
C .....	2.00
C- .....	1.70
D .....	1.00
F .....	0.00
FM** .....	0.00
INC(Incomplete)* .....	0.00
W(Withdrew after deadline) .....	Neutral
ILL(Compassionate reasons/illness) .....	Neutral
P (Pass for credit classes) .....	Neutral
T(Transfer credit on admission) .....	Neutral

\* see 18.5

\*\* see 18.6

### 19.2 Grade Points in the Spring/Summer Session

Students enrolled in classes during the Spring/Summer session will earn grade points which will be included in their cumulative GPA and the sessional GPA for the next regular academic session. A sessional GPA will not be calculated for spring and summer sessions.

### 19.3 Grade Points on Admission

Transfer credits on admission count as credits without grade points, i.e. they are neutral in the calculation of the GPA.

### 19.4 Grade Points on Letter of Permission

The grade earned in a class taken at another institution on a letter of permission is recorded and the appropriate Dalhousie grade points are assigned. For Institutions which do not use letter grades, the Registrar's Office translates the grade into a Dalhousie grade and assigns the corresponding grade points:

### 19.5 Repeating Classes for which a Passing Grade has been Awarded

With the permission of the department/school/college concerned, a student may repeat any class for which a passing grade has previously been awarded. The original passing grade will nevertheless remain on the transcript and a second entry will be recorded with the new grade and the notation "repeated class." No additional credit will be given for such a repeated class, but both grades will be included in the calculation of the sessional and cumulative GPA.

## 20. Probation

### 20.1 College of Arts and Science

**20.1.1** Students with a cumulative GPA of less than 1.70 and greater than or equal to 1.00 who have completed at least four full credits will be placed on academic probation.

**20.1.2** Students on probation are allowed to continue to register on probation provided their sessional GPA is at least 1.70. Students will be returned to "good standing" when they achieve a cumulative GPA of 1.70. Students on probation who do not achieve a sessional GPA of 1.70 will be academically dismissed for a 12-month period.

**20.1.3** Students who are returning from a 12-month period of academic dismissal are allowed to register on probation. They are allowed to continue to register on probation provided their sessional GPA is at least 1.70. Students will be returned to "good standing" when they achieve a cumulative GPA of 1.70. Students who do not achieve a sessional GPA of at least 1.70 will be dismissed academically for the second time for a 36-month period.

**20.1.4** Students require a cumulative GPA of 1.70 to graduate. Therefore, no one will be allowed to graduate while on probation.

### 20.2 Faculty of Health Professions and Faculty of Management

**20.2.1** Students with a cumulative GPA of less than 2.00 and greater than or equal to 1.70 who have completed at least four full credits will be placed on academic probation.

**20.2.2** Students on probation are allowed to continue to register on probation provided their sessional GPA is at least 2.00. Students will be returned to "good standing" when they achieve a cumulative GPA of 2.00. Students on probation who do not achieve a sessional GPA of 2.00 will be academically dismissed.

**20.2.3** Students require a cumulative GPA of 2.00 to graduate. Therefore, no one will be allowed to graduate while on probation.

## 21. Academic Dismissal

### 21.1 Academic Dismissal - College of Arts and Science

**21.1.1** Students with a cumulative GPA of less than 1.00 who have completed at least four full credits will be academically dismissed for a 12-month period.

**21.1.2** Students on probation who do not achieve a sessional GPA of 1.70 or greater will be academically dismissed for a 12-month period.

**21.1.3** Students who have been academically dismissed for the first time may re-register on probation after a 12-month period.

**21.1.4** Students who have been academically dismissed for the second time will not be allowed to apply for re-admission for at least three calendar years.

### 21.2 Academic Dismissal - Faculty of Health Professions and Faculty of Management

**21.2.1** Students with a cumulative GPA of less than 1.70 who have completed at least four full credits will be academically dismissed for a 12-month period.

**21.2.2** Students on probation who do not achieve a sessional GPA of 2.00 or greater will be academically dismissed for a 12-month period.

**21.2.3** Students who have been academically dismissed will not be allowed to apply for re-admission for at least twelve months.

**21.2.4** Students who have been academically dismissed for the first time and have subsequently been re-admitted after an absence of a 12-month period may re-register on probation.

**21.2.5** Students who have been academically dismissed twice will not be allowed to apply for re-admission.

## 22. Graduation Standing

### 22.1 Minimum Cumulative GPA

**22.1.1** A minimum cumulative GPA of 1.70 is required for the awarding of a degree in the College of Arts and Science.

**22.1.2** A minimum cumulative GPA of 2.00 is required for the awarding of an undergraduate degree in the Faculty of Health Professions and the Faculty of Management.

### 22.2 Graduation with Distinction

A cumulative GPA of at least 3.70 is required to graduate with distinction. For the purpose of determining whether a student will graduate with Distinction, all classes taken while at Dalhousie, including repeated classes, and classes for which non-passing grades were obtained, are included. At least half of the classes must be completed at Dalhousie.

### 22.3 BA or BSc with Honours and First Class Honours

Students in the Faculty of Arts and Social Sciences who have obtained a grade of B- or better in five advanced classes, that is, classes other than electives, will normally be admitted to the fourth year Honours, concentrated, combined or multidisciplinary Honours programme.

Students in the Faculty of Science who have obtained a grade of B or better in five advanced classes, that is, classes other than electives, will normally be admitted to the fourth year Honours, concentrated, combined or multidisciplinary Honours programme. In Special Honours programs, such as Biochemistry and Microbiology, see departmental entry.

To count towards an Honours degree each advanced class, (i.e., each class of the second, third, and fourth years, except electives) must be passed with a grade of at least C. Should a D or a C- be received, it must be made good by repeating the class and achieving a C or better grade or by taking an additional advanced class (preferably in the same subject). Otherwise the student must transfer out of the Honours programme. To continue in an Honours programme and to graduate, students registered in the Faculty of Arts and Social Sciences must achieve a cumulative GPA of 2.70 or better in their advanced classes; those students registered in the Faculty of Arts and Social Sciences for an Honours Programme in a Science subject (Biochemistry, Biology, Chemistry, Computing Science, Economics, Earth Sciences, Marine Biology, Mathematics, Microbiology, Neuroscience, Physics, Psychology, Statistics) must achieve a cumulative GPA of 3.00 or better in their advanced classes. Students registered in a Combined Honours Programme in the Faculty of Arts and Social Sciences must achieve a cumulative GPA of 3.00 or better in Science subjects (Biochemistry, Biology, Chemistry, Computing Science, Earth Sciences, Economics, Marine Biology, Mathematics, Microbiology, Neuroscience, Physics, Psychology, Statistics) should one of their "allied subjects" be in such a science subject. Students registered in the Faculty of Science must achieve a cumulative GPA of 3.00 or better in their advanced classes. For

first class Honours, students in both Faculties must achieve a cumulative GPA of 3.70 or better in their advanced classes.

The Honours Qualifying Examination as prescribed by the department/school/college concerned must be passed. Unless Pass-Fail grading is employed, the grade must be B- or better and for first class Honours, A- or better.

## 23. Graduation

In order to graduate students must submit a Request to Graduate to the Office of the Registrar by the deadlines indicated below:

Graduation Month	Deadline
February.....	October 1
May.....	December 1
October.....	July 1

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

## 24. Change from BA to BSc Programme and Vice Versa

All students who have completed all the requirements for a BSc degree have automatically completed all the requirements for a BA degree, provided they have included a language credit. Similarly most students who have completed all requirements for a BA degree in a science subject will have automatically completed all requirements for a BSc degree, provided they have completed the mathematics requirement. However, students who are registered for a BSc degree and wish to be awarded a BA degree or vice versa must do so by submitting an admissions application to the Office of the Registrar.

## 25. Deans' and Directors' Lists

### 25.1 College of Arts and Science and Faculty of Management

Students who have completed first, second, third or fourth year (where year is defined as the number of classes or credit hours deemed by the Faculty/School/College to be the normal yearly workload in the student's degree programme) and have achieved a sessional GPA of 3.70 in the last five credits or equivalent credit hours will be placed on the Dean's or Director's List of the Faculty or School. The notation "Dean's List" or "Director's List" will appear on the student's transcript. Normally, fewer than fifteen percent of students are on the Deans' and Director's Lists.

### 25.2 Faculty of Health Professions

For those programmes enrolling full-time students, the Dean's list will be considered annually on a minimum (and no maximum) number of credits designated by the School/College as a normal yearly workload. For those programmes where there are part-time students, see 25.1 for the method used.

## 26. Appeals

### 26.1 College of Arts and Science/Faculty of Management

Any students who believe they will suffer undue hardship from the application of any of the academic regulations may appeal for relief to the academic appeals committee of the applicable Faculty or School. Students wishing to appeal a decision based on College regulations may obtain copies of the document "How to appeal a College of Arts and Science regulation". Such appeals must be addressed in writing to the Chair of the appropriate appeals committee, c/o Office of the Registrar and must clearly state the arguments and expectations of the petitioner. An appeal from a student registered prior to 1991, arising from a required withdrawal from the faculty for academic reasons should be addressed to the Admissions Committee of the appropriate Faculty or School.

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

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

### 26.2 Faculty of Health Professions

Students may appeal decisions pertaining to the College's or a School's interpretation of academic rules and regulations to the Faculty of Health Professions Undergraduate Committee on Studies. Normally, appeals to this committee occur after appeal procedures at the School or College level have been exhausted.

In the case of appeals initiated by students the following procedures shall normally be followed:

1. The student prepares and presents a written statement to the Dean requesting an appeal hearing and stating clearly which regulation is in question and the remedy being sought. The statement is to contain an outline of the circumstances that necessitate the appeal to the Faculty level and the expectations of the

appellant. The student will also provide a telephone number and address through which the student can be reached.

2. The request for an appeal must be presented by the student to the Dean of the Faculty of Health Professions within thirty calendar days of notification of the student by the School/College of the disputed academic decision. The Dean will then ensure that the request for an appeal is forwarded to the Chairperson of the Committee on Studies within two business days.
3. Before acting upon the request for an appeal, the Chairperson of the Faculty Undergraduate Committee on Studies shall determine if School/College appeal procedures have been exhausted and that all the evidence presented to him/her has in fact been considered by the School/College Committee on Studies. If the Chairperson of the Undergraduate Committee on Studies is from the appellant's School/College, the Vice-Chairperson will preside over the appeal process.
4. When the Chairperson or Vice-Chairperson has determined that the Faculty Committee should hear the case, he/she will place the matter on the agenda of the next regularly scheduled meeting, unless in the judgement of the Chairperson there is reason to hold the hearing at an earlier date. The case must be heard within thirty calendar days of receipt by the Dean of a written request for appeal.
5. The Chairperson shall notify the student by telephone and by registered mail of the date, time, place of the appeal hearing, and of the student's right to appear before the Committee, either alone or with an advocate of his/her choice.
6. Documentation in support of the appeal must normally be distributed to the Committee with the agenda seven days prior to the meeting. The chairperson is to ensure that an identical package of all materials is made available to the appellant, the appellant's advocate and the School/College.
7. The members of the Committee whose decision is under appeal have the right to be present and to make representations before the Faculty Committee with, or without, an advocate of their choice and/or other School/College personnel.
8. After the student's appeal has been heard, the Committee will continue the meeting in camera to reach a decision. Other persons from the School/College (as noted in 7 above) and the appellant and his/her advocate will be required to leave prior to the in camera deliberations.
9. The decision of the Faculty Undergraduate Committee on Studies will be dispatched

directly to the appellant by the Chairperson of the Faculty Undergraduate Committee on Studies in writing within 72 (seventy-two) hours of the hearing by registered mail. A copy of the decision will also be sent to the Director of the School/College in question and to the Dean of the Faculty.

10. Should the Committee decide against the student's appeal, the Chairperson of the Faculty Undergraduate Committee on Studies will advise the student of the right to appeal to Senate.
11. In the case of appeals initiated by the School/College on behalf of a student, the School/College will be responsible for providing all documentation. Correspondence or communications from the Chairperson of the Faculty Undergraduate Committee on Studies, as described in procedures 3, 5, 8, 10 and 11 above, shall be with the Director of the School/College.

## 27. Changes in Regulations

In general, any change which affects a currently registered student adversely will not apply to that student. Any student suffering undue hardship from application of any of the regulations may appeal for relief to the appropriate academic appeals committee as in Section 26, 26.1 and 26.2 above.

## Degree Requirements

Following is a list of the faculty requirements needed to satisfy degree programmes at Dalhousie University. Details of these requirements can be found on the pages following these lists. Departmental requirements can be found in the appropriate departmental listing in this calendar. Please note that students must satisfy both departmental and faculty requirements.

Requirements for degree programmes not listed here can be found in the appropriate department/school/college listing.

### BA, BSc Major (3 year)

- Total credits required - 15
- Required GPA for graduation - 1.70
- Total credits required at or above the 2000 level - 7
- One credit in a writing class
- One language/humanities credit
- One life or physical science credit
- One social science credit
- One credit in a language class for Bachelor of Arts
- One credit in math for Bachelor of Science

At least 4 and no more than 8 credits in the area of concentration must be beyond the 1000 level, including 2 beyond the 2000 level. Chemistry majors need complete only 1 credit beyond the 2000 level.

Within the last ten credits, complete one credit in each of two subjects other than the major.

### BA, BSc Advanced Major (4 year)

- Total credits required - 20
- Required GPA for graduation - 1.70
- Total credits required at or above the 2000 level - 12
- One credit in a writing class
- One language/humanities credit
- One life or physical science credit
- One social science credit
- One credit in a language class for Bachelor of Arts
- One credit in math for Bachelor of Science

At least 6 and no more than 9 credits in the area of concentration must be beyond the 1000 level, including 3 beyond the 2000 level.

Within the last 15 credits, complete one credit in each of two subjects other than the major.

### BA, BSc Advanced Major Co-op (4 year)

- Total credits required - 20
- Required GPA for graduation - 1.70
- Total credits required at or above the 2000 level - 12

- One credit in a writing class
- One language/humanities credit
- One life or physical science credit
- One social science credit
- One credit in a language class for Bachelor of Arts
- One credit in math for Bachelor of Science
- Four co-op workterms

At least 6 and no more than 9 credits in the area of concentration must be beyond the 1000 level, including 3 beyond the 2000 level.

Within the last fifteen credits, complete one credit in each of two subjects other than the major.

### BA, BSc Honours (4 year)

- Total credits required - 20
- Required GPA for graduation - (see section 22.3)
- One credit in a writing class
- One language/humanities credit
- One life or physical science credit
- One social science credit
- One credit in a language class for Bachelor of Arts
- One credit in math for Bachelor of Science
- Two credits in a minor subject
- Qualifying examination

At least 9 and no more than 11 credits in the area of concentration must be beyond the 1000 level.

Within the last fifteen credits, complete one credit in each of two subjects other than the major.

### BA, BSc Honours Co-op (4 year)

- Total credits required - 20
- Required GPA for graduation - (see section 22.3)
- One credit in a writing class
- One language/humanities credit
- One life or physical science credit
- One social science credit
- One credit in a language class for Bachelor of Arts
- One credit in math for Bachelor of Science
- Two credits in a minor subject
- Qualifying examination
- Four co-op workterms

At least 9 and no more than 11 credits in the area of concentration must be beyond the 1000 level.

Within the last fifteen credits, complete one credit in each of two subjects other than the major.

## 1. College of Arts and Sciences

### 1.1. Subject Groupings in the College of Arts Sciences

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

#### 1.1.1. Languages and Humanities:

Classics, Comparative Literature, Comparative Religion, English, French, German, Greek, History, King's Foundation Year, Latin, Music, Philosophy, Russian, Spanish, Theatre, and Women's Studies.

#### 1.1.2. Social Sciences:

Canadian Studies, Economics, Education, History, International Development Studies, King's Foundation Year, Political Science, Psychology, Sociology and Social Anthropology, and Women's Studies.

#### 1.1.3. Life Sciences and Physical Sciences:

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

**Please Note:** In cases where a subject is listed in more than one of the groupings, any credit taken in that subject may be used to satisfy only one of the grouping requirements. A second credit in the same subject cannot be used to satisfy another subject grouping requirement.

The exception is King's Foundation Year which may be used to satisfy both the Humanities-Languages and Social Science groupings. King's Foundation Year students must take a class in the Life / Physical Sciences to complete the subject grouping distribution requirements.

### 1.2 Bachelor of Arts, Bachelor of Science - All Programmes

In the first year full-time students normally take five full-credit classes or equivalents. Students in the first year may not take for credit more than the equivalent of three full-credit classes in a single subject.

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

#### 1.2.1 Writing Class

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

Chemistry 1000.06R; Classics 1000.06R, 1010.06R, 1100.06R; Comparative Religion 1301.06R; English 1000.06R; German 1000.06R, 1050.06R; History 1400.06R; King's Foundation Year; Music 1010.06R; Philosophy 1010.06R; Political Science 1103.06R; Russian 2050.06R; Science 1500.30R; Theatre 1000.06R.

#### 1.2.2 Mathematics Requirement

In order to qualify for a BSc degree candidates are required to complete successfully at least one full University credit in Mathematics other than Mathematics 1001.03A/1002.03B, Mathematics 1110.03A/1120.03B. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from section 1.1.3.

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

#### 1.2.3 Formal Subjects

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

Chemistry 1000.06R, 1010.06R, 1020.06R, 1030.06R; Computing Science (all classes); Economics 1106.03A/B, 2222.03A, 2223.03B, 2228.06R; Mathematics (all classes); Philosophy 2110.06R, 2130.03A, 2140.03B, 2190.03A/B, 2880.06R; Physics 1000.06R, 1100.06R, 1300.06R; Political Science 2494.06R, 3495.03A/B.

#### 1.2.4 Language Class

Students should consider becoming fluent in French. BA students are required to obtain one credit from the following language classes:

Classics 1700.06R, 1800.06R; French 1000.06R, 1001.06A/2001.06B, 1020.06R, 1040.06R; 1080.06R; German 1000.06R, 1010.06R, 1050.06R,

1060.06R; Russian 1000.06R, 1050.06R; Spanish 1020.06R, 2000.03A, 2010.03B.

For students with advanced language skills, upper-level language classes may be substituted. Consult the Office of the Registrar if you require further information. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from section 1.1.1.

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

BA students who choose to major in Economics, International Development Studies, Philosophy, Political Science, Psychology or Sociology and Social Anthropology may substitute for a language class at least one full class in Mathematics or Statistics, other than Mathematics 1001.03A/1002.03B or Mathematics 1110.03A/1120.03B, to meet this requirement; or they may meet it by passing the test administered by the Department of Mathematics, Statistics & Computing Science. A class taken to satisfy this requirement cannot also satisfy the requirement of a class from section 1.1.3.

Students who have not completed their first year but wish to enrol for further study, must first complete the first-year requirements.

### 1.2.5 Cross-listed Classes

Please note that cross-listed classes will count as one subject only for the purpose of satisfying degree requirements, e.g. Economics 2280.03 cross-listed with Mathematics 2060.03 may count either as part of the Mathematics requirement or as part of a major in Economics, but not both.

### 1.2.6 Arts and Science Electives

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

- (a) Architecture 1000.06R;
- (b) Education Foundation Offerings (classes with numbers below 4400); classes numbered 4400 and above are not available as Arts and Science electives;
- (c) Classes in Engineering and Oceanography. The restriction on Engineering electives does not apply to students in the Diploma in Engineering Programme who combine their studies with a programme

leading to a BA or BSc in the College of Arts and Sciences. (See the Engineering entry in this calendar).

- (d) Classes in Music. Note: Music classes 1000.06R, 1001.03A, 1002.03B, 2007.06R, 2008.06R, 2010.06R, 2011.06R, 2012.06R, 2013.06R, 2021.06R, 2087.06R, and 3084.03B are available as normal electives, but other classes in Music may be taken by special permission of the Department of Music.
- (e) The following approved classes from other Faculties and institutions: Commerce 1000.03, 1101.03A/B, 1102.03A/B, 2201.03A/B, 2301.03A/B, 2401.03A/B, 2801.03A/B, 3203.03A/B, 3302.03B, 3304.03A/B, 3306.03A/B, 3308.03B, 3501.03A/B, 4120.03A/B and Health Education 4412.03A/B.

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

## 1.3. Bachelor of Arts and Bachelor of Science - Honours Programmes

**1.3.1 Second, Third and Fourth Years:** Able and ambitious students are urged to enter Honours Programmes. These programmes require a higher quality of work than is required by the other undergraduate programmes of the College (15-credit Major and 20-credit Advanced Major). There are three types of Honours programmes: concentrated, combined and multidisciplinary.

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

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

Applications for admission to Honours programmes must be made to the Departments concerned on forms available in Departments and at the Office of the Registrar. The Registrar may be consulted by those considering multidisciplinary honours.

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

For each individual student the entire Honours programme, including elective credits, is subject to supervision and approval

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by the Department or Departments concerned, or in the case of multidisciplinary honours, by an interdisciplinary committee.

**Note:** The last day to apply to an Honours programme is September 26.

**1.3.2. Honours in a concentrated programme** is based on the general requirement that the 16 credits beyond the first year of study comprise:

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

**1.3.3. Honours in a combined programme** is based on the general requirement that the 16 credits beyond the first year of study comprise:

- (a) A normal requirement of eleven credits beyond the 1000-level in two allied subjects, not more than seven credits being in either of them. Students may, with the approval of the Departments concerned, elect a maximum of thirteen credits in two allied subjects, not more than nine credits being in either of them. In this case the requirement in (b) below is reduced to two or three credits.
- (b) Four elective credits in subjects other than the two offered to satisfy the requirement of the preceding clause.
- (c) An additional grade (see Honours Qualifying Examination below).
- (d) Honours in a combined programme leading to the BSc may be obtained by choosing both subjects from the BSc Honours subjects listed above, or by combining one of the BSc Honours subjects with one of the BA Honours subjects, provided that the larger number of advanced credits is from a science subject.

Details of specific departmental honours programmes are given under departmental listings of Programmes of Study.

**1.3.4. Multidisciplinary Honours programmes** are based on the general requirement that the 15 credits, beyond the first year of study comprise:

- (a) Twelve credits beyond the 1000-level in three or more subjects. No more than five of these may be in a single subject; no less than six nor more than nine may be in two subjects.
- (b) Three elective credits.
- (c) For a multidisciplinary BA (Honours), at least ten credits of the twenty selected must be selected from subject groups, sections 1.1.1, 1.1.2, and 1.1.3, at the beginning of this section.
- (d) For a multidisciplinary BSc (Honours), at least eight credits of the twenty required must be selected from Biochemistry, Biology, Chemistry, Computing Science, Economics, Earth Sciences, Mathematics, Microbiology, Neuroscience, Physics, Psychology, and Statistics.
- (e) An additional grade (see Honours Qualifying Examination below).

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

For the standing required for Honours, see section 22.3, p. 97.

## 1.4 Bachelor of Arts, Bachelor of Science - Advanced Major Programmes (20-credits)

Students who do not wish to attempt an Honours programme are encouraged to enter an Advanced Major programme which also requires 20 credits but with a lesser degree of concentration in a single subject. Such students are advised to seek detailed information from the department in which they wish to concentrate. The requirements for such programmes are consistent with requirements for Major degree programmes. The five additional credits required must all be obtained at an advanced level. Unlike the Honours degree, the Advanced Major degree may not provide appropriate training for consideration for admission to a one-year Master's programme.

In order to satisfy the requirements for the Advanced Major degree, at least 12 of the 20 credits must be beyond the 1000-level. A

minimum of six and a maximum of nine credits beyond the 1000-level are to be in the Major, and three of them must be beyond the 2000-level.

It is also possible to enter an **Advanced Double Major** in the 20-credit programme, with the approval of the two major departments concerned. In this case a minimum of ten credits and a maximum of thirteen beyond the 1000-level are to be in the two allied subjects, with no more than nine and no fewer than four in either. At least two credits in each of the two major subjects must be beyond the 2000-level.

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

For the BSc, the Advanced Major may be chosen from Biochemistry, Biology, Chemistry, Computing Science, Economics, Earth Sciences, Marine Biology, Mathematics, Microbiology, Physics, Psychology, or Statistics.

An Advanced Double Major leading to the BSc may be obtained by choosing both subjects from the BSc major subjects listed above or by combining one of the BSc major subjects listed above with one of the BA major subjects, provided that the larger number of advanced credits is from a science subject.

## 1.5 Bachelor of Arts, Bachelor of Science - Major Programmes (15 credits)

### 1.5.1. Second and Third Years

Before registering for the second year, each student must declare an area of concentration and obtain programme advice from a faculty advisor in the appropriate department.

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

- (a) at least seven credits shall be beyond the 1000-level.
- (b) at least one credit or two half-credits shall be in each of at least two subjects other than the area of concentration.
- (c) at least four and no more than eight credits beyond the 1000-level shall be in a single area of concentration (the major), and at least two of these must be beyond the 2000-level with the following exception: Students enrolled in the combined Engineering Diploma

and 15-credit major programme in Mathematics or Chemistry need take only one full credit (or two half credits) beyond the 2000-level in the area of concentration.

- (d) up to four of the credits in the major subject must be selected in accordance with departmental or interdepartmental requirements.

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

For the BSc the area of concentration may be chosen from Biology, Chemistry, Computing Science, Economics, Earth Science, Mathematics, Physics, Psychology, or Statistics.

For the standing required for a BSc or BA see section 22, p. 97.

### 1.5.2. Individual Programmes

In cases where students feel that their academic needs are not satisfied under the above requirements, individual programmes may be submitted to the Student Affairs Committee of the Faculty of Arts and Social Sciences or to the Curriculum Committee of the Faculty of Science or the School of Education prior to or during the student's second academic year. The Dean shall act as advisor for such students.

## 1.6 Upgrading of a BA or BSc to an Honours or Advanced Major Degree

A person who holds a Dalhousie BA or BSc (15-credit) degree may apply through his/her department advisor or, for Multidisciplinary Programmes, their Coordinator, for admission to an Advanced Major or Honours programme. On completion of the required work with proper standing, a certificate will be awarded which has the effect of upgrading the degree to Advanced Major or Honours status, as appropriate.

## 1.7. Programmes in Co-operative Education (20 credits)

The aim of Co-op degree programmes is to enable students to combine their studies with work experience. The programmes are thus year-round, including Spring and Summer School, and will normally require from forty-eight to fifty-two months for completion.

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

The following Departments currently offer Co-op programmes: Biology, Chemistry, Earth Sciences, Mathematics, Statistics and Computing Science, and Physics. For details of these programmes, consult the Calendar entries for the Departments.

## 1.8. Joint Honours: Dalhousie-Mount Saint Vincent

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

## 1.9. Bachelor of Music and Bachelor of Music Education

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

## 1.10. Diploma in Engineering

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

## 1.11. Bachelor of Education

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

For details about BEd programmes, see the entry for the School of Education.

## 1.12. Certificate and Diploma in Costume Studies

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

## 1.13. Diploma in Meteorology

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

## 2. Faculty of Management

### 2.1 School of Business

The Bachelor of Commerce Co-op is a four-year programme comprising 7 academic terms and 3 work terms. The equivalent of 20 full credits (40 half credits) are required for graduation. Note: all classes are half-credits except those designated as "R", which are full credits.

The work term requirements of the Bachelor of Commerce Co-op may involve placement problems for Visa students. Subject to approval by the School, students may be permitted to arrange their own work term positions. Notwithstanding, the best interests of most Visa students may be better served by seeking admission to a university that does not have a mandatory Co-op programme.

The classes in the programme are divided into five categories, as follows:

#### 2.1.1 Required Core Area Classes

The equivalent of ten full credits (twenty half credits) Commerce 1000.03, 2101.03, 2102.03, 1501.03, 2201.03, 2301.03, 2401.03, 2501.03, 2502.03, 2601.03, 2701.03, 2302.03, 3501.03, 4350.06R; (Economics 1100.06R, 2200.03, or 2201.03; Mathematics 1000.03 and 1010.03, or 1110.03 and 1120.03\*

Note: Mathematics 1110.03 and 1120.03 are specifically designed for the Commerce programme, and are not normally accepted as the prerequisites for upper level Mathematics or Computing Science classes.

#### 2.1.2. Core Area Electives

The equivalent of four full credits (eight half credits) to be selected from offerings in the core areas of Commerce, Economics and Mathematics (including Computing Science).

#### 2.1.3. Non-Commerce Electives

The equivalent of three full credits (six half credits) to be selected from all classes offered in the university except those designated as Commerce classes.

#### 2.1.4. Free Electives

The equivalent of one and one-half full credits (three half credits) chosen, subject to the approval of the School of Business Administration, from all classes offered in the University.

#### 2.1.5. Work Term Requirements

The equivalent of one and one-half full credits (three half credits) requires the satisfactory completion of three work terms.

Students are expected to ensure that the classes taken comply with the above.

Academic regulations for the Bachelor of Commerce Co-op are generally based on or adapted from those applicable to the Bachelor of Commerce degree. The Bachelor of Commerce Co-op, however, is a more structured programme, with most of its classes assigned to specific years and terms. The chart below summarizes the degree requirements and class sequencing through all seven of the academic terms and three work terms that constitute the Bachelor of Commerce Co-op Programme. It will be noted that Commerce 1000.03 and Commerce 1501.03 will be offered in the Spring to permit students an opportunity to make up academic deficiencies and proceed to Year II of the Bachelor of Commerce Co-op.

### 2.1.6. Competency in the English Language

All students in the Commerce programme must satisfy the School as to their competency in the English Language. This requirement is satisfied by successfully completing the Business Communication Course, Commerce 2701.03, which is a required course in second year. The School recommends, but does not require, that students take at least one course in first year,

from their electives, in which written work is considered frequently and in detail. These writing classes are approved by the Writing Across Curriculum Committee and are listed as follows: Chemistry 1000.06, Classics 1000.06, 1010.06, 1100.06, Comparative Religion 1301.06, English 1000.06, German 1000.06R, 1060.06, History 1400.06, Music 1010.06, Philosophy 1010.06, Political Science 1103.06, Russian 2050.06 and Theatre 1000.06R.

### 2.2. School of Public Administration

Please refer to the Public Administration entry in this calendar

## 3. Faculty of Health Professions

For degree requirements for programmes in the Faculty of Health Professions, refer to the entry in this calendar for the appropriate school or college.

## Dalhousie University Co-op Bcomm

Term Year	Fall Sept./Dec.	Winter Jan./April	Co-op Summer May/Aug.
I	Math 1000.03 or 1110.03 (1) Comm 1000.03 (1)  Econ 1100.06 (2) 3 Non-commerce Electives (6)	Math 1010.03 or 1120.03 (1) Comm 1501.03 (1)	Free Safety Net  • Comm 1000.03 (1) Comm 1501.03 (1)
II	Comm 2101.03 (1) Comm 2301.03 (1) Comm 2401.03 (1) Comm 2501.03 (1) Econ 2200.03 or 2201.03 (1) Seminar	Work Term (1)	Comm 2101.03 (1) Comm 2201.03 (1) Comm 2502.03 (1) Comm 2701.03 (1) Comm 3302.03 (1)
III	Work Term (1)	Comm 2801.03 (1) Comm 3501.03 (1) 3 Core Electives (3)	Work Term (1)
IV	Comm 4350.03 (2)  3 Core Electives (3) 1 Free Elective (1)	2 Core Electives (2) 2 Free Electives (2)	•

\* Student's academic standing will be assessed at the end of this academic term (see sections 20, 1, and 22, Academic Regulations).

## African Studies

Location: Pearson Institute Halifax, N.S.  
Telephone: (902) 494-2114  
Advisor: Jane Parpart 494-3667

Dalhousie University offers a set of classes in different disciplines which focus on Africa. Its Centre for African Studies, established in 1975, coordinates teaching, seminar, research, community and publications programmes in African Studies. Its faculty associates hold appointments in the social sciences, humanities and professional schools. Undergraduate classes on Africa are usually available in Economics, History, International Development Studies and Political Science. Other classes with a broader Third World focus, which usually includes African content, are offered in Comparative Religion, English, Education, Health Law, and Sociology and Social Anthropology.

Students interested in Africa are encouraged to select classes from these several disciplines which concentrate on the continent. These could be included in single or combined major or honours programmes in Economics, History, International Development Studies, Political Science and/or Sociology and Social Anthropology.

## Architecture

**ARCH 1000.06R Introduction to Architecture:** An introductory class showing architecture as a bridge between the Arts and Science providing an insight into professional architectural studies. In the first term discussion centres around some components of architectural design; in the second term, architecture in present day life. Available as an elective in the general degree programmes in Arts and Social Sciences and Science. This class is held at TUNS.

Instructor: Staff  
Format: Lecture/seminar 1 hour,  
practical 2 hours

## Anatomy and Neurobiology

**Location:** Sir Charles Tupper Medical Building, 13th floor, Halifax, N.S. B3H 4H7  
**Telephone:** (902) 494-2052  
**Fax:** (902) 494-1212

### Head of Department

D.A. Hopkins

### Professors

D.H. Dickson, BA, MSc, PhD (Western)  
 D.A. Hopkins, BSc (Alta), MA, PhD (McM)  
 J.G. Rutherford, BA (Cornell), MS (Syracuse), PhD (SUNY), Associate Dean, Faculty of Graduate Studies  
 J.M. Walker, BPT, MSc (Man), PhD (McM), major appointment in Physiotherapy  
 R.J. Wasseraug, BSc (Tufts), PhD (Chicago)

### Associate Professors

R.E. Clattenburg, BSc, MSc (Acadia), PhD (Western)  
 R.W. Currie, BSA, MSc, PhD (Man), Graduate Studies Co-ordinator  
 M.M. Hansell, BSc (Tor), PhD (Calif)  
 I.G. Mobbs, BSc (Aberdeen), MSc (McMaster), PhD (Western)  
 P.E. Neumann, BA, MB (Brown)  
 K. Semba, B.Ed, MA (Tokyo), PhD (Rutgers)

### Assistant Professors

G.V. Allen, BSc, PhD (Dal)  
 H.H. Ellenberger, BA, MSc, PhD (Miami)  
 T. Hagg, BSc (Amsterdam), MD, MSc (Lelden), PhD (UCSD)  
 W.B. Mathleson, MSc (Carleton), PhD (Ottawa)  
 F.M. Smith, BSc, PhD (UBC)

The Department of Anatomy and Neurobiology provides facilities for advanced study and research in Neuroscience, Histology, Embryology, Cell Biology, Neuroendocrinology and Evolutionary Biology.

### Classes Offered

**ANAT 1010.03 R Basic Human Anatomy:** This course is offered by the Department of Anatomy and Neurobiology and is reserved for students in Nursing and Pharmacy. The course uses a systems approach to examine the cellular and gross anatomy of the body. There are no formal laboratory sessions. There are forty-seven (47) hours of scheduled classroom lectures plus review sessions from September to April. Preserved cadaver material is available for independent study in the department facilities on the twelfth and fourteenth floors of the Tupper Building.

**Format:** Lecture 2 hours  
**Instructor:** G.V. Allen  
**Restriction:** Restricted to Nursing and Pharmacy students

**ANAT 1020.03 R Basic Human Anatomy:** This course is offered by the Department of Anatomy and Neurobiology to Dental Hygiene, Recreation, Physical and Health Education and Kinesiology students. The course uses a systems approach to examine the cellular and gross anatomy of the body. There are no formal laboratory sessions. There are forty-seven (47) hours of scheduled classroom lectures plus review sessions from September to April. Preserved cadaver material is available for independent study in the department facilities on the twelfth and fourteenth floors of the Tupper Building.

**Format:** Lecture 2 hours  
**Instructor:** G.V. Allen  
**Restriction:** Restricted to Dental Hygiene, Recreation, Kinesiology, and Physical and Health Education students.

**ANAT 1030.03B Gross Anatomy:** This course is taught by the Department of Anatomy and Neurobiology in the Faculty of Medicine and designed especially for Dental Hygiene students, and deals with detailed gross anatomy of the head and neck. This course complements ANAT 1020.03R and PHYL 1010.08R.

**Format:** Lecture 2 hours, lab 2 hours  
**Instructor:** R.W. Currie  
**Restriction:** Restricted to Dental Hygiene students.

**ANAT 2100.03B Neuroanatomy:** A survey of the histology, development and organization of the central nervous system, with emphasis on the developmental and structural relationships between spinal cord and brainstem. The organization of cranial nerves and microanatomy of the brain stem is discussed. The organization of sensory and motor systems is presented in detail. The cerebral cortex, cerebellum, basal ganglia, and limbic system are also covered.

**Format:** lecture and laboratory 3 hours  
**Instructor:** D.A. Hopkins (Anatomy and Neurobiology Dept.)

**Prerequisite:** BIOL 2020.03A or B or 2015.06R or permission of instructor

**Cross-listing:** BIOL 3440.03B, NESC 3440.03B

**Restriction:** Restricted to Occupational Therapy and Physiotherapy students. (BIOL 3440.03B and NESC 3440.03B do not have this restriction).

**ANAT 2160.03A Introduction to Human Histology:** Histology is the study of the structure of cells, tissues and organ systems,

# 108 Anatomy and Neurobiology

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and utilizes information derived from both light and electron microscopy. It complements studies in anatomy, cell biology, physiology and biochemistry, broadening the understanding of how organisms function.

**Format:** lecture 2 hours, laboratory 2 hours

**Instructor:** D.H. Dickson (Anatomy and Neurobiology Dept.)

**Prerequisites:** BIOL 2020.03A or permission of instructor

**Cross-listings:** BIOL 3430.03A

**ANAT 2170.06R Gross Anatomy:** A regional study of human gross anatomy with emphasis on functional anatomy of the back and limbs.

Laboratory work/study includes radiology, osteology, living (surface) anatomy and dissection of the human body. Biology students, please see BIOL 3435 description for complete details.

**Format:** lecture 3 hours, laboratory 4 hours

**Instructor:** R.E. Clattenburg

**Restriction:** Restricted to Occupational Therapy and Physiotherapy students. This restriction does not apply to the cross-listing.

**Cross-listings:** BIOL 3435.06R

**ANAT 3421.03B Comparative Vertebrate Histology:** An advanced histology course surveying the whole range of vertebrate tissues and organs.

**Format:** lecture 2 hours, lab 2 hours

**Instructor:** TBA (Anatomy and Neurobiology Dept.)

**Prerequisite:** BIOL 3430.03A

**Cross-listed:** BIOL 3421.03B

# Biochemistry

**Location:** Sir Charles Tupper Medical Building College Street  
**Telephones:** (902) 494-2480  
**Fax:** (902) 494-1355

## Head of Department

W. Carl Breckenridge

## Faculty Advisors

J.A. Verpoorte - Undergraduate Advisor (494-2022)  
 R.A. Singer - Graduate Advisor (494-8847)

## Professors

A.H. Blair, BA, MSc (UBC), PhD (Calif)  
 W.C. Breckenridge, BSc (Queen's), MSc, PhD (Tor)  
 P.J. Dolphin, BSc, PhD (Southampton)  
 W.F. Doolittle, AB (Harv), PhD (Stan)  
 M.W. Gray, BSc, PhD (Alta)  
 C.W. Helleiner, BA, PhD (Tor)  
 C.B. Lazler, BA (Tor), MSc (UBC), PhD (Dal)  
 F.B.St.C. Palmer, BSc, PhD (Western)  
 D.W. Russell, BPharm, PhD, DSc (Lond), BEd (Dal)  
 R.A. Singer, AB (Princeton), PhD (Harv)  
 M.W. Spence, MD (Alta), PhD (McG)  
 M.H. Tan, BSc, MD (Dal)  
 J.A. Verpoorte, BSc, Drs (Utrecht), DSc (Pretoria)  
 C.J.A. Wallace, BA, MA, DPhil (Oxon)

## Associate Professors

H.W. Cook, BSc, MSc (McG), PhD (Dal)  
 F.I. Maclean, BA, MA (Tor.), DPhil (Oxon)

## Assistant Professors

D.M. Byers, BSc, MSc (Dal), PhD (Alta)  
 M. Dobeon, BSc, DPhil  
 P.X.-Q. Liu, BSc (Wuhan), PhD (Cornell)  
 N. Ridgway, BSc (Dal), PhD  
 H.-S. Ro, BSc, PhD (McM)

## Lecturers

S.S. Reddy, BS, MD (Memorial)  
 D.C. Riddell, BSc, PhD (Kingston)

## Introduction

Biochemistry is the study of biological function at the molecular level. Although biochemical processes follow the basic laws of physics and chemistry, living organisms, because of their complexity, operate on a set of distinct principles that are not found in simple isolated chemical systems. The goal of biochemistry is to elucidate these principles. The department offers an integrated series of classes that will provide students with an up-to-date view of modern biochemistry ranging from structure-function

relationships in macromolecules to the dynamic aspects of metabolism. A set of classes has been identified to meet the needs of honours Biochemistry or Microbiology students who hope to pursue further study in molecular and genetic approaches to fundamental problems. These classes provide solid grounding in bacterial and eukaryotic gene structure and function, regulation and evolution, and both practical and theoretical presentations of current and developing methodology (genetic engineering). The classes can be fully integrated with training in metabolism, enzymology, bacteriology, virology and immunology provided by the two departments, as they provide a good practical grounding in the recombinant DNA methods which have become essential in fields as diverse as genetic diagnosis and gene therapy, forensics, industrial microbiology, and molecular evolution.

## Degree Programmes

**Note:** Students interested in a Biochemistry degree should obtain from the department a special booklet that describes all of the programmes available and the special requirements relating to them. Degree programmes should be planned in consultation with the undergraduate coordinator (Dr. J.A. Verpoorte), or another faculty advisor (Dr. F.B. Palmer, Dr. R.A. Singer).

There is no three-year programme with a Biochemistry major. Students wishing to include Biochemistry in other programmes are welcomed. Students cannot obtain credit for both Biochemistry 2200.03 and 2020.03 and the Biochemistry 2000.06 and 2600.03 offered previously. Note that all Biochemistry classes have prerequisites.

For general Degree Requirements, please see the Degree Requirements section in this calendar.

## BSc with Honours in Biochemistry

This is a special concentrated Honours Programme. Because Biochemistry and Chemistry are closely interwoven both conceptually and experimentally, the list of major classes required includes both subjects to a total of 10.5 credits. Additional chemistry classes may be taken as electives, or by choosing Chemistry as a minor subject. Students should consider Mathematics 1060.03 or 2060.03. For entrance to Biochemistry 2200.03, students require minimum grades of C in Biology 1000.06 and Chemistry 1010.06 (or equivalent). Honours students must meet the general degree requirements of the faculty.

## Departmental Requirements

### Classes required in Honours:

- 2000 level:** Biochemistry 2020.03, 2030.03, 2200.03, Chemistry 2201.03, 2301.03, 2302.03, 2400.06
- 3000 level:** Biochemistry 3200.03, 3300.03, 3400.03, Chemistry 3403.03 and 3402.03 or Microbiology 3033.03
- 4000 level:** Biochemistry 4802.06, 4803.03. Three more credits in Biochemistry including .5 in 43\*\* series, .5 in 44\*\* series and .5 in 47\*\* series

### Other required classes:

Chemistry 1010.06, Biology 1000.06 (with grade of C or better); Physics 1100.06, Math 1000.03 and 1010.03

### Other requirements:

Two credits in a minor subject. Honours Qualifying result.

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

Laboratory exercises, many of the classes offered by the department of Biochemistry include a laboratory component. The laboratory exercises provide an opportunity to develop laboratory skills, as well as to illustrate the theoretical principles taught in class. This process culminates in fourth year, when both an advanced laboratory class and a supervised research project are required for honours Biochemistry students. Although no exercise involves live animals, experiments may use materials derived from animal sources, as well as from plants and micro-organisms. Laboratory experiments will often be performed in groups, but the writing of reports is expected to be an individual effort, meeting the guidelines on plagiarism set out in the University Regulations in the Calendar.

## BSc with Combined Honours in Biochemistry and Another Science

Biochemistry may be chosen along with one of Biology, Chemistry, Mathematics, Microbiology, Physics, Psychology, or possibly another subject, for a Combined Honours Programme.

## Departmental Requirements

Biochemistry 2020.03, 2030.03, 2200.03, 3200.03, 3300.03, 3400.03 and one full credit from 43XX, 44XX, and 47XX and also Chemistry 2400.06.

Consult the Undergraduate Advisor, Dr. J.A. Verpoorte, for details of recommended courses of study.

## BSc Advanced Major in Biochemistry

The department offers a four-year, 20-credit programme of study leading to an Advanced Major Degree. The programme, while not designed as a preparation for graduate study in Biochemistry, nevertheless introduces students to all main aspects of the subject. As well as meeting the general degree requirements of the faculty.

## Departmental Requirements

### Classes required in Advanced Major:

- 2000 level:** Biochemistry 2020.03, 2030.03, 2200.03, Chemistry 2201.03, and 2400.06
- 3000 level:** Biochemistry 3200.03, 3300.03, 3400.03
- 4000 level:** Three full credits in Biochemistry at 4000 level

### Other required classes:

Chemistry 1010.06 and Biology 1000.06

Students who have not passed Nova Scotia grade 12 Physics or its equivalent must include a 1000-level Physics class among their first ten credits.

## Co-op Programme

This programme consists of 8 academic and 4 work terms in laboratories in government and industry. The work terms, each of 4 months duration, would provide the students with work experience and enable them to make more intelligent career choices.

### The work-study programme.

Year	Fall	Winter	Summer
1	Acad	Acad	--
2	Acad	Acad	W1
3	Acad	Acad	W2
4	W3	Acad	W4
5	Acad		

Consult the department for details

## Classes Offered

The Department also teaches students in Dental Hygiene, Dentistry, Medicine, Nursing and Pharmacy; these classes are described in the appropriate sections of the Calendar. Classes marked \* are not offered every year; please consult the current timetable.

**BIOC 1420.03 B Introductory Biochemistry:** Topics discussed are structure, biosynthesis, and function of carbohydrates, lipids, proteins and nucleic acids; enzyme kinetics; genetic engineering; nutrition. Medical aspects are stressed.

Instructor: F. I Maclean

Format: Lecture 3 hours, Lab 2 hours

**Prerequisite:** Chemistry 1410.03A or permission of Instructor  
**Exclusions:** this class cannot be used as a prerequisite for any other biochemistry class.

**BIOC 2020.03A or B Cell Biology:** See class description for BIOL 2020.03 A or B, in the Biology section of this calendar.

**BIOC 2030.03A or B Genetics and Molecular Biology:** See class description for BIOL 2030.03A or B, in the Biology section of this calendar.

**BIOC 2200.03B Introductory Biochemistry:** This class will survey basic topics and concepts of Biochemistry. The structures, properties and metabolic inter-relations of proteins, carbohydrates and lipids will be considered together with an introduction to nutrition and metabolic control. Although mammalian examples will predominate some consideration of special aspects of biochemistry of microbes and plants will be included. In the laboratory, fundamentals of peptides, proteins and enzymes will be explored.

**Instructors:** C.W. Helleiner and C.B. Lazler  
**Format:** lecture 3 hours, tutorial 1 hour alternating with Lab 4 hours

**Prerequisites:** Biology 1000.06, Chemistry 1100.06, grades of C. Students are advised to also take Chemistry 2400.06

**Cross-listing:** BIOL 2010.03B

**Exclusions:** No credit will be given together with credits for previous classes BIOC 2000.06 and 2600.03

**SCI 3000.06R Science Fundamentals:** See class description in Science, Interdisciplinary section of this calendar.

**BIOC 3101.03A and 3102.03B Introductory Biochemistry for Pharmacy Students:** These classes deal with general aspects of biochemistry and include the chemistry of natural products. Classes are restricted to Pharmacy students.

**BIOC 3200.03, 3300.03, and 3400.03** are half-credit classes, each of which deals with one important aspect of biochemistry. The level of instruction is such that adequate preparation is essential. These classes are described below.

**Prerequisites:** Chemistry 2400.06, Biochemistry 2020.03, 2030.03, 2200.03, or instructor's consent

**BIOC 3200.03A Biological Chemistry:** This class deals with chemical principles governing biochemical systems. We discuss the factors that determine how readily a given metabolic reaction proceeds and describe how these factors may be

expressed quantitatively. Basic principles of protein structure, carbohydrates and lipids are discussed. The ways in which proteins bind other molecules are described.

A discussion of enzyme catalysis emphasizes relationships between macromolecular structure and biochemical function, enabling us to explain the striking effectiveness and high specificity with which these catalytic proteins carry out their functions.

**Instructors:** A.H. Blair and J.A. Verpoorte  
**Format:** lecture 3 hours; lab 3 hours  
**Prerequisites:** see above  
**Cross-listing:** BIOL 3012.03A

**BIOC 3300.03B Intermediary Metabolism:** Emphasis is chiefly on metabolic pathways common to all organisms, notably the reductive synthesis and oxidative catabolism of carbohydrates, lipids, and some nitrogen compounds. Other pathways, significant in certain tissues or organisms, are included. Metabolic regulation is surveyed, and factors influencing the rate at which compounds flow through selected pathways are examined. Students learn how pathways are compartmentalized, interrelated, and affected by a biotic chemical changes in the environment. Laboratory exercises demonstrate the strategies and techniques used to study metabolic pathways.

**Instructors:** F.B. Palmer and W.C. Kimmins (Biology)

**Format:** Lecture 3 hours, Lab 3 hours  
**Prerequisites:** see above  
**Cross-listing:** BIOL 3013.03B

**BIOC 3400.03A Nucleic Acid Biochemistry and Molecular Biology:** This class focuses on the relationship of structure to function in RNA and DNA. Methods for studying the primary, secondary, and tertiary structures of nucleic acids are explored in lectures and in the laboratory. Enzymic mechanisms for biosynthesis, rearrangement, degradation, and repair of nucleic acid molecules are studied, as are the processes of replication and transcription. In this context, nucleic acid biochemistry is emphasized as a basis for understanding storage and transfer of biological information.

**Instructors:** M.W. Gray and M. Dobson (Biochemistry) and J.M. Wright (Biology)

**Format:** Lecture 3 hours, Lab 3 hours  
**Prerequisites:** see above  
**Cross-listing:** BIOL 3014.03A

**4300 Series: Intermediary Metabolism and Control:** These half-credit classes continue the study of metabolism begun in Biochemistry 3300.03, and introduce also some specialized topics of particular interest. Emphasis is on how metabolic systems are related and how the systems and their relations are controlled. Appraisal of

experimental evidence and interpretation of data are stressed. Students are asked to note the prerequisites stated in each class description.

**BIOC 4301.03B Biochemical Communication: Membranes, Neurotransmitters, and Hormones:** This class examines current ideas of biochemical communication mechanisms, especially in the nervous and endocrine systems. The topics include membrane biogenesis, structural and functional relationships between cytoskeleton and membranes, intra- and intercellular trafficking and signal transduction. Recent advances in our knowledge of hormonal regulation of gene expression are emphasized and the mechanisms of action of peptide and steroid hormones and neurotransmitters are discussed in depth.

**Instructors:** D.M. Byers, H.W. Cook, F.B. Palmer and N. Ridgway

**Format:** Lecture 3 hours

**Prerequisites:** BIOC 3200.03, 3300.03, and 3400.03 or instructors' consent

**Cross-listing:** BIOC 5300.03

**BIOC 4302.03A Biochemistry of Lipids:** The chemistry and physics of insoluble lipids in an aqueous environment are explored. Current evidence for the physical state of lipids in organisms is examined, and problems in the interaction of insoluble lipids with soluble and insoluble enzymes are considered. The metabolism of lipids that have specialized physiological functions, such as glycolipids, eicosanoids, steroids, phospholipids, etc, are studied.

**Instructors:** H.W. Cook and N. Ridgway

**Format:** Lecture 3 hours

**Prerequisites:** BIOC 3200.03 and 3300.03

**Cross-listing:** BIOC 5301.03

**BIOC 4304.03B Integration and Control of Metabolism:** Topics include: generation and regulation of membrane potentials, roles of membrane potentials in energy generation and in modulating pathways requiring movement of metabolites among cellular compartments, adaptation of metabolic pathways to meet special needs or circumstances, and assessment of flux through competing pathways. Specific mechanisms by which metabolic pathways respond to both internal and external signals such as direct metabolite control, covalent and non-covalent modification of enzymes, enzyme translocation among cellular compartments and enzyme turnover are considered in detail. Interpretation of experimental data is emphasized.

**Instructors:** W.C. Breckenridge and P.J. Dolphin

**Format:** lecture 2 hours

**Prerequisites:** BIOC 3200.03 and 3300.03

**Cross-listing:** BIOC 5304.03

**4403.03B & 4404.03A Molecular Biology of the Gene:** These half-credit classes consider the duplication, transfer, and expression of genetic material. The experimental evidence for current concepts of gene structure and function is stressed. Students study the language of molecular biology and learn about the experimental techniques peculiar to it. Lectures adopt a historical perspective so that students come to appreciate how the discipline of molecular biology has developed.

**BIOC 4403.03B Genes and Genomes:** This course discusses the organization of genes into genomes. It deals with (i) compartmentalization of genetic material in nuclear and organellar genomes, (ii) the structure, behaviour and origins of components of both nuclear and organellar genomes which are not genes (transposable and other repetitive elements, introns), (iii) genetic and physical methods for mapping genomes, and (iv) the significance of genetic organization and higher order chromosomal structure and function. The methodology and prospects of the human genome project will be discussed at some length.

**Instructors:** P. Liu and W.F. Doolittle

**Format:** lecture 3 hours

**Prerequisites:** BIOC 2030.03, 3400.03 & 4404.03 and MICR 3033.03

**Cross-listing:** MICR 4403.03, BIOL 4011.03, BIOC 5403.03

**BIOC 4404.03A Gene Expression:** The different mechanisms for regulation of gene expression in bacterial and eukaryotic cells, and their viruses, are emphasized. Particular topics include genomic, transcriptional, and post-transcriptional modes of regulation.

**Instructor:** R.A. Singer

**Prerequisites:** BIOC 3400.03 or instructor's consent

**Cross-listing:** MICR 4404.03, BIOL 4010.03, BIOC 5404.03

**BIOC 4602.06R Honours Project & Thesis:** The class requires laboratory research, at least one day per week and an interim report at the end of the first term. A final written report must be submitted at the end of the academic year.

**Coordinator:** J.A. Verpoorts

**Format:** lab 1 day per week

**Prerequisites:** Permission by coordinator and a member of the department who will serve as supervisor

**Exclusions:** In exceptional cases the research project can be done outside the biochemistry department, prior approval must then be obtained from the class coordinator.

**BIOC 4603.03A Advanced Laboratory in Biochemical Techniques:** The class will consist of a series of laboratory modules

(each of 4 weeks' duration, 1 day per week or 72 hours total, with limited flexibility to accommodate the need to attend other classes) The class is organized collaboratively by the Departments of Biochemistry, Biology and Microbiology. Several modules will be offered in 3 sections covering techniques used in the study of molecular biology, protein structure-function, and specific metabolic processes. Students in a concentrated Honours Biochemistry programme must complete 1 module from each section. Students in advanced major or other programmes may select their three modules from any section or sections, subject to availability of space. Such students should consult the department regarding prerequisites.

**Instructors:** C.J.A. Wallace and members of the departments of Biochemistry, Biology and Microbiology

**Format:** Lab 1 day

**Prerequisites:** BIOC 3200.03, 3300.03, and 3400.03

**Cross-listing:** BIOL 4012.03/5012.03 and MICR 4601.03/5601.03, BIOC 5603.03

**BIOC 4700.03A Proteins:** Selected aspects of the chemistry of proteins are discussed. Topics include relations between structure and activity, the stabilizing forces in protein structure, and interactions between proteins and other compounds. Chemical and physical methods for protein isolation and study of properties are also considered.

**Instructor:** J.A. Verpoorte

**Format:** lecture 3 hours

**Prerequisites:** BIOC 3200.03 and CHEM 2301.03 and 2302.03 or instructor's consent

**Cross-listing:** BIOC 5700.03

**BIOC 4701.03B Enzymes:** Our current understanding of enzymic catalysis and its experimental basis are examined. The relationship between structures of catalytic and regulatory sites and their functions is considered for selected enzymes. The kinetics of enzyme-catalysed reactions are studied, as is the way in which binding of regulatory molecules influences kinetic behaviour and thereby regulates cellular metabolism.

**Instructor:** A.H. Blair

**Format:** lecture 2 hours, tutorial 1 hour

**Prerequisite:** 3000-level classes in biochemistry, bioorganic chemistry and CHEM 2301.03 and 2302.03, or instructor's consent

**Cross-listing:** BIOC 5701.03

**\*BIOC 4800.06R Clinical Medical Biochemistry:** This course examines the biochemical basis of disease and the principles of laboratory testing and utilization.

**Instructors:** Members of the Department of Pathology

**Format:** Lecture 3 hours, including presentations, case studies and problem solving

**Prerequisites:** Consult with the Department of Pathology course coordinator

**Cross-listing:** PATH 0501.06, BIOC 5800.06

**\*BIOC 4802.06R Principles of Instrumentation:** Not offered in 1994-1995

**\*Consult Department of Pathology**

**BIOC 4804.03A Introduction to Pharmacology I:** See class description for BIOL 4404.03A, in the Biology section of this calendar.

**BIOC 4805.03B Introduction to Pharmacology II:** See class description for BIOL 4405.03B, in the Biology section of this calendar.

**BIOC 8700.00 A Co-Op Seminar (non-credit)**

**BIOC 8880.00 Honours Qualifying Examination:** Honours students must fulfil the requirements of this class (see Degree Requirements 1.3.6) by presenting two additional reports on their work in BIOC 4802.06. The first is a Progress Report, and the second an oral presentation at a special year-end Departmental Seminar.

**BIOC 8891.12 R Co-Op workterm 1**

**BIOC 8892.12 R Co-Op workterm 2**

**BIOC 8893.12 R Co-Op workterm 3**

**BIOC 8894.12 R Co-Op workterm 4**

## Biology

**Location** Biology Wing, Life Science  
Centre, Main Office, 2nd floor,  
Room 2078

**Telephone** (902) 494-3515

**Fax** (902) 494-3738

### Chair

J.H.M. Willison

### Undergraduate Programme Advisors

C. Beauchamp (494-2145)  
J. Breckenridge (494-8817)  
C. Corkett (494-7016)  
P. Harding (494-7016)  
A. Mills (494-2893)  
B. Retalack (494-7072)  
E. Staples (494-2484)

### Honours Programme Advisors

P. Collins (Administration) (494-3847)  
M.J. O'Halloran, Marine Biology (494-2136)  
A. Pinder (494-3822)  
S. Walde (494-8432)  
J. Wright (494-8468)

### Emeritus Professors

L.C. Vining, MSc (Auckland), PhD (Cantab),  
FRSC  
K.E. von Maltzahn, MS, PhD (Yale)

### Professors

R.G. Brown, MSc (McG), PhD (Rutgers)  
A.R.O. Chapman, PhD (Liv)  
R.W. Doyle, MSc (Dal), PhD (Yale) Director,  
Gene Probe Laboratory  
J. Farley, MSc (Western), PhD (Man)  
J.C. Fentress, PhD (Cantab) (major  
appointment in Psychology)  
B. Freedman, MSc, PhD (Tor)  
B.K. Hall, PhD, DSc (UNE), FRSC, Killam  
Research Professor  
O.P. Kamra, MS (NC State), PhD (Wash State)  
W.C. Kimmins, PhD (Lond) Dean of Faculty of  
Science  
P.A. Lane, MSc (SUNY Binghamton), PhD  
(SUNY Albany) (partial leave of absence)  
R.W. Lee, MA (Mass), PhD (SUNY Stony  
Brook)  
T.H. MacRae, MSc, PhD (Windsor)  
I.A. McLaren, MSc, (McG), PhD (Yale) -  
George S. Campbell Professor  
E.L. Mills, MS, PhD (Yale) - (major  
appointment in Oceanography)  
R.K. O'Dor, PhD (UBC) Director, Aquatron  
D.G. Patrlquin, MSc, PhD (McG)  
R.E. Schelbling, PhD (McG)  
J.H.M. Willison, PhD (Nottingham) - Chair  
E. Zouros, MSc, PhD (Agri Col Athens), PhD  
(Chic)

### Associate Professors

E.W. Angelopoulos, MS, PhD (Minn)  
R.G. Boutlier, MSc (Acadia), PhD (East  
Anglia) (leave of absence)  
R.P. Croll, PhD (McG), major appointment in  
Physiology and Biophysics  
G.S. Hicks, MSc (Carl), PhD (Sask)  
B. Pohajdak, MSc, PhD (Man)  
S. Walde, PhD (Calgary) University Research  
Fellow  
H. Whitehead, PhD (Cantab), University  
Research Fellow, (partial leave of absence)  
J.M. Wright, PhD (MUN)

### Associate Professor (Research)

G.F. Newlrk, PhD (Duke)

### Assistant Professors

A. Pinder, PhD (Mass) University Research  
Fellow  
M. Johnston, PhD (Chicago)  
M. Leonard, PhD (Ottawa), Women's Faculty  
Award

### Adjunct Professors

J.D. Castell, MSc (Dal), PhD (Oregon State),  
Fish. & Mar. Serv., D.F.O.  
J.S. Craigie, MSc, PhD (Queen's), Marine  
Biosciences Inst., NRC  
E. Kenchington, BSc, MSc (Dal), PhD  
(Tasmania), D.F.O.  
M. Silver, PhD (Syracuse)

### Senior Instructors

C. Beauchamp BSc., MSc (Memorial), BEd  
(Dal)  
J. Breckenridge, BSc (Queen's), MSc (Dal)  
P. Collins, BSc, MSc (Dal)  
C. Corkett, BSc, DipEd(Technical), PhD  
(London)  
P. Harding, BA (Tor), BEd, MSc (Dal)  
A. Mills BSc (Carleton)  
M.J. O'Halloran, BSc (South), BEd, MSc (Dal)  
B. Retalack, BSc, MSc (Dal), PhD  
(Manchester)  
E. Staples, BSc (Dal), BEd (MSVU)

### Post Doctoral Fellows

R.M. Ball, BSc (Carlton), PhD (Georgia)  
G. Clairsaux, PhD (Brest)  
S. Ekanayake, PhD (Dal)  
A. Graveson, BSc (Bishop's), PhD (Ottawa)  
S. Gallager, PhD (Boston)  
T. Miyake, MS (Michigan), PhD (Texas A&M)  
S. Smith, MSc, PhD (Ottawa)  
C. Stalcar, MSc (NAU), PhD (Mass)  
M. Zhang, MSc, PhD (Dal)

### Areas of Specialty of Biology Faculty

**Animal Biology:** I. McLaren, A. Pinder, M.  
Leonard  
**Cell Biology:** T. MacRae, W. Pohajdak, M.  
Willison  
**Developmental Biology:** B.K. Hall, G.S. Hicks

**Ecology/Environmental Studies:** R.W. Doyle, B. Freedman, P. Lane, I. McLaren, R. Schelbling, S. Walde, H. Whitehead, M. Willison

**Entomology and Parasitology:** E. Angelopoulos

**General Studies:** K.E. vonMaltzahn

**Genetics:** R.W. Doyle, R.W. Lee, O.P. Kamra, E. Zouros

**Marine Biology:** R. O'Dor, R. Schelbling, H. Whitehead

**Microbiology:** R.G. Brown

**Molecular Biology:** J. Wright, W. Pohajdak

**Physiology:** R. Boutiller, R.K. O'Dor, D. Patriquin, A. Pinder

**Plant Biology:** G.S. Hicks, A.R.O. Chapman, M. Willison, M. Johnston

## Degree Programmes

The department offers the following degree programmes: 15 credit (3 year) BSc and BA major; 20 credit (4 year) BSc and BA Advanced Major; concentrated, combined, or unconcentrated BSc and BA Honours; and, 20 credit BSc Advanced Major and BSc Honours in Marine Biology.

Consult the "Degree Requirements" section of this calendar for full details.

## Major in Biology

### Departmental Requirements

Classes required in major:

- 1000 level:** Biology 1000.06 or 1001.06 or SCI 1500.30 (with a minimum grade of C+)
- 2000 level:** Biology 2020.03; 2101.03 or 2001.03 or 2002.03; 2060.03, 2030.03
- 3000 level:** At least two credits at or above the 3000 level

## Advanced Major in Biology

### Departmental Requirements

Classes required in Advanced Major:

- 1000 level:** 1000.03 or 1001.03 or SCI 1500.30 (with a minimum grade of C+)
- 2000 level:** 2020.03, 2001.03 or 2002.03 or 2101.03, 2060.03, 2030.03
- 3000 level:** minimum three credits at or above the 3000 level

## Honours Biology, BA, BSc

**Honours Advisors:**

A. Pinder (494-3822)

S. Walde (494-8432)

J. Wright (494-8468)

P. Collins (administration, 494-3847)

Students contemplating doing honours are encouraged to consult annually with an honours advisor to ensure that their class selection is correct. One may normally officially register for an honours biology programme anytime after receiving Christmas grades in the 2nd year, and before the end of the 3rd year. To register for a programme, meet with one of the honours advisors (listed above) to complete an application and have it approved.

It is the responsibility of all students to arrange for supervisors for their thesis research. Honours theses may be supervised by a faculty member within the Biology Department, or by an external scientific investigator, subject to the approval of the honours committee. Students should begin to search for a potential supervisor during their 3rd year of study and should have completed arrangements by May of their 3rd year. If students wish to be supervised by someone external to the department, they must consult with their honours advisor to determine the potential supervisor's eligibility. Those with a cumulative GPA of A- should consider applying for an NSERC Undergraduate Research Scholarship to start their honours research with a supervisor during the summers. The deadline for applying for these scholarships is usually in early January of each year.

### Departmental Requirements

(Also see "Academic regulations - university", including the "Graduate standing" section, and "Degree requirements - College of Arts and Science" at the beginning of this calendar.) Students following a Concentrated Honours programme in Biology must take a minimum of 9 and a maximum of 11 credits in Biology, including a research project and thesis. At least 3 of the 9 required credits must be at, or above, the 3000 level. Some students may wish to choose a Combined Honours Programme and should consult the "Degree requirements - College of Arts and Science" section of this calendar. Students entering 1st year in September 1994 must include the following Biology classes in ALL Biology Honours programmes, concentrated or combined. Students presently in their 2nd, 3rd, and fourth year of University should follow the old departmental regulations described in earlier calendars and listed on advising forms available in the Biology department office. In addition to the overall University requirement for a minimum B average (GPA of 3) in the classes of the Major and Minor of an honours programme, Biology Honours students must obtain a minimum of a B average in the following specific Biology required classes.

## Classes required in Honours:

- 1000 level:** 1000.06 or 1001.06 or Science Foundation Year, SCI 1500.30 (with a minimum grade of C+)
- 2000 level:** 2020.03, 2030.03, 2060.03, two from: 2001.03 or 2002.03 and 2101.03
- 3000 level:** 3040.06 and at least one class from: 3050.03, 3070.06, 3071.06, 3073.03 and 3077.06
- 4000 level:** 4900.00 and Honours Qualifying exam

## Other Required Classes

CHEM 1040.06 or 1010.06 or 1500.06

Two full credits above the 1000 level in any other subject for the Minor requirement.

## Other Recommended Classes

PHYC 1300.06 or 1000.06 or 1100.06 or 1500.03 and 1550.03

MATH 1000.03 and 1060.03

## Honours and Advanced Major in Marine Biology

The Biology Department recognizes the special needs of the rapidly expanding marine field and offers BSc Honours and Advanced Major Degrees in Marine Biology, including a Co-operative Education Programme.

Details of the Marine Biology programme will be found under a separate listing for Marine Biology at the end of the Biology section.

## Classes Offered

The normal entry requirement for admission to upper level classes in Biology is a grade of C+ or better in BIOL 1000.06R, 1001.06R, or Science Foundation Year (SCI 1500.30R). Students with a grade lower than C+ and extenuating circumstances may appeal to the department Undergraduate Coordinator.

**Note:** Due to the combined pressures of student numbers and a dearth of available space in some classes, the names of students not appearing on the first day of class may be deleted from class lists. Students are advised that being signed into a class is no guarantee of late admission.

Classes marked with an asterisk (\*) are offered in alternate years. Consult timetable for current year.

Biology classes are grouped into four general categories:

**1. 1000 - Level classes:** BIOL 1000.06R and BIOL 1001.06R: These classes are intended to be introductory university-level classes in biology.

SCI 1200.06R may be of interest to non-biologists.

**2. 2000-Level Classes:** All Biology majors (15, 20 credit and Honours) are required to take a core program at the 2000 level. Students should normally complete these core classes in their second year. The core programme is designed to provide a basis for more advanced studies in Biology as well as to ensure that all majors are exposed to general discipline or subject areas of biology. A variety of skills including writing, oral presentation, computer literacy, library use, and problem solving are integrated into the curriculum of these core classes along with 'hands-on' activities in the laboratory or field. The second-year core programme covers four discipline areas; some evolutionary biology and some physiology will be included in these four areas:

- I Cell Biology  
2020.03A or B
- II Diversity of Organisms (animals, plants and microbes)  
2001.03A  
2002.03B  
2101.03B
- III Ecology  
2060.03A or B
- IV Genetics and Molecular Biology  
2030.03A or B

All students majoring in Biology are required to take a minimum of four, 2000-level, half-credits, with one half-credit class being selected from each of these 4 discipline areas.

Students interested in biochemistry are advised to take the second year biochemistry class offered by the Biology and Biochemistry departments. This class is not part of our core-programme but is a pre-requisite for entry into some higher level classes.

Students majoring in subjects other than Biology can design their own programmes and will not have to conform to these 2000-level core requirements. All students should ensure they have the necessary prerequisite classes required for entry into 3000-level classes.

Transition procedures: These 2000-level core requirements were introduced in 1990 and will apply to Biology honours and majors entering their second year from September 1990 onwards.

Biology honours and majors presently in their fourth year will still be able to follow the old regulations which can be obtained on a form available in the Biology main office. Fourth year biology majors wishing to take

any of the new 2000-level classes should note the regulations given in the class descriptions below concerning which of the old 2000 level classes had similar content. Students who have already taken old 2000-level classes with similar content will be unable to receive additional credit in some of the new core classes.

**3. 3000-Level Classes:** These classes are mainly for second and third year students. No biology major will be allowed to register in any 3000 or 4000-level class without having completed, or being registered in 2000-level classes in biology totalling at least two full credits.

**4. 4000-Level Classes:** These classes are primarily for honours or advanced major students. They are open to others with the permission of the instructor. Where biology classes are identified as being given in another department (e.g. Anatomy), that department should be consulted for details.

**5. Microbiology:** The following classes given in the Microbiology Department may be taken as a Biology credit toward BA, BSc, and BSc (Hons) Biology degrees even though they are not cross-listed with Biology: MICR 2100.03A, 3033.03B, 3114.03A, 3115.03A, 3118.03B, 4026.03A, 4027.03B, 4037.03A, 4038.03A, 4114.03B, 4115.03B, 4118.03A, and 4301.03A.

**BIOL 1000.06R Principles of General Biology:** This class surveys the fundamental principles of biology and is designed for those students wishing to major in biology or related subjects such as chemistry, physics, or mathematics. Students are encouraged to combine Biology 1000.06R with two of chemistry, physics, or mathematics in their first year. Biology 1000.06R is one of two options (see Biology 1001.06R) which prepare students for second year biology classes.

The class emphasis is on those features common to all organisms. It examines the requirements for life, its biochemical base, and its cellular organization. These are related to the function of whole organisms, their diversity, and evolution.

**Format:** lectures, 3 hours/week;  
laboratory, 3 hours/week.  
**Instructors:** Staff  
**Prerequisite:** Senior high school level biology.  
**Exclusion:** BIOL 1001.06

**BIOL 1001.06R Introductory Biology:** This class is an introductory class which presumes no previous knowledge of biology. Students who wish to take a biology class that would allow further study in biology but who do not wish to be restricted in their choice of other classes by the suggested co-requisites for Biology 1000.06R are encouraged to take this

class. Like Biology 1000.06R, this class prepares students for second year Biology classes.

**Format:** lecture 3 hours/week;  
laboratory 3 hours/very other week  
**Instructors:** C. Corkett, A. Mills, D.G. Patriquin  
**Prerequisite:** none  
**Exclusion:** BIOL 1000.06

**SCI 1200.06R An Overview of the Cosmos, Earth, and Life:** See class description in Science, Interdisciplinary section of this calendar.

**BIOL 2001.03A Marine Diversity: (Area II)** The sea was the cradle of life and the origin of most phyla. This class explores the enormous variety of living and fossil organisms from the sea and looks at the special problems and adaptations of benthic, planktonic and nektonic species. It examines functional and taxonomic relationships using lectures, laboratories with living organisms, and a field trip.

**Format:** lecture 2 hours, tutorial 1 hour, laboratory 3 hours  
**Instructors:** C. Corkett, R. O'Dor, R. Schelbling  
**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)

**BIOL 2002.03B Terrestrial Diversity: (Area II)** A survey of the terrestrial organisms. The class emphasizes the restrictions imposed on terrestrial adaptations by the aquatic origins of the colonizers, discusses the physiology of living in a terrestrial environment, looks at the domestication of plants and animals by man, and speculates on the future diversification of the earth environment and its inhabitants.

**Format:** lecture 2 hr, tutorial 1 hr, lab 3 hr  
**Instructors:** M. Johnston and A.H. Mills  
**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)

**BIOL 2010.03B Introductory Biochemistry:** See class description for BIOC 2200.03B, in the Biochemistry section of this calendar.

**BIOL 2020.03A or B Cell Biology: (Area 1)** An Introduction to the eukaryotic cell. Major cell components and activities are described at ultrastructural and molecular levels with emphasis on mammalian systems. The concept of the cell as an integrated structural, functional unit is developed.

**Format:** lecture 3 hours, laboratory 3 hours  
**Instructors:** T.H. MacRae, B. Pohajdak, and B. Retallack  
**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)  
**Cross-listing:** BIOC 2020.03A or B  
**Exclusion:** BIOL 2016.06, BIOC 2000.06

**BIOL 2030.03A or B Genetics and Molecular Biology:** (Area IV) Genes contain the biological information that specifies the cell and the organism. Therefore, genetics, the study of genes, is a means to understand the function and propagation of cells and organisms. The power and prominence of modern genetics have grown from a blend of classical and molecular approaches; both of these approaches are emphasized in this class. Major topics discussed include: the structure and function of DNA, the nucleic acid that comprises genes and chromosomes; transmission genetics, concerned with the propagation of genetic information; gene function, the expression of genetic information; and manipulation of DNA (genes) by genetic engineering. A range of organisms is considered, including bacteria, single-celled and multicellular eukaryotes, and viruses.

**Format:** lecture 3 hours, laboratory & tutorial 3 hours

**Instructors:** O. Kamra, C. Helleiner (Biochemistry), E. Staples, E. Zouros

**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)

**Cross-listing:** BIOC 2030.03A or B

**Exclusion:** BIOL 2035.06 (last offered in 1989-90)

**BIOL 2080.03A or B Introductory Ecology:** (Area III) Ecology is the study of the interrelationships of organisms and their environments. The broad subject of ecology focuses upon the interactions of plants and animals, including humans, with each other and with their non-living world. Three levels of ecology are studied: (1) Individuals, (2) Populations, (3) Communities and Ecosystems. Assignments and tutorials enlarge upon concepts presented in lectures. Students are instructed in elementary computer techniques and use the computer for most assignments. This class provides an overview of the science of ecology for the informed citizen, and also a good foundation for further work in ecology, marine biology and environmental studies.

**Format:** lecture 3 hours, laboratory/tutorial 2 hours

**Instructors:** C. Beauchamp, R. Doyle, R. Scheibling

**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)

**Exclusions:** BIOL 2066.03, BIOL 2046.06

**BIOL 2101.03B Microbial Diversity:** (Area II) An introduction to the basic concepts of microbiology through lectures, laboratory sessions and demonstrations. The diversity and uniqueness of different microorganisms is emphasized, in addition to their structure, growth, metabolism and interactions. The involvement of microorganisms in fields such as medicine, industry and ecology is also discussed. Students who plan to repeat the

class must obtain permission from the instructor before they register in the class. This class serves as a pre-requisite for all third-year Microbiology classes offered in the Biology and Microbiology departments. Students can take this as well as MICR 2100.03A as content is different.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructors:** J. Breckenridge, B. Pohajdak  
**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better or permission)

**SCI 3000.06R Science Fundamentals:** See class description in Science, Interdisciplinary section of this calendar.

**BIOL 3012.03A Introduction to Biological Chemistry:** See class description for BIOC 3200.03A, in the Biochemistry section of this calendar.

**BIOL 3013.03B Intermediary Metabolism:** See class description for BIOC 3300.03B, in the Biochemistry section of this calendar.

**BIOL 3014.03A Nucleic Acid Biochemistry and Molecular Biology:** See class description BIOC 3400.03A, in the Biochemistry section of this calendar.

**BIOL 3020.03A Advanced Cell Biology:** (not offered in 1994-95) Molecular and organelle aspects of cytoplasmic organization in eukaryotic cells are examined. A number of interrelated topics are discussed providing an opportunity to study new concepts in cell biology and to evaluate established ideas in the context of recent findings. Students must supplement lectures with assigned readings and discuss selected subjects in essays.

**Format:** 3 lectures of 1.5 hours per week

**Instructor:** T.H. MacRae  
**Prerequisite:** BIOL 2020.03A or B (with a minimum grade of B-) or instructor's consent

**\*BIOL 3032.03B Cytogenetics:** (may not be offered in 1994-95) Detailed consideration of certain genetical and cytological mechanisms in relation to chromosomal modifications, gene mutations and evolution.

**Format:** lecture, 2 hours; laboratory, 3 hours

**Instructor:** O.P. Kamra  
**Prerequisite:** BIOL 2030.03A or B

**\*BIOL 3034.03B Biological Effects of Radiation:** (may not be offered in 1994-95) A survey of current knowledge of the effect of ionizing radiation on biological material at three levels: physical, chemical and biological. In addition, methods of dosimetry, autoradiography, somatic and genetic effects, radiometric chemicals and bioassays are discussed.

**Format:** lecture 3 hours

**Instructor:** O. Kamra  
**Prerequisite:** 1st year Biology and Chemistry

**\*BIOL 3039.03B Human Genetics:** (may not be offered in 1994-95) For students of Biology and Medicine with special interest in human genetics. Topics include human cytogenetics and abnormalities, inborn errors, genetic risk induced by environmental factors; prediction and detection of genetic risk, genetic counselling, genetic and non-genetic factors in behavioral characters and multi-factorial diseases; genetic variability; selection and genetic load in human populations; ethical and social issues associated with manipulation of human genetic pools.

**Format:** lecture 3 hours; laboratory 2 hours

**Instructors:** O. Kamra, P. Welch, E. Zouros  
**Prerequisite:** BIOL 2030.03A or B

**BIOL 3040.06R Evolution:** Evolution is a comprehensive, integrative class covering a great breadth of topics related to the process of evolution (patterns of diversity and evolutionary history of particular groups are covered in other classes). Topics will include the history of evolutionary thought, Darwinian evolution, the "Modern Synthesis", adaptation, the relationship between evolution and systematics, evolutionary developmental biology, molecular evolution, and current controversies such as the neutral theory of molecular evolution, group selection, non-adaptive evolution, and mass extinctions and chance as major influences on evolution.

**Format:** lecture 3 hours, tutorial 1 hour

**Instructors:** J. Farley, B.K. Hall, M. Johnston, M. Ragan, E. Zouros, and staff

**Prerequisite:** BIOL 2020.03, 2030.03, 2060.03 and one of 2001.03, 2002.03 or 2101.03

**Co-requisite:** BIOL 3050.03A would be useful, but not mandatory

**BIOL 3050.03A Developmental Biology:** The lectures describe development as a sequence of programmed events, in which 'simple' structures such as the fertilized egg are progressively transformed into complex organisms. These events are governed by a set of developmental 'rules'. Our knowledge of these rules comes from experimental study of developing systems such as sea urchins, frogs, peas, carrots, chick embryos and humans. Laboratories stress the use of live material and give students practice with such techniques as test tube fertilization in achinoderms.

**Format:** lecture/discussion 3 hours, laboratory 3 hours

**Instructors:** P. Collins, B.K. Hall, G.S. Hicks

**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C+ or better)

**Co-requisite:** BIOL 2020.03A or B, BIOL 2030.03A or B

**Exclusion:** BIOL 2050.03 (last offered 89/90)

**BIOL 3051.03B Advanced Animal Development:** (Will not be offered in 1994-95) This class is the follow-up to BIOL 3050.03A and deals with the mechanisms and controls which regulate the development of vertebrate and invertebrate embryos. Topics covered include cell determination and differentiation, morphogenesis, mechanisms of organ formation, inductive tissue interactions, growth, regeneration and wound healing. The two laboratory projects involve experiments designed to explore aspects of cell differentiation and morphogenesis, preparation of laboratory reports, and introduction to microdissection, sterile techniques, tissue recombinations and whole-embryo staining.

**Format:** lecture 3 hours, laboratory/discussions 3 hours

**Instructors:** P. Collins, B.K. Hall

**Prerequisites:** BIOL 3050.03A (with a minimum grade of B-) plus completed or concurrent registration in second year cell/molecular classes from the old or new core.

**BIOL 3060.03A Environmental Ecology:** This class considers the ecological effects of pollution, disturbance, and other stressors. Emphasis is on air pollutants, toxic metals, acidification, eutrophication, pesticides, forestry, extinction, warfare, and broader topics such as environmental impact assessment and ecological monitoring and research programmes.

**Format:** lecture 2 hours, laboratory/tutorial 3 hours

**Instructor:** B. Freedman

**Prerequisite:** BIOL 2060.03A or B (or see instructor)

**Cross-listing:** BIOL 5060.03

**BIOL 3061.03A Communities and Ecosystems:** This class is divided into four sections: (A) Introduction, History and Concepts; (B) Community Structure and Stability; Theory and Experiment; (C) Environmental Assessment and Management at the Ecosystem level; and (D) Case Studies and Global Problems.

**Format:** lecture 3 hours

**Instructor:** P.A. Lane

**Prerequisite:** BIOL 2060.03A or B

**\*BIOL 3062.03A Behavioral Ecology:** This class examines animal behaviour from an evolutionary perspective. Why do animals do what they do? Using the theory of natural selection as a basis, we will examine foraging, grouping patterns, territorial behaviour, parenting, mating behaviour, social

organization, aggression and cooperation. There will be tutorials and laboratory/field and essay assignments.

**Format:** lecture 2 hours, tutorial 1 hour  
**Instructor:** M. Leonard, H. Whitehead  
**Prerequisite:** BIOL 2060.03A or B

**BIOL 3063.03B Resource Ecology:** (may not be offered in 1994-95) Introduction to sustainable development and the management of renewable resources. Topics vary from year to year but generally include fisheries population models and bioeconomics, wildlife and forest management, biological control strategies and agro-ecology, genetic containment and the protection of genetic diversity.

**Format:** lectures & seminars 3 hours  
**Instructors:** R. Doyle, B. Freedman, S. Walde

**Background:** Introductory ecology, calculus and statistics classes or half-classes.

**BIOL 3066.03A Plant Ecology:** (may not be offered in 1994-95) Various topics within the field of Plant Ecology are discussed. At the ecosystem level, we deal with the cycling of energy and significant nutrients, and with successional changes in these processes. At the autecological level we deal with plant population biology, resource allocation, and physiological ecology. The plant environment is described in terms of energy budgets, soils, and water availability.

**Format:** lecture 2 hours, laboratory 3 hours, one/two field trips on weekends

**Instructor:** M. Johnston  
**Prerequisite:** BIOL 2060.03  
**Cross-listing:** BIOL 5066.03

**BIOL 3067.03B A Survey of Fish Biology:** (may not be offered in 1994-95) The topics may include fish systematics, physiology, behaviour and ecology.

**Format:** lecture 2 hours, seminar 1 hour  
**Instructor:** Staff  
**Prerequisite:** BIOL 2001.03A  
**Cross-listing:** BIOL 5067.03B

**BIOL 3069.03B Population Ecology** (may not be offered in 1994-95): An examination of selected topics in population ecology. Topics include the effect of species interactions (predation, competition, mutualism) on population fluctuations, cycles and extinction. The relevance of theory to particular case studies such as lynx-hare cycles and biological control of winter moth will be discussed. Recent literature will be emphasized. Written assignments and exams will contribute to the final grades.

**Format:** lecture/tutorial 3 hours  
**Instructor:** S. Walde

**Prerequisites:** Introductory Ecology, MATH 1010.03, 1060.03, or equivalent

**BIOL 3070.06R Principles of Animal Physiology:** A discussion of the mechanisms which coordinate the activities of cells within multi-cellular organisms and permit such organisms to maintain a stable internal environment in a changing external environment. The emphasis is on the mechanisms most widely distributed through the animal kingdom. The laboratories are designed to illustrate these "principles of physiology" in a variety of organisms and to demonstrate the experimental approaches used to study physiology.

**Format:** lecture 3 hours, laboratory 3 hours

**Instructors:** R.P. Croll, R.K. O'Dor, A. Pinder, M-J. O'Halloran

**Prerequisite:** BIOL 2001.03A or 2002.03B, 2020.03A or B

**Exclusion:** BIOL 3071.06R, 3074.03A, 3076.03B

**BIOL 3071.06R Physiology of Marine Animals:** The problems of animals in a marine environment are quite different from those found in air or fresh water, but the "physiological principles" are similar. This class deals with the same principles as 3070, but emphasizes the special characteristics of marine animals and the techniques necessary to study them in laboratories and tutorials.

**Format:** lecture 3 hours, laboratory 3 hours

**Instructors:** R.P. Croll, R.K. O'Dor, A. Pinder, M-J. O'Halloran

**Prerequisite:** BIOL 2001.03A or 2002.03B, 2020.03A or B

**Exclusion:** BIOL 3070.06R, BIOL 3074.03A, BIOL 3076.03B

**\*BIOL 3073.03B Plant Physiology:** (Not offered in 1994-95) Topics include water relations, photosynthesis, respiration, nitrogen metabolism, transport, translocation, and some aspects of plant development, crop physiology and productivity.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructor:** TBA  
**Prerequisite:** BIOL 2002.03 or 2020.03 or instructor's consent

**BIOL 3074.03A/3076.03B Physiology of Marine Animals Parts I and II:** These classes will cover topics described already under BIOL 3070.03 and 3071.03 and are only open to Marine Biology Co-op (Honours and Advanced Major) students that are unable to take BIOL 3071.06R because of work term schedules. These Co-op students must take both classes, normally BIOL 3074.03A in their 3rd year and 3076.03B in their 4th year. All other students should take BIOL 3071.06R. The

format, instructors, prerequisites, and exclusions are the same as listed under BIOL 3071.06R.

**Restriction:** Restricted to Marine Biology Co-op students

**Exclusion:** BIOL 3070.06R, 3071.06R

**BIOL 3077.06R Human Physiology:** See class description for PHYL 4403.06R in the Physiology and Biophysics section of this calendar.

**BIOL 3100.03B Aquatic Microbiology (not offered in 1994-95):** The main emphasis of this class is on the interactions of microbes and aquatic plants and animals including nutrition, disease, and immunization. The latter part of the class considers the role of microorganisms in nutrient availability and productivity in aquatic environments.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructors:** R.G. Brown and D. Cone

**Prerequisites:** Normally, Biology 2101.03 or Microbiology 2100.03, but Marine Biology Honours students are exempt.

**BIOL 3211.03A Systematic Survey of the Algae:** An examination of the taxonomic and evolutionary relationships of the algae. Considerable emphasis is placed on practical work (field and laboratory) where students become familiar with the algal components of the local flora.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructor:** A. Chapman

**Prerequisites:** grade C or better in BIOL 2001.03

**\*BIOL 3212.03B Biology of the Algae:** A non-systematic examination of the cellular, organismic, population and community organizations of benthic and planktonic algae.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructor:** A. Chapman

**Prerequisites:** grade C or better in BIOL 2001.03

**BIOL 3215.03A Systematics of Higher Plants:**

This class is concerned with an organismal approach to the study of flowering plants: identification, relationship, and evolution. The course focuses on gross morphology rather than internal anatomy. It provides an introduction to basic botanical terminology and to the concepts and the scientific conventions concerned with plant description, classification and nomenclature. Lectures examine the development of systematics from Linnaeus to Darwin, to the advent of modern experimental taxonomy (biosystematics). Laboratory exercises centre on the identification and characterization of flowering plant families through the use of diagnostic keys. For this purpose, students

are provided with native and exotic living plants and freshly frozen specimens. Field ecologists, environmental biologists, and naturalists should find the applied approach to this course broadens their general knowledge of plants and enables them to identify plant specimens. Each student submits a small collection of pressed plants. (see Instructor, preferably before September, for details).

**Format:** lecture 3 hours, laboratory 3 hours

**Instructor:** P. Taschereau

**Prerequisites:** Biology 2002.03, or instructor's consent

**BIOL 3218.03B Plant Anatomy:** Lectures will explore the internal organization of the leaves, stems, and roots of both the flowering plants and the cone-bearing plants, emphasizing the common plan that is found at the tissue system level of organization. All major cell and tissue types will be reviewed in the light of modern evidence which correlates structure with function. These surveys will embrace both the primary and the secondary plant bodies, and developmental aspects will be emphasized. Laboratory exercises will illustrate these concepts, focusing on the study of a variety of economically important woody and herbaceous crop plants.

**Format:** lecture 3 hours, lab 3 hours

**Instructors:** P.A. Collins, G. Hicks

**Prerequisite:** BIOL 1000.06R or 1001.06R

**BIOL 3220.03B Land Plants: A Survey:** A survey of the biology, systematics and evolutionary history of the main divisions of land plants including: conifers and their gymnosperm allies; ferns, horsetails, ground pines, club mosses and liverworts. Flowering plants are excluded. A framework for discussion of the comparative morphology of these groups will be alternation of generations. Evolutionary adaptations to the land will be emphasized. Considering the fossil record in some detail, we will evaluate evidence for the origin of leaves, the seed habit, gymnosperm cones and the seed habit. The class may be useful to those students considering the teaching profession, graduate study or who are interested in broadening their general knowledge.

**Format:** lecture/discussion 3 hours

**Instructor:** G. Hicks

**Prerequisite:** BIOL 2002.03B or permission of the instructor

**BIOL 3301.03A/3302.03B Invertebrates Parts I and II:** These classes will cover topics described under BIOL 3321.06R, and are only open to Marine Biology Co-op students who are unable to take BIOL 3321.06R because of work-term schedules. These Co-op students must take both classes, normally 3301.03A in their 3rd year and 3302.03B in their 4th year. All other students should take BIOL

**3321.06R.** The format, instructor, prerequisites, and exclusions are the same as for BIOL 3321.06R.

**Restriction:** Restricted to Marine Biology Co-op students only

**Exclusion:** BIOL 3321.06R

**BIOL 3321.06R Invertebrates:** Recent fossil findings in the Burgess Shale of British Columbia and elsewhere plus methods of cladistic analysis have profoundly changed our understanding of the relationships between and within the various invertebrate phyla. Thus this class will not only examine the structure, function, and classification of the invertebrates, using live material from the marine environment as much as possible, but will come to terms with some of the new ideas about their phylogenies.

**Recommendation:** This class is designed not only for honours students in marine biology, but for anyone who loves "mucking about" with some of the world's most beautiful organisms.

**Format:** lecture 3 hours, laboratory 3 hours

**Instructor:** staff

**Prerequisite:** BIOL 1000.06R or 1001.06R (Third and fourth year Geology students interested in paleontology may take this class without any previous biology classes.)

**Exclusion:** BIOL 3301.03A and BIOL 3302.03B

**BIOL 3322.03A Parasitology:** The lectures emphasize the parasite-host relationships, evolution of the parasites and adaptations to the host, modifications of physiology, structure and life cycle for a parasitic existence. Examples are taken from all major animal groups where a parasitic mode of existence has developed beginning with the protozoa. Since the most extensive research pertains to parasites of man, the emphasis is on human parasites. Recommended for Ecologists and Pre-Meds. The laboratory stresses recognition and identification of parasites.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructor:** E. Angelopoulos

**BIOL 3324.06R Entomology:** Entomology is an important branch of academic biology and also one of the largest divisions of applied biology. The class is an introduction to the study of insects dealing with: (1) The classification and evolutionary diversity of insects. (2) The biology, ecology and behaviour of insects. (3) Applied aspects — medical, agricultural and forest entomology, harmful and beneficial insects; biological control of insects.

**Format:** lecture 2 hours, laboratory 3 hours

**Instructor:** E. Angelopoulos

**BIOL 3326.03B Vertebrate Design: Evolution and Function:** (May not be offered in 1994-95) Design of organisms is the result both of evolutionary history and natural selection for function. Organisms have to work, but do not have to be the best possible design. In this class we will analyse current designs found among the vertebrates in terms of vertebrate evolutionary history and functional morphology. This class will be particularly valuable in conjunction with BIOL 3070.06R/3071.06R.

**Format:** lecture 3 hours, tutorial 1 hour

**Instructor:** A.W. Pinder

**Prerequisites:** Biology second year core

**\*BIOL 3402.03A The Rise of Modern Science:** The modern world has been fundamentally altered by science and technology. In what ways? How has this come to be? This class will attempt to answer these questions by looking at the origins of modern science and technology in the 16th and 17th centuries, its growth of popularity in the 18th, and the rise of the scientific profession and science-based industry in the 19th and 20th centuries. **Recommendation:** This class is designed for students in the arts and the sciences who have some interest in history and/or philosophy. Science students in particular should realize that a considerable amount of reading and writing will be required in this class.

**Instructors:** E.L. Mills

**Prerequisites:** No formal prerequisites, but students *must* be in their 3rd or 4th year and *must* have at least a B average.

**Cross-listing:** COMR 3502.03, HIST 3072.03, SCI 4000.03

**\*BIOL 3404.03B History of Medicine:** (May not be offered in 1994-95) This class deals with the history of medicine in the 19th and 20th centuries. It will stress the impact of the medical sciences (physiology, pathology, bacteriology etc.) on the theories and practice of medicine from the 1880's to the present. This class is designed for pre-medical students and students in the health professions.

**Format:** class 3 hours

**Instructor:** J. Farley

**Cross-listing:** HIST 2995.03A or B

**BIOL 3421.03B Comparative Vertebrate Histology:** An advanced histology course surveying the whole range of vertebrate tissues and organs.

**Format:** lecture 2 hours, lab 2 hours

**Instructor:** TBA (Anatomy and Neurobiology Dept.)

**Prerequisite:** BIOL 3430.03A

**Cross-listing:** ANAT 3421.03B

**BIOL 3430.03A Introduction to Human Histology:** Histology is the study of the structure of cells, tissues and organ systems, and utilizes information derived from both light and electron microscopy. It complements studies in anatomy, cell biology, physiology and biochemistry, broadening the understanding of how organisms function.

**Format:** lecture 2 hours, laboratory 2 hours

**Instructor:** D.H. Dickson (Anatomy and Neurobiology Dept.)

**Prerequisites:** BIOL 2020.03A, or 2015.06R or permission of instructor

**Cross-listings:** ANAT 2160.03A

**BIOL 3435.06R Anatomy:** A regional study of human gross anatomy with emphasis on functional anatomy of the back and limbs. Laboratory work/study includes radiology, osteology, living (surface) anatomy and dissection of the human body. Instructor's consent and signature are required.

**Format:** lecture 3 hours, laboratory 4 hours

**Instructor:** R.E. Clattenburg (Anatomy and Neurobiology Dept.)

**Prerequisites:** Must be in 3rd or 4th year and have a GPA of 3.00 (minimum). No formal prerequisites.

**Cross-listings:** ANAT 2170.06R

**BIOL 3440.03B Neuroanatomy:** A survey of the histology, development and organization of the central nervous system, with emphasis on the developmental and structural relationships between spinal cord and brainstem. The organization of cranial nerves and microanatomy of the brain stem is discussed. The organization of sensory and motor systems is presented in detail. The cerebral cortex, cerebellum, basal ganglia, and limbic system are also covered.

**Format:** lecture and laboratory 3 hours

**Instructor:** D.A. Hopkins (Anatomy and Neurobiology Dept.)

**Prerequisite:** BIOL 2020.03A or B or 2015.06R or permission of instructor

**Cross-listing:** ANAT 2100.03B, NESC 3440.03B

**BIOL 3580.03A or B Philosophy of Biology:** See class description for PHIL 3420.03A or B, in the Philosophy section of this calendar.

**BIOL 3601.03B Nature Conservation:** Previously called "Man in Nature", the course traces the development of human economy and the resultant impact on the wild environment. Particular attention is paid to human population dynamics, biotic extinctions and land-use patterns. Having identified the causes of impoverishment of biodiversity the course examines possible cures, including: sustainable development, conservation

science and environmental ethics. Special attention is paid to the establishment and management of protected areas.

**Format:** Lecture 3 hours/tutorial 1 hour

**Instructor:** M. Willison

**Prerequisites:** BIOL 1000.06 or 1001.06 or SCI 1200.06, or SCI 1500.30 or permission of instructor

**Exclusion:** Biol 3410.03B taken in 91/92 or 92/93

**BIOL 3614.03 R Field Ecology:** (Not offered 1994-95): The class provides practical experience in techniques of quantitative field ecology, including design of field sampling programmes and manipulative experiments. Students examine specific ecological questions and hypotheses by collecting, analyzing and interpreting field data and writing scientific reports. Projects focus on intertidal and subtidal systems but involve concepts and techniques that have broad application in ecology. Lectures provide the theoretical background to projects and the rationale for methodology and statistical analysis. Topics include: spatial pattern, zonation, animal movement, disturbance and succession, and herbivore-plant interaction.

**Format:** 5 projects involving 7 days of field work in September; laboratory or lecture first term only

**Instructor:** R. Schelbling

**Prerequisites:** BIOL 2060.03 and MATH 1060.03, 1070.03 or equivalent

**BIOL 4010.03B Genes and Genomes:** See class description for BIOC 4403.03B, in the Biochemistry section of this calendar.

**BIOL 4011.03A Gene Expression:** See class description for BIOC 4404.03A, in the Biochemistry section of this calendar.

**BIOL 4012.03A Advanced Laboratory in Biochemical Techniques:** See class description for BIOC 4603.03A, in the Biochemistry section of this calendar.

**BIOL 4024.03A Microscopy:** The class is concerned with biological ultrastructural analysis concentrating on transmission and scanning electron microscopy. Electron microscopy, including ancillary techniques, is considered in depth. The importance of a proper understanding of the physical and/or chemical principles governing technical procedures such as fixation, freeze-fracture, colloidal gold probes, stereology, autoradiography, x-ray microanalysis and photography are emphasized. During laboratory periods students have the opportunity through individual projects to participate in some of the techniques covered in the lectures. This class is designed primarily for honours and graduate students.

**Format:** lecture 2 hours, no formal lab

**Instructors:** G. Faulkner, K.B. Easterbrook, D.B. Stoltz, L. Frotten-Mallet  
**Prerequisites:** Instructor's consent  
**Cross-listing:** MICR 4024.03A/5024.03A, BIOL 5024.03A

**\*BIOL 4060.03A Marine Mammalogy:** (May not be offered in 1994-95) The class will examine the characteristics that mammals brought with them when they returned to the ocean, the evolution of the different groups of marine mammals, some of their special adaptations, the roles of marine mammals in oceanic ecosystems and general principles of the marine mammal population biology. Finally we will consider the factors that regulate marine mammal populations and how these influence attempts to manage and conserve them. Assignments will include a laboratory exercise, a review essay on some marine mammal adaptation, exploring a computer model of a marine mammal population, tests, projects, etc. and an examination.

**Format:** lectures 3 hours  
**Instructors:** I.A. McLaren, H. Whitehead  
**Prerequisites:** BIOL 2060.03 and 3326.03 or see instructors

**BIOL 4061.03A Experimental Design and Data Analysis in Biology:** The purpose of this class is to introduce students who have previously taken formal classes in statistics to the practice and pitfalls of experimental design and data analysis in biology. Using many real examples, especially from the ecological literature, we will show how experiments should be designed and analyzed in different situations, with emphasis on potential problems and how they may be overcome. We will also introduce some of the more common techniques used in the analysis of univariate and multivariate biological data.

**Format:** lecture, 2 hours/tutorial every other week

**Instructors:** R. Schelbling, H. Whitehead  
**Prerequisites:** STAT 2070.03/2080.03; offered to well prepared honours students as well as graduate students

**Cross-listing:** BIOL 5081.03A

**BIOL 4068.03A Limnology:** The class is divided into four sections: (A) Physical Limnology — geology, morphometry, thermal properties, system hydrology & budgets, optical properties, vegetational interactions, history of limnology in N.S.; (B) Chemical limnology — oxygen, acidity/alkalinity, physical/chemical interactions, major/minor ions and heavy metals, organic molecules, atmospheric geochemistry, ionic budgets and mass balances; (C) Biological limnology — paleolimnology, microbiology/ phytoplankton, quantitative geochemistry,

zooplankton/invertebrates, vertebrates, sampling technology; (D) Applied limnology — eutrophication, acid rain, water pollution.

**Format:** lectures 3 hours, laboratory/tutorial 3 hours

**Instructor:** P. Lane  
**Prerequisites:** BIOL 2060.03A or B

**\*BIOL 4070.03B Advanced Topics in Animal Physiology:** (Not offered in 1994-95) Whereas the introductory animal physiology classes emphasize common principles, this class emphasizes the diversity of physiological solutions to common problems among animals. A different problem is chosen each year and each student presents two seminars reviewing the literature of particular animals' solutions. The student also writes a short term paper based on one of their presentations.

**Format:** lecture 2 hours, open laboratory

**Instructors:** R.P. Croll, R.K. O'Dor, A. Pinder

**Prerequisite:** BIOL 3070.03 or 3071.03  
**Cross-listing:** BIOL 5070.03B

**\*BIOL 4073.06R Animal Nutrition:** General principles and techniques of animal nutrition are reviewed and used to examine current literature. Emphasis is on the assessment of nutrition requirements of aquatic and marine species.

**Instructor:** J. Castell

**\*BIOL 4101.03B Industrial Microbiology and Biochemistry:** This class considers the industrial and environmental applications of micro-biology, particularly the industrial processes, like brewing, manufacturing, anti-biotic production, and waste water management. A fundamental and practical understanding of the biochemistry of these process is a key component.

**Format:** lecture and seminar 2 hours

**Instructor:** M. Silver  
**Prerequisites:** BIOL 2101.03B or MICR 2100.03A

**BIOL 4113.03B Biology of the Prokaryotic Cell:** (Not offered in 1994-95) Although the class concentrates on the structure and function of the bacterial cell envelope, that is, the capsule, cell wall and cell membrane, other topics such as the physiology of obligate anaerobiosis, sporulation, motility etc. are also covered. As part of this class, students will write one essay.

**Format:** lecture 2 hours

**Instructor:** R. Brown  
**Prerequisite:** MICR 2100.03A or BIOL 2101.03B and CHEM 2400.06 or BIOL 2010.03

**\*BIOL 4214.03B Physiology of Marine Algae:** (May not be offered in 1994-95) A comparative study of the physiology and biochemistry of the various algae classes is

conducted, including studies of carbohydrates, proteins, fats, pigments and nutrition.

**Format:** lecture 3 hours  
**Instructor:** J. Craigie  
**Prerequisite:** Permission of Instructor

**BIOL 4302.03B Molecular Immunology:** (Not offered in 1994/95) An advanced class which investigates the molecules involved in the generation and expression of immune responses. Topics typically include the structure and function of cytokines, the generation of antibody diversity by immunoglobulin gene rearrangement, the structure and function of cell surface receptors such as the T cell antigen receptor, MHC and adhesion molecules, and the molecular interactions which lead to immune non-responsiveness.

**Format:** lecture, student presentations, discussion  
**Instructors:** T. Lee, A.W. Stadnyk, B. Pohajdak  
**Prerequisites:** MICR 3115.03A and/or instructor's consent  
**Cross-listing:** MICR 4302.03B/5302.03B, BIOL 5302.03B

**BIOL 4303.03B Granulocytes and the Immune Response:** An advanced class dealing with the contribution of granulocytes to immunologic function. Mast cells, basophils, neutrophils, macrophages, NK cells and eosinophils will be considered with respect to their unique functions and contribution to a variety of immune effector mechanisms. This class is offered on alternate years to MICR 4302.03B/BIOL 4302.03B.

**Format:** lecture, student presentations, discussion  
**Instructors:** T. Lee, A.W. Stadnyk, B. Pohajdak  
**Prerequisites:** MICR 3115.03A and/or instructor's consent  
**Cross-listing:** MICR 4303.03B/5303.03B, BIOL 5303.03B

**BIOL 4369.03B Fisheries Oceanography:** See class description for OCEA 4160.03B, in the Oceanography section of this calendar.

**BIOL 4404.03A Introduction to Pharmacology I:** This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions in mammals including humans. The interaction of drugs with the central and peripheral nervous systems will be covered. Factors which affect the blood levels of drugs (absorption, distribution, metabolism, and elimination) will be considered, together with the mechanisms by which drugs act and their potential uses. Instructor's consent and signature are required.

**Format:** lecture 2 or 3 hours

**Instructors:** H. Robertson, J. Blay  
**Cross-listing:** PHAC 5406.03A, BIOC 4804.03A, NESC 4374.03A

**BIOL 4405.03B Introduction to Pharmacology II:** This class is intended to cover specific aspects of drug action in greater depth than 4404.03A and to provide students with practical expertise in pharmacology. The laboratory component consists of prescribed exercises using varied techniques. Instructor's consent and signature are required.

**Format:** lecture 3 hours, laboratory 3 hours

**Instructors:** TBA  
**Prerequisite:** BIOL 4404.03A  
**Cross-listing:** PHAC 5407.03B, BIOC 4805.03B, NESC 4375.03B

**BIOL 4600.03B Invertebrate Fisheries and Aquaculture:** Subject matter will deal with commercially exploited invertebrates (crustaceans and molluscs) with a heavy emphasis on bivalves. Topics to be covered include: (1) Review of the major invertebrate harvest fisheries (locations, methods, population cycles, fisheries models) (2) Biology and ecology of the Bivalvia (feeding, bioenergetics, growth, and reproduction) (3) Shellfish aquaculture (methods, species, site location, economics). These topics will be covered with respect to the Maritimes as well as non-local fisheries. Course structure will be a mixture of lecture and class discussions. Course requirements will include a research paper and oral presentations.

**Format:** lecture/discussion 3 hours  
**Instructors:** G. Newkirk  
**Prerequisites:** BIOL 2001.03A, 2060.03A or B, and 3321.06R; fundamental knowledge of statistics; or instructor's consent  
**Cross-listing:** OCEA 4800.03/5600.03, BIOL 5600.03B

**BIOL 4660.03A Principles of Biological Oceanography:** See class description for OCEA 4150A, in the Oceanography section of this calendar.

**BIOL 4662.03B Biology of Phytoplankton:** See class description for OCEA 4230.03B, in the Oceanography section of this calendar.

**BIOL 4664.03B History of Marine Sciences:** See class description for SCI 4001.03 in the Science, Interdisciplinary section of this calendar.

**BIOL 4666.03B Benthic Ecology:** See class description for OCEA 4330.03B, in the Oceanography section of this calendar. (May not be offered in 1994-95)

**BIOL 4800.06 Special Topics:** Available as 4806.03A, 4807.03B, 4808.03R. Arranged by consultation with staff and with approval of the Curriculum Committee.

**BIOL 8700.00 A or B Co-op Seminar I**  
(non-credit)

**BIOL 8891.12 Co-op Work Term I**

**BIOL 8892.12 Co-op Work Term II**

**BIOL 8893.12 Co-op Work Term III**

**BIOL 8894.12 Co-op Work Term IV**

**BIOL 4900.08R Honours Research and Theses: Compulsory class in honours programme.**

**Format:** Student seminars

**Instructor:** P. Collins, J. Wright, and staff

## Marine Biology

### Honours and Advanced Major in Marine Biology

The Biology Department offers a 4 year Honours and a 4 Year Advanced Major degree in Marine Biology. Since 1991, we have also been offering these two degrees as a Co-operative Education degree (Marine Biology Co-op) where students integrate work experience into their academic programme.

These programmes are designed to provide a fundamental background in biological science while permitting concentration in Marine Biology. The Advanced Major prepares students for technical positions in government fisheries laboratories, fish farms, etc. The honours programme is more rigorous and provides research experience during the thesis and is intended for students wishing to continue with further research training at graduate school.

The resources of the departments of Biology and Oceanography are combined in the Life Sciences building which is equipped with a sophisticated flow-through sea-water system. The Life Sciences centre is located very close to the sea coast and this enables many classes to offer field work.

### Co-operative Education Programme in Marine Biology, Honours and Advanced Major

**Programme Co-ordinator**  
M.J. O'Hailoran (494-2138)

The Co-operative education degree is an integrated programme of 8 academic terms and 4 work terms in industry, government laboratories, aquaculture farms, etc. The work terms, each of 4 months duration, enables students to apply their knowledge of marine biology and provides them with work experience for making intelligent career choices. Upon successful completion of the programme the student's transcript indicates

the programme was a co-operative one. The Co-op degree normally takes 4 1/3 years to complete.

#### The Work-study programme

The work terms are of 4 months duration and alternate with study terms as follows:

Year	Fall	Winter	Summer
1	AT1	AT2	Free
2	AT3	AT4	WT1
3	AT5	WT2	AT6
4	WT3	AT7	WT4
5	AT8	Graduation	

AT = Academic term

WT = Work Term

The Faculty's Co-op Placement Officer serves to co-ordinate the contacts between students and employer. Students are remunerated according to the employer's policies regarding permanent employees of similar training and education. At the end of each work term, each student must submit an acceptable work report.

The academic programme and required classes for Honours and Advanced Major Co-op students are essentially the same as for the non co-op programme (listed below). Students in the third and fourth year of their co-op programme will have difficulty taking full-credit R classes during the academic year because of their work terms. The 2 required full-credit third year biology classes (Biology 3321.08R and 3071.08R) are split into Part 1 (A term) and Part 2 (B term) so that students can take Part 1 in the fall term of their third year and Part 2 in the winter term of their fourth year.

Many employers require basic computer skills (word-processing, data-base management) so students are strongly advised to take non-credit (Henson College) or credit classes during their first 2 years.

During their second year Co-op students must attend a few non-credit seminars to prepare them for their work term placements.

#### Eligibility

Students should obtain application forms from the Marine Biology Co-op Co-ordinator at the end of their first year. They should also contact the Co-op Co-ordinator during their first year of study to have their programme checked.

Both Honours and Advanced Major Co-op students are required to demonstrate sufficient academic potential and maintain a grade average of B (GPA 3.00) in Biology 1000.08R or 1001.08R, 2001.03A, 2020.03A or B, 2030.03A or B, 2060.03A or B. Students must also be Canadian citizens or landed immigrants.

## Honours in Marine Biology

### Programme Advisor:

M.J. O'Halloran (494-2136)

Honours students must take a minimum of 9 and a maximum of 11 credits in their major subject (Marine Biology/Biology) above the 1000 level in addition to the general rules of the College of Arts and Science (see degree requirements in the College of Arts and Science section of this calendar).

Students are recommended to take Oceanography as their minor subject and 2 credits are required.

It is the responsibility of all students to arrange for supervisors for their research. Honours theses may be supervised by a faculty member within the Biology department, or by an external scientific investigator, subject to the approval of the honours committee. Students should begin to search for a potential supervisor during their 3rd year of study and should have completed arrangements by May of their 3rd year. If students wish to be supervised by someone external to the department, they must consult with their honours advisor to determine the potential supervisor's eligibility. Students with a cumulative GPA of 3.70 should consider applying for an NSERC Undergraduate Research Scholarship to start their honours research with a supervisor during the summers. The deadline for applying for these scholarships is usually in early January of each year.

For the standing required for Honours please see "Graduation Standing" section "Academic Regulations" given earlier in this calendar.

Our department requires marine biology honours students to obtain a B average (GPA 3.00) in the following second year classes:

BIOL 2001.03A, 2020.03A or B, 2030.03A or B, and 2060.03A or B. These classes must be completed by the end of year 2.

### Departmental Requirements

#### Classes required in major:

1000 level:	1000.06 or 1001.06
2000 level:	2001.03, 2020.03, 2030.03, 2060.03
3000 level:	3071.06R or 3074.03 & 3076.03; 3211.03 or 3212.03; 3321.06 or 3301.03/3302.03
4000 level:	4900.06, Honours Qualifying exam (pass/fail grade) two and one half other advanced credits at 2000 or above level

#### Other required classes:

Chemistry 1010.06 or 1040.06; Mathematics 1000.03 and 1060.03; Oceanography 2850.06 or 2851.03/2852.03; Statistics 2080.03, a half-credit field class in Marine Biology

#### Suggested biology credits and electives

The following 3rd and 4th year classes are marine related and could be used for obtaining more biology credits or serve as electives. Other biology classes can also be taken if students want to concentrate in a specific area such as ecology, molecular or developmental biology but please discuss this with your Marine Biology programme Advisor first.

All students should ensure they have the necessary pre-requisites classes for entry into higher level classes.

**Aquaculture** BIOL 4600.03B (Invertebrate fisheries and aquaculture)

**Development** BIOL 3050.03A (Developmental biology)

**Animal Diversity** BIOI 3067.03 (Fish Biology), BIOL 3326.03B (Vertebrates and evolution), BIOL 405.0 (Biology of fishes) offered by St.Mary's university, BIOL 4060.03B (Marine Mammalogy)

**Ecology** BIOL 3061.03A (Communities and ecosystems), BIOL 3069.03B (Population ecology), BIOL 4061A (Expt'd design), BIOL 4666.03B (Benthic ecology)

**Earth Sciences** ESCI 4280.03B (Marine geophysics)

**Evolution** BIOL 3040.06R (Evolution)

**Microbiology** BIOL 3100.03B (Aquatic microbiology)

#### Oceanography

BIOL 4600.03B/OCEA 4600.03B (Invert. Fisheries and Aquaculture)

BIOL 4369.03B/OCEA 4160.03B (Fisheries Oceanography)

BIOL 4660.03A/OCEA 4150.03A (Introduction to biological oceanography)

BIOL 4662.03B/OCEA 4230.03B (Biology of phytoplankton)

OCEA 4170.03A (Introduction to physical and chemical oceanography)

OCEA 4280.03A (Biology of zooplankton)

OCEA 4380.03B (Marine modelling)

OCEA 4664.03B (History of Oceanography)

**Limnology.** BIOL 4068.03A (Limnology)

**Physics** PHYC 1300.06R (Physics In and around you)

**Physiology** BIOL 4070.03B (Advanced topics in animal physiology)

**Politics** POLI 3590.06R (Politics of the Sea)

**Resource management/economics** BIOL 3083.03B (Resource ecology), BIOL 4850.03B (Resource systems and economic development), ECON 361B (Fisheries economics) offered at St. Mary's University).

**Science** SCI 3000.06R (Science fundamentals)

### Classes at St. Mary's University

**Biology of Fishes 405.0R:** A study of fishes, their classification, growth and development, ways of life and management. The laboratory portion of the course familiarizes students with representatives of world taxa and the study of fishes in Nova Scotia.

**Format:** Lectures 3 hrs and lab or fieldwork 3 hrs a week for 2 terms

**Instructor:** Staff

**Prerequisites:** BIOL 2001.03A, STATS 1060.03A or B

**Fisheries Economics 361.1(2)A or B:** This class emphasizes the application of economic concepts to problems of fishery management and development. Topics to be discussed include: common property resources, the economics of fishery regulation, socioeconomics, fish markets, and the fishery as part of the national and regional economy. Particular attention will be paid to current issues in the Atlantic Canada fishery. (Check with the Finance and Management Science Dept at SMU to see if offered in 1993-94)

**Format:** Classes 1.5 hrs, seminars 1.5 hrs a week in B term

**Instructor:** T. Charles

**Prerequisites:** Instructor's consent. An introductory economics class would be useful.

### Honours Co-op in Marine Biology

#### Departmental Requirements

Same as for regular Marine Biology Honours as above plus:

BIOL 8700.00A (Co-op Seminar), BIOL 8891.12, 8892.12, 8893.12, 8894.12 (Co-op Workterms)

#### Suggested Biology credits or electives

Same as for regular Marine Biology Honours as above plus COMP 1000.03A or B.

### Advanced Major in Marine Biology (4 year)

Advanced major students are required to take a minimum of 8 and a maximum of 9 credits above the 1000 level in their major

subject (Marine biology/Biology) in addition to the general rules for Advanced majors which are listed in the degree requirements section of the College of Arts and Science regulations in this calendar.

### Departmental Requirements

#### Classes required in major:

**1000 level:** 1000.06 or 1001.06

**2000 level:** 2001.03, 2020.03, 2030.03, 2060.03

**3000 level:** One half-credit field class plus minimum two and one half credits at 3000 or 4000 level

#### Other required classes:

Chemistry 1010.06, or 1040.06

Mathematics 1000.03, and 1060.03

#### Suggested Biology credits or electives

These can be selected from any of the "mandatory" or "suggested" marine related classes listed earlier in the Marine Biology Honours programme with the exception of BIOL 4900.06R.

Other biology classes may be taken if students wish to concentrate in a particular subject area of Marine Biology such as ecology, molecular or developmental biology but this should be discussed first with the Marine Biology programme advisor.

### Advanced Major Coop in Marine Biology

#### Departmental Requirements

Same as for regular Advanced Major in Marine Biology as above plus:

BIOL 8700.00A (Co-op Seminar), BIOL 8891.12, 8892.12, 8893.12, 8894.12 (Co-op Workterms)

## Business Administration

**Location:** 6152 Coburg Road  
**Telephone:** (902) 494-7080

The School of Business Administration offers a curriculum of undergraduate and graduate studies designed to equip students to serve the community in business, government, and the professions.

The undergraduate programme includes studies in the humanities and social sciences as well as in the functional areas of business. Recognition is given to the growing emphasis on quantitative and behavioral analysis.

### Administrative Staff 1993/94

#### Director, School of Business

##### Administration

Leonard C. MacLean

#### Director, Centre for International Business Studies

Mary R. Brooks

#### Director, Courseware Development Project

Donald P. Sheridan

#### Co-ordinator, Canada/China Management Education Programme, Dalhousie/Xiamen Linkage, Dalhousie/Zimbabwe Linkage

Cecil R. Dipchand

#### Director, Academic Programmes

Edgar W. Scott

#### Director, Co-op Programme

John R.E. Parker (to Dec 31/93)

Earl Walsh (Jan - June 1994)

#### Administrative Assistant

Susan M. DeYoung

### Academic Staff 1993-94

#### Emeritus Professors

C.R. Brookbank, BA, MA, PhD (Tor)

R.E. George, BSc (Lond), MA (Bristol), PhD (Lond)

#### Professors

M.R. Brooks, BOT (McG), MBA (Dal), PhD (Wales)

F.G. Crane, BA (Acadia), DPA, MPA (Dal), PAdm (ICSAC), PhD (Bradford)

C.R. Dipchand, BComm, (Queen's), MBA (Sask), PhD (Western)

I. Fooladi, BS (Iran), MA (Tehran), MS, PhD (Oregon)

L.C. MacLean (Director), BA, BEd (StFX), MA, PhD (Dal)

J.D. McNiven (Dean, Faculty of Management), BA, MA, PhD (Mich)

M.J.C. Martin, BSc (Nottingham), PhD (Sheffield)

J.R.E. Parker, BComm (Dal), MBA (Wash), CPhil (Mich), FCA

G.S. Roberts (Bank of Montreal Chair), AB (Oberlin), MA, PhD (Boston Coll)

P.J. Rossen, Dip MS (Salford), MA (Lancaster), PhD (Bath) (on leave Jan - June 1995)

Y. Sankar, BA (McG.), MA (Tor.), PhD (Johns Hopkins)

D.A. Schellinck, BSc, MBA (Dal), PhD (Ill)

#### Associate Professors

B.C. Archibald, BA (Queen's), MSc (Stanford), PhD (Waterloo)

R.G. Blunden, BComm (Dal), MM (Northwestern), PhD (Western) (on leave 1994/95)

R. Carroll, BBA, BEd (St.FX), MBA (Dal), FCGA

D.C. Cherry, BComm (Dal), MBA (McM), CMA

J.E.D. Conrod, BComm (Dal), MBA (Tor), CA

C.J. Dirksen, MBA (Oregon), BS (Santa Clara), PhD (Oregon)

J.F. Duffy, BS, MS, PhD (Iowa)

R.A. Ellison, BSc (UNB), MBA (McM), PhD (Tenn)

H.I. Gassmann, Vordiplom (Stuttgart), MS (Oregon), PhD (UBC)

R.E. Klapstein, BSc (Calg), BA (Alta), MBA,

LLB (Dal), LLM (Osgoode Hall), CMA

S.O. Larsson, BSc (SGW), MSc (Alta), PhD (UBC) (on leave 1994/95)

R.N. Maddox, BA, MBA, PhD (Ohio State)

L.W. Meales, AB, MBA (Rutgers), PhD (Mass)

A. Oppong, BSc (Ghana), MBA (Chicago), PhD (Iowa), CGA

D.J. Patton, BA (UNB), MA (Tor), DBA (Indiana)

A.C. Peacock, BA, MA, PhD (Western) (on leave 1994-95)

R.S. Sandhu, BSc, BCL, LLM (Delhi), LLM (Yale), MBA (Dal)

E.W. Scott, BComm (Dal), MBA (Col), CA, CMA

Y. Shafai, BSc, MPA (Tehran), MBA, PhD (Mich State)

D.P.J. Sheridan, CD, BA, BEd, MEd (Admin) (Sask), PhD (Alta)

F.S. Skinner, BComm (Memorial), MBA, PhD (Tor)

R.A. Street, BComm, LLB (Dal), MBA (Western), LLM (Dal)

#### Assistant Professors

R.G. Baltazar, BSc (Ateneo de Manila), MIM (AGSIM)

J.K. Grude, BA (Atla.), MSc, PhD (London)

B.W. MacLean, BComm, MBA (Dal), CA

## Part-Time Faculty

D.R. Bagg, BA, MBA, MPA  
 E. Hertels, MA (Glasgow), MA (McGill)  
 R. Hiacock, BA (Western), MBA (Dal)  
 C. Ivey, BComm, MBA (Dal), CMA, CFMA  
 A. McGee, BSc, MBA (Dal)  
 H. McNutt, MBA (SMU)  
 B. Miller, BS (SUNY), MA (William and Mary),  
 MBA (Dal)  
 B. Moffatt, BA (Acadia), MBA (Dal), CMA  
 E. Pease, BA, BEd (Dal), MEd (MSV)  
 D. Trainor, BBA (UPEI), MBA (Dal), CA  
 M.P. Whalen, BSc (SMU), MBA (Dal)

## Co-op Professional Staff 1993/94

N. Battis, BA (Loyola), BComm (Concordia)  
 M. Muise, BSc, MBA (Dal)  
 D. Royale, BA, BEd (Memorial)  
 E. Walsh, BCom (St. Mary's), FCA

## Bachelor of Commerce

The School of Business Administration offers the undergraduate Bachelor of Commerce degree, which is a four-year programme. Starting in September 1991, the Bachelor of Commerce was changed to a mandatory co-operative education programme which allows students to combine relevant work experience with academic studies. The schedule for the Bachelor of Commerce Co-op includes seven academic terms (AT) and three work terms (WT), as follows:

Yr/Term	Fall	Winter	Summer
1	AT1	AT2	FREE
2	AT3	WT1	AT4
3	WT2	AT5	WT3
4	AT6	AT7	

Students enrolled before September 1991 will be able to continue the regular Bachelor of Commerce programme. Such students should consult the Calendar for the year they entered the commerce programme. For further information, contact the Director, Academic Programmes, School of Business Administration, 8152 Coburg Road, (902) 494-7080.

Both the regular and co-op programmes in Commerce require a broad and general range of studies, including required and elective classes provided by the College of Arts Science. Both programmes also allow students to choose a measure of concentration in a variety of special areas.

The term "Bachelor of Commerce" is used in this Calendar with reference to the programme applicable to students enrolled prior to September 1991. The programme of studies for the Bachelor of Commerce Co-op is the programme described in detail in this calendar.

## Degree Requirements

- 4 year programme includes 7 academic terms and 3 work terms
- Total credits required - 20
- Required GPA for graduation - 2.00
- Required core area credits - 10 credits
- Commerce 1000.03, 1501.03, 2101.03, 2102.03, 2201.03, 2301.03, 2401.03, 2501.03, 2502.03, 2601.03, 2701.03, 2902.03, 3501.03, 4350.06
- Economics 1100.06, 2200.03 or 2201.03
- Math 1000/1010 or 1110/1120
- Core area electives - 4 credits select from Commerce, Economics, Mathematics and Computing Science
- Non-Commerce electives - 3 credits select from all classes offered except Commerce
- Free electives - 1 1/2 credits select from all classes offered above the 1000 level, except with School approval
- Workterms - 1 1/2 credits and a non-credit seminar

## Courseware Development Project

The School of Business Administration prides itself on the use of computers in all aspects of the curriculum. Initiated under the auspices of the Courseware Development Project, the prime objectives are to bring the most advanced information technology into the classrooms and to make hardware and software resources available to the students. This initiative was made possible through generous contributions from several Canadian corporations, as well as continuing support of the Capital Campaign for Dalhousie and the Annual Fund Campaign. Through this support the School of Business Administration has become a recognized world leader in the use of information technology.

Currently all faculty members and staff have their own personal computers and students have access to a computer lab with 44 personal computers and 16 terminals. All personal computers in the School are based on the Intel 486 family of processors. They are fully networked and running Windows software and applications. All personal computers and terminals are also connected through data switches and ethernet connections to the School's two MicroVAXes, scientific workstations, as well as a host of other computers on campus. Through internet connections there is also access to thousands of computers throughout the world.

## Programme Guide

The School has developed suggested programmes for the guidance of students in the BComm Co-op who wish to concentrate in a particular area of study. Consult the office of the Director, Academic Programmes.

The professional accounting bodies allow certain exceptions in respect of classes taken in the School of Business Administration.

These differ from province to province. Particulars can be obtained from the several provincial offices of the Institute of Chartered Accountants, the Association of Certified General Accountants, the Society of Management Accountants, and the Chartered Institute of Secretaries. In Atlantic Canada, the Atlantic School of Chartered Accountancy provides the pre-qualification education for the CA profession, and can advise which of the classes completed at Dalhousie are accredited for their purposes.

**Note:** All classes are half-credits except those designated as "R", which are full credits.

## Classes Offered

**Note:** Each of the following A or B classes may be offered only as A or B. Check the current timetable to determine in which term the class is offered. It may not be possible to offer all the electives listed below in every year. Students should bear this in mind when planning their programme for the following year.

### COMM 1000.03A Introduction to Business:

This course is designed to introduce the student to the various aspects of business and the areas of study within it, including economic systems, entrepreneurship, marketing, management, accounting, and finance. A wide range of teaching-learning methods are applied, including lectures, seminars, computer simulations, case discussion, and business games. The course prepares the student for the more rigorous treatment of functional topic areas in subsequent courses and establishes a business person's perspective.

**Format:** lecture 1 1/2 hrs per week, tutorial/seminar 1 1/2 hrs per week

### COMM 1101.03A or B Introductory

**Accounting I: for Non-Commerce students:**

An introduction to the principles and practices used by accountants in processing and communicating data both within and outside the entity. Emphasis is on financial statement accounting and reporting, with the following objectives:

- (1) to introduce the theoretical framework upon which financial statement accounting is based, and examine its major underlying principles;
- (2) to examine basic financial accounting methodology, and develop the analytical and procedural skills related thereto;
- (3) to develop an understanding of the information content of conventional

financial statements, and an appreciation of the inherent limitations of accounting information.

**Format:** Regular lecture method: two 90-minute lectures per week, plus a 90-minute weekly tutorial, as required. Selected computer exercises are part of the course, requiring some time to be spent in the Computer Lab.

**Exclusion:** Credit can be given for only one of Commerce 1101.03 and Commerce 2101.03

### COMM 1102.03A or B Introductory

**Accounting II: for Non-Commerce students:** Emphasis is placed on the need for accounting information by managers, with the following objectives: (1) to develop an understanding of the kinds of accounting information managers need; (2) to introduce managerial accounting methodology and develop the analytical and procedural skills related thereto; (3) to introduce accounting reports which are useful for management planning, control and decision-making; (4) to develop an awareness of the limitations of managerial accounting information.

**Format:** Two 90-minute lectures per week; written and computer-based assignments

**Prerequisite:** Commerce 1101.03

**Exclusion:** Credit can be given for only one of Commerce 1102.03 and Commerce 2102.03

### COMM 1501.03A or B Introduction to

**Computers in Business Management:** The goal of this course is to enable students to be immediately productive within an information processing system. Successful completion of this course will provide students with a clear understanding of computers and how they may be incorporated into a business environment, as well as a proficiency with an Integrated Windows-based word processing, spreadsheet, databases and presentation software suite. The class combines traditional lectures with a completely self-paced, computer-managed, instructional environment, including on line tutorials, quizzes and electronic mail. It is strongly recommended that students complete this class in their first year of study.

**Format:** Lectures/computer labs, 3 hours

**Exclusions:** Credit can be given for only one of Computer Science 1000.03 and Commerce 1501.03.

Commerce 1501.03 is designed exclusively for students enrolled in Commerce, and Computing Science 1000.03, 1200.03 or 1400.03 are not eligible as substitutes for Commerce 1501.03.

**COMM 2101.03A or B Introductory Accounting I:** for Commerce students: An introduction to the principles and practices used by accountants in processing and communicating data both within and outside the entity. Emphasis is on financial statement accounting and reporting, with the following objectives:

- (1) to introduce the theoretical framework upon which financial statement accounting is based, and examine its major underlying principles;
- (2) to examine basic financial accounting methodology, and develop the analytical and procedural skills related thereto;
- (3) to develop an understanding of the information content of conventional financial statements, and an appreciation of the inherent limitations of accounting information.

**Format:** Regular lecture method: two 90-minute lectures per week, plus a 90-minute weekly tutorial, as required. Selected computer exercises are part of the course, requiring some time to be spent in the Computer Lab.

**Exclusion:** Commerce 1101.03

**COMM 2102.03R Introductory Accounting II:** for Commerce students: Emphasis is placed on the need for accounting information by managers, with the following objectives: (1) to develop an understanding of the kinds of accounting information managers need; (2) to introduce managerial accounting methodology and develop the analytical and procedural skills related thereto; (3) to introduce accounting reports which are useful for management planning, control and decision-making; (4) to develop an awareness of the limitations of managerial accounting information.

**Format:** Two 90-minute lectures per week; written and computer-based assignments

**Prerequisite:** Commerce 2101.03

**Exclusion:** Commerce 1102.03

**COMM 2110.03A or B Accounting Information Systems:** This class provides a basic understanding of information systems, especially accounting information systems. It builds on material learned in Commerce 1501 dealing with various hardware and software issues not covered in that course. The course emphasizes the topics of systems analysis, design, control and evaluation, and topics related to database systems. In addition, the course involves instruction in, and the use of, various computer programmes such as spreadsheets, databases and wordprocessors.

**Format:** Ranges from 3 hours of lectures per week to no classroom time, with extensive computer conferencing

**Prerequisites:** Commerce 1101.03 or 2101.03, 1102.03 or 2102.03, 1501.03; computer- and accounting-related work experience often provides an adequate background for this class; see instructors for further information.

**COMM 2201.03A or B Introduction to Managerial Finance:** An introduction to the problems business managers face in the acquisition and effective use of the firm's financial resources, and analytical concepts for evaluating financial decisions. How the firm can achieve successful interaction with its external environment and make an appropriate contribution to the operation of the economy is considered. Topics covered: time value of money; present value; financial ratio analysis; working capital management; and long-term financial decisions.

**Format:** Lecture 1.5 hours; tutorial 1.5 hours

**Prerequisites:** Commerce 1000.03, 1101.03 or 2101.03; Economics 1100.06

**Co-requisite:** Commerce 1102.03 or 2102.03

**COMM 2301.03A or B Organizational Behaviour:** Insight into human behaviour in organizations and capacity for objective analysis is developed. Research and text material drawn from the fields of sociology, anthropology and psychology are used in the development of understanding and objectivity. Case material and substantive data from the behavioral sciences are considered. Covers such major topics as motivation, group behaviour, individual differences, personality, perception, communications, leadership, inter-group behaviour, conflict management, job design, corporate culture, learning and creativity.

**Format:** lecture 1.5 hours; tutorial 1.5 hours

**Prerequisites:** Commerce 1000.03 and 1501.03, Economics 1100.06 and one Mathematics at the 1000 level

**COMM 2302.03R Organizational Theory and Design (formerly 3302.03):** Surveys both theory and research pertaining to complex organizations with emphasis on design, structure and administrative practices in the environmental setting and how the interaction of these variables relates to organizational performance. Concomitant with this exposure to theory and research, students have the opportunity to apply this knowledge to case studies relevant to complex organizations. Emphasis is on the analysis of case studies and the formulation of general solutions and decisions for action. Covers such topics as bureaucracy, function-product structures, matrix structure, organizational goal-setting,

organizational design and ethics, organizational decision-making, communications, control, management of change and innovation, new corporate designs, computer technology and organizational design.

**Format:** Lecture 3 hours

**Prerequisite:** Commerce 2301.03

**Exclusion:** Commerce 3302.03 (formerly)

**COMM 2401.03A or B Introduction to Marketing:** The student receives a basic understanding of the character and scope of marketing and its role in business operations and in society, with focus upon the concepts and techniques an organization must employ to anticipate and satisfy consumer needs. Emphasis is placed on the tools available for the marketing manager, the problems to be confronted, and the development of understanding and analytical ability in the following: the role of the consumer; product-line development; channels of distribution; pricing systems; selling and promotional activities. Case materials and problem sets are used to give insight into the analytical tools used in problem analysis and decision-making.

**Format:** lecture/discussion, 3 hours

**Prerequisites:** Commerce 1000.03 and 1501.03; Economics 1100.06; and one Mathematics at the 1000 level.

**Co-requisite:** Commerce 1101.03 or 2101.03

**Exclusions:** students cannot receive credit for both Commerce 2401.03 and 1401.03 (as this course was formerly numbered)

**COMM 2501.03A or B Statistics for Business I:** An Introduction to the principles and applications of statistics relevant to business and economics, with emphasis on making inferences based on observed data. Topics covered include descriptive statistics, probability, random variables, decision theory, estimation, hypothesis testing, statistical software.

**Format:** Lecture 3 hours

**Prerequisite:** Commerce 1000.03 and 1501.03, Economics 1100.06 and one Mathematics at the 1000 level.

**Exclusions:** Mathematics 1060.03, 2060.03, Statistics 1060.03, 2060.03, Economics 2260.03

**COMM 2502.03R Statistics for Business II:** A continuation of Commerce 2501. Topics covered include ANOVA, chi-square, non-parametric regression and correlation, time series, index numbers, an Introduction to the use of statistical packages on the computer, and management uses of statistical data.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2501.03 or Mathematics 1060.03 or 2060.03, or Statistics 2060.03, or Economics 2260.03

**Exclusions:** Mathematics 2080.03, Statistics 2080.03, Economics 2260.03

**COMM 2601.03A or B Legal Aspects of Business - Contracts:** This course provides an appreciation of some of the legal problems that might be faced by the business community. It examines the meaning and sources of law, the machinery of justice, the law of torts, the formation of contracts, capacity to contract, legality of object, mistake, undue influence, duress, misrepresentation, statute of frauds, privity of contracts, interpretation, breach and discharge of contracts, and the law of agency. Students must make extensive use of the law library in writing reports on a series of cases.

**Format:** Lecture 3 hours

**COMM 2602.03A or B Commercial Transactions:** This follow-up to Commerce 2601 examines the law relating to the sale of goods, bailment, contracts of employment, negotiable instruments, real property, tenants and landlords, mortgages, partnerships, corporations, devices for securing credit and the rights of creditors. Students must make extensive use of the law library in writing reports on a series of cases.

**Format:** Lecture 3 hours

**Prerequisite:** Commerce 2601.03

**COMM 2701.03R Business Communication:** The goal of this class is to teach students how to properly prepare both written and oral business communications. The stress will be on written communication, specifically business memos, letters and reports, although communication theories and the role of communication in business will be discussed. As well, one oral presentation per student will be required.

**Format:** Lecture 3 hours

**COMM 2801.03B Work Term one, Bachelor of Commerce Co-op:**

**Prerequisites:** successful completion of 7 full credits (14 half credits) including ECO 1100.06; MATH 1000.03 and 1010.03, or MATH 1110.03 and 1120.03; COMM 1000.03; COMM 1501.03; and COMM 1101.03.

**COMM 3100.03A Financial Accounting and Investigation:** This course is intended for non-accounting students. The approach to the course is analytical rather than procedural, with an emphasis on a user perspective. Topics include an in-depth treatment of

liquidity and profitability analysis, pensions, leases, earnings per share, cashflow, accounting for inflation, special industry analysis, and non-profit accounting.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 1101.03 or 2101.03, 1102.03 or 2102.03

**Exclusions:** Commerce 2111.03, 3111.03, 3113.03

**COMM 3101.03B Managerial Accounting:**

The course applies, through a combination of case analysis and problem-solving, managerial accounting concepts to the planning and controlling activities in organizations. Emphasis will be given to non-manufacturing activities. This course is intended for students not concentrating in accounting.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 1101.03 or 2101.03, 1102.03 or 2102.03, 2201.03

**Exclusions:** Commerce 3112.03

**COMM 3111.03A or B Intermediate Financial Accounting Procedures:**

This class and its follow-up, Commerce 3113.03, are meant to provide an understanding of corporate financial reporting and the related conceptual framework. The course develops technical expertise in various financial accounting topics, some of which were introduced in Commerce 2101.03 and 2102.03. The focus is on understanding the implicit inter-relationships in the framework and the environmental factors that work to establish GAAP (generally accepted accounting standards).

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 1101.03 or 2101.03 and 1102.03 or 2102.03 with a B- average, or permission of instructor

**Exclusion:** Commerce 3100.03; Commerce 2111.03 (formerly)

**Cross-listing:** BUSI 6108.03

**COMM 3112.03A or B Cost Accounting:**

The purpose of this course is to provide the student with detailed knowledge of cost/managerial accounting concepts and practices which help organizations in their planning, decision-making and control activities. Topics to be covered include product costing systems, cost behaviour analysis and estimation, cost allocation, standard costs and budgeting. The course is intended primarily for students who plan to concentrate their studies in the accounting area. Students who wish to take a course in cost/managerial accounting beyond the introductory level, but do not plan to pursue a career in accounting, should consider taking Commerce 3101.03 instead of this course.

**Format:** Lectures/case discussions, 3 hours

**Prerequisites:** Commerce 1101.03 or 2101.03 and 1102.03 or 2102.03, with at least a B-average, or permission of the instructor

**Exclusions:** Commerce 3101.03; Commerce 2112.03 (formerly)

**Cross-listing:** BUSI 6108.03

**COMM 3113.03A or B Intermediate Financial Accounting Theory:**

This course and its prerequisites, Commerce 3111.03, are meant to provide an understanding of corporate financial reporting and the related conceptual framework. The course examines the assumptions underlying topics in the external reporting model, and the consequences of relaxing those assumptions in, for instance, the study of accounting measurement models. Quantitative technical skills are emphasized simultaneously with the qualitative factors governing accounting policy choice.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 3111.03 (formerly 2111.03), or permission of the instructor

**Exclusion:** Commerce 3100.03

**Cross-listing:** BUSI 6113.03

**COMM 3114.03A or B External Auditing:**

This course covers the theory and practice of public auditing according to generally accepted auditing standards (GAAS). The first half of the course considers the forces impacting on the setting of standards and the current level of standards. This part includes pronouncements of the accounting profession, reporting standards, professional ethics, statute laws, legal liability and responsibilities, standards for examination of internal control in both manual and computerized environments, standards for the quality of evidence, statistical sampling and the sufficiency of evidence, documentation and working papers. The second part of the course considers typical audit programmes for examination of balance sheet and income statement accounts.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2110.03, 3111.03 (formerly 2111.03)

**COMM 3120.03A or B Information for Organizational Control:**

The course develops and evaluates in detail management control systems in all types of organizations - profit and not-for-profit, manufacturing and service organizations. Case analysis is used to look at structures such as cost, profit and investment centres. Information requirements of specific control and planning models, such as linear programming, decision theory and forecasting, are also examined.

**Format:** Lecture/case analysis/ problem-solving, 3 hours

**Prerequisites:** Commerce 3112.03, 2301.03, 2502.03, or permission of instructor

**Cross-listing:** BUSI 6107.03

**COMM 3201.03A or B Intermediate Finance:** A more intensive study of capital budgeting, cost of capital and valuation theory than that of Commerce 2201.03. The course is intended to provide an overview of the theory of corporate finance and the application of that theory to the problems faced by a financial manager. Emphasis is on principles of capital budgeting, valuation, investment decisions, financial structure, dividend policy and bargaining for funds vital in financing a business enterprise. Case analysis will be used.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2201.03

**Co-requisite:** One of 3111.03 (formerly 2111.03), 3112.03, 3100.03 or 3101.03

**COMM 3202.03A or B Security Analysis:** Introduces the theory and philosophies of investment, and concentrates on investment analysis using computers, machine-readable data and other tools available to the institutional investor. The focus is on common stocks, bonds, and investment trusts. Case material is primarily Canadian and covers stocks, bonds, options and mutual funds. Reading assignments and case analysis provide opportunities to handle investment analysis and portfolio management on a problem-solving basis.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2201.03, 2502.03; Economics 2201.03

**COMM 3203.03A or B Canadian Capital Markets:** Canada's capital markets and the flow of funds within them. Main sectors in the capital markets are identified and their historical development and function within the total structure is emphasized. Other areas include term structure and risk structure of interest rates, the risk-return relationship on financial assets and the efficiency of Canada's capital markets. Reading assignments, case analysis, evaluation of available research results and classroom discussion comprise the class.

**Format:** Lecture 3 hours

**Prerequisites:** Economics 2201.03; Commerce 2201.03. The former may be waived with the consent of the instructor.

**COMM 3210.03A or B Insurance and Risk Management in the Corporate Setting:** Basic concepts of insurance, insurance market organizations, types of insurance and the development of programmes for corporate risk management. Problems of implementation and administration are also considered.

**Prerequisites:** Comm 2102.03/2201.03/2302.03/2502.03; ECO 2200.03 or 2201.03

**Cross-listing:** BUSI 6207.03

**COMM 3303.03A or B The Personnel Function:** Covers the major aspects of the personnel function: job analysis, human resource planning, selection, training, performance appraisal, compensation, labour relations, safety and health, and human resource information systems. Knowledge of the processes is supplemented by the development of analytical skill in coping with various personnel problems and in the integration of the processes with the many other functions required in the organization. This "system and process" analysis builds upon the skill and knowledge acquired in Commerce 2301.03. Cases simulate work environments. The role of personnel management and administration of the personnel function are analyzed.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2301.03

**Cross-listing:** BUSI 5321.03

**COMM 3304.03A or B Labour - Management Relations:** Introduces students to some practical and theoretical aspects of labour-management relations in Canada. Examines historical, legal, behavioral, economic and political background of our system. Emphasis is on the key processes of industrial relations as they impinge on the activities of managers. Cases used are drawn mainly from Canadian sources.

**Format:** Lecture 3 hours

**Prerequisites:** COMM2301.03/2302.03 or instructor consent

**COMM 3305.03A or B Individual And Organizational Change:** Current concepts and methods of individual and organizational change. The primary objective: to develop the student's skills as a change agent and improve performance as a manager, using lectures, exercises and case studies. The opportunity to fine-tune those analytical and decision-making skills necessary for the effective introduction of change into complex organizations, enabling the student to: (1) identify those situations where change is appropriate; (2) develop effective change strategies; (3) implement planned change; and (4) effectively monitor the change process.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2301.03 and 2302.03, or permission of instructor

**COMM 3306.03A or B Interpersonal Dynamics:** A more intensive study of the processes and possible problems associated with the dynamic interaction between individuals. Building upon Commerce

**2302.03**, such techniques as sensitivity training, structured exercises in interpersonal relations, and case studies are employed.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2301.03 and 2302.03, or permission of instructor

### **COMM 3307.03A or B New Venture**

**Creation:** This course is about entrepreneurship - the process of creating new businesses. It is designed to expose students to the issues, problems and challenges of creating new businesses and to provide students with the opportunity, within the framework of a formal course, to explore and develop business ideas they have been considering or wish to investigate. Cases are used to permit students to vicariously experience some of the issues entrepreneurs face. Experiential exercises enable the students to better understand themselves, their entrepreneurial potential and the merits of their new venture idea. A major field project requires the development of a detailed business plan for the new venture.

**Format:** Lecture 3 hours

**Prerequisites:** COMM 2102.03/2201.03/2401.03, or permission of instructor

**Exclusion:** Commerce 3308.03 (before 1991/92)

**COMM 3401.03A or B Buyer Behaviour:** In view of the very competitive situation in Western business, the firm that is successful designs and sells products that meet the desires of specific consumer segments. Thus, analysis and prediction of consumer behaviour are increasing in importance and sophistication. An extensive body of research evidence from marketing and the behavioral sciences is explored and evaluated to assess the marketing implications of elements of consumer behaviour. The emphasis of the class is empirical research on an outside project. The theoretical background for the projects and their progress are discussed in class. Students must do a considerable amount of background reading from the text and outside sources.

**Format:** Lecture/discussion, 3 hours

**Prerequisites:** Commerce 2401.03

### **COMM 3402.03A or B Marketing**

**Communications:** The communication tools of advertising, sales promotion, and public relations are presented as part of the overall marketing mix. Positioning, segmentation, and other marketing concerns will be studied as they relate to the firm's communications situation. Problems of the promotion manager will be presented to help students appreciate those factors which affect promotional decisions. The completion of a marketing communications plan for an outside organization is required, as is group case work.

**Format:** Lecture/case method/applied project work, 3 hours

**Prerequisites:** Commerce 2401.03

### **COMM 3404.03A or B Marketing Research:**

The scientific method in solving marketing problems. Emphasis on planning and formulating research problems, research design, application of sampling methods, statistical design of experiments, and analysis of data collected. A real-life research project is required, its nature to be determined considering student interests and backgrounds.

**Format:** Lecture/discussion, 3 hours

**Prerequisites:** Commerce 2502.03, 2401.03

**COMM 3405.03A or B Export Marketing:** The course will discuss reasons why Canadian companies get involved in exporting, and will focus on the development of marketing plans for the export of Canadian goods and services. Also discussed will be barriers faced by companies engaging in international trade, and government agencies providing support services to facilitate international transactions.

**Format:** Lecture/discussion, 3 hours

**Prerequisites:** Commerce 1102.03, 2401.03; Economics 1100.06

**Recommended:** Commerce 3701.03

**COMM 3406.03A or B Retailing:** Retailing is designed to provide an understanding of the functions, problems and practices of retail management. It provides an exposure to location planning, layout, organizational structure, retail personnel management, buying, pricing, retail accounting and control mechanisms. A major component of the course is the completion of a strategic plan for a retail business concept.

**Format:** Lecture/case method/applied project work, 3 hours

**Prerequisites:** Commerce 2201.03, 3401.03, 3410.03

### **COMM 3407.03A or B Logistics**

**Management:** An examination of the decision problems faced by the manager of the channels of distribution, the transportation and storage of products, and the communications and data processing system, in order to minimize the total cost of these activities and satisfy the marketing requirements of the firm and its customers. Topics include: the integrated logistics management concept, customer service, transportation, distribution centres, inventory management, materials management, packaging, purchasing, order processing and information systems, financial control, logistics organization, international logistics, reverse distribution and recycling, and the strategic logistics plan.

**Prerequisites:** Commerce 3410.03 and 3501.03, or permission of the instructor

**Cross-listing:** BUSI 6407.03

**COMM 3408.03A or B Transportation Modes and Policy:** This course examines the development and operation of various transportation modes and national transportation policy in Canada. Topics include the characteristics, cost structures and pricing decisions of the various modes (air, pipeline, rail, road and water); the National Transportation Act and other relevant legislation; the structure of the industry and government agencies; regulation; subsidies, passenger transportation and tourism, urban and metropolitan transportation; traffic and carrier management; transportation and environmental issues; current and emerging freight and passenger issues (with particular reference to the role of transportation in the Atlantic Region).

**Format:** Lecture/discussion/seminar, 3 hours

**Corequisite:** Commerce 3410.03, or permission of the instructor

**Cross-listing:** BUSI 6406.03

**COMM 3409.03A or B Sales Management:** This course is designed to provide an understanding of the tasks and problems facing today's sales manager and to familiarize one with current sales force management practices. Specifically, this class provides an exposure to the concepts, techniques and procedures in buyer-seller relations, salesmanship, organization of the sales force, personnel management, selection, sales training, motivation, compensation, evaluation and supervision, budgets, quotas, territories and sales control. Extensive use is made of the case method, and classroom discussion is used to extend the basic text material and examine other points of view.

**Format:** Lecture/case method/field work, 3 hours

**Prerequisite:** Commerce 2401.03

**Co-requisite:** Commerce 2201.03, 2301.03, 3101.03

**Exclusion:** Commerce 2402.03 (as this class was formerly numbered)

**Cross-listing:** BUSI 6405.03

**COMM 3410.03A or B Channels of Distribution:** Few companies deal with their final customers directly, most relying on a network of distribution channel intermediaries to get their products to market. This requires that producers carefully design, select and manage their distribution channel operations to achieve the desired level of performance. This course reviews theory and practice in this field of management, employing case analysis and projects to enhance student learning.

**Format:** Lecture/discussion, 3 hours

**Prerequisites:** Commerce 1102.03 or 2102.03, 2401.03, 2201.03, 2301.03

**Exclusions:** prior to 1988/89, this class was numbered Commerce

2401.03. Credit will be given for only one of Commerce 2401.03 (taken prior to 1988/89) and Commerce 2403.03 (taken after 1987/88) and Commerce 3410.03 (taken after 1992/93)

**COMM 3501.03A or B Production/Operations Management:** "Production" is one of the basic functions of any organization, whether it provides goods or services. Consequently, all managers, whatever their specialist interests, should have an understanding of some of the key concerns in managing operations, particularly if they aspire towards senior/general management positions. The purpose of this course is to provide such an understanding. It begins at a basic level by examining various types of production processes and continues by considering key aspects of scheduling, control, materials management and quality assurance. It concludes by examining production planning and strategy.

**Format:** Two 1.5-hour lectures (or case discussions)

**Prerequisites:** Commerce 2201.03, 2301.03, 2401.03, 2501.03

**COMM 3601.03A or B The Law of Business Associations:** Modern business operating through various forms of associations, in particular the corporation, raises complex problems: (a) the choice of the form of business enterprise; (b) the nature of the corporate personality; (c) the dual system of incorporation; (d) the corporate constitution; (e) the contracts between the corporation and outsiders; (f) the control and management of a corporation; (g) the capital structure of a corporation in the raising and maintenance of capital; (h) the securities legislation; and (i) organic changes in a corporation through mergers, amalgamations, sale of assets, take-overs, reorganization, receivership and winding up. Improved understanding of the complexities of the field, while providing indispensable minimal skills essential in reaching well-formulated decisions, is the objective.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2601.03, 2602.03

**COMM 3602.03A or B The Consumer and the Regulation of Business:** Complexities in the relationships between the consumer, business and government continue to increase. A rapidly expanding body of law designed to regulate these relationships in an effort to promote freedom of contract has developed. Of particular concern are problems relating to quality and safety of goods and services, warranties and guarantees, misleading advertising, unfair trade practices, the regulation of consumer credit, and legal remedies. Some of the more critical problems,

the legal remedies available, and the role of administrative tribunals, their jurisdiction, and their procedures and policies are examined.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2601.03, 2602.03

**COMM 3701.03A or B The Firm In the International Environment:** As an introduction to international business, this course examines the principal methods of doing business abroad and the dimensions of the international business environment that are important to each. Successful exporting calls for an understanding of, among others, international trade flows, national trade policies, international financial flows and foreign exchange movements. Accordingly, selected aspects of the theories of international trade and finance are presented, as well as the origins and current operations of major international institutions - the GATT, IMF and World Bank Group. Regional trading areas and international commodity arrangements are also covered. The course also treats the theory of the multinational enterprise, along with methods for analyzing the economic, political and social dimensions of host countries.

**Prerequisites:** Commerce 2102.03, 2201.03; Economics 2200.03 or 2201.03

**COMM 3801.03A:** Work term two, Bachelor of Commerce Co-op

**Prerequisites:** Commerce 2801.03 and successful completion of 9 full credits (18 half credits)

**COMM 3802.03:** Work term three (May - August), Bachelor of Commerce Co-op

**Prerequisites:** Commerce 3801.03 and successful completion of 11 full credits (22 half credits)

**COMM 4101.03A or B Advanced Topics In Accounting I:** This course covers advanced concepts in accounting. Topics include non-profit accounting, current pronouncements, special industry accounting, valuation, capital market and information efficiency, estates and trusts, bankruptcy, as well as an in-depth review of certain topics treated in prerequisite courses.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 3111.03, 3112.03 and 3114.03, or permission of the instructor

**Cross-listing:** BUSI 6110.03A or B

**COMM 4102.03A or B Advanced Topics In Accounting II:** This class has two objectives: (1) to provide an in-depth study of the interrelated topics of intercorporate investments, business combinations, consolidated financial statements and foreign operations, and (2) to develop a framework that may help to resolve controversial issues in advanced financial accounting.

**Format:** Lecture 3 hours; extensive use is made of assigned cases and problems

**Prerequisites:** Commerce 3111.03 and 3113.03, or permission of the instructor

**Cross-listing:** BUSI 6109.03

**COMM 4107.03A or B International Accounting:** Accounting practices in various countries are studied for both internal and external accounting and reporting problems. Foreign currency translation methods for Canadian companies operating in other countries are also reviewed.

**Format:** Lecture 2 or 3 hours, depending on the instructor and his/her emphasis on research as a supplement to didactic lecturing

**Prerequisites:** Commerce 3113.03, 3120.03

**COMM 4113.03A or B Contemporary Issues In Accounting:** Current issues in accounting and recent accounting literature are examined to provide a familiarity with the direction of accounting developments, and as a basis for future study of accounting problems and practices. Difficulties with present practices are explored, along with proposed alternatives.

**Format:** Seminar 2 or 3 hours, depending on the instructor's emphasis and on enrolment

**Prerequisites:** Commerce 3113.03

**Recommended:** Accounting concentration

**Cross-listing:** BUSI 6151.03

**COMM 4114.03B Computer Auditing:** This class examines the special considerations when auditing in a computerized environment. Three major areas covered in the class are: (1) Special internal control techniques/requirements and standards for examination of internal control. This includes standards for acquisition, development, implementation, conversion, testing and maintenance of systems, concentrating on the goal of ensuring that good internal control is attained. The course also covers the standards associated with computerized processing of transactions, creation and control over databases, and special planning for interruption of computer operations and re-start. (2) Audit procedures in a computerized environment. For each special internal control technique, there exist a number of possible audit procedures. Audit strategy is considered, including auditing around the system, reliance on and examination of computerized controls, and use of computer-assisted audit techniques. (3) Use of computer-assisted audit techniques, including use in the course of "Interactive Data Extraction and Analysis", a software package from the CICA, developed by the Auditor General of Canada.

**Format:** Lecture 2 hours; lab 1 hour

**Prerequisites:** Commerce 2110.03, 3114.03

**COMM 4120.03A or B Taxation:** An introduction to the taxation system in Canada, with special reference to the provisions of the Income Tax Act (federal) and their effects on business decisions. The measurement processes used to determine the tax base are examined, and the basic elements in the calculation of tax payable for individuals and corporations are discussed.

**Format:** Two 90-minute lecture sessions, with significant effort directed to the solving of short case problems

**Prerequisites:** Commerce 1101.03 or 2101.03; Economics 1100.06

**Exclusions:** Taxation I in the Law School, if taken recently

**Cross-listing:** BUSI 6102.03

**COMM 4121.03A or B Advanced Taxation:** (Not offered every year.) A more detailed examination of the corporate taxation system in Canada. Some examples of how tax awareness and planning can be a significant element in the regular business decision-making process for both individuals and corporations, and especially for private corporations.

**Format:** Lecture 3 hours per week for part of the term; the remainder consists of seminar presentations of researched topics by students

**Prerequisites:** Commerce 4120.03

**Recommended:** should be taken in the student's senior year

**Cross-listing:** BUSI 6103.03

**COMM 4150.03B Research in Accounting:** This class provides the opportunity for students to undertake both directed and independent study of selected topics in accounting, and requires a major research paper. This class is available to Honours students only.

**Format:** Research seminar 3 hours

**Prerequisites:** Commerce 4113.03, and an average grade of at least B+ in Commerce 3113.03, one of Commerce 3111.03 or 3112.03, one of Commerce 2110.03 or 3114.03, one of Commerce 2201.03 or 3201, one of Commerce 2602 or 2302, and Commerce 2602

**Recommended:** All Honours requirements met or currently being completed

**COMM 4200.06R Seminar in Finance:** Special seminar restricted to Honours students in Finance. Students are exposed to aspects of financial theory not covered in other classes. Each student prepares an original Honours thesis.

**Prerequisites:** an average of B+ in Commerce 2201.03, 2602.03, 3201.03, either 3202.03 or 3203.03, and Economics 2200.03 or 2201.03

**COMM 4201.03A or B International Financial Management:** This course focuses on the financial management of the individual firm in the international market place. Topics include the financial goals of multinational enterprises (MNEs), foreign exchange management, international money markets, financing foreign trade, international capital budgeting, and managing the MNE system.

**Prerequisites:** Commerce 1102.03 or 2102.03, 2201.03, 2502.03; Economics 2200.03 or 2201.03

**Cross-listing:** BUSI 6807.03

**COMM 4300.06R Seminar in Management:** Special seminar restricted to Honours students in Management.

**Prerequisites:** Commerce 3305.03 or one-half credit in Psychology at the 2000 level and a B+ average in Commerce 2301.03, 2502.03, 2302.03, 3303.03, 3304.03; Economics 2200.03 or 2220.03

**COMM 4350.06R Strategic Management:** This is the capstone course of the Commerce programme. It is about general management - the practice of business from the perspective of the general manager. As such, it integrates the concepts and techniques developed in earlier courses. The principal tool of the general manager is strategy, so the primary course concern is the formulation and implementation of strategy. Other issues addressed include: business ethics and the role of personal values in strategy, business-government relations, and managing strategic change. The course exposes students to a wide variety of organizations and contexts through cases, and includes a major field project where students, in small groups, study and advise actual businesses.

**Format:** Lecture 3 hours

**Prerequisites:** Commerce 2102.03, 1601.03, 2201.03, 2301.03, 2401.03, 2302.03, and 3601.03; Economics 1100.06

**COMM 4401.03A or B Marketing Strategy:** This course is intended for marketing majors who wish to deepen their understanding of how marketing strategy is formulated and implemented. This involves high-level, long time-frame decisions, since the product and market strategies are at issue. The course aims to improve decision-making skills in managing product/market portfolios and implementing marketing strategies. As a

capstone course, it is designed to permit the integration of learning from other marketing courses, as well as those in finance, policy and management. Instruction is mostly through case study discussions, report writing, and group presentations.

**Format:** Seminar 3 hours  
**Prerequisites:** COMM 2401.03/3401.03/3404.03 (or 3408.03 if transportation major) & 1 other marketing course (3410.03 - formerly 2403.03 - recommended)

**Recommended:** Concentration in marketing

**COMM 4402.03A or B Independent Study in Marketing:** The content of this class is negotiated with an individual instructor. The class offers the student the opportunity to explore in greater detail any particular area of interest in marketing.

**Format:** Directed readings and discussions  
**Prerequisites:** Commerce 2401.03, 3404.03, and two other half classes in marketing

**COMM 4403.03A or B Special Topics in Marketing:** A special interest seminar for senior level marketing students. The particular topics to be discussed are at the discretion of the instructor. Interested students should consult the School.

**Format:** Lecture/discussion/seminar, 3 hours  
**Prerequisites:** Commerce 2401.03, 3401.03  
**Exclusion:** Commerce 3403.03 (formerly)

**COMM 4413.03A Advanced Topics in Marketing:** This class carries students beyond the basic tools of Marketing, developing an understanding and appreciation of the value of theory in Marketing. (This is a required class for Honours students in Marketing.)

**Format:** Discussion/seminar, 3 hours  
**Prerequisites:** Commerce 2401.03, 3401.03, 3404.03, and at least one-half other class in Marketing at the 3000 or 4000 level

**COMM 4450.03B Honours Thesis in Marketing:** Students write an Honours thesis demonstrating their ability to gather, analyze, and synthesize data leading to new knowledge useful in understanding Marketing. Special seminar restricted to Honours students in Marketing.

**Format:** Seminar 3 hours  
**Prerequisites:** Commerce 4413.03A; an average grade of B+ in all Marketing classes beyond Commerce 2401.03  
**Co-requisites:** Commerce 4401.03B must be taken concurrently

**COMM 4501.03A or B Operations Research:** The goal of this course is an understanding of

the major O.R. techniques and how to apply them, not their theoretical development. Topics include: linear programming formulation, simplex method, sensitivity, integer variables, transportation, network problems, and dynamic programming. Cases are used to illustrate the main topics.

**Format:** Two 1.5-hour lectures  
**Prerequisites:** Commerce 1501.03 and 2502.03, or permission of the instructor

**COMM 4534.03A or B Managing Technological Entrepreneurship:** High technology based industries face unique management problems imposed by the rapid rate of technological change and the often uncertain environmental impacts of technological innovations. This class examines some of the techniques that have recently been developed to improve management effectiveness in high technology organizations and their responsiveness to environmental concerns.

**Prerequisites:** all required core area classes, except Commerce 4350.06, or consent of instructor  
**Cross-listing:** BUSI 6553.03

**COMM 4538.03A or B Applied Multivariate Analysis:** The convenience of packaged statistical programmes (e.g., SPSS) has opened the area of data analysis to researchers with a wide variety of backgrounds. Since it is possible to operate "canned" programmes without understanding advanced mathematics, there is a need for a class designed around a packaged statistical programme (SPSS) that introduces the user to the basic concepts underlying the techniques. An introductory class in multivariate analysis for students in business and economics. Students use and interpret statistical programmes with data sets from such business areas as marketing, finance and organizational behaviour.

**Prerequisites:** Mathematics at the 1000 level; Commerce 1501.03 and 2502.03, or consent of instructor  
**Cross-listing:** BUSI 6504.03

## Canadian Studies Programme

**Location:** Multidisciplinary House, 1444  
Seymour Street, Halifax, N.S.  
**Telephone:** (902) 494-3814  
**Fax:** (902) 494-2176

### Coordinator

J.A. Wainwright - (494-3814/3876)

### Faculty

R. Apostle (Sociology and Social Anthropology)  
B. Bednarski (French)  
M. Bradfield (Economics)  
D. Cameron (Political Science)  
D. Clairmont (Sociology and Social Anthropology)  
M. Cross (History)  
C. Danyak (History)  
J. Elliott (Sociology and Social Anthropology)  
R. Finbow (Political Science)  
B. Lesser (Economics)  
V. Miller (Sociology and Social Anthropology)  
P. Monk (English)  
I. Oore (French)  
H. Runts (French)  
J. Smith (Political Science)  
D. Sutherland (History)  
G. Taylor (History)  
A. Wainwright (English)

### Aim

The purpose of the programme is to allow students to concentrate part of their work on Canadian Studies both within their major field and outside of it. For example, a student who is planning to major in a subject will take a number of classes in that subject that are designated as Canadian. The student will in addition take a number of classes that are designated as Canadian outside his or her major field.

In other words, the Canadian Studies Programme does not attempt to establish a new major field. It seeks to use any one of a number of departments in the Faculty of Arts and Social Sciences as a base around which a student may effectively cluster a number of classes in Canadian subjects. However, all students in the Canadian Studies programme must take the half-credit interdisciplinary seminar, CANA 2000.03A or B. Students in this seminar will consider significant issues in Canadian history, politics, society, and literature and their interrelated contribution to this country's past, present, and future. Those who fulfil the Canadian-content

requirements of this programme will have the words "With An Emphasis in Canadian Studies" on their transcript upon graduation.

### Classes

Before enrolling in any of the classes listed below, students should consult with the Coordinator of Canadian Studies in the Multidisciplinary House.

In addition to the disciplines and classes listed below, there are individual Canadian content classes available from the Departments of Comparative Religion and Music, and from the School of Education. Please consult with the appropriate Chairs.

Students who are interested in a Canadian Studies programme should attempt in their first year to take an introductory class in the following subjects: English, French, History (preferably HIST 1200.06R if available), and in either Political Science or Sociology and Social Anthropology. (Prospective Economics majors may substitute an introductory class here).

With attention to prerequisite classes, in the second, third, and possibly fourth years of study, students, either as part of, or in addition to, fulfilling their major discipline requirements, should take:

- One or more classes in English from the list below;
- One or more classes in French from the list below. Students should take French 1000.06R and 2000.06R or 1020.06R or 1040.06R (In this latter case, a second-year French class, 2021.03A/2022.03B, is strongly recommended, though not required);
- One or more classes in History from the list below;
- One or more classes in either Political Science or Sociology and Social Anthropology from the lists below (again, an Economics major may substitute an upper-level class here).

**NOTE:** Classes marked \* are not offered every year. Please consult the current timetable on registration to determine if these classes are offered.

**CANA 2000.03A or B Distinct Societies - A Seminar in Canadian Studies:** An Interdisciplinary seminar for second, third, and fourth year students in the Faculty of Arts and Social Sciences who, in pursuit of their degree in a particular subject, are taking one or more Canadian-content classes in English, History, and French, as well as one or more Canadian-content classes in Political Science OR Sociology and Social Anthropology OR Economics. This seminar is also open, as an elective class, to FASS students with an interest in Canadian Studies who may not

complete the Canadian-content requirements. This seminar will be taught by a number of professors in various Faculty of Arts and Social Sciences disciplines. In individual weekly seminars students will consider essays and other short readings in English, History, French (in translation), Political Science, Sociology and Social Anthropology, and Philosophy. The class is designed to provide students with the opportunity to consider the structure and content of Canadian society from a variety of academic viewpoints - philosophical, historical, political, sociological, and literary. Students must consult with the Canadian Studies Coordinator before enrolling in the seminar.

**Instructors:** Walwright, Taylor, Cross, Danyak, Apostle, Elliott, Miller, Smith, Finbow, Cameron, Bednaraki, Oore, Runts, Burns  
**Format:** Seminar/Discussion  
**Co-requisites:** Canadian-content classes in English, History, French, and Political Science or Sociology and Social Anthropology or Economics

### English Classes Cross-listed With Canadian Studies

- \*ENGL 2207.06R Canadian Literature
- \*ENGL 4357.06R Honours Seminar in Canadian Literature

### French Classes Cross-listed With Canadian Studies

- FREN 2021.03A/FREN 2022.03B Études pratiques/Practice in Language Skills
- FREN 2203.03A or B Approches du texte littéraire/Approaches to Literary Texts
- \*FREN 3025.03A or B Les Parlers acadiens: Introduction linguistique/Linguistic Introduction to Acadian Dialectology
- \*FREN 3900.03A/FREN 3901.03B La Littérature canadienne-française/French Canadian Literature
- \*FREN 3910.03A or B Études acadiennes/Acadian Studies
- \*FREN 4902.03A Écrivains Québécois Contemporains/Contemporary Quebec Writers
- \*FREN 4904.03A or B Écrivaines Québécoises/Quebec Women Writers

### History Classes Cross-listed With Canadian Studies

- HIST 1200.06R History of Canada
- \*HIST 2202.03A or B Canada's Industrial Revolution, 1850-1950

HIST 2211.03A or B Social History of Canada Before 1870

HIST 2212.03A or B Social History of Canada Since 1870

HIST 2221.03A or B Rough Justice: Canadian Popular Culture to the 1890's

HIST 2222.03A or B Rough Justice: Canadian Popular Culture, 1890's to Present

HIST 2230.06R Canada in the 20th Century

HIST 2270.06R The Atlantic Provinces

\*HIST 2334.03A or B The United States, Canada, and the World

\*HIST 3220.03A or B Youth Culture in Canada, 1950's to 1970's

\*HIST 3222.03A or B Topics in Canadian Social History, 19th and 20th Centuries

\*HIST 3225.03A or B Crime, Punishment and the Criminal Law in Canadian Society

\*HIST 3230.03A or B Labour and Community in 19th Century Canada

\*HIST 3231.03A or B The Canadian Working Class: The 20th Century Experience

\*HIST 3245.03A or B French Canada

\*HIST 3250.03A or B Canada Within the Empire

\*HIST 3255.03A or B The Age of MacDonald and Laurier

\*HIST 3260.03A or B West by North: History of the Canadian West and North

\*HIST 3261.03A or B The Rural Experience in Canada

\*HIST 3272.03A or B Themes in the History of Atlantic Canada

HIST 3273.03A or B Nova Scotia: Pre-Confederation

HIST 3274.03A or B Nova Scotia: Post-Confederation

\*HIST 3286.03A or B The Urban Experience in Canada

\*HIST 3292.03A or B Wealth and Power in North America

\*HIST 3302.03A or B Technology and History in North America

\*HIST 3810.03A or B Women in Capitalist Society: The North American Experience Cross-listed in Women's Studies as \*WOST 3305.03A or B.

\*HIST 3750.03A or B History of Seafaring

**Please Note:** 3000-level classes have prerequisites which apply to Canadian Studies students as well as History majors.

## **Political Science Classes Cross-listed With Canadian Studies**

POL 2200.06R Canadian Government and Politics

\*POL 2226.03A or B Government and Business Relations

\*POL 3205.03A or B Canadian Political Thought

POL 3216.03A or B Local and Regional Government

POL 3220.03A or B Intergovernmental Relationships in Canada

\*POL 3224.03A or B Canadian Political Parties

\*POL 3228.03A or B Interest Groups: Function and Management

\*POL 3235.03A or B Regional Political Economy in Canada

\*POL 3245.03A or B The Judicial System and Canadian Government

\*POL 3250.03A or B Canadian Public Administration

POL 4204.06R Advanced Seminar in Canadian Government

POL 4240.03A or B Policy Formulation in Canada

POL 4241.03A or B Introduction to Policy Analysis

## **Social Anthropology Classes Cross-listed With Canadian Studies**

\*SOSA 3008.03A or B Canadian Society and Politics

Please note that this class is not offered every year. However, there are numerous Canadian content classes in the Department. Students should consult with the Chair and then with the Coordinator of Canadian Studies.

## **Economics Classes Cross-listed With Canadian Studies**

ECON 2232.06R Canadian Economic History

ECON 3316.03B Collective Bargaining and Labour Market Policy

\*ECON 3317.03B Poverty and Inequality

ECON 3324.06R Public Finance

\*ECON 3326.03A Money and Banking

ECON 3332.03A or B Resource Economics

\*ECON 3336.03B Regional Development

\*ECON 3432.06R Regional Economics

\*ECON 4000.06R Seminar on Economic Policy (not usually offered)

\*ECON 4426.03B Monetary Policy

\*ECON 4433.03B Intergovernmental Fiscal Relations

Other Economics classes that deal with Canadian issues are available. Students should consult with the Chair and with the Coordinator of Canadian Studies.

## Chemistry

Location: Chemistry Building  
 Telephone: (902) 494-3305  
 Fax: (902) 494-1310

### Chairperson of Department

R.J. Boyd

### Faculty Undergraduate Advisors

T.S. Cameron (494-3769)  
 T.P. Forrest (494-3315)  
 J.S. Grossart (494-3314)  
 K.R. Grundy (494-3409)  
 R.D. Guy (494-7079)  
 P.G. Kusalik (494-3627)  
 J.A. Pincock (494-3324)  
 R. Stephens (494-7075)  
 R.E. Wasylshen (494-2564)  
 R.L. White (494-6403)

### Emeritus Professors

O. Knop, DSc (Laval), Harry Shirreff Professor of Chemical Research  
 D.E. Ryan, BSc (UNB), MA (Tor), PhD, DSc (Lond), DIC

### Professors

D.R. Arnold, BS (Bethany College), PhD (Roch), Alexander McLeod Professor of Chemistry  
 W.A. Aus, PhD (Vienna)  
 R.J. Boyd, BSc (UBC), PhD (McG)  
 T.S. Cameron, BA, MA, DPhil (Oxon)  
 A. Chatt, BSc (Calcutta), MSc (Roorkee), MSc (Wat), PhD (Tor)  
 H.C. Clark, BSc, MSc, PhD (Auckland), PhD, ScD (Cantab), President, Dalhousie University  
 J.A. Coxon, MA (Cantab), MSc, PhD (East Anglia)  
 T.P. Forrest, BSc (MtA), MSc (Dal), PhD (UNB)  
 J.S. Grossart, BSc, MSc, PhD (Natal)  
 J.C.T. Kwak, BSc, MSc, PhD (Amsterdam)  
 K.T. Lefk, BSc, PhD (Lond)  
 P.D. Pacey, BSc (McG), PhD (Tor)  
 J.A. Pincock, BSc, MSc (Man), PhD (Toronto)  
 L. Ramaley, BA (Col), MA, PhD (Prin)  
 R. Stephens, MA (Cantab.), MSc (Bristol), PhD (Lond), DIC  
 R.E. Wasylshen, BSc (Wat), MSc, PhD (Man)  
 M.A. White, BSc (Western), PhD (McM)

### Associate Professors

N. Burford, BSc (Wales), PhD (Calgary)  
 T.B. Grindley, BSc, MSc, PhD (Queen's)  
 K.R. Grundy, BSc, MSc Hons, PhD (Auckland)  
 R.D. Guy, BSc (SFU), PhD (Carl)  
 D.L. Hooper, BSc, MSc, PhD (UNB)  
 C.H. Warren, BSc (Western), PhD (McM)

### Assistant Professors

P.G. Kusalik, BSc (Lethbridge), MSc, PhD (UBC), (NSERC University Research Fellow)

P.D. Wentzell BSc (Dal), PhD (Mich State)  
 R.L. White BSc (Dal), PhD (McM)

### Visiting Scientists (1993)

J. Kankare, University of Turku, Finland  
 A. Laaksonen, University of Stockholm, Sweden  
 G. Motesdayan-Aval, National Teacher's University, Iran

### Senior Instructors

S.A. Barkhouse, BSc (MSVU), BEd, MBA (Dal)  
 C.D. Burkholder, BSc (Wat)  
 C.M. Byers, BSc Hons (Dal)  
 J. Gabor, MSc (Budapest)  
 D.J. Silvert, MSc (CWURU)  
 K.E. Thompson, BSc (Acadia), MBA (SMU)  
 M.E. Warren, BSc (Western)

### Adjunct Professors (1993)

R.K. Boyd, National Research Council, Institute for Marine Biosciences  
 J.M. Curtis, National Research Council, Institute for Marine Biosciences  
 A.J. Thakkar, UNB, BSc, PhD (Queen's)  
 K. Vaughan, St. Mary's, BSc (UMIST), PhD (St. Andrew's)  
 M. Zaworotko, St. Mary's, BSc (London), PhD (Alabama)

### Postdoctoral Fellows and Research

#### Associates/Assistants (1993)

G. Bednarz, MSc (Lódz), PhD (Dal)  
 R. Cordes, BSc (Dal), MSc (UBC)  
 X. Du, PhD (Dal)  
 J.J. Effing, PhD (University of Mainz, Germany)  
 K. Eichele, PhD (University of Tübingen, Germany)  
 L.A. Erikson, PhD (Uppsala, Sweden)  
 H. Furue, BSc (Inter. Christ Univ., Japan), MSc (Osaka Univ., Japan), PhD (Queen's)  
 W. Kwiatkowski, PhD (Technical University of Lódz, Poland)  
 C.B. Lucasius, PhD (Univ. of Nijmegen, The Netherlands)  
 K.C. Manthorne, BSc (Dal), BSc Eng (TUNS)  
 S. Mason, PhD (Leicester)  
 I. McLennan, PhD (Guelph)  
 S.V. Serada, BSc (Kiev State University), PhD (A.N. Neameyanov Inst. of Organoelement Compounds, Moscow)  
 Z. Shi, BSc (Shandong), PhD (Dal)  
 X. Sun, BSc, MSc (Shandong Teacher's Univ.), PhD (Dal)  
 I. Svishchev, PhD (Moscow)

## Introduction

Chemistry is one of the fundamental sciences. It explores the interactions among different forms of matter and energy. Its main purpose is to gain a basic - but also a very useful - understanding of how compounds react and when and why they form particular

products. The universe and the world in which we live are composed of chemicals. Therefore, chemical knowledge helps us to influence and protect our environment; chemical principles and procedures are found everywhere in the groundwork of the natural and medical sciences.

The Honours BSc is the expected professional requirement for a chemist. Chemists with honours degrees are employed in widely differing areas in industry and government. This degree will provide a background for further graduate work in chemistry or in such diverse areas as medicine, law, business administration, biochemistry, oceanography and geology. A postgraduate degree is essential for independent original research in an industrial career or in university teaching.

Chemistry 1010.06 (or 1020.06 or 1040.06 or 1500.06) is an introduction to the discipline. All students intending to take classes in chemistry beyond the first-year level should include classes in mathematics (Math 1000.03/1010.03) and physics (not PHYC 1000.06) in their first year. Final grades in these classes should not be less than C; if they are, the student is bound to find advanced classes in chemistry difficult and frustrating.

At the second-year level the student is exposed to the four traditional areas of specialization in chemistry. Inorganic chemistry deals with all the chemical elements except carbon, and the compounds which these elements form. Organic chemistry is devoted to the study of the almost limitless number of compounds containing carbon. Analytical chemistry is concerned with the determination of the composition of substances, and with the detection of elements in quantities however minute. Physical chemistry is concerned with both macroscopic phenomena, including why and at what rates chemical reactions occur, and with molecular phenomena through the application of spectroscopic techniques. Beyond the second-year level, a student's studies in chemistry become increasingly concentrated in one of these four areas. The student may also be introduced to biochemistry or the chemistry of living organisms, as well as such specialties as structural chemistry, radiochemistry, environmental chemistry and theoretical chemistry.

## Degree Programmes

The Honours in Chemistry, Joint Honours in Chemistry and Biochemistry and Advanced Major in Chemistry as described in this calendar, are programmes accredited by the Canadian Society for Chemistry (CSC). CSC accreditation ensures that graduates of these

programmes have met certain criteria concerning the quantity and quality of their instruction and qualifies such graduates for membership in the CSC.

See "Degree Requirements" section for complete details.

## Honours in Chemistry

This programme is intended to provide a broad training in chemistry while at the same time making provision for the individual interests of students. Competence in mathematics as well as chemistry is required. All honours students must consult annually with the Honours Student Advisor and obtain approval of their class selection.

All nine required chemistry credits must be passed with a grade of at least C.

## Departmental Requirements

### Classes required in Honours:

<b>1000 level:</b>	Chemistry 1010.06, 1020.06, 1040.06 or 1500.06
<b>2000 level:</b>	Chemistry 2101.03, 2201.03, 2301.03, 2302.03, 2400.06
<b>3000 level:</b>	3101.03 or 3102.03, 3201.03, 3301.03, 3302.03, 3401.03 and 3880.00
<b>4000 level:</b>	4880.00, honours qualifying credit (8880.00)

The remaining seven half credits in Chemistry must be chosen from the classes listed below, with at least one half credit from each of the groups A, B, C and D.

- A: CHEM 3101.03, or 3102.03, 4101.03, 4102.03
- B: CHEM 3202.03, 4201.03, 4202.03, 4203.03
- C: CHEM 3303.03, 4301.03, 4304.03, 4305.03, 4306.03, 4307.03
- D: CHEM 3402.03, 3403.03, 4401.03, 4402.03, 4403.03
- E: CHEM 3501.03, 4501.03, 4502.03, 4503.03, 4504.03

### Other required classes:

Math 1000.03 and 1010.03, Math 2000.06 or equivalent, Physics 1100.06

Two credits beyond the 1000 level must be taken in a minor subject. Minor subjects allowed for this degree are biochemistry, biology, computing science, earth sciences, mathematics, or physics. The minor, the unspecified credits in chemistry, and electives should be chosen according to the future plans of the student.

## Combined Honours Programme

The department has designed a number of programmes which allow a student to obtain a Combined Honours Degree in Chemistry with one of Biochemistry, Biology, Computing Science, Earth Sciences, Mathematics or

**Physics.** To obtain an introduction to all the basic areas of chemistry, CHEM 2101.03, 2201.03, 2301.03, 2302.03 and 2400.06 must be part of any combined honours programme involving Chemistry, and must be passed with a grade of at least C.

The additional eight credits in chemistry and the other subject must be chosen in consultation with the two departments involved. Students must consult the Honours Student Advisor of the Department of Chemistry and the Chair of the other area of study before registering in the combined programme. Students should also consult the Department's Handbook "Undergraduate Studies in Chemistry" for more information.

## Advanced Major in Chemistry

### Departmental Requirements

**Classes required in Advanced Major:**

- 1000 level:** Chemistry 1010.06 or 1020.06 or 1040.06 or 1500.06
- 2000 level:** Chemistry 2101.03, 2201.03, 2301.03, 2302.03 and 2400.06
- 3000 level:** 3101.03 or 3102.03; 3201.03, one half credit from 3301.03, 3302.03, 3401.03

All Chemistry classes must be passed with a grade of at least C-.

**Other required classes:**

Math 1000.03, 1010.03, 2000.06 or equivalent and Physics 1100.06 or equivalent

## Advanced Double Major Programme

The Department has a number of programmes which allow a student to obtain an Advanced Double Major Degree in Chemistry with one of Biochemistry, Biology, Computing Science, Earth Sciences, Mathematics or Physics. To obtain an introduction to all the basic areas of chemistry, CHEM 2101.03, 2201.03, 2301.03, 2302.03 and 2400.06 must be part of any advanced double major programme involving Chemistry, and must be passed with a grade of at least C-.

Additional credits in Chemistry and the other subject must be chosen in consultation with the two departments involved. Students are encouraged to consult an academic advisor in the Department of Chemistry and the Chair of the other area of study before registering in the programme. Students should also consult the Department's Handbook "Undergraduate Studies in Chemistry" for more information.

## Major in Chemistry

### Departmental Requirements

**Classes required in Major:**

- 1000 level:** Chemistry 1010.06 or 1020.06 or 1040.06 or 1500.06
- 2000 level:** Chemistry 2101.03, 2201.03, 2301.03, 2302.03 and 2400.06
- 3000 level:** At least one credit at or above the 3000 level

All Chemistry classes must be passed with a grade of at least C-.

**Other required classes:**

Physics 1300.06 or 1100.06, Math 1000.03, 1010.03

## Earth System Science

Refer to the Earth System Science section in this calendar.

## Classes Offered

A or B indicates that the class is a half credit and is offered in either the A or B term or in exceptional circumstances in both terms. C indicates a half credit class extending over both the fall and winter terms. An asterisk (\*) indicates that the class is not necessarily offered every year. Consult the timetable for up-to-date details.

Early registration for classes is strongly encouraged. In recent years certain classes, particularly CHEM 1010.06R, 1500.06R, 2101.03A or B, 2201.03A or B and 2400.06R have reached maximum possible enrolment long before completion of the final registration period in September.

Students who have passed a first-year Chemistry class with a grade of D should consider themselves inadequately prepared for further studies in this subject. Such students may not be allowed to register directly for second-year Chemistry classes but may request that their names be put on a waiting list. Consult the Department for details. Duly registered students, who do not show up for the first two scheduled lectures in a class, may lose their place to students on the waiting list.

## Chemistry Resource Centres

First-Year and Advanced Resource Centres are located in Rooms 122 and 115. The former is staffed with people who can help with Chemistry problems. Facilities include study areas, a computer laboratory with special programmes designed for Chemistry students, molecular models, audio-visual aids and a small library.

**\*CHEM 1000.06R The Chemical World:** This class is intended for students who want to take only a first-year credit in science, and who wish to understand some of the chemical aspects of the world around us. The class does not use a mathematical approach to science, and can be taken by students with no, or limited, previous chemistry experience. The class will cover the development of chemical knowledge from early times to the present. By means of lectures, frequent (and sometimes spectacular!) demonstrations, and laboratory or reading projects, students will be introduced to the world of chemistry and to chemicals and chemical ideas in everyday use. Students contemplating careers, e.g., in law, business, or government could profit from the material studied in this class. Students will be required to do extensive written assignments, which will be marked both on content and writing style. CHEM 1000.06R is an approved "writing class" in the College of Arts and Science. CHEM 1000.06R does not serve as a prerequisite for second-year chemistry classes.

**Instructor:** T.S. Cameron  
**Format:** lectures 2 hours, lab/tutorial 2 hours

**Exclusions:** CHEM 1000.06R cannot be taken concurrently with or after CHEM 1010.06R, 1020.06R, 1040.06R and 1500.06R

**CHEM 1010.06R General Chemistry:** A study of the fundamental principles of chemistry with particular reference to stoichiometry, atomic and molecular structure, gases, liquids and solids, solutions, thermochemistry, equilibria, chemical properties of common substances, acid-base and oxidation-reduction reactions and chemical kinetics. Students enrolling in this class should have a background in chemistry equivalent to the Nova Scotia XII level. Mature students should consult the Department. It is important that students be familiar with exponents and logarithms, and be able to solve quadratic and simultaneous equations.

**Instructors:** A. Chatt, T.B. Grindley, P.G. Kusalk, L. Ramaley, R. Stephens, C.H. Warren  
**Format:** lectures 3 hrs, tutorial 1 hr, lab 2 hrs

Any of CHEM 1010.06R, 1020.06R, 1040.06R or 1500.06R may serve as a prerequisite for any 2000 level class in chemistry, and as a credit in the College of Arts and Science. However, credit will only be given for one of 1010.06, 1020.06, 1040.06 or 1500.06.

**CHEM 1020.06R General Chemistry for Engineering Students:** This class is similar to Chem 1010.06, but with greater emphasis on quantitative topics, including chemical

equilibrium, thermodynamics, reaction kinetics and electrochemistry. The class is open only to students enrolled in the Engineering programme, but it serves also as a regular prerequisite for all second-year chemistry classes.

**Instructors:** J.A. Coxon, R.E. Wasylishen  
**Format:** lectures 3 hours, tutorial 1 hour, lab 2 hours

**CHEM 1040.06R General Chemistry for the Life and Health Sciences:** The basic content and rigour of this class is the same as that of CHEM 1010.06. However, more emphasis is given to organic (as opposed to inorganic) structures, and topics that are of interest to the life and health sciences are favoured over those of the inanimate variety. Thus, chemical principles are illustrated primarily by examples from living systems. Additional areas such as enzyme kinetics, isotopes in medicine, and several types of bio-analyses are introduced in short and simple form. Some chapters take note of the material covered in other prominent first-year classes, particularly in biology and psychology. Requisite highschool chemistry (N.S. grade XI/XII) may be reviewed in tutorial but is not retaught in lecture. CHEM 1040.06 uses the same textbook and laboratory experiments as CHEM 1010.06 and serves as a regular prerequisite for all second-year Chemistry classes.

**Instructor:** T.P. Forrest  
**Format:** lectures 3 hours, tutorial 1 hour, lab 2 hours

**Prerequisite:** N.S. Grade XII Chemistry (441) or equivalent

**CHEM 1410.03A Introductory Chemistry:** A descriptive introduction to chemistry with emphasis on materials related to the life and health sciences. The class requires a background of high school chemistry and mathematics. Topics covered include units, matter, the Periodic Table, stoichiometry of reactions, gases, liquids, solids, solutions, simple concepts of equilibria, acids, bases, radioactivity hydrocarbons, alcohols, ethers, amines, amides, esters and simple carbohydrates and proteins. The organic chemistry deals primarily with structures and introduces molecules of medicinal interest.

**Instructor:** P.D. Pacey  
**Format:** lectures 3 hours, tutorial 2 hours

**Note:** This class does not serve as a prerequisite for any other chemistry class.

**CHEM 1430.06R Introductory Chemistry and Biochemistry:** This class combines CHEM 1410.03A and Biochemistry 1420.03B for use by Nursing students.

**Note:** This class does not serve as a prerequisite for any other classes in chemistry or biochemistry.

**CHEM 1500.06R Principles of Chemistry (formerly 1030R):** Similar to CHEM 1010 but with more emphasis on atomic and molecular structure, thermodynamics, equilibria and kinetics. This class is intended for prospective science students and for students wishing to gain a more thorough introduction to the principles of chemistry. Students enrolling in this class must have attained high standing in high school chemistry and are advised to contact the lecturer prior to registering for this class. Concurrent enrolment in Mathematics 1000.03 and 1010.03, or in Mathematics 1500.06 is advised.

**Instructors:** J.C.T. Kwak, P. Wentzell  
**Format:** lectures 3 hours, lab/tutorial 3 hours

**CHEM 2101.03A or B Introductory Inorganic Chemistry:** The fundamentals of inorganic chemistry are covered. Specific topics include: ionic bonding and the nature of solids, the structure of atoms and simple bonding theory, coordination chemistry of the transition metals and selected topics in main group chemistry. The preparation, analysis and observation of inorganic compounds are the laboratory assignments.

**Instructor:** N. Burford, T.S. Cameron  
**Format:** lectures 3 hours, lab 3 hours  
**Prerequisites:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06

**CHEM 2201.03A or B Introductory Analytical Chemistry:** An introduction to those analytical techniques most often employed in modern chemical analysis. Topics include: acid-base and redox chemistry and the theory of titrations based on these types of reactions; atomic and molecular spectroscopy in the visible and ultraviolet regions of the electromagnetic spectrum; potentiometry and the use of ion selective electrodes; and gas and liquid chromatography. Laboratory experiments will be based on topics selected from the lectures and will introduce the student to a wide variety of methods.

**Instructors:** R.D. Guy, R. Stephens  
**Format:** lectures 3 hours, lab 3 hours  
**Prerequisites:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06

**CHEM 2301.03A Chemical Thermodynamics:** The physical chemist attempts to describe macroscopic systems and chemical reactivity based on an understanding of the atoms and molecules which make up the systems we study. This first class in physical chemistry will start with a discussion of the forces between molecules, and the properties of gases, liquids and solids. Energy relations in macroscopic systems are presented; further topics in thermodynamics include thermochemistry, entropy, and free energy relations, with many applications including phase equilibria, chemical equilibrium, solutions and colligative properties. In the

laboratory students will perform experiments based on many of the concepts discussed in class, including an introduction to data handling by computer.

**Instructor:** J.C.T. Kwak  
**Format:** lectures 3 hours, lab 3 hours  
**Prerequisites:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06, Mathematics 1000.03 and 1010.03

**CHEM 2302.03B Chemical Kinetics and Dynamics:** This class examines the dynamics of systems by considering motion and reactivity of molecules. Topics include transport properties such as diffusion and ionic conductivity, the molecular kinetic theory of gases, and rates of chemical reactions. The latter are studied in detail, with applications in atmospheric chemistry, liquid and solid state reactivity, catalysis, enzyme kinetics and polymers. The laboratory experiments emphasize the determination of molecular motion and chemical reactivity using a variety of techniques and instrumental methods.

**Instructor:** P.D. Pacey  
**Format:** lecture 3 hours, lab 3 hours  
**Prerequisites:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06, Mathematics 1000.03

**\*CHEM 2303.03B or A Physical Chemistry for the Life Sciences:** Chemistry majors may not apply credit for CHEM 2303.03 towards the major requirements for a degree in Chemistry. Those who do not plan a career in chemistry, but who can use the principles and concepts of physical chemistry in related areas, are introduced to the basic ideas of physical chemistry with the necessary mathematical concepts in simple terms. Previous knowledge of calculus is not necessary. The principal topics: thermodynamics, rates of enzyme-catalyzed reactions, chemical equilibrium and spectroscopy are treated by application to examples of biological and environmental interest.

**Instructor:** P.G. Kusalk  
**Format:** lectures 3 hours, lab/tutorial 3 hours

**Prerequisite:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06

**Exclusions:** Credit will not be given for both of CHEM 2301.03 and CHEM 2303.03 or for both of CHEM 2302.03 and CHEM 2303.03

**CHEM 2400.06R Introductory Organic Chemistry:** This class gives a broad introduction to the chemistry of carbon compounds, including molecular shapes and bonding, characteristic reactions of functional groups and the way in which they take place, and the application of spectroscopy to organic

**chemistry.** Laboratory work is designed to teach a broad range of fundamental operations and techniques used in modern organic chemistry laboratories. Students should have a good comprehension of the principles studied in CHEM 1010.06 or equivalent, as evidenced by a grade of at least C.

**Instructors:** D.R. Arnold, T.P. Forrest, and J.A. Pincock

**Format:** lecture 3 hours, lab 3 hours

**Prerequisites:** CHEM 1010.06 or 1020.06 or 1040.06 or 1500.06 with a grade of at least C.

**SCI 3000.06R Science Fundamentals:** See class description in Science, interdisciplinary section of this calendar.

**CHEM 3101.03A or B Chemistry of the Main Group Elements:** This class gives an overview of the chemistry of the non-metal elements (p block), with particular emphasis on the elements of the second (B - F) and third rows (Al - Cl). Preparative methods, molecular structure, characterization, and bonding are discussed, with some examples examined in detail. The laboratory introduces synthetic procedures for the preparation of inorganic compounds and some study of their reactions. Some of these experiments involve special techniques, such as vacuum line manipulation and high temperature.

**Instructor:** N. Burford

**Format:** lecture 3 hours, lab 3 hours

**Prerequisite:** CHEM 2101.03

**CHEM 3102.03A or B Coordination Chemistry of the Transition Metals:** Modern bonding theories are used to unify discussion of the chemical and physical properties of compounds of the transition elements. The laboratory experiments introduce procedures for the preparation and characterization of compounds of the transition elements. The compounds prepared illustrate the principles discussed in class and exhibit unusual structures, geometries, oxidation states and other interesting properties.

**Instructor:** K.R. Grundy

**Format:** lecture 2 hours, tutorial 1 hour, lab 3 hours

**Prerequisite:** CHEM 2101.03

**CHEM 3201.03A Analytical Spectroscopy and Separations:** The most commonly employed instrumental techniques in chemical analysis use spectroscopy in some form or involve separations. Qualitative and quantitative analysis and the instrumentation involved are discussed in some detail for spectroscopic methods in the visible, ultraviolet, and X-ray regions of the spectrum. Various methods of separation including precipitation, solvent extraction, and the various types of chromatography are presented. Laboratory experiments illustrate the above techniques with practical examples.

**Instructor:** R.D. Guy

**Format:** lecture 3 hours, lab 3 hours

**Prerequisite:** CHEM 2201.03

**CHEM 3202.03B Instrumental Methods of Analysis:** This class deals with the application of various important instrumental and computer techniques to problems in chemical analysis. These techniques include electrochemistry, radiochemistry, mass spectrometry, sampling theory, electrophoresis, data analysis and automation. Basic chemical, physical and mathematical principles are explained, instrumentation is described and analytical applications are examined. Laboratory experiments are designed to illustrate the techniques covered in the lectures.

**Instructor:** P.D. Wentzell

**Format:** lecture 3 hours, lab 3 hours

**Prerequisite:** CHEM 3201.03 or instructor's consent

**CHEM 3301.03A Quantum Mechanics and Chemical Bonding:** This class gives an introduction to quantum mechanics and its application to spectroscopy and the electronic structure of atoms and molecules. The postulates of quantum mechanics are presented and applied to some simple physical systems, followed by a discussion of the rotations and vibrations of molecules, and the electronic structure of atoms, concluding with an introduction to the simple Hückel molecular orbital method. The relevance to chemical bonding will be stressed.

**Instructor:** C.H. Warren

**Format:** lectures 3 hours

**Prerequisite:** Mathematics 2000.06 or 2480.03A/2490.03B and CHEM 2101.03 or 2301.03 or 2302.03

**CHEM 3302.03B Symmetry and Spectroscopy:** Many different types of electromagnetic radiation, such as ordinary visible light, microwave radiation, and X-rays, are absorbed and emitted by all atoms and molecules. The understanding and uses of such phenomena constitute the subject of spectroscopy. Spectroscopic methods are used extensively in all areas of chemistry and a wide range of applications have been developed. In recent years, the traditional approaches have been complemented by dramatic development of newer techniques, such as magnetic resonance and laser spectroscopies. This class provides an introduction to the physical basis and applications of most types of spectroscopy, including microwave, infrared, visible, ultraviolet, laser, Raman, and magnetic resonance techniques. The topics of molecular symmetry and elementary group theory are introduced at an early stage, and provide a satisfying and unifying thread extending over all areas of spectroscopy.

**Instructor:** J.A. Coxon  
**Format:** lecture 3 hours, lab 3 hours  
**Prerequisites:** CHEM 3301.03 or permission of the instructor

**CHEM 3303.03A or B Materials Science:** The emphasis of this class will be on the exposition of the underlying principles involved in understanding physical properties of materials, such as thermal and mechanical stability, and electrical and optical properties. All phases of matter will be examined: gases, liquids, films, liquid crystals, perfect crystals, defective solids, glasses. The principles of important processes such as photography and Xerography will be explained.

**Instructor:** M. A. White  
**Format:** lecture 3 hours  
**Prerequisites:** CHEM 2301.03 or Physics 3200.03A or Earth Sciences 2100.06R or Engineering 2340.03A or permission of the instructor.

**CHEM 3401.03B Intermediate Organic Chemistry:** This class is a continuation of CHEM 2400.06 and covers many of the topics included in the last third of modern organic chemistry texts. Topics presented include enolate anions, amines, aromatics, heterocycles, carbohydrates, amino acids, and concerted reactions. The synthesis of compounds of chemical and pharmaceutical interest will be used as a focus for these topics. In addition, an introduction to some of the principles of mechanistic organic chemistry will be presented. Students work independently in the laboratory on the preparation of organic compounds. The success of student syntheses is monitored by the use of spectroscopic and other techniques. Students should have a good comprehension of the principles studied in CHEM 2400.06R, as evidenced by a grade of at least C.

**Instructor:** J.A. Pincock  
**Format:** lecture 3 hours, lab 3 hours  
**Prerequisite:** CHEM 2400.06R (or equivalent)

**CHEM 3402.03A Identification of Organic Compounds:** The class develops separation techniques, together with wet chemical and spectroscopic analysis methods, that were introduced in CHEM 2400.06. Spectral techniques studied include ultraviolet, infrared, Raman, proton and carbon nmr, and mass spectrometry. Students, using a variety of techniques, work independently in the laboratory to identify unknown substances and to separate and identify components of mixtures. Students should have a good comprehension of the principles studied in CHEM 2400.06R, as evidenced by a grade of at least C.

**Instructor:** J.S. Grossert  
**Format:** lecture 3 hours, lab 3 hours

**Prerequisite:** CHEM 2400.06 (or equivalent)

**CHEM 3403.03B Bioorganic Chemistry:** The principles of organic chemistry that are used by the organic chemist to explain and predict the reactivity of compounds will be used to study the behaviour of organic compounds in nature. To cause a reaction to occur in the laboratory it might be necessary to alter functional groups and provide other conditions necessary to induce particular reactivity. In a natural system the same principles can be considered in the analysis of the reactivity of the organic compounds involved. The basic principles controlling the reactivity of organic compounds will be reviewed and applied to a study of selected naturally occurring reaction pathways.

**Instructor:** R.L. White  
**Format:** lecture 3 hours  
**Prerequisite:** CHEM 2400.06 or equivalent

**CHEM 3501.03B Numerical Methods in Chemistry:** This class provides an introduction to numerical methods that can be applied to various problems in chemistry. Students will utilize these techniques on microcomputers. Topics to be covered include the treatment of experimental data by least squares methods; by curve fitting, smoothing, and interpolation techniques; and by numerical integration. Matrices, determinants, and eigenvalue equations will be studied and applied to problems in quantum chemistry and spectroscopy. Complex equilibria will be examined through the numerical solution of simultaneous equations. Computer graphics will be introduced and applied to topics such as wave functions, gas laws, potential energy contours, coordinate transformations and molecular geometries. Computer simulation of experiments will also be examined.

**Instructor:** C.H. Warren  
**Format:** lecture 3 hours  
**Prerequisites:** CHEM 2301.03 and 2302.03 and Mathematics 2000.06 or 2480.03A and 2490.03B or instructor's consent

**CHEM 3890.06R General Topics in Chemistry:** A non-credit seminar class to be given by invited speakers. Attendance at all seminars is required of all 3rd year Honours Chemistry students.

**\*CHEM 4101.03A or B Topics in Non-Metal Chemistry:** Following a brief overview of the fundamental aspects of preparation, structure and bonding for familiar systems, selected topics are examined in some detail. An emphasis is placed on novel structure and bonding arrangements in comparison with carbon chemistry and other common systems.

**Instructor:** N. Burford.  
**Format:** lectures 3 hours  
**Prerequisite:** CHEM 3101.03  
**Cross-listing:** CHEM 5101.03

**\*CHEM 4102.03A or B Advanced Transition Metal Chemistry:**

Organotransition metal chemistry has grown over the last several decades into one of the most important areas of research and development in inorganic chemistry. In this class the most important types of organic ligands and their bonding characteristics will be surveyed, as will the most important reaction pathways such as migratory insertion, oxidative addition, nucleophilic addition, etc. The class concludes by examining homogeneous catalysis by organotransition metal complexes. The lab consists of several projects in which the principal reaction pathways are explored and the important characterization techniques are employed.

**Instructor:** K.R. Grundy  
**Format:** lecture 2 hours, lab 3 hours  
**Prerequisites:** CHEM 3102.03 or instructor's consent  
**Cross-listing:** CHEM 5102.03

**\*CHEM 4201.03A or B Advanced Topics in Separations:**

Chemistry started as the science of separations and separations are still its most prominent feature in most laboratories around the world. This class will deal mainly with chromatography and associated techniques; in particular, gas chromatography in its regular, capillary and supercritical forms, high-pressure liquid (including ion) chromatographies, capillary electrophoresis, and gas and liquid chromatography combined with other instrumental techniques such as mass spectrometry. The original ideas behind the design of separation media and detection modes will be emphasized, and so will be their consequences for the analysis of living and environmental systems. This class will not present a survey of the field; rather, it will focus primarily on past (and future) innovation. Please consult the instructor for the detailed content of this class in a given year.

**Instructor:** W.A. Aus  
**Format:** lecture 2 hours, lab arranged  
**Prerequisites:** CHEM 3201.03, or instructor's consent  
**Cross-listing:** CHEM 5201.03

**\*CHEM 4202.03A or B Topics in Advanced Analytical Spectroscopy:**

The topics covered are applicable to elemental analysis: atomic absorption, emission, fluorescence; optical rotation; X-ray spectroscopy; neutron activation analysis. The class will cover the theory and application of the different spectroscopic methods, and will include discussion on instrument design and performance. The emphasis on different topics may vary from year to year; students are advised to consult with the instructor for further detail.

**Instructor:** R. Staphens  
**Format:** lecture 2 hours, lab arranged

**Prerequisite:** CHEM 3201.03  
**Cross-listing:** CHEM 6202.03

**\*CHEM 4203.03A or B Environmental Chemistry:**

The first part of this class covers the chemical equilibria suitable for the description of metal ion and organic chemical interactions in the environment. Topics to be covered in this section include polyprotic acid equilibria in sufficient depth to describe carbonate and hydrogen sulphide systems (acidity, alkalinity, conservative quantities), redox equilibria (Eh-pH diagrams), solubility of oxides, hydroxides and carbonates and complexation equilibria. Adsorption equilibria are covered for metal ion and organic interactions with clays, humic and hydrous oxide materials. The second part of the class covers analytical methodology for the determination of metals and organics in environmental systems. Particular interest is paid to analytical methods for the speciation of compounds in waters and sediments. Students should be familiar with or interested in using microcomputers for chemical calculations.

**Instructor:** R.D. Guy  
**Format:** lecture 3 hours, lab arranged  
**Prerequisite:** CHEM 3201.03  
**Cross-listing:** CHEM 6203.03

**CHEM 4301.03B Theory of Chemical Bonding:**

This class discusses chemical bonding within the framework of molecular quantum mechanics; the science relating molecular properties to the motions and interactions of electrons and nuclei. The emphasis is on the qualitative features and physical basis of molecular orbital theory and its application to chemistry. The symmetry properties of molecular orbitals are discussed within the context of group theory. Other topics include ladder operators and the addition of angular momenta.

**Instructor:** R.J. Boyd  
**Format:** lecture 3 hours  
**Prerequisites:** CHEM 3301.03 or instructor's consent  
**Cross-listing:** CHEM 5301.03

**\*CHEM 4304.03A Kinetics and Catalysis:**

This class relates the properties of molecules in motion to the rates of chemical changes. Collision, transition state and diffusion theories are applied to significant industrial, biological and atmospheric processes. Photochemistry, and its converse, luminescence, are interpreted. Mechanisms of catalyst activity are discussed. The laboratory experiments use sophisticated techniques, including computerized data acquisition.

**Instructor:** P.D. Pacey  
**Format:** lecture 2 hours, lab 3 hours, alternate weeks  
**Prerequisite:** CHEM 2302.03 or equivalent  
**Cross-listing:** CHEM 5304.03

**\*CHEM 4305.03B Introductory Statistical Thermodynamics:** The principles of statistical mechanics are introduced and the relationship between the laws of thermodynamics and the underlying microscopic processes is examined. Wherever possible applications to chemical systems are emphasised. An overview of modern techniques is also given.  
 Instructor: P.G. Kusaik  
 Format: lecture 3 hours  
 Prerequisites: CHEM 2301.03 and 3301.03, or Instructor's consent  
 Cross-listing: CHEM 5305.03

**\*CHEM 4306.03A or B Magnetic Resonance:** The basic principles of magnetic resonance will be discussed and reinforced with examples of applications to problems in chemistry and chemical physics. Topics to be discussed include: the magnetic Hamiltonian, chemical shielding, nmr in solids, quantum mechanical approach to spectral analysis of nmr spectra in liquids, use of organic radicals, relaxation, molecular rate processes, and two dimensional nmr. Students will be assigned problems on a regular basis.  
 Instructor: R.E. Wasylishen  
 Format: lectures 2 hours  
 Prerequisites: CHEM 3301.03 or Instructor's consent  
 Cross-listing: CHEM 5306.03

**\*CHEM 4307.03A or B Biophysical Chemistry:** This class gives a theoretical and practical introduction necessary for the application of physical chemistry to life sciences and medicine. Topics include the structure and conformation of biological macromolecules, techniques for the study of biological structure and function, transport processes and biochemical spectroscopy. The laboratory is on an open basis with at least four experiments to be completed during the term.  
 Instructor: Staff  
 Format: Lectures 2 hours, lab 3 hours, alternate weeks  
 Prerequisite: CHEM 2301.03 and 2302.03 and CHEM 3301.03 and 3302.03 or Instructor's consent

**CHEM 4401.03A or B Synthesis in Organic Chemistry:** The prerequisite classes provide a foundation of knowledge of many organic reactions that are useful for bringing about specific functional group transformations. This class expands this foundation and shows how these reactions can be combined in well planned, multi-step strategies to synthesize complex molecules. The thought processes involved are illustrated with examples chosen from recently reported syntheses of natural and unnatural products.  
 Instructor: T.B. Grindley, R.L. White  
 Format: lectures 3 hours

Prerequisites: CHEM 3401.03 and 3402.03 or equivalents, or Instructor's consent  
 Cross-listing: CHEM 5401.03

**CHEM 4402.03A or B or R Organic Structure Determination:** This class continues the study of molecular structure and conformation begun in CHEM 3402.03A, using methods and results from infrared and nuclear magnetic resonance, and mass spectrometry.  
 Instructor: D.L. Hooper  
 Format: lecture 3 hours, lab as needed  
 Prerequisite: CHEM 3402.03  
 Cross-listing: CHEM 5402.03

**CHEM 4403.03A or B Organic Reaction Mechanisms:** The fundamental concepts of bonding, structure, and dynamic behaviour of organic compounds are discussed. The applications of molecular orbital theory and molecular mechanics calculations are introduced. Methods for determining the mechanisms of organic reactions are discussed. Topics considered include applications of kinetic data, linear free energy relationships and acid and base catalysis, concerted reactions and the importance of orbital symmetry, steric effects, solvent effects, and isotope effects.  
 Instructors: D.R. Arnold and J.A. Pincock  
 Format: lecture 3 hours  
 Prerequisites: CHEM 3401.03 and 3402.03 or equivalents, or Instructor's consent  
 Cross-listing: CHEM 5403.03

**\*CHEM 4501.03A or B Electronic Instrumentation for Scientists:** This class starts with basic electrical concepts and describes simple ac and dc circuits. Semiconductors are introduced, followed by a discussion of power supplies and the various types of amplifiers. Chemical instruments are used as examples whenever possible. Practical aspects of electronics such as basic measurements, the use of various electronic instruments, reading circuit diagrams and troubleshooting are emphasized. No knowledge of physics beyond the first year is required.  
 Instructor: L. Ramaley  
 Format: lecture 2 hours, lab 3 hours  
 Prerequisite: CHEM 2201.03  
 Cross-listing: CHEM 6501.03

**\*CHEM 4502.03A or B Polymer Science:** This class will cover aspects of synthesis, analysis, characterization, structure and application of synthetic and naturally occurring macromolecules. Emphasis will be on the application of standard methods of organic synthesis, analytical separations, and physico-chemical characterization. There is no laboratory, but students will do an independent literature project.

**Instructor:** J.S. Grossert, J.C.T. Kwak,  
R.E. Wasylshen  
**Format:** lecture 3 hours  
**Prerequisites:** CHEM 2201.03 and 2301.03  
 and 2302.03 and 2400.06 or  
 Instructors' consent

**\*CHEM 4503.03A or B Group Theory in Chemistry:** The theory of abstract groups and their representations, crystallographic and non-crystallographic point groups, and an introduction to space groups are given. Examples from stereochemistry, crystallography and spectroscopy illustrate the theory.

**Instructor:** Staff  
**Format:** lecture 3 hours  
**Prerequisite:** CHEM 3302.03  
**Cross-listing:** CHEM 5503.03

**\*CHEM 4504.03A or B Diffraction Techniques in Solid State Chemistry:** All chemical elements and compounds can exist as crystalline solids. This class will study the arrangements of atoms and molecules in such solids and will examine the methods used to determine these structures. Particular emphasis will be placed on the techniques of X-ray crystallography.

**Instructor:** T. S. Cameron  
**Format:** lecture 2 hours, lab 3 hours  
**Prerequisites:** CHEM 2101.03 and Math  
 2000.06 or 2200.06 or  
 equivalent  
**Cross-listing:** CHEM 5504.03

**CHEM 4801.03A or B or R Advanced Major Research Project:** This class is designed for those students in the Advanced Major programme who wish to participate in original research. It will consist of a literature or experimental research project on some aspect of chemistry in which the student has an interest. The results of the research will be embodied in a report which shall be graded. Students taking this class must consult with the Coordinator at the beginning of each term.  
**Coordinator:** T.S. Cameron

**CHEM 4880.00R Advanced Topics in Chemistry:** A non-credit seminar class to be given by invited speakers. Attendance at all seminars is required of all 4th year Honours Chemistry students.

**CHEM 8880.00R Honours Qualifying Examination:** This is an additional class required of all Honours students in Chemistry in order to satisfy regulation 1.3.6 (see Academic Regulations section of this calendar). It should be taken in the final year of a concentrated chemistry honours programme. All honours students, whether in a concentrated or unconcentrated programme, must consult with the professor in charge of the Honours Thesis Programme.  
**Coordinator:** T.S. Cameron

## Classics

**Location:** 1244 LeMarchant Street,  
Halifax, N.S.  
**Telephone:** (902) 494-3468  
**Fax:** (902) 494-1957/1997

### Chair

J.P. Atherton (494-3468)

### Undergraduate Advisor

P.J. Calkin (494-3468)

### Professors Emeritus

A.H. Armstrong, MA (Cantab), FBA

J.A. Doull, BA (Dal), MA (Tor)

### Professors

J.P. Atherton, MA (Oxon.), PhD (Liverpool)

R.D. Crouse, BA (Vind), STB (Harv), MTh (Trin), PhD (Harv), DD (Trin)

R. Friedrich, Dr.phil. (Goettingen)

C.J. Starnes, BA (Bishop's), STB (Harv), MA (McG), PhD (Dal), President of University of King's College

### Associate Professors

W.J. Hanky, BA (Vind), MA (Tor), DPhil (Oxon)

D.K. House, MA (Dal), PhD (Liverpool)

P.F. Kusmaul, Dr.phil (Basle), Dr.phil.habil. (Heidelberg)

### Assistant Professor

P.J. Calkin, BA (UBC), MA, PhD (Dal)

## Introduction

Classics is the study of origins - how the Christian-European tradition arose out of the ancient civilizations of the Mediterranean area. The fundamental ideas and beliefs of Europeans and North Americans, by which they are distinguished from Chinese, Indians, and those of other traditions, were formed in the meeting of Greek and Oriental cultures in ancient times. To understand fully contemporary Western culture, we must study its historical origins. The Department of Classics actively encourages students of all backgrounds and traditions to participate in the study of the classical heritage.

Such an understanding of the unique aspects of Western culture is most important in the contemporary world where all cultures have come into relation with one another.

Classics is the study of the intellectual forces that have shaped our civilization, and to understand fully the assumptions and ideas of that civilization we have to go back to their original formulation. Our literary forms, the shape of our political and social institutions,

such disciplines as Philosophy, History, and many of the Natural Sciences all originated and took shape in the ancient cultures of Greece and Rome.

Classics is thus more than the study of ancient languages. Languages are not learned for themselves, but because they are necessary for the scientific study of ancient history, literature, religion, mythology and philosophy. The Classics Department at Dalhousie provides instruction both in these subjects and in ancient languages. While previous preparation in one or more ancient languages is desirable, it is nevertheless quite feasible for students who discover an interest in classics to begin their language studies at university.

Students of classics must learn Greek and Latin if they wish to take an honours degree or to go on to graduate studies in the field, but the Department offers a variety of classes in Greek and Roman Literature, Ancient and Medieval Philosophy, Ancient and Christian Religion, and general Classical Culture, which do not require a foreign language.

Classics is worth studying for its own sake by students who wish to obtain a better understanding of the common assumptions and beliefs of Western society. This knowledge has always been regarded as pertinent to a career in politics and the higher levels of the civil service. For those who are thinking of the clergy, Classics is the most relevant preparation. Classical studies also prepare students for a life of teaching and scholarship in several directions. Canada is responsible for its own culture, and we have great need of scholars and teachers who know about its origins. Classics is also the best preparation for the study of non-European cultures (Chinese, Indian, Islamic, etc.), and there is a growing need for specialists in these fields. For the older history of philosophy, and for the history of Christian belief until, and including, the Reformation, a knowledge of Classics is indispensable. The same may be said for Medieval Studies. Classics leads also to ancient Near Eastern Studies (Jewish, Babylonian, Egyptian, etc.) and to Archeology.

## Degree Programmes

See "Degree Requirements" section for complete details.

### Honours in Classics

The candidate may choose between three programmes: BA with Honours in Classics (Ancient Literature), BA with Honours in Classics (Ancient History), or BA with Honours in Classics (Ancient Philosophy). In each case, it is highly desirable, but not essential, that the student begin the study of

at least one of the classical languages during the first year of study. For purposes of meeting grouping requirements, some Ancient and Medieval Philosophy classes may be counted either as Classics credits, or Philosophy credits.

## Departmental Requirements

### Classes required in Honours:

- 2000 level:** Six to eight credits at or above the 2000 level in Classics
- 3000 level:** At least 2 credits at 3000 level or higher in Classics must include work in Greek or Latin at the 3000 level in one and at the 2000 level in the other

Whether the Honours degree is awarded in Ancient Literature, History or Philosophy depends on the area of the Department's offerings in which a larger part of the work is done.

Candidates for Honours and Combined Honours degrees who anticipate continuing their studies at the Graduate level in Classics should consult the calendars of the Graduate Schools of their choice concerning requirements for entry into Graduate programmes. It may be the case that additional preparation in the classical languages or in other aspects of ancient civilizations is required for entry into certain programmes.

## Combined Honours

Classics may be taken as part of a combined honours programme with other disciplines. Students interested in such programmes should consult with the undergraduate advisors of the respective departments.

## Advanced Major in Classics (20 credit)

### Departmental Requirements

#### Classes required in Advanced Major:

- 2000 level:** Three to six credits at or above the 2000 level in Classics
- 3000 level:** At least three credits at or above the 3000 level in Classics

#### Other requirements:

Usually two language classes in Greek and/or Latin are required.

## Major in Classics, BA (15 credit)

### Departmental Requirements

#### Classes required in major:

- 2000 level:** Two to six credits at or above the 2000 level

- 3000 level:** At least two credits at or above the 3000 level

The Department is glad to assist students in working out programmes according to their interests.

**Note:** The following classes satisfy the first-year writing requirements for a degree: CLAS 1000.06R; CLAS 1010.06R; CLAS 1100.06R.

The programmes of all students majoring or honouring in the Department must be approved by the Undergraduate Advisor.

## Classes Offered

**Note:** Classes marked \* are not offered every year. It is advisable to inquire at the Classics Department (494-3468) to determine if these classes are offered.

**Note:** The introductory classes, and the more elementary classes in Ancient History and Religions, and Classical Philosophy listed below do not require knowledge of the ancient languages. However, students who plan to do advanced work in any of these areas are advised to begin study of the appropriate languages as early as possible.

**CLAS 1000.06R Classical Literature:** An introduction to classical civilization by way of the literature, read in English translations. Authors studied are Homer, the Greek Dramatists, Plato, Vergil and St. Augustine. This class meets the first year writing requirement.

**Instructors:** W. Hankey/R. Friedrich/R. D. Crouse/C. J. Starnes and others.

**Format:** Lecture 2 hours

**CLAS 1010.06R Ancient History:** An Introduction to the Cultural History of the Ancient World: The first term is devoted to a study of the major pre-classical civilizations (Sumer, Egypt, etc.) with attention paid to the art, religion and social forms of these cultures as well as their political development. In the second term the civilizations of Greece, Rome, and Israel are studied, and their issues in the Early Christian world considered. As the class is intended as an introductory one, no special preparation is expected. There is no foreign language requirement. This class fulfils the first year writing requirement.

**Instructor:** D. K. House

**Format:** Lecture 2 hours

\***CLAS 1021.03A Ancient Art:** Greece and the Ancient Near East: Aided by slides and films, in addition to lectures and readings, this class will study the origin and development of ancient art in Greece, Mesopotamia and Egypt to the end of the Hellenistic period.

**Instructor:** G. Thomas (this is given at St. Mary's University)

**Format:** Lecture 3 hours

\***CLAS 1022.03B Ancient Art: Rome and Christian Europe:** Aided by slides and films, in addition to lectures and readings, this class will study the art of Ancient Rome after the Hellenistic period and of the Christian world to the end of the 14th century.

**Instructor:** W. J. Hankey

**Format:** Lecture 3 hours

**CLAS 1100.06R Classical Mythology:** Why has the mythology of the world of classical Greece and Rome been so central a part of the artistic, intellectual and religious culture of the Western world? This course explains the origin, meaning and importance of classical mythology. During the first term, work begins with a survey of pre-classical mythology: this is explored through myths of the origin and creation of the natural world; here the early cultures of the Sumerians, the Egyptians and the Jews are studied. After a historical lecture on the origins of Indo-European mythology, attention turns to the world of Mycenaean and Early Classical Greece; the works of Hesiod, and the myths of Prometheus are particularly closely considered in this section.

In the New Year the understanding of the human world (community & family) through myth is the principal pre-occupation; here the Iliad of Homer, the Aeneid of Virgil (for the Romans) and the Oedipus plays of Sophocles are the texts through which the mythological consciousness is analysed. The course concludes with a consideration of why the Greeks broke away from the world of myth and began to understand nature and human culture through science and philosophy. This class fulfils the first year writing requirement.

**Instructor:** J. P. Atherton

**Format:** Lecture 2 hours

**CLAS 1700.06R Introductory Greek:** An introduction to Classical Greek. Greek is a highly inflected language and as such presents English-speaking students with a number of challenges not found in most modern languages. This class introduces the student in a systematic way to the most common and important elements of Classical Greek grammar. The aim of the class is to bring the student by the end of the year to read connected passages from Xenophon and other Greek prose writers.

**Instructor:** Staff

**Format:** Lecture 3 hours

**CLAS 1800.06R Introductory Latin:** An introduction to Latin through the study of its basic grammar. The aim of the class is to enable students to read Latin texts with the assistance of nothing more than a Dictionary.

**Instructor:** C. J. Starnes

**Format:** Lecture 3 hours

**CLAS 2000.06R Classical Literature:** An introduction to classical civilization by way of the literature, read in English translations. Authors studied are Homer, the Greek Dramatists, Plato, Vergil and St. Augustine. This class is the same as CLAS 1000.06R and may therefore not be taken by anyone who has taken that class.

**Instructors:** W. Hankey/R. Friedrich/R. D. Crouse/C. J. Starnes and others.

**Format:** Lecture 3 hours

**CLAS 2100.06R Classical Mythology:** Why has the mythology of the world of classical Greece and Rome been so central a part of the artistic, intellectual and religious culture of the Western world? This course explains the origin, meaning and importance of classical mythology. During the first term, work begins with a survey of pre-classical mythology: this is explored through myths of the origin and creation of the natural world; here the early cultures of the Sumerians, the Egyptians and the Jews are studied. After a historical lecture on the origins of Indo-European mythology, attention turns to the world of Mycenaean and Early Classical Greece; the works of Hesiod, and the myths of Prometheus are particularly closely considered in this section.

In the New Year the understanding of the human world (community & family) through myth is the principal pre-occupation; here the Iliad of Homer, the Aeneid of Virgil (for the Romans) and the Oedipus plays of Sophocles are the texts through which the mythological consciousness is analysed. The course concludes with a consideration of why the Greeks broke away from the world of myth and began to understand nature and human culture through science and philosophy. This class is the same as CLAS 1100.06R and may therefore not be taken by anyone who has taken that class.

**Instructor:** J. P. Atherton

**Format:** Lecture 2 hours

\***CLAS 2200.06R Ancient History:** The Ancient City: An introduction to Ancient History through a study of the constitutions of the Greek city states (especially Athens) and of Rome. Basic texts, such as Aristotle's Athenian Constitution, are read in English translation. This class is open to first-year students. There is no foreign language requirement. This class is given alternately with Clas 2210.06R.

**Instructor:** P. F. Kusmaul

**Format:** Lecture 2 hours

\***CLAS 2210.06R Roman History:** The Roman Empire and the Rise of Christianity: A continuation of the introduction to Ancient History through a study of the institutions and constitutional arrangements of the Roman Empire from the time of Augustus. The

relation of the Empire to Christianity is a topic of primary interest. This class is given alternately with CLAS 2200.06R and, like it, is open to first-year students. There is no foreign language requirement.

**Instructor:** P. F. Kusmaul  
**Format:** Lecture 2 hours

**CLAS 2361.03A/CLAS 2362.03B Ancient Philosophy from Its Beginning to the Sixth Century AD:** Proper attention is paid to the great classical philosophies of Plato and Aristotle studied in their historical context. Much emphasis is laid on the Greek philosophy of the first centuries AD and its influence on developing Christian thought. The first half considers the history from the Pre-Socratics to Plato. The second half moves from Aristotle to Plotinus.

**Instructors:** J. P. Atherton/W. J. Hankey  
**Format:** Lecture 2 hours  
**Cross-listing:** PHIL 2361.03A/2362.03B  
**Exclusion:** CLAS 3361.03A/3362.03B

**\*CLAS 2501.03A Introduction to Classical Rhetoric:** In recent years rhetoric has attained great importance and significance for literary criticism and theory as well as for philosophy. The system of rhetoric and its terminology were developed and completed by the Greeks and Romans; therefore, Classical Rhetoric forms the basis of all modern approaches to rhetorical practice and theory. This class is intended to introduce the student to the system and to the central terms of rhetoric, as they have been developed and shaped in the relevant texts of Greek and Roman authors. All texts will be studied in English translation.

**Instructor:** R. Friedrich  
**Format:** Seminar/Lecture 3 hours

**CLAS 2700.06R Intermediate Greek:** A continuation of CLAS 1700.06R and the normal second year class in Greek. The work of the class is divided equally between formal grammar sessions and the reading of Greek texts from Xenophon, Lysias and Plato. In the grammar sessions a complete and systematic review of all Greek grammar is undertaken during which the student meets the more difficult forms and constructions which are omitted in CLAS 1700.06R. The aim of the class is to prepare the student to read the philosophical and dramatic texts of the 5th century BC.

**Instructor:** Staff  
**Format:** Seminar 3 hours  
**Prerequisite:** CLAS 1700.06R or 2710.06R

**CLAS 2710.06R Greek Prose:** A study of Greek grammar through the reading of Greek prose authors (Xenophon, Lysias).

**Prerequisite:** any 1000 level Classics class or equivalent.

**Instructor:** Staff  
**Format:** Seminar 3 hours

**Prerequisite:** Any 1000 level Classics class or equivalent

**CLAS 2800.06R A Study of Latin Prose and Poetry:** CLAS 2800.06R is a continuation of CLAS 1800.06R or CLAS 2810.06R. A study of the poetry and prose literature of Rome through a selection of texts. Particular attention is paid to improving the students' command of the grammar and syntax of the Latin language.

**Instructor:** P. F. Kusmaul  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 1800.06R or 2810.06R

**CLAS 2810.06R Latin Prose:** A study of Latin accidence and syntax through the reading of Roman prose authors (Caesar, Cicero).

**Instructor:** C. Starnes  
**Format:** Seminar 3 hours  
**Prerequisite:** Any 1000 level Classics class or equivalent

**\*CLAS 2860.06R Latin Historical Texts:**  
**Instructors:** J. P. Atherton/P. F. Kusmaul  
**Format:** Seminar 2 hours  
**Prerequisite:** 1800.06R or 2810.06R

**\*CLAS 3280.06R Christian Beginnings and the Early History of the Church:**  
**Format:** Seminar 2 hours  
**Enrolment:** Limited  
**Cross-listing:** CLAS 5708.03

**\*CLAS 3300.06R Pagan and Christian Schools from Clement of Rome to Augustine:** The class considers the mutual effect of pagan and Christian intellectual, spiritual and institutional forms on one another in the first four centuries of the Common Era. In particular it treats the way in which the pagan schools and the Christian church mirror one another: the common elements and their opposed systematic relations. Students will ordinarily have some background in Ancient History and Philosophy.

**Instructor:** W. J. Hankey  
**Format:** Lecture 2 hours

**\*CLAS 3370.06R The Augustinian Tradition:** The class considers the effect of Augustine on the philosophical and theological thought of late Antiquity and the Middle Ages. The relation to the Proclean Neoplatonism transmitted through Pseudo-Dionysius is a special concern. Texts from Dionysius, Eriugena, Anselm, Bonaventure, Aquinas and Cusanus are analysed. Students will ordinarily have begun either Greek or Latin though others may be admitted by permission.

**Instructor:** W. J. Hankey  
**Format:** Lecture 2 hours  
**Cross-listing:** CLAS 5370.06

**CLAS 3380.06R Medieval Philosophy:** A study of the development of philosophy in the formative age of European civilization related to political, institutional, literary and

theological concerns. An attempt is made to show how the legacy of classical and Christian antiquity was appropriated and reformed to constitute the ideology of medieval Christendom. The lectures are devoted mainly to the study and discussion of a few fundamental texts, beginning with Boethius' *Consolation of Philosophy*. Special attention is given to Anselm's *Prologion* and the first few questions of Thomas Aquinas' *Summa*. It is the object of lectures to present the continuity of the historical development and to emphasize broad implications of the philosophical doctrines presented in the texts. In the later part attention is given to late medieval Platonism and Mysticism, to show something of the Reformation and modern philosophical and religious thought.

Instructor: R. D. Crouse  
 Format: Lecture 2 hours  
 Cross-listing: PHIL 2380.06R

\*CLAS 3400.06R *The Dialogues of Plato*: This seminar involves the detailed study of a group of dialogues. The choice of dialogues varies from year to year.

Instructor: D. K. House  
 Format: Seminar 3 hours  
 Cross-listing: CLAS 5603.06

\*CLAS 3410.06R *St. Augustine's Confessions*: A study of the three parts of Augustine's *Confessions* with a view to understanding his dissatisfaction with the various positions he adopted prior to his conversion to Christianity (Part I), the practical consequences of this conversion (Part II), and the new theoretical understanding of time, space and motion which come out of his Trinitarian exegesis of the first chapters of Genesis (Part III). This class presupposes some knowledge of the history of Ancient Philosophy, and some of Latin. This class is given alternately with CLAS 3420.06R.

Instructor: C. J. Starnes  
 Format: Seminar 2 hours  
 Cross-listing: CLAS 5705.06

\*CLAS 3420.06R *St. Augustine's City of God*: A study of Augustine's account of the failure of the Roman Empire and of the new Christian 'city' that replaced it. The class sometimes concentrates on the entire twenty-two books of the *City of God* and sometimes begins with a study of earlier accounts of Rome (*Aeneid*), and of the relations of Rome and the church in, for example, the Apostolic Fathers, the Acts of the Martyrs and Tertullian, before turning to the first ten books of the *City of God*. This class is given alternately with CLAS 3410.06.

Instructor: C. J. Starnes  
 Format: Seminar 2 hours  
 Cross-listing: CLAS 5706.06

CLAS 3470.06R *Reading and Research: Ancient Literature*

CLAS 3480.06R *Reading and Research: Ancient History*

CLAS 3490.06R *Reading and Research: Ancient Philosophy*

\*CLAS 3500.06R *Aristotle*: This seminar involves the detailed study of either Aristotle's *Metaphysics* or *De Anima* or *Physics* or ethical and political treatises. The choice of texts varies from year to year.  
 Instructor: D. K. House  
 Format: Lecture/Seminar 2 hours  
 Recommended background: CLAS 2361.03A/2362.03B  
 Cross-listing: CLAS 5602.06

CLAS 3510.06R *Ancient and Modern Drama I*: Ancient and Modern Drama I is a study of Western drama from its ritual beginnings in ancient Greece to its 20th century forms. It is presented in two parts, each forming a full credit class. However, both parts (CLAS 3510.06R and 3511.06R) are designed in such a way that they can be taken independently from one another. Ancient and Modern Drama I deals with ancient drama and theatre: their beginnings in the Dionysian ritual; the Dionysian festivals; production and stage conventions. The aim of this class is a study of Greek and Roman plays, both tragedies and comedies, by Aeschylus, Sophocles, Euripides, Aristophanes, Menander, Plautus, Terence and Seneca. This study will be accompanied by readings from Aristotle's *Poetics* and Horace's *Art of Poetry*. All texts will be studied in English translation. This class is given alternately with CLAS 3511.06R.

Instructor: R. Friedrich  
 Format: Seminar 2 hours  
 Recommended: CLAS 2000.06R

\*CLAS 3511.06R *Ancient and Modern Drama II*:

Format: Seminar 2 hours

CLAS 3700.06R *Advanced Greek*: This class which reads both a prose and a poetic work is the normal third class in Greek.

Instructors: D. K. House/R. Friedrich  
 Format: Seminar 2 hours  
 Prerequisites: CLAS 2700.06R

\*CLAS 3710.06R *Greek Epic*:  
 Instructor: R. Friedrich  
 Format: Seminar 2 hours  
 Prerequisite: CLAS 2700.06R  
 Cross-listing: CLAS 5010.06

\*CLAS 3720.06R *Greek Lyric*:  
 Instructor: Staff  
 Format: Seminar 2 hours  
 Prerequisite: CLAS 2700.06R  
 Cross-listing: CLAS 5013.06

\*CLAS 3730.06R *Greek Drama: Tragedy*:  
 Instructor: R. Friedrich  
 Format: Seminar 2 hours

**Prerequisite:** CLAS 2700.06R  
**Cross-listing:** CLAS 5011.06

**\*CLAS 3750.06R Greek Authors:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2700.06R  
**Cross-listing:** PHIL 3750.06

**CLAS 3760.06R Reading and Research of Greek Texts:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2700.06R

**\*CLAS 3780.06R Greek Historians:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2700.06R  
**Cross-listing:** CLAS 5032.06

**CLAS 3791.03A or B Reading and Research:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2700.06R

**\*CLAS 3800.06R Roman Satire:**  
**Instructor:** P. F. Kusmaul  
**Format:** Seminar 2 hours

**CLAS 3810.06R A Study of Vergil:** A study of the development and importance of Vergil's basic themes and ideas embodied in the *Aeneid*. In the first part of the class special attention is given to his early work the *Buccolica*, where his themes begin to appear, and their development is then followed through the relevant parts of the *Georgica*. The main part of the class is devoted to the reading and discussion of the chief themes of the *Aeneid*, especially as they illustrate Roman political, religious and social ideas which have greatly influenced our own beliefs and institutions.

**Instructors:** J. P. Atherton/R. Friedrich  
**Format:** Seminar 2 hours  
**Prerequisite:** A class in Latin at the 2000 level.  
**Cross-listing:** CLAS 5040.06

**CLAS 3820.06R Advanced Reading in Latin Literature:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2800.06R

**\*CLAS 3840.06R Latin Philosophical Texts:** The purpose is to give students experience in reading philosophical Latin. Various authors are read from Cicero to the late Middle Ages.  
**Instructor:** R. D. Crouse  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2800.06R  
**Cross-listing:** CLAS 5890.06

**CLAS 3850.06R Reading and Research of Latin Texts:**  
**Format:** Seminar 2 hours  
**Prerequisite:** CLAS 2800.06R.

**\*CLAS 3900.06R The Philosophy of Aristotle:** The general scope of the Aristotelian Philosophy - the understanding of nature, the City, the aesthetic experience of humanity - is

considered in relation to the argument of the *Metaphysics* or 'First Philosophy'. Given alternately with CLAS 3910.06R.  
**Instructor:** J. P. Atherton  
**Format:** Seminar 2 hours  
**Cross-listing:** CLAS 5604.06

**\*CLAS 3910.06R Neoplatonism: Plato and Neoplatonism:** The philosophy of Plotinus and later thinkers considered as the resume of Greek Philosophy; In particular the role of Plato and other older philosophers in the formation of Neoplatonism is a principal interest. Given alternately with CLAS 3900.06R.

**Instructor:** J. P. Atherton  
**Format:** Seminar 2 hours  
**Recommended:** CLAS 2361.03A/2362.03B  
**Cross-listing:** CLAS 5605.06

**\*CLAS 4200.06R Ancient Practical Philosophy:**  
**Format:** Seminar 2 hours

**\*CLAS 4320.06R Ancient and Modern Dialectic:**  
**Format:** Seminar 2 hours

**\*CLAS 4400.06R Philosophy of the Church Fathers:** This seminar involves the detailed study of a text, or group of texts, from one or more of the Greek or Latin Church Fathers. The choice of text varies from year to year, in relation to the needs and interests of students. Given alternately with CLAS 4450.06R.

**Instructor:** R. D. Crouse  
**Format:** Seminar 2 hours  
**Cross-listing:** CLAS 5700.06

**\*CLAS 4450.06R Medieval Interpreters of Aristotle:** The precise topic of this seminar is chosen in consultation with prospective students. For example, it might concentrate upon the interpretation of a work of Aristotle by Thomas Aquinas, or Albert the Great, or Dante. Given alternately with CLAS 4400.06R.

**Instructor:** R. D. Crouse  
**Format:** Seminar 2 hours  
**Cross-listing:** CLAS 5701.06

**\*CLAS 4500.06R Seminar on Neoplatonism:** Major Neoplatonic systems, pagan and Christian, are considered from Plotinus to Cusanus.

**Instructor:** W. J. Hankey  
**Format:** Seminar 2 hours

**CLAS 4530.06R Seminar on the Roman Empire and the Rise of Christianity:** Selected topics from the transition from Classical to Christian culture are studied. Particular attention is paid to the connection between religious innovation and the effect of the new beliefs on literature, art and philosophy.

**Instructor:** P. F. Kusmaul  
**Format:** Seminar 2 hours  
**Cross-listing:** CLAS 5530.06

**CLAS 4580.06R Reading and Research**

**CLAS 4680.03A/4690.03B Reading and Research**

**CLAS 4710.03A/4720.03B Special Topics**

**CLAS 4800.06R Reading and Research**

**CLAS 4810.03A/4820.03B Special Topics**

**CLAS 4850.06R Reading and Research**

**CLAS 4900.06R Departmental Seminar:**

**Format: Seminar 2 hours**

**CLAS 0400.00R Honours Seminar:** In order to obtain their Honours degree, students must complete twenty credits plus the Honours Seminar and pass the exam at the end of it. This is a non-credit class which meets every two weeks. Details available from the department. **Note:** Students are not required to take all units of this class in one year but may spread them out over two or three years to suit their individual programmes.

**Instructor: R. Friedrich et al**

**Format: Seminar**

**Prerequisite: CLAS 2810.06R and CLAS 2710.06R**

Classes in Ancient Hebrew, Coptic, Syriac and Arabic, are sometimes available as electives at the discretion of the Department, only in relation to the needs of the particular student.

## Co-operative Education in Science

### Academic Director

M.R. Lewis, BS, MS (UMd), PhD (Dal)

### Placement Officer

C.L. Harding, BSc (Dal), (902) 494-2044  
Student Union Building, Room 404

### Academic Advisors

A.E. Sedgwick, Mathematics and Computing Science

C.A. Field, Statistics

J.M. Hall, Earth Sciences

G. Stroink, Physics

M.J. O'Halloran, Marine Biology

F.I. Maclean, Biochemistry

## Co-operative Education Programmes

In Canada Co-operative Education means a programme alternating academic terms with paid work experience related to the area of study. An increasing number of departments in the Faculty of Science offer students this option. The academic requirements are generally the same as for an Honours or Advanced Major degree. (See the departmental listings for more information). The workterms alternate with academic semesters beginning in January or May of Year II. The workterms, each normally 13-16 weeks in duration, are spent in industrial, business, government or laboratory positions. The work experience helps students see the applicability of their training in science and helps them make intelligent career choices. Upon successful completion of at least 3 workterms and the 20-credit academic requirements, the student's transcript will have indicated the programme to be a co-operative one.

A Co-op degree normally takes 4 1/3 years. The Physics programme is 5 years. The programmes are available either as Honours or Advanced Major programmes. Earth Science and Physics are Honours only. A Combined Honours Co-op degree, combining a Co-op subject and another appropriate subject, is possible. Students interested in such a programme should consult a Co-op Advisor.

**Eligibility:** Students must be Canadian citizens or landed immigrants and demonstrate sufficient academic potential (typically B-average). Some students may be admitted on a probational basis pending an improvement in their grades. Students whose grades drop significantly may be withdrawn from the Co-op option.

**Application:** Students should apply to one of the Academic Advisors near the end of first year and indicate Co-op when they register for second year.

**Academic Advice:** Students must plan their programmes carefully each year with their departmental academic advisor who must approve any changes. Co-op students have limited opportunity to take R classes. Also the choice of classes for the summer academic term is limited.

**Work Terms:** Although the Co-op Office has an outstanding placement record, it is ultimately the responsibility of the student to arrange the work term. The Placement Officer serves to co-ordinate the contacts between student and employer. Students are remunerated according to the employer's own policies.

It is important that students realize that successful completion of the work terms is an integral part of the course of study. Indeed, the advantages of Co-op Education derive directly from the successful interplay of academic knowledge and practical implementation. Consequently the work terms are central to Co-op Education.

**Work Term Reports:** At the end of each work term, each student must submit an acceptable work report. These are generally 15-20 typewritten pages. Guidelines are available from the Academic Advisor. The reports must be submitted by the 15th day of the month the following academic term begins.

**Work Term Sequence:** Work terms alternate with study terms in a fixed pattern for each programme.

	A	B	S	A	B	S	A	B	S	A			
a)	1	2	-	3	w	4	w	5	w	6	7	w	8
b)	1	2	-	3	4	w	5	w	6	w	7	w	8
c)	1	2	-	3	4	w	5	6	w	w	7	w	8

Most students follow pattern a) with first work term in January of second year. Pattern b) is for Marine Biology. Pattern c) is for Earth Sciences and Biochemistry. Changes to a pattern require prior approval. Sometimes two consecutive work terms are arranged.

**Co-op Seminar:** This is a special seminar arranged for the benefit of Co-op students. Various topics of relevance to the work terms are discussed. The purpose of the seminar is to better prepare students for their work terms so that everyone involved in the work term — the student, the employer, and the University — may benefit as much as possible.

Co-op students enrolled in their second year at Dalhousie must attend this non-credit seminar (min. of 12 hours required).

**Additional Information:** For additional information contact one of the departments listed above or: Science Co-operative Education, Dalhousie University, Student

Union Bldg., Room 404, 6136 University Avenue, Halifax, Nova Scotia, B3H 4J2, (902) 494-2044.

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## Comparative Religion

**Location:** 6209 University Ave., 3rd floor, Halifax, N.S.  
**Telephone:** (902) 494-3579  
**Fax:** (902) 494-1997

### Chair

R. Ravindra (494-3578)

### Undergraduate Advisor

C.T. Sinclair-Faulkner (494-3579)

### Professor

R. Ravindra, BSc, MTech (IT), MA (Dal), MSc, PhD (Tor), Adjunct Professor of Physics  
 C.T. Sinclair-Faulkner, BA (Tor), MTh, MA, PhD (Chic)

## Introduction

The University study of religion aims at an intellectual understanding of this more than intellectual reality. Religion is a phenomenon virtually universal in human society and history; some have held that it is central to the human condition. Understanding involves grasping simultaneously both the meaning of faith in the lives of participants, and the critical analysis of outside observers. Both the student wishing enhanced understanding of religion as an historical, and social and human fact, and the student who wishes to wrestle with problems arising in academic reflection concerning the relation between the personal and the objective, can find material to engage them in the classes described below.

See "Degree Requirements" for complete details.

## Advanced Major in Comparative Religion

### Departmental Requirements:

#### Classes required in Advanced Major:

**1000 level:** 1000.06R or 1301.06R  
**2000 level:** Select 2 classes from 2001.03A/B, 2002.03A/B, 2003.03A/B  
 Select 2 classes from: 2011.03A/B, 2012.03 A/B, 2013.03 A/B Select 1 other credit at or above 2000 level  
**3000 level:** At least two and one half credits at or above 3000 level  
**4000 level:** At least one half credit at 4000 level

## Major in Comparative Religion

### Departmental Requirements

#### Classes required in Major:

**1000 level:** Comr 1000.06R or 1301.06R  
**2000 level:** Select 2 classes from: 2001.03A/B, 2002.03A/B, 2003.03A/B Select 2 classes from: 2011.03A/B, 2012.03A/B, 2013.03A/B  
**3000 level:** At least one and one half credits at 3000 level or above  
**4000 level:** At least one half credit at 4000 level

This programme provides Comparative Religion majors with a broad introduction to both Eastern and Western religious life, and to the various ways in which religion may be studied. In light of their specific interests, Comparative Religion majors are encouraged to enrol in related classes offered by other Departments. Programmes should be planned in consultation with the undergraduate advisor, Dr. C.T. Sinclair-Faulkner.

Please consult the current timetable on registration to determine which classes are being offered.

## Classes Offered

First-year students are not admitted to classes beyond the 1000 level without the consent of the instructor. Classes at the 2000 level do not have prerequisites; in general, they are available only to students in their second year or above. Prerequisites for classes at the 3000 and 4000 levels are listed with each individual class below; in general, they are available only to students in their third year or above in the University.

**\*COMR 1000.06R/2000.06R Introduction to World Religion:** This class will focus on a comparative study of Christianity and other major world religions. The first half of the class will be an introduction to the basic ideas and concerns of the world religions with an emphasis on fundamental general questions in comparative studies: What materials in different traditions are comparable? What psychological and intellectual attitudes are required for such a study? The second half is devoted to a comparative study of the Gospels and a scripture from another religion. Extra work will be required in 2000.06R which is not available to first year students.  
**Instructor:** R. Ravindra  
**Format:** lecture and tutorial 3 hours

**COMR 1300.03A or B Explorations in Religion:** The description and understanding of religion requires diverse approaches: historical, psychological, sociological, philosophical. It also requires that knowledge of oneself go hand in hand with knowledge of

the human phenomenon or religion. This class introduces the student to basic concepts in the academic study of religion and to some of the most recent scholarship in the area.

Instructor: C.T. Sinclair-Faulkner  
Format: lecture 3 hours

\*COMR 1301.06R Introduction to the Study of Religion: Religion is: a way of life? an encounter with God? a neurosis? the essential human trait? an epiphenomenon? The possibilities are explored by using the insights of modern social scientists, humanists and theologians to study Canadian life. This class fulfills the first-year Writing Requirement. A detailed syllabus is available from the Department of Comparative Religion.

Instructor: C.T. Sinclair-Faulkner  
Format: lecture 2 hours, section meeting 1 hour

\*COMR 2001.03A or B Judaism: About thirty-three hundred years ago a man named Moses is said to have led the people of Israel out of slavery in Egypt, bound them in a covenant with God to live in the way that God would have them live, and brought them to the land of Canaan. They became the people of the Bible (literally, "the Book") and, when their temple at Jerusalem was destroyed two thousand years ago, they developed a dispersed community centred on the Bible as interpreted by their rabbis or teachers. Although six million Jews died in the Holocaust during the Second World War, there are fourteen million Jews in the world today, of whom roughly one-fifth live in the state of Israel (established in 1948) and over 300,000 live in Canada.

Instructor: C.T. Sinclair-Faulkner  
Format: lecture and seminar 3 hours

\*COMR 2002.03A or B Christianity: Christianity was founded two thousand years ago by Yehoshuah (Jesus), a Jew living in the Roman province of Palestine who left behind no writings of his own and who was executed for treason and blasphemy. Before his death he gathered together a diverse group which included some fishermen, a tax collector, a rich woman and a rabbinical student. They and others who joined later became the "Church" (literally, "the things which belong to the Lord"), declaring that Yehoshuah had risen from the dead and that he was both the Messiah and the Son of God. This claim scandalized many Jews and puzzled many Greeks. But Christianity went on to shape much of western civilization, and ultimately the world. Today Christianity is the religion of at least one billion people around the world, and of 80% of Canadians.

Instructor: C.T. Sinclair-Faulkner  
Format: lecture and seminar 3 hours

\*COMR 2003.03A or B Islam: Islam was founded by Muhammad less than fourteen hundred years ago, and it may be argued that

It was the first "world" religion. The Arabic word "Islam" means many things at once: submission, obedience, surrender, peace. Setting his face resolutely against the worship of false gods, Muhammad accepted Jews and Christians as "People of the Book" but added the Qur'an to the TANAKH and the New Testament as the scriptures which reveal the way in which Allah (literally, "the God") would have people live. Muhammad is God's messenger, delivering the Holy Qur'an, but Muhammad himself is not divine. At present Islam is the fastest growing religion on earth. There are almost one billion Muslims in the world, of whom more than 100,000 live in Canada.

Instructor: C.T. Sinclair-Faulkner  
Format: lecture and seminar 3 hours

\*COMR 2011.03 A or B Hinduism: What has been called Hinduism in modern times is less a religion in the Western sense and more a whole way of life woven into the very fabric of the culture and society in India where nearly seven hundred million Hindus reside. This religion is said to be eternal, without any human founder, although continually vitalised by many remarkable sages and incarnations of God. The oldest religion in the world, Hinduism displays an unbroken continuity of the tradition from the pre-historic times to the present, spanning at least five thousand years. Other major and minor religions have been spawned by Hinduism, such as Buddhism and Jainism; also Sikhism and Sufism in interaction with Islam. The religious and cultural life of much of the Asian continent, on which now lives more than half of humanity, has been strongly influenced by one or another aspect of Hinduism.

Instructor: R. Ravindra  
Format: lecture and seminar, 3 hours

\*COMR 2012.03 A or B Chinese and Japanese Religions: China and Japan have had an enormous impact on the cultural history of the world in the past, and are also bound to have significant impact in the future. The religious ideas and practices which originated and developed in these countries influence nearly half of mankind today. These days, many Westerners are also drawn to the practical and holistic views of Taoism and Confucianism.

This course will provide an introduction to the major religious traditions in China and Japan, namely, Taoism, Confucianism, Buddhism and Shintoism.

Instructor: R. Ravindra  
Format: lecture and seminar, 3 hours

\*COMR 2013.03A or B Buddhism: Buddhism originated in India in the 6th century B.C.E. with Siddhartha Gautama, the Buddha -the Enlightened and the Compassionate- and from there spread throughout South East Asia and the Far East in the following millennium. It

practically disappeared from the land of its origin after nearly sixteen hundred years during which time it permanently influenced Indian thought and spirituality. Buddhism was considerably modified by the great cultures of China, Korea and Japan.

Buddhism has influenced the religious world-views and practices of more than half of humanity, largely owing to its great impact in Asia. Now, many Westerners are also drawn to the philosophy and meditational practices of different forms of Buddhism. This class will offer a basic introduction to the history, ideas and practices of Buddhism.

**Instructor:** R. Ravindra  
**Format:** lecture and seminar, 3 hours

**\*COMR 2200.03A or B Religion and War:** Religious attitudes toward war have ranged from pacifism, through vigorous efforts to enforce limits on war's destructiveness, to outright support for specific wars. The class will examine comparatively the views of major religious traditions on war; the use of war and the warrior as religious symbols; the crisis of religious views on war in the nuclear age. It is cross-listed with Religious Studies 342.2 at Saint Mary's University.

**Instructor:** C.T. Sinclair-Faulkner  
**Format:** lecture and seminar 3 hours

**\*COMR 3002.06R Religion in Story:** When religious people seek answers to ultimate questions or try to come to grips with the mystifying phenomenon of the Holy, they turn to stories. Modern novels and short stories, particularly Canadian works, are the primary reading assignments in this class. They are set in the context of related material from the broader western culture, including the Jewish scriptures. A detailed syllabus is available from the Department of Comparative Religion.

**Instructor:** C.T. Sinclair-Faulkner  
**Format:** lecture and seminar 3 hours  
**Prerequisites:** at least one of COMR 2001.03A or B, COMR 2002.03A or B, COMR 2003.03A or B or permission of the Instructor

**\*COMR 3003.06R Religion in Canada:** When Canadians have built cities, gone to war, founded economic empires, fallen in love, designed school systems, and elected governments, religion has often been a decisive factor. Sometimes religion has been the decisive factor. What is "religion" in Canada? In the course of this extensive historical study of life in Canada from the 16th century to the present, a variety of answers will be explored. A detailed syllabus is available from the Department of Comparative Religion.

**Instructor:** C.T. Sinclair-Faulkner  
**Format:** lecture and seminar 3 hours  
**Cross-listing:** HIST 3228.06R

**Prerequisite:** COMR 2001.03A or B or COMR 2002.03A or B or permission of the instructor

**\*COMR 3006.03A or B Western Spirituality - Mystics:** Some have argued that the mystic's experience lies at the heart of all religions, while others see it as dangerous to what has traditionally been regarded as religion. Original accounts of Jewish, Christian, Muslim and Amerindian spiritualities are studied in their historical context in this class. A detailed syllabus is available from the Department of Comparative Religion.

**Instructor:** C.T. Sinclair-Faulkner  
**Format:** lecture and seminar 3 hours  
**Prerequisite:** at least one of COMR 2001.03A or B, COMR 2002.03A or B, COMR 2003.03A or B or permission of the Instructor

**\*COMR 3007.03A or B Western Spirituality - Communities:** Modern persons tend to view religion as a solitary enterprise, but more often than not religious communities have taken shape around those who have had a profoundly religious experience. Original accounts of Jewish, Christian and Muslim spiritualities are studied in their historical context in this class. A detailed syllabus is available from the Department of Comparative Religion.

**Instructor:** C.T. Sinclair-Faulkner  
**Format:** lecture and seminar 3 hours  
**Prerequisite:** at least one of COMR 2001.03A or B, COMR 2002.03A or B, COMR 2003.03A or B or permission of the Instructor

**COMR 3008.03A or B The Medieval Church:** This class does not attempt to provide a chronological survey of the development of the Western church, but is an advanced seminar dealing with topics which have no strict chronological limits. Subjects of study include monasticism, heresy, education and the universities, town and cathedral, lay-clerical conflict, and "popular" concepts of religion. Each year one or more topics are examined in detail, with the help of original documents in translation, and using recent periodical literature and/or monographs. Students prepare and present one or two well-researched papers, and class discussions are used to explore related materials and readings in greater depth. Some prior knowledge of medieval European history is essential.

**Instructor:** C.J. Neville  
**Format:** lecture/discussion, 2 hours  
**Prerequisites:** HIST 2001.03A or HIST 2002.03B or HIST 2120.03A

**Recommended:** HIST 1001.03A  
**Exclusions:** Former HIST 3021.03A and 3022.03B students

**Cross-listing:** HIST 3002.03A or B

**\*COMR 3014.03A or B Love and Death in World Religions:** What are love and death? Why do mystics in many traditions speak of love and death together? What meaning can life have in the face of the inevitability of death? Does individual identity come to a complete end or does one continue existence in some form, as most religions assert? What is the nature of judgment after death? Is there reincarnation?

**Instructor:** R. Ravindra

**Format:** lecture and seminar, 3 hours

**Prerequisites:** a class in Comparative Religion or the permission of the instructor; students must be in third year or above

**\*COMR 3015.03A or B Myths, Symbols and Rites:** Myths, symbols and rites have been among the major vehicles of spiritual truths and psychological insights in all religions. After a general discussion of the nature of symbolic and mythic understanding, the focus is on some of the major myths and symbols associated with the lives and teachings of Krishna, Shiva, Gautama Buddha and Jesus Christ.

**Instructor:** R. Ravindra

**Format:** lecture and seminar, 3 hours

**Prerequisites:** a class in Comparative Religion or the permission of the instructor; students must be in third year or above

**COMR 3502.03 The Rise of Modern Science:**

The modern world has been fundamentally altered by science and technology. In what ways? How has this come to be? This class will attempt to answer these questions by looking at the origins of modern science and technology in the 16th and 17th centuries, its growth of popularity in the 18th, and the rise of the scientific profession and science-based industry in the 19th and 20th centuries.

**Recommendation:** This class is designed for students in the arts and the sciences who have some interest in history and/or philosophy. Science students in particular should realize that a considerable amount of reading and writing will be required in this class.

**Instructor:** E. L. Mills

**Prerequisites:** No formal prerequisites, but students must be in their 3rd or 4th year and must have at least a B average.

**Cross-listings:** BIOL 3402.03, HIST 3072.03, SCI 4000.03

**\*COMR 3503.03A or B Nuclear Bombs: Survival and Morality:** This class, designed for students in the arts and the sciences, will study the history of atomic bomb development, the moral issues involved in the

destruction of Hiroshima and Nagasaki, and the concerns about human survival raised by the proliferation of these weapons.

**Instructor:** R. Ravindra

**Format:** seminar 3 hours

**Prerequisites:** COMR 3502.0A or B (or equivalent) or permission of the instructor

**Cross-listing:** PHYC 4020.03

**\*COMR 3532.03A or B Mystical Consciousness and Modern Science:** Yoga, Zen, Prayer of the heart, Sufism and other spiritual disciplines have gathered an enormous amount of experiential and theoretical material about human consciousness and its many levels, from the ordinary to the mystical and cosmic. The first half is devoted to understanding many levels of human consciousness based on these disciplines. The second half is devoted to a critical examination of mystical consciousness in the light of modern scientific discoveries, and of the fundamental presuppositions of modern science in the light of the universal experience and knowledge of the many levels of consciousness.

**Instructor:** R. Ravindra

**Format:** seminar 3 hours

**Prerequisites:** a class in Comparative Religion or in Science (preferably both); students must be in third year or above.

**Exclusion:** COMR 3531.06R

**\*COMR 3533.03A or B Spirituality and Ecology:** What is the scientific and technological understanding of Nature? How does this relate with the religious views about the cosmos? Are the roots of our contemporary ecological crisis to be found in the relationship between human beings and nature as mentioned in the Bible? Can the Hindu-Buddhist traditions and the North American native spirituality offer something of practical value for the cultivation of the right attitude to the environment and our place in the universe?

**Instructor:** R. Ravindra

**Format:** Seminar 3 hours

**Prerequisites:** a class in Comparative Religion or in Science (preferably both); students must be in third year or above.

**Exclusion:** COMR 3531.06R

**\*COMR 4310.03A or B Topics in Comparative Religion/\*COMR 4320.03A or B Independent Study in Comparative Religion:** Structured as a seminar or for independent guided study depending on the interests and needs of the students and the faculty. The intention is to devote some concentrated time to a specific topic of interest (e.g., *Cults and New Religions, The Feminine in World Religions, Religious Aspects of Middle-East Politics, Tradition and Modernity*). Please

consult the Department for the topic which may be discussed in any given term. These classes will normally only be arranged at the request of a student who is majoring in Comparative Religion, though other students may then be admitted to the class upon application to the instructor. These classes permit the student majoring in Comparative Religion to integrate the work of many previous classes and lines of study while examining some chosen topic in the academic study of religion.

**Instructor:** staff

**Format:** seminar 3 hours, staff

## Computing Science

Location: Chase Building  
Telephone: (902) 494-2572  
Fax: (902) 494-5130

### Chair of Department

R. P. Gupta

### Director of Division

A.E. Sedgwick

### Faculty Advisors

C. Hartzman (Honours)  
M.A. Shepherd (Graduate)  
A.E. Sedgwick (Co-op and Majors)

### Professors

P. Kasat, PhD (St. Andrews)  
K.J.M. Moriarty, MSc (Dal), PhD (London)  
M.A. Shepherd, MSc, PhD (Western)

### Associate Professors

A. Farrag, PhD (Alberta)  
C.S. Hartzman, MS (Purdue), PhD (Colorado)

### Assistant Professors

Q. Gao, PhD (Waterloo)  
A.E. Sedgwick, MS (Wisconsin), PhD (Tor)  
S. Srinivas, PhD (Ind. Inst. of Sc.)

### Computer Systems Manager

D. Trueman, MSc (Toronto)

### Adjunct Professors

H.S.P. Jones BSc (Wales) MSc (Southampton)  
L. Oliver, MSc (Acadia), PhD (McG)  
S. Sanilevici, PhD (McG)  
C. R. Watters, MSc (Western), PhD (TUNS)

Please refer to the entry for the Department of Mathematics, Statistics and Computing Science for a full listing of the members of the Department and information on other programmes offered by the Department.

## General Interest Classes

The Division offers a number of classes that should be of interest to students whose major field of study while at Dalhousie will not be Computing Science. These classes are:

**COMP 1000.03A or B:** A class designed for the humanities and social sciences but probably of interest to students in other disciplines as well.

**COMP 3090.03A:** A class that should be of interest to students in all disciplines.

## Degree Programmes

Students who plan to pursue a programme leading to a degree in Computing Science should arrange a programme in consultation with the appropriate Faculty Advisor, listed above. Students should also consult the "Degree Requirements" section of the Calendar for specific regulations.

## Honours in Computing Science

### Departmental Requirements

#### Classes required in Honours:

**1000 level:** Computing Science 1400.03 and 1410.03 and 1670.03  
**2000 level:** Computing Science 2350.03, 2450.03, 2610.03, 2670.03, 2700.03  
**3000 level:** Computing Science 3170.03, 3250.03, 3040.03, 3700.03  
**4000 level:** Four credits at or above the 4000 level, Computing Science Honours Thesis

#### Other required classes:

MATH 1000.03 and 1010.03, MATH/STAT 2060.03, 2080.03, or MATH 2030.03 and 2040.03 or MATH 2135.03.

## Honours Co-op, in Computing Science

### Departmental Requirements

#### Classes required for Honours Coop:

**1000 level:** Computing Science 1400.03 and 1410.03 and 1670.03  
**2000 level:** Computing Science 2350.03, 2450.03, 2610.03, 2670.03, 2700.03  
**3000 level:** Computing Science 3170.03, 3250.03, 3040.03, 3700.03  
**4000 level:** Four credits at or above the 4000 level, Computing Science Honours Thesis

**4 Coop Workterms:** 8891.12, 8892.12, 8893.12, 8894.12

#### Other required classes:

MATH 1000.03 and 1010.03, MATH/STAT 2060.03, 2080.03, MATH 2030.03 and 2040.03 or MATH 2135.03.

**Honours Thesis:** The Honours Thesis should comprise a body of work equivalent to a half credit, and would normally be worked on for the whole of the last year of the Honours programme. The thesis must be supervised by a faculty member, and must be read by the supervisor and one other faculty member.

Attendance at the Honours seminar is required for all Honours students during the last ten credits.

<sup>†</sup>Typically taken within the first two years.

## Combined Honours

Students interested in taking honours in Computing Science and another subject as a combined programme should consult the honours advisor through whom a suitable course of study can be arranged.

A combined honours programme may well be an appropriate choice for many students. If a student is contemplating graduate work, it should be borne in mind that the work in either subject of a combined honours programme may be insufficient for entry to a regular graduate programme, and that a qualifying year may be necessary.

## Advanced Major in Computing Science

### Departmental Requirements

#### Classes required in Advanced Major:

- 1000 level:** Computing Science 1400.03 and 1410.03
- 2000 level:** Computing Science 2350.03, 2450.03, 2610.03, 2700.03 plus one other credit in Computing Science 2000 - 4000 level
- 3000 level:** Computing Science 3040.03, 3170.03, 3250.03, 3700.03 plus one other 3000 level or above credit in Computing Science

#### Other required classes:

MATH 1000.03 and 1010.03, MATH 2030.03

## Advanced Major Co-op in Computing Science

### Departmental Requirements

#### Classes required in Advanced Major Co-op:

- 1000 level:** Computing Science 1400.03 and 1410.03
- 2000 level:** Computing Science 235.030, 2450.03, 2610.03, 2700.03 plus one other credit in Computing Science 2000 - 4000 level
- 3000 level:** Computing Science 3040.03, 3170.03, 3250.03, 3700.03 plus one other 3000 level or above credit in Computing Science

Co-op Seminar 8700.00A

4 Co-op workterms: 8891.12, 8892.12, 8893.12, 8894.12

#### Other required classes:

MATH 1000.03 and 1010.03, MATH 2030.03

## Major in Computing Science

Majors in Computing Science must obtain at least four (and no more than eight) credits beyond the 1000 level in Computing Science.

### Departmental Requirements

#### Classes required in major:

- 1000 level:** Computing Science 1400.03 and 1410.03
- 2000 level:** Computing Science 2700.03, 2350.03, 2450.03, 2610.03
- 3000 level:** Computing Science 3170.03 and 3700.03 plus one other credit at or above the 3000 level

#### Other required classes:

MATH 1000.03 and 1010.03, MATH 2030.03

Students wishing to major in Computing Science will normally take the pair COMP 1400.03/1410.03.

Students who wish to arrange inter-disciplinary programmes (with fields such as Mathematics, Physics, Psychology, and others) are invited to discuss their interests with the department.

## Co-operative Education Programmes

The department offers several Co-op education programmes involving Computing Science, a concentrated programme in Computing Science, a 20-credit major programme and a combined programme with Mathematics.

Computing Science Co-op students are required to take all the classes that non Co-op students take.

Further information about the Co-op programmes is included under the Calendar entry for Co-operative Education in Science. Interested students should note that some departmental regulations for Co-op students differ from those regulations for students not in the Co-op programme.

Any student who is interested in enrolling in a Co-op programme is urged to contact the Faculty Advisor for Co-op Education as early as possible in their academic career for advice on classes and other information.

### Prerequisites

If a Computing Science class is listed as a prerequisite for a Computing Science class beyond the first year level, a grade of C or better is required in the listed class for it to count as a prerequisite.

## Other Information

The Department operates a network of SUN systems, running Unix with 24 Xterminals, for Computing Science students. The Xterminals are located in the Killam Library Building. Colour workstations are available to senior students. The University also operates a VAX running VMS and an Alliant Fx/2816 running concentrix that are used for some Computing Science courses and has PC and Macintosh labs available for course work and student use.

Students who complete the first two years of a Dalhousie programme in Computing Science may complete their programmes at Dalhousie or may be able to transfer to the Technical University of Nova Scotia (TUNS) to complete a Bachelor of Computing Science with Engineering options. Further information about the classes required for admission to a TUNS programme may be obtained from TUNS or the Department of Mathematics, Statistics and Computing Science.

Note that credit may not be obtained for the same class twice even if the number has been changed (e.g. 2700.03 is the same as the former 3690.03).

## Classes Offered

Not all classes are necessarily offered every year. Please consult the current timetable on registration to determine if a class is offered.

**COMP 1000.03A or B Microcomputer Applications:** The goal of this class is to learn how to make correct use of contemporary computer application software. Spreadsheets will be used to carefully design and implement models in mathematics, the sciences, and the social sciences. The proper design of database schemes to accurately represent data and their interrelationships will be introduced through the use of database management systems. Societal issues connected with computing will be woven into the fabric of the course. Students will write essays based on these issues using word processing software. Some sections of this course use PC microcomputers, the others use Macintosh computers.

**Format:** lecture 3 hours, tutorial 1 hour  
**Prerequisites:** None  
**Exclusion:** Note that Computing Science students may not take this course for credit after COMP 1400.03.

**COMP 1400.03A Introduction to Computing Science:** This course provides a general introduction to computing science, algorithmic concepts, and structured programming. The main focus is to teach the students

programming skills in C and how to apply these skills in solving a variety of useful problems.

**Format:** lecture 3 hours, tutorial 1 hour

**Prerequisites:** Nova Scotia Math 441 or equivalent

**COMP1410.03B Algorithms and Data Structures:** This is an introductory course on data structures and algorithms. The prerequisite is COMP 1400.03 or familiarity with the programming language C. The topics include: algorithms analysis, abstract data types, elementary data structures (arrays, stacks, queues, and lists), trees, recursion, sorting and searching.

**Format:** lecture 3 hours, tutorial 1 hour

**Prerequisite:** COMP1400.03 and Math 1000.03.

**COMP1670.03A Discrete Structures I:** See class description for Math 1670.03A, in the Mathematics section of this calendar.

**COMP2300.03B Introduction to Mathematical Modelling Using Algebra:** See class description for MATH 2300.03B, in the Mathematics section of this calendar.

**COMP2350.03A File Structures and Relational Databases:** The relational data model is introduced. Efficient retrieval and manipulation of data stored in relational databases motivates the study of file and index structures. The class examines logical file organizations (indexed sequential files, direct files, tree-structure files, etc.), file operations, and their physical implementations. The entity-relationship model, used for proper database design, is introduced. The class will make use of commercial, micro-computer based relational database software.

**Format:** lecture 3 hours

**Prerequisite:** COMP 1410.03

**COMP2450.03B Introduction to Computer Systems Organization:** An introduction to machine architecture from the perspective of an assembly language programmer. Students gain familiarity with an assembly language and the translation process needed to produce machine code. Common addressing modes, macros and file I/O are discussed, together with the internal structure of memory, control units and processing units.

**Format:** lecture 3 hours

**Prerequisite:** COMP 1410.03

**COMP 2610.03A Data Structures and Algorithmic Analysis:** Data types and the operations on them are covered in this class. After a review of the data structures covered in COMP1410.03, the class proceeds in detail to examine trees, graphs, sets and strings. Efficient representations and algorithms for these structures are discussed. External file

sorting methods are also discussed.

Considerable emphasis is placed on the analysis of algorithms.

Format: lecture 3 hours, tutorial 1 hour

Prerequisite: COMP 1410.03

**COMP 2670.03B Discrete Structures II:** This class continues Math 1670.03. This course covers some basic concepts in discrete mathematics which are of particular relevance to students of computer science, engineering, and mathematics. The topics to be covered will include: Solution of Recurrence Relations, Generating Functions, Modular Arithmetic, Chinese remainder theorem, Trees and graphs, Finite state machines, Groups and rings, Boolean algebras.

Format: Lecture 3 hours

Prerequisite: MATH 1670.03

Cross-listing: MATH 2670.03B

**COMP 2700.03B Programming Languages:**

The emphasis is on fundamental concepts such as block structure and recursion and structured control flow. Exercises are given in several languages such as Lisp and Prolog. Recursion and functional programming are extensively discussed as well as an Introduction to object-oriented programming.

Format: lecture 3 hours

Prerequisite: COMP 2610.03

**SCI 3000.06R Science Fundamentals:** See class description in Science, Interdisciplinary section of this calendar.

**COMP 3040.03A Computer Architecture and Design:**

An introduction to logic design and detailed computer architecture. Basic logic elements such as gates and flip-flops are discussed and the design of combinational networks, registers and control mechanisms analyzed. Internal representation and arithmetic, communication between components, instruction fetch and sequencing, interrupts and I/O controllers are also discussed.

Format: lecture 3 hours

Prerequisite: COMP 2450.03

**COMP 3090.03A or B Computers and Society:**

The impact of computers on society is discussed in this class. Topics include the history of computing and technology, the place of the computer in modern society, legal issues such as the copywriting of software, the computer scientist as a professional, the impact of databanks on individual privacy and the public perception of computers and computer scientists.

Format: lecture 3 hours

Prerequisite: None

**COMP 3170.03B (formerly 2270.03)**

**Introduction to Numerical Linear Algebra:** Floating point arithmetic. Numerical solution of linear systems of equations; Gauss elimination methods and iterative methods;

condition numbers of problems and of algorithms; estimation of condition numbers. Numerical calculation of eigenvalues; QR and LR algorithms; singular value decomposition; Gram Schmidt orthogonalization. Use is made of program libraries such as Linpack, Eispack and Matlab.

Format: lecture 3 hours

Prerequisites: MATH 1010.03, MATH 2030.03, COMP 1410.03

Cross-listing: MATH 3170.03

**COMP 3210.03A or B Introduction to Numerical Analysis:** See class description for Mathematics 3210.03B, in the Mathematics section of this calendar.

**COMP 3250.03A Data Base Management**

**Systems Design:** The concepts and structures necessary to design and implement a data base management system are stressed. Hierarchical, network and relational models are discussed with emphasis on the necessary logical and data structures. Various normal forms and canonical schema are discussed as well as the concepts of relational algebras and relational calculus.

Format: lecture 3 hours

Prerequisite: COMP.2350.03

**COMP 3350.03A or B Introduction to Vector and Parallel Computing:** An introduction to the computer architecture of the supercomputers of today: CRAY X-MP, CRAY 2, FUJITSU VP2000, NEC SX-3, and Alliant FX/2800. The software for the efficient implementation of vectorization and parallel processing will be discussed.

Format: lecture 3 hours

Prerequisites: COMP 3170.03 and COMP 2450.03

**COMP 3390.03A or B Statistical Computing:**

See class description for STAT 3390.03 in the Statistics section of this calendar.

**COMP 3700.03B Operating Systems I:**

This class covers the principles of modern operating system design with examples from existing systems. Specific topics include: concurrent processes, interprocess communication, synchronization, scheduling policies, multi-level storage management, and associated algorithms.

Format: lecture 3 hours

Prerequisite: COMP 2610.03

**COMP 3750.03A or B Artificial Intelligence:**

An introduction to basic concepts and techniques of artificial intelligence systems with insights given into active research areas and applications. Representational issues and notational structures are emphasized and existing systems are surveyed. Students work on assignments and small projects using Lisp.

Format: lecture 3 hours

Prerequisite: COMP 2700.03

**COMP 3810.03B MicroComputers and the Real World:** See class description for PHYC 3810.03 in the Physics section of this calendar.

**COMP 4100.03A or B Operating Systems II:** A further development of the material of Operating Systems I, but with the focus on distributed operating systems. Topics include the client-server model, IPC, light weight processes, RPC, distributed file systems, distributed transactions, transparency and reliability.

Format: lecture 3 hours  
Prerequisites: COMP 3700.03B  
Cross-listing: COMP 5100.03

**COMP 4130.03A or B Analysis of Algorithms:** This class covers algorithmic solutions to a wide variety of problems and a formal analysis of their complexity. It is a continuation of the 2810.03 class. Problems are taken from combinatorics and numerical computation including algorithms for unordered and ordered sets, graphs, fast multiplication, prime testing, factoring, polynomial arithmetic and metric operations. Other topics include the analysis of algorithms used in systems programming and artificial intelligence, such as pattern matching for text processing and algorithms in natural language processing.

Format: lecture 3 hours  
Prerequisites: COMP 2700.03  
Cross-listing: MATH 4130.03/5130.03, COMP 5130.03

**COMP 4140.03A or B Software Design and Development:** This class involves a formal approach to state-of-the-art techniques in software design and development. Students work in teams in the organization, development and management of a large software project. Formal models of structured programming, stepwise refinement and top-down design, strength and coupling measures, milestones and estimating, chief-programmer teams, programme libraries and documentation are included.

Format: lecture 3 hours  
Prerequisites: COMP 2700.03  
Cross-listing: COMP 5140.03

**COMP 4150.03A or B Theory of Programming Languages:** This is a class in the formal treatment of programming language translation and compiler design concepts. Topics include lexical analysis and parsing with emphasis on the theoretical aspects of parsing context-free languages, translation specification and machine-independent code optimization. Finite state grammars, lexical scanners, and context-free parsing techniques such as LL(k), precedence, LR(k), SLR(k) are included.

Format: lecture 3 hours  
Prerequisites: COMP 2700.03  
Cross-listing: COMP 5150.03

**COMP 4200.03B Topics In Artificial Intelligence:**

Format: lecture 3 hours  
Cross-listing: COMP 5200.03

**COMP 4250.03A or B Information Retrieval:** An introduction to online information retrieval systems for textual databases. The major models of information retrieval will be covered as well as such basic topics as automated indexing and performance measures, and hypertexts.

Format: lecture 3 hours  
Prerequisite: COMP 2350.03  
Cross-listing: COMP 5250.03

**COMP 4350.03A or B Object-Oriented Programming:** An introduction to object-oriented programming (OOP) and object oriented analysis, object oriented design, and C++.

Format: lecture 3 hours  
Prerequisites: Three 3000 level COMP courses

Cross-listing: COMP 5350.03, MATH 4330.03/5330.03

**COMP 4400.03A or B Programming Methodology:** Techniques for verification of computer programmes. Formal specification of software.

Format: lecture 3 hours  
Prerequisites: B average in 3000-level Computing Science courses  
Cross-listing: COMP 5400.03/5401.03

**COMP 4450.03A or B Introduction to Data Communications:** The elements of data communications and the structure of computer networks will be discussed. The course uses the ISO model as a reference and includes an introduction to basic data transmission techniques, computer network topologies and architectures, and a look at some specific implementations and applications. This course will concentrate on the lower layers of the ISO model.

Format: lecture 3 hours  
Prerequisites: STATS 2070.03/2080.03  
Cross-listing: COMP 5450.03

**COMP 4550.03A or B Topics in Computer Systems Architecture:** This course provides an overview of microcomputer systems both at the general concept level and by examining specific systems. General architecture topics include instruction sets, memory I/O, bus systems and interrupt structures. Specific systems by several different manufacturers are examined on the basis of both hardware and software.

Format: lecture 3 hours  
Corequisite: COMP 3700.03

**COMP 4850.03A or B Selected Topics In Information Retrieval:** Assuming that the student has a broad understanding of the field of information retrieval, this course takes an

in-depth look at selected topics at the forefront of the field. The topics will vary slightly from year to year, but may include: clustering and nearest neighbour matching, information theory, bibliometrics, and new models of information retrieval.

Format: lecture 3 hours  
Prerequisite: COMP 4250.03

## COMP 8894.12 Co-op Work Term IV

**COMP 4660.03A or B Automata and Computability:** This class deals with finite state, pushdown and linear bounded automata; their correspondents in the Chomsky hierarchy for formal grammars and Turing machines. Appropriate closure properties and non-determinism are discussed as well as computable and noncomputable functions and the Halting problem.

Format: lecture 3 hours  
Prerequisite: COMP 2670.03  
Cross-listing: MATH 4660.03/5660.03,  
COMP 5660.03

**COMP 4670.03A or B Computer Graphics:** Graphics for computing science include topics on graphical kernel system (GKS), rotation, compression, segmentation, analysis, and fractals.

Format: lecture 3 hours  
Cross-listing: COMP 5670.03

**COMP 4700.03A or B Advanced Topics in Data Base Design:** Topics vary from year to year depending on the interests of the students and the instructors. Past topics have included concurrency control, scheduling, query optimization and object-oriented data bases.

Format: lecture 3 hours  
Prerequisites: COMP 3250.03  
Cross-listing: COMP 5700.03

**COMP 4800.03A Computer Systems Modelling:** This course develops queueing network models suitable for modelling computer systems. Approximate and exact solutions to these models are developed and single and multiple classes of users are considered. Modelling multiprocessors, I/O, shared memory, swapping, paging, etc. are also considered. Finally, some of the modelling techniques are applied to other situations such as database performance. The models are developed intuitively and justified rigorously using queueing network theory.

Format: lecture 3 hours  
Prerequisites: COMP 3700.03 and STAT 2070.03/2080.03  
Cross-listing: COMP 5801.03

**COMP 8700.00 (non credit) Co-op Seminar**

**COMP 8870.00R Honours Seminar**

**COMP 8891.12 Co-op Work Term I**

**COMP 8892.12 Co-op Work Term II**

**COMP 8893.12 Co-op Work Term III**

## Contemporary Studies Programme

**Location:** University of King's College,  
Halifax, Nova Scotia  
**Telephones:** (902) 422-1271  
**FAX:** (902) 423-3367

**Acting Co-ordinator**  
Kenneth Kierans 422-1271

### Teaching Staff at the University of King's College:

Nina Butlin, BA (Columbia), BEd (Dal), MA (Dal)  
Elizabeth Edwards, BA, MA (Dal)  
Margaret Heller, BA (LU and Dal), MA (Dal)  
Kenneth Kierans, BA (McGill), DPhil (Oxon)

### Teaching Staff at Dalhousie University:

Michael Bishop, BA, MEd (Manchester), MA (Manitoba), PhD (Kent, Canterbury)  
James Brown, AB (Miami), MA (Middlebury), PhD (Penn)  
Victor Li, BA, MA (UBC), PhD (Cantab)

### The Contemporary Studies Programme

Our assumptions about the contemporary world are not only changing but becoming increasingly diverse and complex. One way in which we can reasonably try to make sense of our period as a whole is to combine into a single course of study several different disciplines and traditions of enquiry. To this end, Dalhousie University and the University of King's College jointly offer an Interdisciplinary Program in Contemporary Studies (CSP). This combined-honours BA Program brings together departmental offerings in arts and the social sciences at Dalhousie and joins them with Contemporary Studies classes--including a required 'core' class for each upper year of study--at King's. The King's portion of this intercampus degree Program consists of integrated and interdisciplinary classes. These classes include specialists from a number of disciplines, involve team-teaching throughout, and are supported by a tutorial system. The intention is to provide students with a many-sided yet unified introduction to the study of the contemporary world.

The interdisciplinary offerings within the CSP at King's count as one of two honours subjects. Contemporary Studies classes are designed so that important writers and artists of the 20th century may be considered both on their own terms and in relation to some of the fundamental themes of our time. This naturally very often involves a consideration of the difference between these writers and

artists and those of the 19th century. The three 'core' classes give students a framework for understanding political, scientific, and aesthetic phenomena in the 20th century. The non-required classes focus on diverse aspects of and explanations for these often contradictory contemporary phenomena.

Aside from preparing undergraduates for future more specialized training at the graduate or professional level, the CSP is intended to provide them with a broad overview of 20th-century culture, especially the European and North American relation to it. Students are encouraged to relate the various aspects of contemporary thought to one another and to develop independent insights into the nature of the world in which they live. It is also hoped that CSP students will take an active role in organizing certain events each year, including lectures, debates, and exhibitions.

### Degree Programmes

The departmental offerings within the CSP at Dalhousie include the other honours subject and a number of possible electives. The other honours subject must be selected from the following list of Dalhousie departments and Programs: Classics, English, French, German, History, International Development Studies, Music, Philosophy, Political Science, Russian, Sociology and Social Anthropology, Spanish, and Theatre. Electives may be taken in any of the above-mentioned departments and Programs as well as in the following: Comparative Religion, Music, and Women's Studies. In addition, some professors in the Dalhousie Faculty of Arts and Social Sciences are members of the Contemporary Studies teaching staff and offer classes at King's.

### Combined Honours

All students must meet the distribution requirements of the Faculty of Arts and Social Sciences (see regulations 3 and 11.1). Students who are eligible to take an honours degree are urged to apply to the CSP. Because it is an honours programme, the quality of work required in it is higher than that required in a major or an advanced major programme (see regulation 22.1).

Applications for admission must be made to the Dalhousie department concerned and to the Contemporary Studies Office at King's on forms available from the Registrar at either Dalhousie or King's. Students should apply before registering for the second year. If application is made later, it may be necessary to make up some work not previously taken. For each individual student the entire degree programme, including elective classes, is subject to supervision and approval by the

Dalhousie department concerned and by a member of the Contemporary Studies teaching staff.

All CSP students are encouraged to acquire competence in languages through appropriate classes which are relevant to their degree, interests, and future plans.

The joint Dalhousie/King's Contemporary Studies programme is based on the general requirement that the 20 full classes needed to graduate include:

- (1) Completion of either the King's Foundation Year programme (either the three- or the four-class version) or at least two appropriate first-year full classes at Dalhousie: Classics, CLAS 1000.06R, CLAS 1010.06R, CLAS 1021.03A and CLAS 1022.03B, CLAS 1100.06R; Comparative Religion, COMR 1000.06R/2000.06R; English, ENGL 1000.06R; History, HIST 1001.03A, HIST 1002.03A/B, HIST 1050.06R, HIST 1100.06R, HIST 1200.06R, HIST 1300.06R, HIST 1400.06R; Music, MUSC 1000.06R, MUSC 1350.03A and MUSC 1351.03B; Philosophy, PHIL 1000.06R, PHIL 1010.06R; Political Science, POL 1100.06R, POL 1103.06R, POL 1501.06R; Sociology and Social Anthropology, SOSA 1000.06R, SOSA 1050.06R, SOSA 1100.06R, SOSA 1200.06R; Spanish, SPAN 1100.03A/B; Mathematics, 1001.03A and 1002.03B.

- (2) A normal requirement (see regulation 11.3) of eleven full classes beyond the 1000-level in the two honours subjects, but not more than seven full classes being in either of them. Students may, with the approval of both the Dalhousie department concerned and the Contemporary Studies teaching staff, elect a maximum of thirteen full classes in the two principal subjects, not more than nine full classes being in either of them. In this case, the requirement in (3) below is reduced to two or three full classes.

- (3) Four full elective classes in subjects other than the two offered to satisfy the general requirement (see regulation 11.3) that students complete fifteen full classes beyond the first year of study.

- (4) The three 'core' classes in Contemporary Studies: CSP 2000.06R, CSP 3000.06R, CSP 4000.06R.

- (5) An honours qualifying examination (see regulation 11.3). At the conclusion of an honours programme a student's record must show a grade which is additional to the grades taken

to complete the required 20 full classes. This grade may be obtained through a comprehensive examination, the presentation of a research paper (which may be an extension of one of the classes), or such other method as may be determined by the Dalhousie department concerned and/or the Contemporary Studies teaching staff. CSP students may choose to acquire this additional grade in either honours subject or in both. Completion of CSP 4200.00R, as a twenty-first credit, is sufficient to satisfy the requirement for an honours qualifying examination.

Students may take an 'Independent Reading' class only when they reach their third or fourth year. There are six options for this class, but only one full class or the equivalent may be taken in a year. No more than two full classes of this type may be taken during the course of study. The permission of a member of the teaching staff is necessary in order to take these classes, and their availability is strictly limited.

## Classes offered at the University of King's College

**CSP 2000.06R Social and Political Development in the 20th Century:** This class will examine some of the major figures in contemporary social and political thought. The 19th-century background to these figures will be explored, but the class will concentrate on developments in the 20th century. Particular attention will be paid to changes in music and painting during this period. Writers to be considered include Kant, Marx, Nietzsche, Heidegger, Derrida, Foucault, and Habermas. Movements to be discussed include German Idealism, Romanticism, Marxism, Existentialism, Phenomenology, Structuralism, Post-Structuralism, and Critical Theory.

Instructor: K. Kierans  
Format: lectures and tutorials.  
Prerequisite: none

**CSP 2010.06R/CSP 3010.06R/CSP 4010.06R The Lecture Series:** Each year a lecture series class is offered. Students are allowed to take up to three such classes, one for each year of upper-level study. Each class will consist of thirteen bi-weekly evening lectures given by specialists from Atlantic Canada and beyond. The lecturers will offer students reflections on a number of contemporary issues and themes. Each year a different theme will be explored. For example, a full class could be devoted to modern technology and its often contradictory implications for nature, family life, women, minorities, political structures, literature, drama, and the arts. Small-group tutorials will

help students prepare for and react to the lectures.

**Instructor:** E. Edwards  
**Format:** bi-weekly evening lectures (two hours) and weekly tutorials (two hours).

**Prerequisite:** none.

**CSP 3000.06R The History and Philosophy of 20th-Century Science and Technology:** One of the most controversial issues of the century is about the value of natural science: is it intrinsically valuable or valuable merely as an instrument for mastering the forces of nature? This class will explore the issue by looking at the ambiguities surrounding contemporary developments in theoretical physics, science-based industry, and the technical control of nature. Emphasis will be put on the diverse schools of contemporary sculpture and architecture which at once presuppose and expand the limits of our scientific-technical culture.

**Instructor(s):** staff. The instructor of CSP 2000.06R will participate in this class.

**Format:** lectures and tutorials.

**Prerequisite:** CSP 2000.06R or permission of an instructor.

**CSP 33100.06R Culture, Politics and the Post-Colonial Condition:** The term "post-colonial" marks not only the historical passage of Western colonial expansion and domination, of subaltern resistance and national independence, but also describes a renewal of the cycle of domination and resistance, dependence and struggle in the new nations that have emerged since the end of World War Two and in Western metropolitan centres with their changed conditions and new populations. This course will examine the complex relations and changing configurations of dominations and struggle that continue to exist in our contemporary post-colonial world.

**Instructor:** V. Li

**Format:** seminar/tutorials

**Exclusion:** the former CSP 2040.06

**CSP 3510.03A or B Independent Readings in Contemporary Studies:** In a reading class the student is assigned to a member of staff for regular meetings to discuss readings in a selected area. Papers and research projects are expected.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**CSP 3511.03A or B Independent Readings in Contemporary Studies:** See class description above.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**CSP 3515.06R Independent Readings in Contemporary Studies:** See class description above.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**CSP 4000.06R The Deconstruction of the Tradition in the 20th Century:** Our century has followed Nietzsche in deepening the 19th-century critique of western culture. In the last century, many Europeans and North Americans believed that by refuting or ignoring traditional metaphysics and religion they could scientifically identify human interests and for the first time realize freedom in the world. Special attention will be paid to the literary and poetic forms in which both traditional culture and scientific critique are supposed to be dissolved.

**Instructor(s):** staff. The instructors for CSP 2000.06R and CSP 3000.06R will participate in this class.

**Format:** lectures and tutorials.

**Prerequisite:** CSP 2000.06R and CSP 3000.06R or permission of an instructor.

**First offered 1995-96.**

**CSP 4300.06R The Place of Women in Contemporary French Critical Theory:** This course will concentrate on some of feminism's most challenging voices, those that have emerged from France in this century: Beauvoir, Kristeva, Cixous and Irigaray. The course will attempt to illuminate the intellectual background against which these women write, particularly in the areas of linguistic and anthropological structuralism, and in psychoanalytic theory. The course will be organized in part by the historical evolution of feminist thought, in part by the consideration of central feminist concerns.

**Instructor:** E. Edwards

**Format:** lectures and tutorials

**Prerequisite:** none

**Exclusion:** the former CSP 2030.06

**CSP 4310.06R From Symbolism and Surrealism to the New Novel and Beyond: Questions of Perception, Image and Presence:** Analysis of the interlocking perceptions of self and world, word and image, in the literature and art of our modernity, from Rimbaud and Mallarmé, Gauguin and VanGogh, through Surrealism and Cubism, to Camus and Sartre and beyond: the new novel and new wave film, Barthes, Bonnefoy, and contemporary French women writers.

**Instructor(s):** J. Brown and M. Bishop

**Format:** seminar/lectures and tutorials

**Prerequisite:** none

**Exclusion:** the former CSP 2020.06

**CSP 4500.06R Honours Seminar in Contemporary Studies:** This seminar is specifically intended for students in the combined-honours degree programme in Contemporary Studies. Students must write a substantial essay on a topic to be chosen in consultation with the appropriate member of the Contemporary Studies teaching staff.

**Instructor(s):** Staff.

**Format:** seminar (two or three hours).

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**First offered 1995-96.**

**CSP 4510.03A or B Independent Reading in Contemporary Studies:** In a reading class the student is assigned to a member of staff for regular meetings to discuss readings in a selected area. Papers and research projects are expected.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**First offered 1995-96.**

**CSP 4511.03A or B Independent Reading Class in Contemporary Studies:** See class description above.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**First offered 1995-96.**

**CSP 4515.06R Independent Reading Class in Contemporary Studies:** See class description above.

**Format:** individual instruction.

**Prerequisite:** honours registration in Contemporary Studies or permission of the instructor.

**First offered 1995-96.**

## Earth Sciences

**Location:** Life Sciences Centre, Room 3008  
**Telephone:** (902) 494-2368  
**Fax:** (902) 494-6889

**Chairperson of Department**  
P.J.C. Ryall

**Undergraduate Advisor**  
G.K. Muecke (494-6669)

**Co-op Co-ordinator**  
J.M. Hall (494-6510)

**Graduate Co-ordinator**  
P.H. Reynolds (494-2325)

**Emeritus Professors**  
H.B.S. Cooke, MSc, DSc (Witwatersrand)  
G.C. Milligan, MSc (Dal), PhD (Harv)

**Professors**  
D.B. Clarke, BSc, MA (Tor), PhD (Edin)  
J.M. Hall, BSc (Wales), PhD, DIC (Lond)  
R.A. Jamieson, BSc (Dal), PhD, (MUN)  
F. Medloll, PhD (Parma)  
P.H. Reynolds, BSc (Tor), PhD (UBC), (jointly with Physics)  
P.T. Robinson, BSc (Mich), PhD (Calif)  
P.E. Schenk, BSc (Western), MSc, PhD (Wisc)  
M. Zentilli, BSc (Chile), PhD (Queen's)

**Associate Professors**  
N. Culshaw, BA (Keele), PhD (Ottawa)  
M.R. Gibling, BA (Oxon), PhD (Ottawa)  
G.K. Muecke, BSc, MSc (Alta.), DPhil (Oxon)  
P.J.C. Ryall, BSc (Dal), MSc (Alta), PhD (Dal)  
D.B. Scott, BSc (Washington), PhD (Dal)

**Assistant Professors**  
D. Godfrey-Smith, BA (Calgary), MA (SFU), PhD (SFU)

**Senior Instructor**  
P. Wallace, BSc, MSc (McM)

**Research Associate**  
C. Beaumont, PhD (major appointment in Oceanography Department)

**Adjunct Professors**  
F. Gradstein, BA, MSc, PhD (Utrecht)  
P. Hacquebard, PhD (Groningen)  
P. Mudie, BSc (Capetown), BSc (Leicester), PhD (Dal), FRSC  
M. Salisbury, BSc (MIT), PhD. (Washington)

## Introduction

Earth Science studies the Earth and deals with many questions, such as: How was the

Earth formed? What is its composition? Where do we look for oil? Or nickel? Or reliable water supplies? What changes the Earth now? What moves continents? Why are the ages of all the ocean basins less than one-twentieth the age of the Earth itself? Geology is an intellectually exciting discipline, and its study is of enormous economic importance to Canada.

Classes in earth sciences 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 - and work for private industry or government agencies. Some may need instruction in earth sciences as an aid to other disciplines: for example, a mining engineer, an environmental scientist interested in groundwater problems, a marine engineer interested in coastal processes, or a biologist interested in protozoa. Other students may be interested in an earth sciences 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 introductory classes in earth sciences stimulate their awareness of their surroundings, their understanding of the environment and develop their appreciation of science.

## High School Preparation

Students in high schools who plan a career in sciences involving the Earth, such as geology or geophysics, should note that it is sensible to try to have the following subjects in Grades XI and XII: Grade XII Mathematics, plus Chemistry and Physics. Note that these are not prerequisites, but are strongly advised. The student should aim to make up deficiencies in high school preparation in the first year at Dalhousie.

## Undergraduate Programmes

Students should consult the "Degree Requirements" section of this calendar for specific regulations.

**Programmes and classes for those whose major is not earth sciences.**

These classes are specially designed for those who want to know something about the Earth, but whose major field of study at Dalhousie will lie elsewhere; an economics student, concerned with resources; a history student, interested in the role played by Canada's geological framework in the development of transportation; a biology student interested in faunal environments on the seafloor. These classes are:

- ESCI 1040.03A/1050.03B, The Earth and Society, a class especially designed for students not intending to major in geology

- SCI 1200.06R, *An Overview of the Cosmos, Earth and Life*, an interdisciplinary science class designed for non-science majors
- ESCI 2400.03A, *Marine Geology*, an evening class open to all with good grades in 1000.06R or 1040.03A/1050.03B
- ESCI 2410.03B, *Environmental Geology*, an evening class, open to all with good grades in 1000.06R or 1040.03A/1050.03B
- ESCI 2420.03B, *The Dinosaurs*, open to all with good grades in 1000.06R or 1040.03A/1050.03B.

**For engineering students and science students in other disciplines**

**Biologists:** 1000.06R, 2410.03B/3410.03B, 2201.03A/2202.03B, 2420.03B; **Chemists:** 1000.06R, 2101A/2102B, 3010A, 3020B, 4380A; **Physicists and Mathematicians:** 1000R, 2050.03B, 3130.03B, 4270.03A, 4280.03B, and 4290.03B.

**Field Work**

Field excursions are part of several classes and are conducted at appropriate times during the session. In addition, some optional field excursions may be held each year.

Students are charged a contribution towards the cost of all field excursions. Charges for those trips that are held during the session, as part of a class, are payable to the department. As a result of increased costs and uncertainty of external funding, fees for individual field excursions are fixed yearly. (Please consult Department.) The charges for optional field trips are notified, and payable, several months in advance. Overpayments, in excess of \$5.00, are reimbursed to the student.

## Honours Degree Programmes

An honours degree is almost essential for any professional work in earth sciences, and for graduate study. Students must take the second and third year classes of the Earth Sciences core programme listed below. See "Degree Requirements" section for complete details. Science Foundation year (see separate entry in this calendar) is an appropriate preparation for entry into the second year of an Earth Sciences programme.

**Departmental Requirements**

**Classes required in Honours:**

- 1000 level:** Earth Science 1000.06 or 1040.03 and 1001.03
- 2000 level:** Earth Science 0001.00, 2050.03, 2101.03, 2102.03, 2110.03, 2201.03, 2202.03

- 3000 level:** Earth Science 0003.03, 3010.03, 3020.03, 3140.03, 3301.03, 3302.03
- 4000 level:** Earth Science 0002.03, 4200.06, 4350.03, 4351.03 plus at least one other advanced Earth Science credit for a total of nine credits beyond the 1000 level.

**Honours Qualifying examination**

**Other required classes:**

Math 1000.03 and 1010.03 or Math 1500.06, CS 1000.03A or B (PC section), two of Physics 1100.06, Chemistry 1100.06, Biology 1000.06 or 2001.03 and 2002.03

**Other departmental requirements:**

Two credits in a minor subject.

**Note:** Physics 1100.06R and a Mathematics class are prerequisites for ESCI 2050.03B, which fits best into Year II of the programme.

In second year, students should take one class in two of Physics, Chemistry, Biology, Mathematics. Recommended classes are: Biology 2001.03A and 2002.03B, 3321.03; Chemistry 2110.03A or B, 2200.03A or B, 2310.03A, 2320.03B; Physics 2000.03A, 2005.03A, 2010.03B, 2015.03B; or 2220.03A/2230.03B; Mathematics 2000.06, 1060.03A/1070.03B, 2270.03A or B.

Students in the geophysics stream will take ESCI 3130.03B. This class has a field school, which is an integral part of the course. It is normally held in late April or early May.

To satisfy Regulation 11.6 concerning the Honours Qualifying Examination, a student will complete a thesis as ESCI 4200.06R, followed by an oral examination, based on the general subject area of the thesis. This oral examination then counts as the honours qualifying examination, along with ESCI 0002.03.

Theses must be completed by the second Monday in March of fourth year. Students who complete after this date must re-register for the following academic year in ESCI 4200.06R, pay the fees, and graduate at the spring convocation of the next academic year.

Each advanced class in the second, third and fourth year, except electives, must be passed with a grade of C or better.

In five of the advanced classes, a grade of B or better must be achieved, and in three additional advanced classes, a grade of B- or better is required.

A grade of B- or better must be achieved on the Honours Qualifying Examination.

For First Class Honours, students must achieve either:

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

A grade of A- or better must be achieved on the Honours Qualifying Examination.

### Co-op Programme

A co-op programme is offered by the department, providing students with an opportunity to gain practical work experience concurrently with their academic training. The student is expected to fulfill the normal twenty-credit requirement of an honours degree or advanced major, over eight academic terms that are interspersed with four work terms. A minimum average of B is required for entrance to the programme. The programme commences in the spring term of the second year. Interested students should consult with the department prior to that time.

### Departmental Requirements

#### Classes required in Honours Coop:

- 1000 level:** Earth Science 1000.06 or 1040.03 and 1001.03
- 2000 level:** Earth Science 0001.00, 2050.03, 2101.03, 2102.03, 2110.03, 2201.03, 2202.03, 0001.00
- 3000 level:** Earth Science 0003.03, 3010.03, 3020.03, 3140.03, 3301.03, 3302.03, 0002.03
- 4000 level:** Earth Science 0002.03, 4200.06, 4350.03, 4351.03 plus at least one other advanced Earth Science credit for a total of nine credits beyond the 1000 level.

#### Honours Qualifying result

#### Other required classes:

Math 1000.03 and 1010.03 or Math 1500.06, CS 1000.03A or B (PC section), two of Physics 1100.06, Chemistry 1100.06, Biology 1000.06 or 2001.03 and 2002.03

#### Other departmental requirements:

Two credits in a minor subject. Honours Qualifying result and four work terms interspersed over eight academic terms.

### Hydrogeology/Environmental Geology

In addition to the above programme, the Department offers special programmes emphasizing hydrogeology/environmental

geology in the third and fourth year. Students interested in specializing in these areas should consult with the Undergraduate Advisor.

### Honours Marine Geology Stream Programme

Students wishing to obtain an honours BSc degree in the marine geology stream should discuss their programme with the undergraduate advisor and classes will normally include:

- Year I:** ESCI 1000.06R, MATH 1000.03A/1010.03B, PHYC 1100.06R, CHEM 1010.06R, and WRITING Requirement elective
- Year II:** OCEA 2850.06R, ESCI 0001.00, ESCI 2101.03A, ESCI 2102.03B, ESCI 2201.03A, ESCI 2202.03B, ESCI 2110.03A, Social Science Elective, COMP 1000.03B
- Year III:** ESCI 0003.03, ESCI 3010.03A, ESCI 3301.03A, ESCI 3140.03A, ESCI 3400.03A, ESCI 3410.03B, ESCI 3302.03B, ESCI 3020.03B, ESCI 2050.03B, Elective
- Year IV:** ESCI 4200.06R, ESCI 0002.03, ESCI 4501.03A, ESCI 4350.03A, ESCI 4351.03B, plus 1 1/2 credit from ESCI 4000-level courses (ESCI 4270.03A/4280.03B, 4290.03A, 4501.03A or B, 4502.03A or B, 4503.03A or B, 4510.03A) (and 1-credit from Oceanography, OCEA 4110.03B, 4120.03A, 4130.03A, 4150.03A, 4280.03A)

### Combined Honours Programme

Students wishing to take combined honours in earth sciences and another subject, should discuss their programme in detail with the undergraduate advisor. Students must attend the field school normally taken at the beginning of second year (ESCI 0001.00).

### Combined Honours with Biology

Earth Sciences Honours Programme should be followed during Years I-III and students should take either a Biology class or ESCI 4501.03A or B or 4502.03A or B or 4503.03A or B in place of ESCI 3010.03A/3020.03B. Suggested Biology classes are 1000.06R or 2001.03A and 2002.03B in Year I; 2030.03A and 3030.03B and 2060.03A or B in Year II; 2001.03A and 2002.03B or 3321.03 or 3323.03 in Year III.

## Combined Honours with Physics

Students should follow the Earth Sciences Honours Programme in years I to III, including ESCI 2050.03B and ESCI 3130.03B, but should take a Physics class in place of ESCI 3010.03A/3020.03B. Suggested Physics classes are 1100.06R in Year I, 2000.03A, 2005.03A, 2010.03B, 2015.03B in Year II, two of 3090.03B, 3140.03A or 3000.03A/3010.03B or 3200.03A/3210.03B and 3160.03A/3170.03B in Year III. Math 2000.06 should also be taken in either Year II or III, and Math 3110.03A/3120.03B in Year III or IV.

## Combined Honours with Chemistry

Students should follow the Earth Sciences Honours Programme in Years I-III, but should take 3000 level Chemistry classes in place of ESCI 3301.03A/3302.03B and 2050.03B/3130.03B. Suggested Chemistry classes are 1010.06 in Year I, 2201.03A or B/2101.03A or B and 2301.03A/2302.03B or 2400.06 in Year II; any 3000 level in Year III.

## Earth System Science

Students wishing to follow an interdisciplinary study of the Earth should consult the Earth System Science section of this calendar.

## Advanced Major (20-credits)

### Departmental Requirements

#### Classes required in Advanced Major:

- 1000 level:** Earth Science 1000.06 or 1040.03 and 1001.03  
**2000 level:** Earth Science 0001.00, 2101.03 and 2102.03, 2110.03, 2201.03 and 2202.03  
**3000 level:** Earth Science 0003.03

#### Other required classes:

Math 1000.03 and 1010.03/1060.03 or Math 1500.06, two of Physics 1100.06, Chemistry 1100.06, Biology 1000.06 or Biology 2001.03 and 2002.03

A grade of D in an Earth Sciences class precludes admission to classes for which the class is a prerequisite. Where several classes are listed as prerequisites, and a grade of C- or better was not obtained in all, the instructor's consent may be the basis for admission. Students must satisfy the Faculty of Science Writing Requirement and Mathematics Requirement.

## Major in Earth Sciences (3 year)

Three-year programmes with a major in Earth Sciences are suitable for students who intend to take other professional training or to enter fields where they are likely to need their

geological training as background. A 15-credit degree is of little value as a qualification for a professional career in the earth sciences.

### Departmental Requirements

#### Classes required in major:

- 1000 level:** Earth Sciences 1000.06 or 1040.03 and 1001.03  
**2000 level:** Earth Sciences 0001.00, 2101.03 and 2102.03, 2110.03, 2201.03 and 2202.03  
**3000 level:** Earth Science 0003.03

ESCI 1000.06R or 1040.03A/1001.03B must be passed with a grade of B- or better to continue in the programme.

A grade of D in an Earth Sciences class precludes admission to classes for which the class is a prerequisite. Students must satisfy the Faculty of Science Writing Requirement and Mathematics Requirement.

## Classes Offered

**ESCI 1000.06R Introduction to Geology:** An introductory class for students who plan to take a degree in earth sciences, or in another science, or in engineering. The lecture material covers the whole field of geology including the origin of the solar system, earth history, geological time, ocean basin formation, mountain formation, volcanoes, continental drift, natural resources such as metals and petroleum, and environmental pollution. The laboratory component involves work with minerals, rocks, fossils, and geological maps as well as a number of field excursions to observe local geological features. Students who wish to major in Earth Sciences but have unresolvable scheduling conflicts with ESCI 1000.06R should consult the undergraduate advisor.

**Instructors:** N. Culshaw/F. Madloli  
**Format:** Lectures/Field trips/Laboratories

**Exclusion:** Credit will be given for only one of ESCI 1000.06, 1040.03A/1060.03B, or 1040.03A/1001.03B.

**ESCI 1001.03B Beginning Geology:** This course is intended primarily for students intending to major in earth sciences. Lectures will cover the classification of Earth materials (minerals, rocks, fossils) and the operation of Earth processes (erosion, deposition, volcanism, metamorphism, earthquakes). They will also deal with the internal structure of the Earth (core, mantle, crust), and the many expressions of plate tectonics (mountain ranges, rift valleys, fracture zones, ocean basins, mid-ocean ridges). Laboratories involve work with minerals, rocks, fossils, and geological maps.

**Instructors:** staff

**Format:** Lectures/Laboratories  
**Prerequisite:** ESCI 1040.03A  
**Exclusion:** Credit will be given for only one of ESCI 1000.06, 1040.03A/1050.03B, or 1040.03A/1001.03B.

**ESCI 1040.03A or B/1050.03A or B The Earth and Society:** These classes are designed for non-Earth Sciences majors. Previous Mathematics, Physics, or Chemistry are not required. These courses do not include formal labs, but 1040A includes three field trips, and some assignments are done in a laboratory environment. ESCI 1040A provides an introduction to some basic concepts about the Earth, including the Earth as a planet, geological time, evolution and extinctions, plate tectonics, and the evolution of the Earth's crust. ESCI 1050.03B applies the concepts learned in 1040.03A to understanding how geology affects society. Topics covered include mineral and energy resources, geological catastrophes, geology and landscape of Nova Scotia, and global climate change. ESCI 1040.03A is a prerequisite. Students with good grades in 1040.03A may enter ESCI 1001.03B.

**Instructors:** D.I. Godfrey-Smith/F. Medill/P.J.C. Ryall

**Format:** Lectures/Field trips  
**Exclusion:** Credit will be given for only one of ESCI 1000.06, 1040.03A/1050.03B, or 1040.03A/1001.03B.

**SCI 1200.06R An Overview of the Cosmos, Earth, and Life:** See class description in the Science, Interdisciplinary section of this calendar.

**ESCI 0001.00 Field School:** The course provides seven days of concentrated instruction off campus in geological field methods. A wide variety of rock types are examined in the field using traverses, measured sections and outcrop maps. The course is held the week before classes begin in the fall term and should normally be taken by those enrolling in second year level Earth Sciences courses ESCI 2101.03A, 2102.03B, 2110.03A, 2201.03A or 2202.03B. Although ESCI 0001.00A by itself is non-credit, it appears on transcripts and ESCI 0001.00 plus ESCI 0003.03 is a half credit. The prerequisite for this course is ESCI 1000.06R or ESCI 1040.03A and 1001.03B.

**ESCI 2050.03B Principles of Geophysics:** Geophysical methods are increasingly important in land- and sea-based geological studies. Understanding the principles of the various techniques (seismics, gravity, magnetics) their powers, and limitations, provides a foundation for later work.  
**Instructor:** P.J.C. Ryall  
**Format:** Lecture 3 hours/ Tutorial 2 hours

**Prerequisites:** a first year class in Mathematics and Physics 1100.06R

**ESCI 2101.03A Mineralogy and Crystallography:** This class deals with the way in which the chemical components of rocks are organized into specific crystalline compounds (minerals). The lectures cover the crystallographic principles which determine the regular internal and external structure of minerals (crystallography), the relationship between mineral composition and structure (crystal chemistry) and the interaction of polarized light with crystals (optics). The labs involve hand specimen identification of minerals based on their physical properties and associations with other minerals in rocks.

**Instructor:** M. Zentilli  
**Format:** Lecture 3 hours/ Laboratory 3 hours

**Prerequisites:** ESCI 1000.06R or ESCI 1040.03A and ESCI 1001.03B

**ESCI 2102.03B Introduction to Petrography and Petrology:** In this course we deal with the ways in which minerals interact with melts, solutions and each other to form rocks. Such topics as phase equilibria, solution chemistry and solid-solid reactions will be covered in the lectures as will the basic principles of rock classification based on textures and mineralogical compositions. The labs will emphasize optical identification of minerals and rocks using the petrographic microscope.

**Instructor:** M. Zentilli  
**Format:** Lecture 3 hours/ Laboratory 3 hours

**Prerequisite:** ESCI 2101.03A

**ESCI 2110.03A Field Methods:** This is intended as an introduction to field techniques useful to the practicing geologist, particularly those concepts essential for the accurate field description and identification of rocks and the use and construction of geological maps. Geophysical field techniques and elementary structural geology are also considered.

**Instructor:** N. Culshaw  
**Format:** Lecture 3 hours/ Laboratory 3 hours/ Field trips

**Prerequisites:** ESCI 1000.06R or ESCI 1040.03A and ESCI 1001.03B

**ESCI 2201.03A Stratigraphy:** We deal with the principles by which we interpret the history of the Earth. Topics include measurement of geologic time, origin of the Earth, construction of mountains, organic evolution, and sedimentary environments. Laboratories give practice in using these principles to interpret Earth history.

**Instructor:** P.E. Schenk  
**Format:** Lecture 3 hours/ Laboratory 3 hours

**Prerequisites:** ESCI 1000.06R or ESCI 1040.03A and ESCI 1001.03B

**ESCI 2202.03B Earth and Life Through Time:** This course deals with many of the important events that have occurred to produce our present physical and organic Earth. These events include early attempts to create organisms, the separation and collision of continents, the changing character of life, and the times of great extinctions. A survey of paleontology and paleoecology is given in the laboratories.

**Instructor:** P.E. Schenk  
**Format:** Lecture 3 hours/ Laboratory 3 hours

**Prerequisites:** ESCI 2201.03A or ESCI 1040.03A and Biology 1000.06R

**ESCI 2400.03A Marine Geology:** The ocean basins make up nearly three quarters of the Earth's surface and are the loci of many active geologic processes. This course deals with the morphology and tectonic history of the ocean basins, the lithology and geophysical characteristics of oceanic lithosphere and the nature and distribution of marine sediments. Important processes such as oceanic volcanism, hydrothermal circulation, sea floor spreading and marine sedimentation will be discussed, as will environmental, legal and economic aspects of the marine environment. The course is designed to provide an introduction to marine geology for non-earth sciences majors wishing to learn more about geology and for those who plan to take a degree in earth sciences. This class is not recommended for earth sciences honours students.

**Instructor:** P. Robinson  
**Format:** Lecture/Laboratory 3 hours, one evening per week  
**Prerequisites:** any first year class in earth sciences

**ESCI 2410.03B Environmental and Resource Geology:** Geology lies behind many of the environmental problems facing humanity today. In this class we consider topics such as energy and mineral resources, geological hazards such as earthquakes, landslides, and volcanic eruptions, the relevance of geology in the fields of foundation engineering, pollution and waste disposal, and the role that geology has to play in planning urban areas, especially in Nova Scotia. This class is not recommended for earth sciences honours students who should take ESCI 3410.03B.

**Instructor:** staff  
**Format:** Lecture/ Laboratory 3 hours, one evening per week

**Prerequisites:** ESCI 1000.06R or ESCI 1040.03A and 1050.03B or 1001.03B

**ESCI 2420.03B The Dinosaurs:** This class will consider the origin, evolution and extinction of the dinosaurs as a case-study of evolutionary processes. It will address such questions as: what were the dinosaurs? Cold-blooded reptiles, or warm-blooded, mammal-like parents? Why did some of them grow so large and heavy? Are the birds their descendants? In attempting to answer these apparently simple questions we will also investigate the sophisticated methods for gathering sufficient evidence from bones to reconstruct not only the physiology of these surprisingly modern organisms but also rather intangible characteristics such as behaviour.

**Instructor:** F. Mediol  
**Format:** Lecture 3 hours  
**Prerequisites:** ESCI 1040.03A/1050.03B or 1040.03A/1001.03B or 1000.06R

**ESCI 0003.03 Computing Camp:** This class is required for major, advanced major, and honours programmes and it is designed to provide the computing skills necessary to meet today's challenges. These skills will be learned through a field-mapping project using computers to manipulate data and prepare geologic maps. The class will be held the week before classes begin in the third year of a programme. Successful completion of this class and ESCI 0001.00A will result in a 1/2 credit award.

**SCI 3000.06R Science Fundamentals:** See class description in the Science, Interdisciplinary section of this calendar.

**ESCI 3010.03A Igneous Petrology:** The study of the field relations, mineralogy, texture, and geochemistry of volcanic and plutonic rocks. Lectures discuss the classification, graphical representation, means of production, differentiation, and emplacement of igneous rocks, and their grouping into co-magmatic provinces. Labs involve using the petrographic microscope to determine the crystallization history of igneous rocks through their mineralogy and texture.

**Instructor:** staff  
**Format:** Lecture 3 hours/ Laboratory 3 hours

**Prerequisite:** ESCI 2101.03A/2102.03B

**ESCI 3020.03B Metamorphic Petrology:** Metamorphic petrology is the study of the way in which pre-existing igneous, sedimentary, and metamorphic rocks respond to changes in pressure, temperature, and geochemical environment. Metamorphic reactions, deformation and recrystallization, the stability relations of minerals and mineral assemblages under various physical and chemical conditions, and the concept of metamorphic facies are discussed. In the labs, microscopic mineralogy and texture are used to decipher the metamorphic history of rocks.

**Instructor:** R.A. Jamieson  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 2101.03A/2102.03B, ESCI 3010.03A.

**ESCI 3140.03A Structural Geology:** An introduction to the behaviour of rocks during deformation, stressing the geometrical aspects of rock structures on the scale normally encountered by the exploration geologist, and their interpretation. The laboratory exercises in the construction and interpretation of geological maps develop skill in the interpretation and graphical representation of structures in three dimensions.

**Instructor:** N. Culshaw  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 2101.03A/2102.03B, ESCI 2110.03A, ESCI 2201.03A/2202.03B

**ESCI 3301.03A Sediments and Sedimentary Rocks:** The course deals with physical and biological processes which generate modern siliciclastic, carbonate and evaporite sediments. Materials associated with Quaternary glacial events are discussed. The formation of sedimentary rocks is examined and their petrology illustrated using laboratory techniques. Weekend field trips to selected modern and ancient sedimentary deposits in Nova Scotia take place in the first month of classes.

**Instructor:** M.R. Gibling/P.E. Schenk  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 2201.03A and 2202.03B

**ESCI 3302.03B Quaternary Sedimentary Environments:** The course deals with facies models for Quaternary glacial, coastal, deep sea and alluvial sediment. Emphasis is placed on sedimentation processes typical of each depositional setting and the geometry of the resulting deposits. Ancient deposits, including those resulting from glacial events, are examined, and their association with hydrocarbons, coal and sedimentary ores discussed. The labs provide practical experience of techniques used in facies analysis.

**Instructor:** D.B. Scott/P.E. Schenk  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 3301.03A

**ESCI 3400.03A Fundamentals of Hydrogeology:** The availability of clean water is absolutely essential for the development and maintenance of modern societies. This course will deal with the mathematical description of groundwater movement, geophysical and geological methods for groundwater exploration, regional occurrence

and chemical quality of groundwater, and the effects of waste disposal on chemical quality. Laboratory work stresses familiarity with techniques employed in the assessment and exploration of groundwater resources, as well as the analysis and interpretation of water quality data.

**Instructor:** G.K. Muecke/P.J.C. Ryall  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 2201.03A, 2101.03A, 2102.03B

**ESCI 3402.03B Practical Hydrogeology:** This class is designed to build on Geology 3400A to familiarize the student with the practical aspects of groundwater resources development and monitoring system installation, including drilling methods, well design, well hydraulics and aquifer analysis, slug testing, data interpretation, and introduction to groundwater modelling. Actual case history data and problem assignments with practical applications will be emphasized.

**Instructor:** Staff  
**Format:** Lecture 3 hours  
**Prerequisites:** ESCI 3400.03A

**ESCI 3410.03B Enhanced Environmental Geology:** The topics treated in this course are similar to Geology 2410.03B, but they will be discussed at considerably greater depth during an additional 3 hours lab / tutorial per week. Credit will be given for only one of ESCI 2410.03B or 3410.03B.

**Instructor:** G.K. Muecke  
**Format:** Lecture 3 hours/ Laboratory 3 hours  
**Prerequisites:** ESCI 2201.03A and 2202.03B, 3400.03A, 2101.03A/2102.03B

**ESCI 0002.03A Advanced Field School:** The class is a field excursion of 7 to 14 days duration which is designed to give the student a regional perspective of Appalachian geology, including metamorphic terrains, igneous intrusions and sedimentary basins of Precambrian to Mesozoic age. Classic field localities in eastern North America will be visited. Exceptionally, a more distant location may be selected. It appears on transcripts and is compulsory for all Honours students. Attendance and completion of this class will be part of the 21st credit required for the honours degree.

**ESCI 4100.06R Research Project:** See class description for ESCI 4200.06R.  
**Instructor:** D.B. Clarke  
**Format:** Lecture 2 hours

**ESCI 4151.03A or B Mineral Deposits:** This class is an introduction to the geology of metallic ore deposits (e.g. gold, copper, zinc, lead, platinum-group elements, the rare earths, uranium, etc.) and some industrial

mineral concentrations (e.g. asbestos, barite). Emphasis is given to the diverse geological processes of ore formation within different geological environments, such as the ocean floors, sedimentary basins, continental rifts, island arcs and Andean type continental margins. It also acquaints the student with principles of mineral exploration, assessment, exploitation, and environmental problems related to mining. The class integrates many Earth Science disciplines, and requires extensive reading, writing, and the oral presentation or seminars.

**Instructors:** M. Zentill  
**Format:** Lecture 3 hours  
**Prerequisite:** ESCI 3301.03A/3302.03B

**ESCI 4152.03A or B Fossil Fuels:** The class provides an introduction to the principal fossil fuels: peat and coal, oil shale, oil and natural gas, and uranium. We will discuss the chemical nature of each type of fuel, as well as biological and physicochemical factors involved in its genesis and concentration within the earth. The class will also consider practical methods used in resource evaluation and geological and geopolitical factors that make extraction of raw fuel feasible. Economically important deposits in Canada and worldwide will be discussed.

**Instructors:** M. Gibling/P. Hacquebard  
**Format:** Lecture 3 hours  
**Prerequisites:** ESCI 3301.03A/3302.03B

**ESCI 4200.06R Honours Thesis:** This class deals with many aspects of written and oral communication of scientific and technical material. In particular, it covers the elements of scientific style (clarity, precision, conciseness, and objectivity), the logical organization and development of ideas and arguments, and the acceptable formats for scientific writing. Some attention will also be given to techniques of oral presentation. This is a compulsory class for students writing an Honours thesis in Earth Sciences, but it is open to students from other disciplines. Text: H.M. Welsman, Basic Technical Writing.

**Instructor:** D.B. Clarke  
**Format:** Lecture 2 hours

**ESCI 4270.03A Applied Geophysics:** The application of geophysical methods to petroleum and mineral exploration as introduced in 2050.03B and 3130.03B is here treated at a more advanced level with an emphasis on seismic techniques. Assignments attempt to involve the student in interpretation of realistic geophysical data and modelling on workstations. This class is not offered every year.

**Instructor:** P. Ryall  
**Format:** Lecture 3 hours  
**Prerequisites:** ESCI 2050.03B, ESCI 3130.03B or instructor's consent

**Cross-listing:** ESCI 6270.03

**ESCI 4280.03B Marine Geophysics:** The application of the various geophysical techniques to the study of the sea floor and the principal results obtained are examined. The processes involved in the creation, evolution and destruction of ocean basins and the implications of the experimental observations are also considered. This class is not offered every year.

**Instructor:** K. Loudon  
**Format:** Lecture 3 hours/ Laboratory  
**Prerequisites:** ESCI 2050.03B, ESCI 3130.03B, ESCI 4270.03A or instructor's consent  
**Cross-listing:** ESCI 5280.03, OCEA 4350.03/5350.03

**ESCI 4290.03A Geodynamics:** Essential for earth sciences or physics students who intend to be geophysicists, the class covers the physical state and behaviour of the Earth as a whole. This class is not offered every year.

**Instructor:** C. Beaumont  
**Format:** Lecture 3 hours  
**Prerequisites:** ESCI 2050.03B, ESCI 3130.03B, ESCI 4270.03A or instructor's consent.  
**Cross-listing:** ESCI 5290.03A or B, OCEA 5450.03A or B

**ESCI 4350.03A Tectonics:** This is a required class for Earth Sciences Honours Students. It is intended to introduce students to current research areas in large scale processes in geology. Study of these processes draws on all fields of geology and geophysics. The process studies change as research interests change internationally. Currently three processes are considered. There are, firstly, recent advances in understanding of the Alpine-Himalayan compressional belt, involving such features as lateral extrusion and secondary extension. Secondly, new models for sedimentary basin formation as described, using the North Sea and the margins of the North Atlantic as examples. Lastly, new results on the continental crust, particularly those derived from deep reflection seismics, are described.

**Instructor:** J.M. Hall  
**Format:** Lecture 3 hours  
**Prerequisites:** All third year Geology core courses  
**Cross-listing:** ESCI 5350.03

**ESCI 4351.03B Canadian Regional Tectonics:** This course is intended to synthesize the various aspects of geology treated in more specialized courses through an analysis of those processes which have shaped some of the major Canadian geological regions. We will examine the structure, stratigraphy and petrology of mountain belts (Cordillera, Appalachians), Precambrian shield (Gravelle, Churchill, Superior), and sedimentary basins (East Coast shelf, Western Canada, Sverdrup)

In order to determine what processes, including plate tectonic processes, created them.

Instructor: N. Culshaw/M. Gibling  
 Format: Lecture 3 hours  
 Prerequisites: ESCI 4350.03A  
 Cross-listing: ESCI 5351.03

**ESCI 4380.03A Advanced Geochemistry:** Principles of crystal chemistry, isotope fractionation, thermodynamics and solution chemistry are applied to the investigation of hydrothermal solutions, as well as ground- and surface waters. Geochemical aspects of ore formation, the exploration for economic mineral deposits, and environmental pollution are covered. Geochemical surveys, element dispersion in the near-surface environment, and the origin and evaluation of geochemical anomalies are also discussed. In the laboratory statistical methods of geochemical data processing are introduced using micro-computers.

Instructor: D.B. Clarke  
 Format: Lecture 3 hours/ Laboratory 3 hours

Prerequisites: ESCI 3010.03A, ESCI 3020.03B

Cross-listing: ESCI 5380.03

**ESCI 4400.03B Advanced Metamorphic Petrology:** Metamorphic rocks are considered as equilibrium systems. The role of fluids in metamorphism, metasomatism and mass transport, kinetics of metamorphic processes, microstructure, and textural development of metamorphic rocks are discussed. Laboratory projects and special topics are chosen to suit the students' interests. This class is offered in alternate years.

Instructor: R.A. Jamieson  
 Format: Lecture 3 hours

Prerequisites: ESCI 3010.03A, ESCI 3020.03B

Cross-listing: ESCI 5400.03

**ESCI 4501.03A or B Basin Analysis:** The course is designed to present advanced topics of current interest concerning regional and global patterns of sediment accumulation. Topics may include: sequence stratigraphy and continental margin evolution; stratigraphic and geochemical methods used in analysis of burial history; paleo flow patterns; and basin geology in the context of plate-tectonic theory. This class is not offered every year--consult department.

Instructor: staff

Format: Lecture 3 hours

Prerequisites: ESCI 3301.03A/3302.03B

**ESCI 4502.03A or B Micropaleontology and Global Change:** This class provides a systematic study of major groups of microfossils (principally foraminifera, ostracoda and calcareous nanoplankton). Particular emphasis is placed on the distribution and ecology of recent

microfossils, and on laboratory techniques for sampling and studying them. Quaternary paleo-oceanography and faunal distribution is examined based on knowledge of the tolerances of the living organisms.

Instructor: D.B. Scott  
 Format: Lecture 3 hours/ Laboratory 3 hours

Prerequisites: ESCI 3301.03A/3302.03B

**ESCI 4503.03A or B Carbonate and Evaporite Petrology:** This course deals with carbonate and evaporite depositional and diagenetic environments. Modern environments are surveyed from the deep sea to tidal flat and playa settings. Changes to these records and especially the development of porosity are considered in the second half. This class is not offered every year; consult timetable.

Instructor: P.E. Schenk  
 Format: Lecture 3 hours/  
 Laboratories/Seminars 3 hours

Prerequisites: ESCI 3301.03A or B

**ESCI 4510.03A/4511.03B Directed Reading:** This class is intended to permit further study of a specific topic of interest, or to correct a deficiency in a student's programme.

Instructors: Staff

Format: As required.

Prerequisite: Permission of Department

**ESCI 8700.00A or B (non-credit) - Co-op Seminar**

**ESCI 8891.12R Co-op Work Term I**

**ESCI 8892.12R Co-op Work Term II**

**ESCI 8893.12R Co-op Work Term III**

**ESCI 8894.12R Co-op Work Term IV**

### Seminars

Department seminars are arranged during the term. Other specialized seminars are arranged on an ad hoc basis.

### Graduate Classes

Some graduate classes may be suitable. Please consult the Graduate Calendar and seek advice from the Department.

## Earth System Science

The Earth is an isolated system which supports life. It has evolved over the past five billion years dependent upon extrinsic variables (e.g. solar energy input and collisions with celestial bodies) and intrinsic variables (e.g. tectonic forces and genetic change). A change in one component of the Earth system affects the others. The major components are the lithosphere, hydrosphere, atmosphere and biosphere.

Because of the complexity of the Earth system, the major components have been studied separately: the lithosphere by geologists, the hydrosphere by oceanographers, the atmosphere by meteorologists and the biosphere by biologists. These disciplines have been underpinned by the fundamental sciences of chemistry and physics as well as mathematics. This separation has enabled the development of knowledge, but sometimes at cost to the integration of that knowledge in understanding the Earth system as a whole. It is now time to integrate these separated packages of knowledge into Earth System Science. The goal of Earth System Science, according to the NASA Advisory Council is "To obtain a scientific understanding of the entire Earth System on a global scale by describing how its component parts and their interactions have evolved, how they function, and how they may be expected to evolve on all timescales".

Recent realization of the impact of human activities on the Earth system has spawned a new science, environmental science, which requires an understanding of the Earth system and the factors affecting human behaviour. Environmental scientists must understand the functioning of the Earth system as well as the functioning of human societies in order that change brought about by human activities can be predicted, and if necessary avoided or ameliorated. This understanding will become the cornerstone of the development of an environmentally sustainable society. The challenge, again according to NASA, is "To develop the capability to predict those changes that will occur in the next decade to century, both naturally and in response to human activity."

This programme will meet a variety of career interests including those related to the environment.

## Degree Programmes

The programme in Earth System Science is taken as an area of emphasis in two subjects (chosen from, chemistry, earth sciences and physics) towards an Advanced Double Major, Combined Honours or

Unconcentrated Honours. Each student's programme will be devised within the following general requirements in consultation with a faculty advisor. The Earth System Science classes will be selected from a recommended list (available from Dean's Office - Faculty of Science) of classes from Biology, Chemistry, Earth Sciences, Oceanography, and Physics. When a student completes this programme it will be noted on the transcript, e.g. Advanced Double Major in Biology and Chemistry: (Earth System Science)

### Year I:

Science Foundation Year or equivalent background in Biology, Chemistry, Earth Sciences, Mathematics, and Physics.

### Year II:

- a) Arts/Humanities elective;
- b) Maths/Stats or Computing Science at second year level;
- c) One credit in Earth Sciences and one each in two of Biology, Chemistry and Physics.

### Year III:

- a) Two credits each in two of the three subjects chosen in IIc or four from the relevant science disciplines;
- b) An interdisciplinary Earth Systems class (consult department).

### Year IV:

- a) Two credits in one of the subjects taken in IIIa plus two other credits from Biology, Chemistry, Earth Sciences and Physics (one of these would be the honours thesis), or four from the relevant science disciplines;
- b) An interdisciplinary Earth Systems class (consult department).

## Economics

**Location:** 6206, 6214 and 6220  
University Ave.

**Administrative  
Offices:** 6214 University Ave.  
**Telephone:** (902) 494-2026

### Chairperson of Department

E. Klein

### Faculty Advisors

Michael Bradfield, Undergraduate Coordinator  
(494-6989)

S. DasGupta, Graduate Coordinator  
(494-8888)

Barry Lesser, MDE Coordinator (494-1682)

### Emeritus Professor

Z.A. Konczacki, BSc (Lond), BEconHons  
(Natal), PhD (Lond)

### Professors

F.M. Bradfield, BComm (McM), PhD (Brown)

S. DasGupta, BA (Calcutta), MA (Dahli), MA,  
PhD (Rochester)

E. Klein, LL.M. (Buenos Aires), MSc (Dal),  
Dr.Rer.Pol. (Hamburg)

B. Lesser, BComm (Dal), MA, PhD (Corn)

C.T. Marfels, Dr.Rer.Pol. (Berlin)

R.I. McAllister, MA (Oxon), MA (Cantab)

L. Osberg, BA Hons (Queen's), MPhil, PhD  
(Yale)

U.L.G. Rao, MA, MSc (Andhra), PhD (Western)

A.M. Sinclair, BA (Dal), MA, BPhil (Oxon),  
PhD (Harv)

### Associate Professors

M.L. Cross, AA (Dawson College), BA  
(Montana), MA (SFU), PhD (Texas A&M)

P.B. Huber, BA, MA, PhD (Yale)

R.L. Mazany, BSFS (Georgetown), PhD (UBC)

S.A. Phipps, BA Hons (Victoria), MA, PhD  
(UBC)

### Assistant Professors

P. Burton, BSc (Saskatchewan), MA, PhD  
(UBC)

M Ouyang, MA (UBC), PhD (Man)

K. Pasula, BA, MA (Alta), PhD (Tor)

N. Sharif, BA (Punjab), MA (Dacca), MA, PhD  
(McM)

### Special Lecturer

T.A. Pinfold, BA, MA (Western), PhD (Minn)

## Introduction

Economics is a social science - a science because it involves a rigorous intellectual effort to derive logical conclusions from basic facts and propositions; a social science because it has human beings and their welfare

as its ultimate concern. The basic facts of Economics cannot be knowable and measurable with the same precision as those of the physical sciences - human society and its motivations are far too complex to permit this - but none of the sciences surpasses economics in its relevance to our needs, problems and goals.

Economic man is rational man consuming, organizing and producing within a framework of laws and customs in an effort to use the limited resources of our world efficiently for the greatest satisfaction. It is not an easy science; indeed it is one of the most complex, difficult (and fascinating) areas of study you could choose in the university when you pursue it beyond its elementary levels, but some basic knowledge of economics is essential for any educated person. A more extensive knowledge of the subject is an invaluable complement to other fields of specialization such as law, commerce, politics and other studies in social sciences or humanities, and a specialization in the field can lead to a variety of interesting career opportunities.

## Degree Programmes

The department offers both BA and BSc degree programmes which are described below. A student may graduate with either a BA or a BSc degree but not both. In all programmes the student must ensure that the courses selected satisfy the overall faculty requirements for the relevant general degree (BA or BSc). See "Degree Requirements" section of this calendar.

### General Principles

The following programme arrangements are provided to the students as guidelines to facilitate the selection of classes appropriate to particular areas of interest. They should not, however, be construed as straitjackets nor as a reason for not seeking individual guidance from faculty members. In suggesting such programme frameworks, two principles have particular weight: (a) students taking economics as a major, or in an honours programme, should strike a balance between breadth of coverage among disciplines and depth of specialization in economics; (b) students taking economics as a minor or as a component of another specialization, such as commerce, should be allowed a reasonable degree of flexibility in their choice of economics classes.

### BA Honours Degree Programme (Four Years)

Undergraduate Coordinator: M. Bradfield (Tel: 494-6989)

**Departmental Requirements**

**Classes required in Honours, Bachelor of Arts:**

- 1000 level:** Economics 1100.06  
**2000 level:** Economics 2200.03, 2201.03, Math 2060.03/2080.03 or Economics 2260.03/2280.03, Economics 2232.06 or Economics 2238.03/2239.03  
**3000 level:** Economics 3338.03, 3347.03 and 3348.03  
**4000 level:** Economics 4100.03, 4420.03 and 4421.03 plus 3 other Economics credits at or above the 2000 level for a total of nine Economics credits

**Other required classes:**

Math 1000.03 and 2030.03, Honours Thesis

**BSc Honours Degree Programme (Four Years)**

**Undergraduate Coordinator:** M. Bradfield (Tel: 494-6989)

**Departmental Requirements**

**Classes required in Honours, Bachelor of Science:**

- 1000 level:** Economics 1100.06  
**2000 level:** Economics 2200.03, 2201.03, Economics 2260.03/2280.03 or Math 2060.03/2080.03, and Economics 2232.06 or 2238.03/2239.03  
**3000 level:** Economics 3338.03, 3347.03 and 3348.03  
**4000 level:** Economics 4100.03, 4420.03, 4421.03 plus 3 other Economic credits at or above the 2000 level

**Other required classes:**

Math 1000.03, 1010.03, and 2030.03, Honours Thesis

**Notes:**

1. Classes selected (outside of economics) in the third and fourth year must include at least two classes above the 1000 level.
2. The student's programme is chosen in consultation with the department and must have approval of the department.
3. Students must arrange their courses to ensure that they satisfy the overall requirements for the 15-credit BSc degree.
4. Since mathematics is required for graduate work in most good graduate schools, the value of econometrics and of additional mathematics is stressed. In some instances, the department may permit students to take classes in other

subjects in lieu of classes in Economics and may permit minor variations in the required classes.

**Combined Honours**

Combined honours programmes, BA or BSc, may be arranged with other departments such as Biology, Geology, History, Mathematics, Political Science, Sociology, etc. For combined honours programmes with Economics, students also should consult the other departments concerned.

**BSc Advanced Major Programme (Four Years)**

**Departmental Requirements**

**Classes required in Advanced Major, Bachelor of Science:**

- 1000 level:** Economics 1100.06  
**2000 level:** Economics 2200.03, 2201.03, Economics 2260.03/2280.03  
**3000 level:** Economics 3338.03 plus 2.5 other economics credits at or above the 3000 level

**Other required classes:**

Math 1000.03, 1010.03 and 2030.03

A student who wants to have the option of later converting an advanced major to an honours degree should select classes in accordance with the list of core classes given above and should consult regulations 11.4 and 22. Besides additional core classes, the honours programme requires an honours essay and a higher academic standing than the advanced major. An honours programme can be converted to an advanced major at the student's discretion. The advanced major does, however, allow a maximum of only nine credits in economics while the honours programme allows a maximum of eleven.

**BA Advanced Major Programme (Four Years)**

**Departmental Requirements**

**Classes required in Advanced Major, Bachelor of Arts:**

- 1000 level:** Economics 1100.06  
**2000 level:** Economics 2200.03 and 2201.03 plus two other credits in Economics at or above the 2000 level  
**3000 level:** Three credits in Economics at or above the 3000 level

While the total number of credits required for the advanced major is the same as for an honours degree, the honours program in economics requires an honours essay and must include a core of classes in economics

as given above. In addition, the honours program requires a higher academic standing than does the advanced major. However, the advanced major program does offer students the opportunity to enrol in a comprehensive program not available with the three-year program. Four-year major students are strongly encouraged to consult with members of the department to ensure an integrated and coherent programme.

A student who wants to have the option of later converting an advanced major to an honours degree should select classes in accordance with the list of core classes above and should consult regulations 11.4 and 22. An honours program can be converted to an advanced major at the student's discretion. The advanced major does, however, allow a maximum of only nine credits in economics while the honours program allows a maximum of eleven.

## BA Major in Economics (Three Years)

Undergraduate Coordinator: M. Bradfield (494-6989)

### Departmental Requirements

#### Classes required in Major, Bachelor of Arts:

<b>1000 level:</b>	Economics 1100.06
<b>2000 level:</b>	Two credits at or above the 2000 level
<b>3000 level:</b>	Two credits at or above the 3000 level

Intermediate micro and macro theory (Economics 2200.03 and 2201.03, respectively) are not required but serve as prerequisites for most other classes and should be taken. Students who wish to keep open the option of transferring into the honours or advanced majors programmes should select classes consistent with the requirements of these programmes.

## BSc Degree Programme (Three Years)

Undergraduate Coordinator: M. Bradfield (Tel. 494-6989)

For the general description of the programme see the description of the BA degree programme. The specific requirements are set out below.

#### Classes required in major, Bachelor of Science:

<b>1000 level:</b>	Economics 1100.06
<b>2000 level:</b>	Economics 2200.03, 2201.03, Economics 2260.03/2280.03
<b>3000 level:</b>	Economics 3338.03 plus 1.5 other Economic credits at or above the 3000 level

#### Other required Classes:

Math 1000.03, 1010.03 and 2030.03

Combined programmes may also be arranged, with economics as the major or minor subject in association with such other fields as political science, sociology, history, geology, biology, mathematics - and possibly others.

Final programme approval for all majors' students must be obtained from the appropriate coordinator.

## Classes Offered

Classes marked with an \* are normally offered on a two year rotational basis. Please consult the department for details regarding rotational scheme. Classes marked with a \*\* are of a special nature and not necessarily offered on a regular basis. Please consult the department for details regarding such class offering.

**ECO 1100.06R Principles of Economics:** This class is taken as the first in a series of classes in economics or as a background elective. Emphasis is on developing the basic analytical tools and applying them in the context of contemporary, and generally Canadian, economics problems. Section 5 of Economics 1100 offers a problem-oriented framework in which the analytical tools are developed by examination in each term of a specific question. No more than one credit will be given for 1100.06, 1101.03 and 1102.03, and 1105.06B.

Format: lecture 3 hours  
Instructor: Staff

**ECO 1101.03A or B Principles of Microeconomics:** This class completes the principles of economics complement. Consult Department.

Format: lecture 3 hours  
Instructor: Staff  
Restriction: Available to students who need one half credit of introductory microeconomics.

**ECO 1102.03A or B Principles of Macroeconomics:** This class completes the principles of economics complement. Consult Department.

Format: lecture 3 hours  
Instructor: Staff  
Restriction: Available to students who need one half credit of introductory macroeconomics.

**ECO 1105.06B Principles of Economics:** For description see Economics 1100.06. Consult Department. No more than one credit will be given for 1100.06, 1101.03 and 1102.03, and 1105.06B.

Format: Lecture 6 hours  
Instructor: Staff  
Restrictions: Available only to students who are enrolling for the first time

In January or who are declared economics majors, in that order of priority.

**ECO 2200.03A or B Intermediate**

**Microeconomics:** An extension of microeconomic theory and its applications which satisfies the minimum microeconomic theory requirements for majors in economics. Also of interest to Commerce students or others not majoring in economics, it pays particular attention to applications of theory in a practical context. Serves as the microeconomic prerequisite for higher-level classes in economics.

**Format:** Lecture 3 hours

**Instructor:** Staff

**Prerequisite:** Economics 1100.06 or equivalent

**ECO 2201.03A or B Intermediate**

**Macroeconomics:** Inflation, unemployment, exchange rate and related macro problems, with emphasis on Canadian policy experience in these areas. An extension of macroeconomic theory and its applications which satisfies the minimum macroeconomic theory requirements for majors and honours in economics. Of interest to commerce students or others not majoring in economics, it serves as the macroeconomic prerequisite for higher-level classes in economics.

**Format:** Lecture 3 hours

**Instructor:** Staff

**Prerequisite:** Economics 1100.06 or equivalent

**\*ECO 2232.06R Canadian Economic History:**

The development of Canada from the age of discovery to now, presented in relation to the larger system of the relationships between the Old World and the New. As the class proceeds, the focus shifts more and more towards Canada and more formal theory is introduced in discussing Canadian problems and policies, especially in the twentieth century.

**Format:** Lecture 3 hours

**Instructor:** B. Lesser

**Prerequisite:** A class in economics principles and some knowledge of history is recommended.

**\*ECO 2238.03A The Industrial Revolution in Europe:**

Transitions from preindustrial to industrial economies in England, France, Germany and Russia form a broad background for understanding the roots of contemporary society; of particular relevance for those interested in the economic history of Canada, the United States and other countries formerly part of a colonial system. Emphasis is on the economic, social, and technical changes of these industrial "revolutions" to disclose common elements in the experience of industrialization.

**Format:** Lecture 2 hours

**Instructor:** P.B. Huber

**Prerequisites:** Introductory Economics or permission of Instructor

**\*ECO 2239.03B The European Economy in Historical Perspective - After the Industrial Revolution:**

A self-contained class (may be taken separately from Economics 2238.03A) examining the contrasting development patterns of various industrialized European countries after their respective industrial revolutions and up to about 1960. Focus is on the development of hypotheses regarding the causes and effects of differences in the experience of growth of mature economies.

**Format:** Lecture 2 hours

**Instructor:** P.B. Huber

**Prerequisite:** Introductory Economics or permission of the Instructor

**\*ECO 2250.06R An Applied Course in Economic Development and the Environment: Concepts, Policies and Projects:**

This class is designed around concepts of sustainable development, with emphasis on key issues facing developing countries and less prosperous regions of some industrial nations. There are three main elements: (1) conceptual underpinnings and tensions behind sustainable development; (2) international, national and regional level policies and planning approaches for sustainable development - including lessons from the Rio Summit, the World Bank, CIDA, Canada's Green Plan and the European Regional Development Fund; and (3) projects for sustainable development - drawing on case experience and first-hand field work undertaken as a part of the class programme.

**Format:** lectures, case work with group presentations, tutorials, 3 hours

**Instructor:** R.I. McAllister

**Prerequisite:** Introductory Economics or permission of instructor

**ECO 2260.03A Statistics I:** See class description for MATH 2060.03A, in Mathematics section of this calendar.

**ECO 2260.03B Statistics II:** See class description for MATH 2080.03B, in Mathematics section of this calendar.

**SCI 3000.06R Science Fundamentals:** See Class description in Science, Interdisciplinary section of this calendar.

**\*ECO 3241.03A Comparative Economic Systems: National Economies:**

A detailed background of institutional material on the structure and performance of several economies is featured. Reading on specific countries provides the basis for several short papers. A student taking this class must understand the interrelated character of economic activity and grasp the nature of the price system.

**Format:** Seminar 2 hours

**Instructor:** P.B. Huber  
**Prerequisites:** ECO 2200.03A or B

**\*ECO 3242.03B Comparative Economic Systems:** Economic Organization and Planning: The economic behaviour of organizations and the ways in which this can be controlled provide the basis for consideration of the theory and practice of economic planning at micro-economic and macro-economic levels in various institutional contexts.

**Format:** Seminar 2 hours  
**Instructor:** P.B. Huber  
**Prerequisites:** ECO 2200.03A or B, plus an additional half-class in Economics

**\*ECO 3315.03A Labour Economics:** The theory of labour markets is emphasized, in particular the implications of alternative viewpoints which seek to explain relative wages and unemployment.

**Format:** Lecture 3 hours  
**Instructor:** L. Osberg or S.A. Phipps  
**Prerequisites:** Economics 1100.06; Economics 2200.03 and 2201.03 (or equivalents) are recommended

**\*ECO 3317.03B Poverty and Inequality:** The extent of poverty and the distribution of income and wealth in contemporary societies are discussed. Most data are drawn from Canada but international evidence is introduced for comparative purposes. The theories underlying alternative measures and explanations of economic inequality are emphasized.

**Format:** Lecture and seminar  
**Instructor:** L. Osberg  
**Prerequisites:** Economics 1100.06; Economics 3315.03A is highly recommended

**\*ECO 3326.03A Money and Banking:** The class concerns the nature and operation of the financial system, with particular reference to Canadian experience. It treats financial instruments (including money) and institutions and the social control of the supply of money and credit. This class is complemented by Economics 4426.03B.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisites:** Economics 1100.06R. It is also desirable to have completed Economics 2201.03A or B (or equivalent).

**\*ECO 3328.06R Industrial Organization:** The application of the models of price theory to economic reality. In any industry, the problems of a firm competing with its rivals in order to survive and acquire a higher market share are far more complex than those in price theory where we have to deal with more

or less simplified assumptions. The three main parts are: market structure, market conduct and market performance.

**Format:** Lecture 2 hours  
**Instructor:** C. Marfels  
**Corequisites:** Economics 2200.03A or B (or equivalent) or instructor's consent

**\*ECO 3330.03A or B International Trade:** The causes of international exchange of goods and services are considered and the effects of international integration on the incomes and growth rates of national economies are analyzed. The theory and practice of commercial policy and other restrictions on trade are considered after the pure theory of international trade and its implications have been explored. Depending upon class interest and availability of time, the subjects of economic integration and of Canadian commercial policy may be discussed in some detail.

**Format:** Lecture 3 hours  
**Instructor:** R.L. Mazany or A.M. Sinclair  
**Prerequisites:** Introductory Economics and 2200.03A or B (or equivalent)

**\*ECO 3332.03A or B Resource Economics:** This class focuses on intertemporal economics and the economics of market failure as they pertain to the use of natural resources. A selection of resource sectors will also be discussed. Fisheries, agriculture, forestry, and energy represent possibilities, but this will vary from year to year.

**Format:** Lecture 3 hours  
**Instructor:** M. Cross  
**Prerequisites:** Introductory Economics and Economics 2200.03A or B (or equivalent).

**\*\*ECO 3333.03A or B Theories of Economic Development:** A theoretical framework for the understanding of the process of economic development in the more and the less developed countries is provided with a view to its eventual application to the solution of practical problems. The concluding seminars are devoted to the problem of the foundations of the theory of economic development, and the distinction between the concepts of unilinear and multilinear evolution is discussed.

**Format:** lecture 2 hours  
**Instructor:** B. Lesser  
**Prerequisites:** Introductory Economics. Economics 2201.03A or B (or equivalent) and Economics 3347.03 and 3348.03 are desirable.

**Cross-listing:** ECON 5333.03

**\*\*ECO 3334.03A or B Economic Development - Recent Debates, Controversies and Conflicts:** Whereas Economics 3333.03A deals with the more rigorously defined

theories and models and their appraisal, this class focuses on the development policies and related controversies. Important examples of such controversies and conflicts, with far reaching developmental consequences, are provided. Attention is paid to the much debated environmental aspects of growth and development.

**Format:** Lecture 2 hours  
**Instructor:** Staff  
**Prerequisite:** Economics 1100.06, Economics 2201.03 (or equivalent) and Economics 3333.03A or B are desirable.

**\*ECO 3336.03B Regional Development:**

Most countries have richer and poorer regions. The energy crisis has raised additional complications. Economic development issues, policies, and theories facing more industrialized nations are analyzed with particular focus on Canada (especially the Atlantic region), the European Economic Community, U.S.A., Japan, and Australia.

**Format:** Seminar 2 hours and tutorials  
**Instructor:** R.I. McAllister  
**Prerequisite:** Introductory Economics. At least one class in both Political Science and Canadian History are desirable.

**ECO 3338.03A Introductory Econometrics I:**

The theory of some quantitative methods commonly used by economists is discussed in the context of the classical linear model. Estimation problems caused by violations of the assumptions of the classical model are studied including heteroscedasticity, autocorrelation and simultaneous equations bias. Emphasis is placed on practical econometric problems by requiring students to conduct their own research projects.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisites:** Mathematics 1000.03 (or equivalent) and Economics 2280.03A and 2280.03B (or Math 2080.03A/2080.03B).

**\*\*ECO 3339.03B Introductory Econometrics II:** Further practical problems associated with economic data and with model specification and estimation are discussed. This course is an extension of Economics 3338A.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisite:** Economics 3338.03A

**\*ECO 3344.03A or B Public Finance I:** This course studies the economics of public expenditure programmes. One major theme is that markets do not always lead to economic efficiency. A second major theme is that equity concerns are central to public policy formation.

**Format:** Lectures 3 hours

**Instructor:** Staff  
**Prerequisites:** Introductory Economics, Economics 2200.03A or B and 2201.03A or B (or equivalents) are desirable.

**\*ECO 3345.03A or B Public Finance II:** This course studies the economics of taxes and transfers. Equity and efficiency effects of both are considered.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisite:** Introductory Economics, Economics 2200.03A or B and 2201.03A or B (or equivalents) are desirable.

**\*ECO 3347.03A or B Classical Political**

**Economy:** The theories of production, value, distribution, and economic growth developed in classical political economy will be discussed in this class. Reactions to classical political economy and links between this body of thought and macroeconomics will be included as time permits.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisites:** Economics 1100.06R and Economics 2200.03A or B (or equivalent). Economics 2201.03A or B (or equivalent) is recommended.

**\*ECO 3348.03A or B Modern Economic**

**Thought:** Theories of production, value, and distribution developed since the marginal revolution, which dates from roughly 1870, will be examined in this class. Contributions to this body of thought developed before 1870, while classical political economy was dominant, will also be considered. Theories of equilibrium, stability, and economic growth will be discussed as time permits, but coverage of all topics must be selective because of the vastness of modern economic literature.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisites:** Economics 1100.06 and 2200.03A or B or equivalent; Economics 2201.03 or equivalent advised.

**\*ECO 3350.03A or B Social Cost-Benefit**

**Analysis:** The methodological base of social cost benefit analysis is developed, demonstrating some practical applications. Social cost benefit analysis and capital budgeting are two approaches to investment decision making. The former is used by public sector agencies; the latter is employed by private sector firms. Similarities and differences in the two approaches are highlighted. Solving problems which illustrate basic concepts and a paper reporting on an actual application of the methods taught are important requisites.

**Format:** Seminar 3 hours  
**Instructor:** T.A. Pinfold  
**Prerequisites:** Introductory Economics; Intermediate Microeconomics and Introductory Statistics are desirable.

**ECO 4100.03R Honours Seminar:** This is a required course for honours students, optional for others. The course is devoted to: a) preparation and presentation of honours papers; b) discussion of policy issues; and c) lectures and discussion by faculty members and occasional invited guests.

**Format:** Seminar 3 hours  
**Instructor:** Staff  
**Prerequisites:** Economics 2200.03A or B (or equivalent) and 2201.03A or B (or equivalent) and Economics 2228.06 (or Math 2080.03A/2080.03B)

**\*ECO 4418.03A Foundations of Public Policy Towards Business:** In this course the reasoning for government interference of the free and, at times, not-so-free competitive environment in the corporate economy will be examined. This will include (i) an overview of the concepts of competition and monopoly with main emphasis on workable competition, (ii) the scope and objectives of public policy towards business, and (iii) a comparison of the competitive approach, the regulatory approach, and the ownership approach.

**Format:** Lecture 2 hours  
**Instructor:** C. Marfels  
**Prerequisites:** ECO 3328.06R

**\*ECO 4419.03B Canadian Competition Policy:** The discussion begins with a historical account of Canada's past experience with the Combines Investigation Act and the attempts to amend it. Main emphasis is on the New Competition Act of 1986 and on the rules for mergers and for abuse of dominant positions. Various case studies will exemplify the new powers vested in the Director of Investigation and Research and the role of the Competition Tribunal.

**Format:** Lecture 2 hours  
**Instructor:** C. Marfels  
**Prerequisites:** Economics 4418.03A

**ECO 4420.03A or B Microeconomic Theory:** A basic but rigorous introduction to modern microeconomic theory. Deals in detail with the theory of choice as applied to consumers and firms, and discusses the working of an economy as a system of interdependent decision-makers. Emphasis is on the comparison of alternative solution concepts for competitive economies ending with an introduction to stability theory.

**Format:** Lecture 3 hours  
**Instructor:** E. Klein or S. DasGupta

**Prerequisite:** Economics 2200.03 (or equivalent); Mathematics 1000.03 and 1010.03 are desirable.

**ECO 4421.03A or B Macroeconomic Theory:** For those who wish to do relatively advanced work in economic theory, possibly with the thought of going on to do graduate work in economics. The class assumes some knowledge of calculus. Topics covered include: classical models of income and employment; Keynesian models of income and employment; the theory of economic growth (including two-sector models); and trade cycle models.

**Format:** Lecture 3 hours  
**Instructor:** J. Cornwall  
**Prerequisite:** Economics 2201.03A or B (or equivalent) and Mathematics 1000.03 and 1010.03 (or equivalent)

**\*ECO 4422.03B Inflation, Stagflation and Macroeconomic Policy:** A consideration of different theories of inflation that have been developed to explain the acceleration of inflation in the past decade. Alternative policy solutions are appraised. Forms of incomes policy are taken up in some detail.

**Format:** Lecture 3 hours  
**Instructor:** J. Cornwall  
**Prerequisite:** Economics 2201.03 (or equivalent)

**\*ECO 4426.03B Monetary Policy:** Assuming a basic knowledge of monetary institutions and macro-economics, a critical analysis of the objectives and effectiveness of monetary policy is developed. Particular attention is given to the Canadian experience and the effectiveness of Canadian policy.

**Format:** Lecture 3 hours  
**Instructor:** Staff  
**Prerequisite:** Economics 2201.03A or B (or equivalent); It is advantageous for students to have completed Economics 3326.03A as well.

**\*ECO 4431.03A or B International Payments:** Selected topics in recent international monetary history are examined, the causes of, and remedies for, external imbalance in national economies are considered, and the reorganization of the international monetary system is discussed. Depending upon class interest, certain issues of international development finance and problems of instability and growth in the international economy may be discussed in detail.

**Format:** Lecture 3 hours  
**Instructor:** R.L. Mazany or A.M. Sinclair  
**Prerequisite:** Economics 2201.03A or B (or equivalent)

**\*\*ECO 4446.03A or B Classical Liberalism, and Democracy:** For description see Philosophy 4470.03A or B.

**Format:** Seminar 2 hours

**Instructor:** Staff

**Cross-listing:** PHIL 4470.03/5470.03, POL 4479.03/5479.03

**\*\*ECO 4447.03B The Theory of Games as an Approach to the Foundations of Ethics and Politics:** For description see Philosophy 4430A/B.

**Format:** Seminar 2 hours

**Instructor:** Staff

**Cross-listing:** PHIL 4430.03, POL 4485.03

**\*\*ECO 4448.03A Social Choice Theory:** For description see Philosophy 4480A/B.

**Format:** Seminar 2 hours

**Instructor:** Staff

**Cross-listing:** PHIL 4480.03/5480.03, POL 4480.03/5480.03

## **Graduate Studies**

The Department offers a graduate programme leading to the MA, MDE and PhD degrees. Details of these programmes, including a list of graduate courses, are given in the Calendar of the Faculty of Graduate Studies. Senior undergraduates may be admitted to some graduate classes at the discretion of the instructors concerned.

## School of Education

**Location:** Education Building, Old Arts Annex, Dalhousie University, Halifax, N.S. B3H 3J5  
**Telephone:** (902) 494-3724  
**Fax:** (902) 494-2847

### Director, School of Education

K.C. Sullivan, BSc, BEd (Dal), MEd, PhD (Alta)

### Undergraduate Assistant Coordinator

A. Young (902) 494-3300

### Undergraduate Coordinator

H.J. Murphy, BSc (St. Dunstan's), BEd (PEI), MEd, EdD (Virginia)

### Emeritus Professor

E.Z. Friedenberg, BA (Centenary), MA (Stanford), PhD (Chicago)

### Professors

W.F. Hars, BA (London), MA (Leica), PhD (Tor)  
 T.A. Laidlaw, BA MEd (Calgary), PhD (Alta)  
 J.D. Myers, BA, MA (Tor), PhD (Edinburgh)  
 J.B. Roald, BEd (UBC), MA (Wash), EdD (UBC)

### Associate Professors

A. Barton, BA, MA (Trinity)  
 R.N. Bérard, BA (Antloch), MA (McM), BEd (Dal), PhD (McM)  
 R. Gamberg, BA (Brandela), MA (Illinois)  
 D.A. Manicom, BEd (McG), MEd (AIE), PhD (Tor)  
 J. Manos, BA, BEd (StFX), MEd (Calgary), PhD (Alberta)  
 H.J. Murphy, BSc (St. Dunstan's), BEd (PEI), MEd, EdD (Virginia)  
 P.A. Perron, BMus (McG), MMusEd (Holy Names College), Major appointment in Music  
 E.W. Ricker, BA, MEd (UBC), PhD (Tor)  
 S.W. Sample, BA, Dip Ed (Syd), MEd, EdD (Tor)  
 S.S. Sodhi, BA, BT, MA (Punjab), Dip. Guild. (Delhi), BEd, PhD (Alta)  
 K.C. Sullivan, BSc, BEd (Dal), MEd, PhD (Alta)  
 M. Welton, BA, MA, PhD (UBC)  
 B.A. Wood, BA (Tor), MEd, PhD (Ottawa)

### Assistant Professors

M.L. Crowley, BA (Miami), MAT (Johns Hopkins), PhD (Maryland)

### Part-time Faculty

A. Boyles, BA, BEd (Dal), MA, PhD (UNB), Major appointment in English  
 R. Buckley, BA, BEd, MEd (MSVU)  
 P. De Meo, BA, MA, PhD (UCLA), Major appointment in French  
 M. Forrest, BA (MSVU), BEd, MA (Dal)  
 B. Fox, BA (Sheffield), MA (Dal), PhD (AIE)

D.F. Goble, BSc, MSc (Alta), PhD (Tor), Major appointment in Physics  
 P. Harding, BA (Tor), BEd, MSc (Dal)  
 D. Leitch, BA, BEd, MA, PhD (Dal)  
 L. Moody, BEd, MEd (Dal)  
 J. Rice, BA (Mt.A), BEd, MEd (Dal)  
 L. Sorge, BA, MA (NYU); Major appointment in Theatre

## Education As a Field of Study

The problems of education have been the subject of serious study since at least the time of Plato and Aristotle. Education is an important and interesting field of study in which historical, psychological, philosophical and sociological inquiries, among others, can be pursued. Many elect to take classes in Education because they are interested in the questions raised for their own sake. Others are interested in education as a programme of professional preparation. Such students include in their programmes classes in foundations, methodology and field experience. The study of education should alert the student teacher to the assumptions which lie behind the methods of teaching being considered, and it should ensure that these assumptions do not go unexamined.

## Affirmative Action Policy

The School of Education has an affirmative action policy for indigenous Black or MicMac applicants for all of its programmes. Such applicants will be looked upon favourably as long as the normal minimum admission standards are fulfilled.

## Programmes

1. A sequential secondary BEd programme of one year which may be taken by students who have already completed a BA or BSc degree. Studies in Drama, English, French, Math, Science, Social Studies, Geography, and Music are available.
2. An integrated programme at the secondary level at the end of which students are awarded simultaneously the degrees of BA or BSc or BA (Honours) or BSc (Honours) and BEd.
3. Dalhousie BA/BEd or BSc/BEd for holders of the Nova Scotia Teachers' College Associateship.
4. Dalhousie-Nova Scotia Teachers' College Associateship BEd.
5. A five-year integrated programme at the elementary or secondary level at the end of which students are awarded simultaneously the degrees of BPE and BEd. To enter this programme, students must first be enrolled in the Bachelor of Physical Education programme.
6. Classes which may be used for credit toward a BA or BSc. These classes may

be chosen from the following areas: Sociology of Education, History of Education, Philosophy of Education, and Educational Psychology. Students intending to take education classes for credit toward a BA or BSc degree should consult Arts and Science regulation 1.2.1. Students may **not** take an Education course as one of their first five credits.

## Class Categories

Classes in the BEd programme are grouped into these general categories:

1. Educational Foundations
2. Methods and Field Experience
3. Electives

### 1. Educational Foundations

These classes develop a theoretical perspective as a basis for professional performance. There are four main subdivisions in this category - sociology of education, history of education, philosophy of education, and educational psychology. These classes are found in the calendar under course numbers EDUC 4000 to EDUC 4499.

### 2. Methods and Field Experience

These classes deal essentially in an applied manner with teaching, learning and the evaluation of learning. They are found in the calendar under course numbers EDUC 4800 to EDUC 4999.

Successful completion of the relevant methods class is a precondition for taking the second block of field experience. Students may be considered for dismissal from the programme if they fail practice teaching.

### 3. Electives

These classes provide supporting experience for other classes in Education, additional academic preparation, or an introduction to areas of potential student interest. Electives may be chosen from any courses offered in the BEd programme or classes in departments of the Faculty of Arts and Social Sciences or Faculty of Science. Education electives are found in the calendar under course numbers EDUC 4500 to EDUC 4699.

## Programme Requirements

### BEd Secondary Sequential

The majority of our BEd students participate in the **sequential** programme, which is completed between September and May. Candidates for this degree of BEd (Secondary) must complete successfully a 7-credit programme. This consists of the following: a half-credit course in each of the 3 Educational Foundations areas: sociology,

history, and philosophy; 1 credit in Psychological foundations (including special education); 1 credit in a methods course in a teachable subject area (English, French, Social Studies, Math, Science, Music, Geography); 1 credit in Education 4900.06 (Field Experience); ½ credit in Anti-racist education (EDUC 4071.03); 1 credit in Education 4950.06 (Studies in Education); and 1 further credit elective approved by the faculty advisor.

### BPE/BEd Integrated

The BEd part of the integrated programme consists of a minimum of five full credits:

1. ½ credit in each Foundation area: Sociology, Philosophy, and History;
2. 1½ credit in Psychological Foundations (including Special Education).
3. Secondary: 1 credit in Teachable subject methods.  
Elementary: 1 credit in Language Arts/Reading methods, one-half credit in Math methods, and ½ credit in elementary social studies or elementary science methods
4. 1 credit in field experience

### Co-requirements

**Elementary:** A student must complete a minimum of 5 full classes from English, History, Math and Science. It is recommended that courses be selected from each area.

**Secondary:** A student must complete a minimum of 3 full classes above the 1000 level in a teachable subject\*.

\* Teachable subjects - Drama, English, French, Social Studies, Math, Science, Geography, Music.

Prospective students are strongly encouraged to meet with the appropriate counsellor professor to plan a programme.

### BEd Degree in Association with Nova Scotia Teachers College

#### General Description

The programme is available at Dalhousie University to graduates of the Nova Scotia Teachers College who have completed the three-year Associateship at NSTC. Suitably qualified students may graduate after taking five further classes at Dalhousie. The programme is a fifteen-credit one, comprising six credits in education and nine credits in Arts or Science. A maximum of ten credits may be transferred from NSTC to the joint Dalhousie/NSTC BEd degree, but they must meet Dalhousie's transfer credit regulations.

**Programme: 15 required credits**

1. Education (6 credits):

- (a) 5 maximum may be taken at NSTC and must meet Dalhousie transfer credit regulations;
  - (b) 1 education class must be taken at Dalhousie.
2. Arts and Science (9 credits):
- (a) 5 maximum may be taken at NSTC and must meet Dalhousie transfer regulations and not be in education;
  - (b) 3 must be taken at Dalhousie in Arts and Science subjects other than education and at least 2 must be above the first year level;
  - (c) 1 class, taken at Dalhousie, must be in consultation with the student's advisor (in the School of Education)

## Dalhousie BA or BSc and BEd Degrees for Associates of Nova Scotia Teachers College

### General Description

The programme is available at Dalhousie University to graduates of the Nova Scotia Teachers College who have completed the three-year Associateship at NSTC. Suitably qualified candidates may transfer up to eleven credits from NSTC to Dalhousie. The programme is a twenty-two credit one, comprising seven credits in education and fifteen credits in Arts or Science. All credits transferred from NSTC must meet Dalhousie's transfer credit regulations.

### Programme: 22 required credits

Twenty-two credits are required, seven in education and fifteen in Arts & Social Science and Science.

- 1. Education (7 credits):
  - (a) 5 maximum from NSTC;
  - (b) 2 further from Dalhousie
- 2. Arts & Social Science and Science (15 credits):
  - (a) 6 maximum from NSTC;
  - (b) 9 further from Dalhousie

Students must maintain a minimum of a B average in work completed for both degrees.

## Certification of Teachers

Licences to teach are issued by the Department of Education, Province of Nova Scotia. Information may be obtained from the Registrar, Nova Scotia Department of Education. Students from other provinces should consult the appropriate provincial Department of Education for certification and licensing information.

## Classes Offered

### Educational Foundations (EDUC 4000 - EDUC 4399)

Enrolment is generally restricted to 30 students in Educational Foundations classes.

#### 1. Sociology of Education (EDUC 4000 - EDUC 4099)

**EDUC 4012.03A or B Sociology of Education: Social Class, Race and Gender:** In this course we will analyze assumptions underlying common school practices and the effects of these practices as they relate to social class, race, and gender. We will also examine aspects of learning outside the formal school structure as they bear on these areas.

**EDUC 4021.03A or B Introduction to Gender Socialization:** Identification and analysis of problems deriving from gender socialization in Canada form the core of this class. Attention is concentrated on informal (out of school) socialization in creating and perpetuating the problems.

Format: Lecture, discussion, student participation

Cross-listing: EDUC 5241.03, WOST 2100.03

**EDUC 4022.03A or B Gender Issues in Education:** Central concerns in education include classroom practices, politics and ideology of the curriculum, family-school relations and the transition from school to work. Recent feminist critiques have forced educators to re-examine these areas of concern. This course considers how gender analysis deconstructs and reconstructs our understanding of central economic, social and cultural issues in education.

Format: Lecture/Seminar, 2 hours

Cross-listing: WOST 3100.03

#### 2. History of Education (EDUC 4100 - EDUC 4199)

**EDUC 4141.03A Issues in the History of Canadian Education:** An overview of selected and enduring social, economic, and political issues in the history of Canadian education. Representative topics include: child-centred school or the "3 R's"; a "Canadianized" curriculum or one free from patriotic bias; community or bureaucratic control; stratification and social control or equal opportunity; teacher professionalism vs. unionism; denominational vs. secular education.

Format: Lecture 2 hours

**EDUC 4142.03B Issues in the History of Canadian Education:** An overview of the experiences of minority groups in the history of Canadian education. Topics in the first part of the course include: 19th century

educational arrangements for minorities, including Lord Durham's prescription, the BNA Act, and schooling for immigrants; the development of bilingualism policy and minority language schools; the development of multiculturalism policy and educational alternatives for other groups. In the second part of the course the historical experiences of some of the following groups are profiled: Acadians, Blacks, Native Peoples and selected cultural-religious minorities (Hutterites, Mennonites, Doukhobors).

**Format:** Lecture - 2 hours  
**Cross-listing:** EDUC 5291.03

**EDUC 4161.03R History of Curriculum Thinking:** Topics include contemporary curriculum thought, evolution of ideas concerning development, evaluation, implementation, contributions of selected theorists.

**Format:** Structured seminars (2 hours)  
**Cross-listing:** EDUC 5061.03

**EDUC 4180.03A Famous Teachers of the Past - Part One: Lao Tzu to Hypatia:** Six masters of the ancient art of teaching are studied in turn: Lao Tzu, Buddha, Zeno, Socrates, Jesus and Hypatia. The methods by which the teachers taught are examined in the light of what they had to say and the society and era in which they found themselves.

Students may take either 4180.03 or 4181.03 on its own, or both courses as they wish. This is a class of general interest for which previous knowledge of educational history and philosophy is not essential. Participants are invited to take part in class discussions and to write essays on three of the six teachers.

**EDUC 4181.03B Famous Teachers of the Past - Part Two: Muhammad to Gandhi:** Six masters of the ancient art of teaching are studied in turn: Muhammad, Hildegard, Francis, Galileo, Florence Nightingale and Gandhi. The methods by which the teachers taught are examined in the light of what they had to say and the society and era in which they found themselves.

Students may take either 4180.03 or 4181.03 on its own, or both courses, as they wish. This class is of general interest for which no previous knowledge of educational history and philosophy is not essential. Students from all disciplines are welcome. Participants are invited to take part in class discussions and to write essays on three of the six teachers.

**EDUC 4201.03A or B Analytical Philosophy of Education:** Topics include: the aims of education, the relevance of philosophy to education, children's rights, and the moral responsibilities of the teacher.

**Format:** Lectures and discussions (two hours per week)

**EDUC 4221.03A Introduction to the Philosophy of Education:** A class dealing with a broad range of philosophical questions about education including the use of slogans, multiculturalism, teacher education, and the role of the teacher.

**Format:** Lecture/discussion  
**Cross-listing:** PHIL 2175.03

**EDUC 4222.03B Issues in Philosophy of Education:** An introductory level class dealing with some fundamental issues in philosophy of education, including indoctrination, open-mindedness and bias-free teaching.

**Format:** Lecture/discussion  
**Cross-listing:** PHIL 2180.03

#### 4. Psychology of Education (EDUC 4300 - EDUC 4399)

**EDUC 4311.03A Psychology and Education of the Exceptional Child:** Exceptional child, socio-historical foundations, psycho-diagnostic, psycho-social models, genetic and environmental causes, various categories of exceptionality, standardized tests, abuses, myths in special education, remediation.

**EDUC 4312.03B Emotionally Disturbed and Learning Disinterested Children:** Emotionally disturbed child, psycho-dynamic, developmental, neurological, behavioral, ecological models, remediation, learning disabled, learning disinterested, various models, remedial hoax, special education myths, politics of special education.

**EDUC 4335.03A or B Childhood into Adulthood:** Topics include: Intellectual and social development during childhood, characteristics of adolescence, and theories of development during adulthood.

**Format:** Lectures and discussions/presentations (two hours per week)

**Cross-listing:** EDUC 5335.03

**EDUC 4341.03A Developmental Psychology: Language, Learning and Cognitive**

**Development:** Children and adolescents develop thinking skills and subject mastery, in part, as a result of their interactions with parents, teachers, peers, and educational technologies. According to some therapists, learning is dependent on the student's monitoring of the learning process, the structure of the task, and the nature of the feedback the student receives. Such issues of interactivity have been at the centre of implicit and explicit debates in educational psychology. For example, behaviourists believe that learning occurs as a result of sequenced and recorded behaviour. Cognitive developmentalists, on the other hand, focus on the learner's construction of material

rather than on the detailed nature of its presentation. This course is a review of theories of cognitive development and learning as they address issues of interactivity. Development of language and intelligence will also be reviewed.

**EDUC 4342.03B Developmental Psychology: Social, Moral and Personality Development:** This course will explore the psychosocial and moral development of children and adolescents, drawing on theory and research from psychodynamic, cognitive, developmental, and social-psychological perspectives. The focus will be on understanding the ways in which people come to construct their inner and outer worlds, and how these interact with their negotiation of normal developmental tasks of childhood and adolescence. Topics include parental socialization practices; the influence of peers, family, school and culture; and gender issues.

**EDUC 4371.03A or B Social Psychology of Education:** Topics include: classroom psychological climate, power relationships, authority, obedience, discipline, control, freedom, self-concept.

Format: Lecture and discussion

**EDUC 4380.06R Psychology of Special Education: Resource Teachers:** This course critically examines resource programmes used by the schools to "accommodate" children with learning and behavioral problems.

Topics include: the rationale for and types of resource programmes; roles and competencies of resource teachers; strategies necessary to implement resource programmes in schools so as to assess and instruct children with special needs; evaluation of materials and methods used by resource teachers to help "special children". This course has a limited enrolment. It is intended for the very serious student of special education.

Cross-listing: EDUC 5380.03

**EDUC 4400.06R Psychology and Special Education:** This course is designed to give Bachelor of Education students an introduction to the major areas of Educational Psychology. Students will be exposed to important theorists and issues in the areas of Developmental Psychology, Learning Theory, Social Psychology, Testing and Measurement, and Special Education.

The course will consist of a consideration of the history of childhood, behaviourism, Piaget, and social learning theory; teacher-made tests, standardized tests, test scores and what they mean; social psychology in schools, gender issues, sex roles, Freud and Erickson; and exceptionalty, normalization, integration, learning disabilities, and children in distress.

## Electives

(EDUC 4500 - EDUC 4699)

**EDUC 4560.06R Geography in Education:** While of direct value to teachers in the social studies, the course is open to all students and without prerequisites. It uses techniques of the geographer to study three basic concepts: spatial form and interaction, interrelationship between people and their environment, and regions. Weekend rural field work in the fall involves absence from Halifax over a total of two nights. Local field trips are conducted near the campus at various times during the academic year. Participation in field work is a condition of admission to the course. Evaluation is based on field work, case studies, class tests, and a major research paper.

Format: Lecture-lab 3 hours

Prerequisites: None

Cross-listing: EDUC 5680.06R

**EDUC 4584.03R Introduction to the Study of Teaching and Pedagogy:** The class is an introduction to contemporary research in teaching and pedagogy. Topics include teacher thought processes and behaviour, classroom organization and interaction, classroom discourse, teaching strategies, and school effectiveness.

Format: Structured seminars

Cross-listing: EDUC 5484.03

**EDUC 4634.03A or B Computers and the Classroom:** An introductory class for students with little or no prior computer experience. Emphasis is on developing familiarity with commonly-used software applications, with an aim to assessing their potential in the classroom. Topics include computer-assisted instruction, computer-managed learning, authoring languages, evaluating instructional software, word processing, electronic spreadsheets, and communications via mainframe computer networks.

**EDUC 4637.03A and EDUC 4638.03B Creative Writing and the Computer:** Topics include: The imaginative use of word processing to write, design, illustrate and publish student work in an educational setting. The use of simple modular programming to write and illustrate inter-active multi-dimensional fiction and animated poetry.

Students may take either course on its own, or both courses, as they wish.

Format: Lecture 1 hour, lab 3 hours

**EDUC 4642.03B Adventure-Based Experiential Education:** Outdoor education in one form or another is included as an integral part of most recreational programmes. However, there are values of outdoor adventure activities which go beyond the

usual rationale for recreation programmes. These include personal development, citizenship training, leadership development and community service. This class will explore some of the educational philosophies which rely on an experiential base. Included will be an opportunity for hands-on experiences in developing, planning and evaluating an adventure-based programme which has potential beyond the traditional recreation outcomes. A practicum will be included.  
**Cross-listing:** LEIS 2382.03

**EDUC 4661.03A or B Reading, Writing, and Learning Across the Curriculum:** Intentions: I have several goals for this course: (1) to help you develop a greater awareness of the factors that affect learning from text; (2) to help you discover and examine your assumptions about the nature of learning and teaching; and (3) to help you explore the potential of writing as a vehicle for learning. Rather than to prepare you to work as reading specialists, this course is intended to help you become more effective teachers regardless of your areas of interest/expertise.

**EDUC 4684.03B Physical Activity for Special Populations:** For class description see entry for 2384, the Bachelor of Physical Education section of this calendar.

**Format:** Lecture/practical experience  
**Cross-listing:** PHSE 2384.03/3384.03

**EDUC 4791.03A or B Foundations and Practice of Black and Mi'kmaq Education:** This multi-disciplinary course is designed to reflect the histories, cultures and social realities of Blacks and Mi'kmaqs in Nova Scotia. Teaching methodologies and school curricula relevant to these two distinct communities will be examined.

### **Methods of Secondary School Teaching (EDUC 4800 - EDUC 4899)**

**EDUC 4810.06R Teaching English In Secondary Schools:** In weekly two-hour classes of small and whole group discussions, students concentrate on the theory behind the Nova Scotia Department of Education guideline for English teachers, trying to apply this theory to the classroom. By the end of the year students should have an understanding of the relationship between language and learning and be able to apply that understanding in developing practical activities which will help their own students become active learners.

**EDUC 4820.03A/4821.03B Teaching French In Secondary Schools:** Open only to students who have demonstrated adequate competence in French language and culture (passing a French language proficiency exam is required). Students taking this class must consult the instructor. A consideration of foundations of second language teaching

which moves to a discussion of methodology, techniques, materials (including visual aids), and testing. Emphasis is on developing teaching strategies which enable students to use French as a tool for authentic self-expression, orally and in writing. Directed observation of experienced teachers and practice in the development of teaching skills are integral parts of the class. Evaluation is based upon class participation (micro-teaching, oral reports, contributions to discussions), written projects, lesson plans, and examinations.

**EDUC 4830.06R Teaching Geography In Secondary Schools:** The class is intended for future teachers in junior high social studies, senior high geography, or those wishing to acquire a second teaching method.

Presenting a variety of models for teaching geography, the course gives early attention to lesson and course planning, and later to aspects of curriculum development and evaluation. Course requirements involve microteaching sessions, group production of lab materials, a publishable lesson plan, a major curriculum unit, and the maintenance of log books.

**Format:** Class 2 ½ hours  
**Prerequisites:** Instructor's consent

**EDUC 4840.06R Teaching Mathematics In Secondary Schools:** The study of a variety of methods relating to the teaching of mathematics at the secondary level forms the framework for this class. Students must read about each technique, participate in discussions about these techniques, and in many cases observe classroom situations where each method is used. A strong emphasis is placed on exploring the curriculum changes occurring in Education. This includes the place of statistics, the computer, the calculator, problem solving, and geometry in a school curriculum. Evaluation is based on one major project, assignments done individually and in groups, class participation, and a final examination.

**EDUC 4850.06R Teaching Science In Secondary Schools:** This course makes the connections between various learning theories and their applications to the teaching of science. Through a close examination of the goals, philosophy and methodologies of the junior high Science Plus programme and of senior high science curriculum, a wide variety of teaching strategies will be discussed and practised. Recent concerns in science technology and society, as well as gender issues in science education, will be examined. In addition, other areas of interests and concerns in science education as identified by the students in the class will be addressed.

**EDUC 4860.06R Teaching Social Studies In Secondary Schools:** Skills in curriculum planning and course organization are

developed, and a variety of teaching strategies are introduced. Topics include selecting content and methods setting reasonable objectives for teaching, developing fundamental skills in social studies, and evaluating achievement. Assignments will include written and oral presentations.

**EDUC 4871.03A, 4872.03B, 4873.03R Further Educational Studies:** Students may apply to instructors for permission to undertake either a specially designed reading course in a given area, or to undertake additional work in their first teaching method, for credit. The instructor thus assumes personal responsibility for supervising the work of a student enrolled in this half-credit elective course.

**Cross-listing:** EDUC 4873.03 is cross-listed with INTD 4003.03

**EDUC 4890.06R Teaching Music in Secondary Schools:** An introduction to the development of a music programme at the secondary level. Emphasis is on how to teach a general music class exploring the use of song materials, music theory, movement and creativity, and listening skills.

**Cross-listing:** MUSC 3400.06R

**EDUC 4891.03R Teaching Music in Elementary Schools:** An introduction to the development of a music programme at the elementary level. Emphasis is on how to teach song materials, movement and creativity, reading and writing skills, and what to listen for in music. The educational philosophies of Kodaly and Orff are examined in some detail. Solmization, hand signs, rhythm names, and body co-ordination are some of the skills to be developed.

**Cross-listing:** MUSC 4400.03R

**EDUC 4892.03B, EDUC 4893.03R Additional Curriculum Projects:** Students may apply to instructors for permission to undertake additional project work in the area of curriculum design, implementation, and evaluation, for credit. This may be done with prior consent in writing from the instructor(s) to the Coordinator, BEd Programme. The instructor(s) thus assumes personal responsibility for supervising the work of a student enrolled in this half credit elective course.

### **Field Experience**

(EDUC 4900 - EDUC 4999)

**EDUC 4900.06R, EDUC 4902.03A, EDUC 4903.03B Field Experience:** It is the primary objective of the field experiences to provide students with opportunities to analyze, compare, and participate in a variety of teacher-learner situations. Students who intend to apply for a Provincial Teachers' Certificate should plan to log the equivalent of

200 hours field experience. All arrangements for field experiences are made by the BEd Coordinator.

**Cross-listing:** EDUC 4900.06 is cross-listed with FREN 4900.06

**EDUC 4901.06R Elementary Curriculum Study and Field Experience:** Conducted partially in the Dalhousie University School, and partially in weekly tutorial sessions, this class will examine the theme study approach to programme planning, will help students design and implement their own unit plans, and will emphasize throughout whole language strategies and evaluation from a developmental perspective. Evaluation will be based on class participation and term reports.

The class seminars will take place in the fall term and they will be followed by field experience in the public schools after which a final evaluation will be made. Enrolment in this class is restricted to BScHE and BPE/BEd students with permission of the instructor.

**EDUC 4910.03R Additional Field Experience:** (Available only during the first Summer Session.) Permission of the School is required. This one-half credit class is made available to the BEd students as an elective which they may choose to supplement the basic requirement for field experience. These additional field experiences are acquired through a block of three weeks spent in the schools at the end of the academic year. This class can only be taken with the permission of the major methods instructor and the BEd committee.

**EDUC 4950.06R Studies in Education:** A variety of topics important to the professional development of teachers will be presented and discussed.

## Engineering

**Location:** Sir James Dunn Building,  
Room 326  
**Telephone:** (902) 494-2344  
**FAX:** (902) 494-5191

### Chairperson of Department

D.M. Lewis

### Professors

J.C. MacKinnon, BEng (TUNS), MScEng (Lond), PhD (Dal), PEng  
M.H. Mansour, BEng (Calro), BSc (AIN Shams) MEng (McM), PhD (TUNS), PEng  
S.T. Nugent, BSc (Mem), BEng (TUNS), MAsc (Tor), PhD (UNB), PEng

### Associate Professors

D.M. Lewis, BEng, MEng (NSTC), PEng  
D.G. Retallack, BSc (Dal), BEng (NSTC), MSc, PhD (Manchester), PEng

### Assistant Professor

C.K.K. Lun, BEng, MEng, PhD (McG), PEng

## Introduction

Professional engineers are concerned with making the properties of matter and the sources of energy in nature beneficial to mankind. The curriculum develops "an individual's ability to use the basic sciences, mathematics, engineering sciences, economics and social sciences to convert, use and/or manage resources optimally through effective analysis, interpretation, and decision making to meet objectives". University studies in engineering are concerned with the design of engineering systems, but the skills learned are widely applicable. Many engineers combine their profession with other activities, most notably management.

The professional degree in Engineering is the Bachelor of Engineering degree which is conferred by the Technical University of Nova Scotia in association with Dalhousie University. The first two years of study are taken at Dalhousie and comprise a programme of 11 credits which lead to the Diploma in Engineering. Upon successful completion of this programme, students will be admitted to the Technical University of Nova Scotia for a further three years of study leading to the degree of Bachelor of Engineering in Civil, Electrical, Mechanical, Mining, Chemical, Industrial, or Agricultural Engineering. These programmes have been accredited by the Canadian Accreditation Board of the Canadian Council of Professional Engineers.

TUNS offers a combined BEng/MEng programme in Metallurgical Engineering. The

admission requirement is the Diploma of Engineering, but admission is limited on a competitive basis. The programme is accredited by the Canadian Accreditation Board of the Canadian Council of Professional Engineers.

Most TUNS programmes are co-operative, in which industrial experience is alternated with the academic programme.

## Degree Programmes

Dalhousie offers various programmes for students wishing to pursue studies jointly in Engineering and in Arts or Science. Students may arrange programmes leading to a Bachelor of Science degree, with a major in Biology, Chemistry, Computing Science, Earth Sciences, Mathematics or Physics in addition to the Diploma in Engineering. Programmes leading to a Bachelor of Arts Degree in addition to the Diploma in Engineering can be arranged with a major in a language, social science, or humanities subject. These combined programmes require three years of study at Dalhousie. Three years are still required at TUNS in order to receive the Bachelor of Engineering degree.

Students wishing to enroll jointly in the Diploma in Engineering and Bachelor of Science or Bachelor of Arts programmes should consult the Department of Engineering for advice on programme planning.

Students who graduate from TUNS fulfil the academic requirements for registration as a Professional Engineer in all provinces in Canada. In addition to the academic requirements, the Profession requires that applicants for registration have practical experience relevant to the discipline of engineering. The minimum requirement is four years of experience subsequent to completion of the BEng. It is recommended that, in addition to this, students obtain engineering experience in the summer periods prior to graduation.

## Diploma in Engineering

### Admission Requirements

Students wishing to enroll in the Diploma in Engineering Programme in the Department of Engineering must satisfy the requirements for admission to the Faculty of Science at Dalhousie and must also satisfy the additional requirements of the Department of Engineering. Students are normally expected to have completed Nova Scotia Grade XII senior matriculation classes, or equivalent, in Mathematics, Physics and Chemistry and should rank well in their class. Students may be admitted with advanced standing.

## Admission with Advanced Standing

Students wishing admission with advanced standing in the Diploma in Engineering Programme are advised that normally a minimum of six full credit classes of those described for the programme must be taken at Dalhousie. Transfer credit will not be granted for any class in which the final grade was less than C, or equivalent, or for any class in which a final grade was granted conditionally.

## Diploma in Engineering Programme

- Total credits required - 11
- Year 1: Engineering 1100.03, 1120.03, Math 1000.03, 1010.03, Chemistry 1020.06, Physics 1100.06, one writing class
- Year 2: Engineering 2121.03, 2331.03, 2240.03, 2340.03, 2222.03, 2101.03, 2230.03, 2341.03, Math 2480.03, 2490.03, one elective from Social Sciences or Humanities
- Required GPA for graduation - 1.70

## BSc/Diploma in Engineering

Students may arrange programmes leading to a BSc with a major in one of the sciences in combination with the Diploma in Engineering. Upon completion of the joint programme, graduates receive both the Diploma in Engineering and a BSc degree.

The programme for the BSc plus Diploma in Engineering consists of fifteen classes. Eleven of the classes are the classes for the Diploma in Engineering. The remaining classes must be chosen to meet the requirements for the BSc. One of these requirements is that there must be four classes beyond the first year in the science major. If the science major is mathematics, physics, or chemistry, then the recommended first year programme is the first year of the Diploma in Engineering. The second and third years each consist of approximately half of the remaining requirements for the Diploma and half of the requirements for the BSc. If the science major is computing science, biology, or earth sciences, then students should seek the advice of the Department of Engineering, prior to registration in first year.

## BA/Diploma in Engineering

Students may arrange programmes leading to a BA with a major in one of the arts (humanities, languages, social sciences) in combination with a Diploma in Engineering. Upon completion of the joint program, graduates receive both the Diploma in Engineering and the BA degree.

This joint programme consists of fifteen classes. Eleven of the classes are required for the Diploma in Engineering; two of these are electives which must be in the humanities or

social sciences. The remaining four classes must be chosen to meet the requirements for the BA.

Students interested in this type of programme should contact both the Department of Engineering and the department for the BA major subject.

## Classes Offered

Texts and names of instructors shown are for the previous year.

**ENGI 1100.03A Graphics:** In this class the basic problem of representing three-dimensional solid objects on a two-dimensional sheet of paper is solved by a variety of methods. Problems involving points, lines, planes, and objects are tackled using the techniques of multiview drawing, pictorials (oblique, isometric, and perspective), and descriptive geometry. Problems are solved using pencil and paper and also using Computer Assisted Drafting.  
**Instructor:** D.M. Lewis  
**Format:** Lecture 3 hours, lab 3 hours

**ENGI 1120.03B Statics:** Statics is the first in a sequence of three classes in Engineering Mechanics. The work in Statics is designed to instruct the student in concepts of force and equilibrium. Topics include a review of the laws of motion, elements of vector algebra, such quantities as position and force vectors, moments of a force about an axis, couple moments, equivalent force systems, and equilibrium of two and three-dimensional structures. Structural applications such as two-dimensional trusses, frames and simple machines, as well as shear forces and bending moments in beams are discussed. Laws of Coulomb friction, centroids and centre of mass, and area moments and products of inertia are also presented.

**Format:** Lecture 4 hours, lab/tutorial 2 hours

**Instructor:** M.H. Mansour

**Prerequisite:** Mathematics 1000.03

**ENGI 2101.03B Engineering Design:** The work of ENGI 1100.03A (Graphics) is extended to include technical drawings and computer graphics, a design project with working drawings and a technical report, as well as the construction and testing of a physical model.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructors:** D.M. Lewis, J.C. MacKinnon

**Prerequisite:** Engineering 2121.03A, 2331.03A, 2240.03A, 2340.03A

**ENGI 2121.03A Dynamics of Particles:** This second class in Engineering Mechanics considers the kinematics and kinetics of a single particle and of systems of particles.

The class builds on the concepts introduced in Engineering 1120.03 (Statics); a vector approach is used. Topics include kinematics of a particle, Newton's laws, work, energy, power, conservative force fields, linear impulse and momentum, impulsive forces, impact, collisions, and angular momentum. All topics are treated using rectangular, path, and cylindrical coordinates.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructors:** S.T. Nugent

**Prerequisites:** Engineering 1120.03B, Mathematics 1010.03

**ENGI 2222.03B Dynamics of Rigid Bodies:**

This class completes the study of Engineering Mechanics. The concepts introduced in Engineering 2121.03 (Dynamics of Particles) are extended to rigid bodies. Topics include kinematics of a rigid body using both the translating reference frame theory and the general rotating reference frame theory, kinetics of plane motion of rigid bodies including general plane motion, energy methods, impulse and momentum methods and vibrations of single degree of freedom systems.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** C.K.K. Lun

**Prerequisite:** Engineering 2121.03A, 2240.03A, Mathematics 2480.03

**ENGI 2230.03B Electric Circuits:** An introduction to the fundamental laws of electric circuits and circuit parameters, the concept of time-constants, impedances, admittances, general network theorems, three-phase circuits and transformers. The laboratory periods illustrate the use of electrical measuring devices.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** S.T. Nugent

**Prerequisite:** Physics 1100.06, Mathematics 1010.03

**ENGI 2240.03A Computer Methods In Engineering:** This class first introduces the student to computers in general and to our machines in particular, to the use of an editor for creating computer programmes, and to the design and running of simple programmes.

The class then focuses on an algorithm-design process which uses structured programming techniques and is independent of the language chosen for coding. PASCAL is used as the implementation language, and it is taught to an intermediate level. Typical assignments involve computer solutions of engineering and mathematical problems.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** C.K.K. Lun

**Prerequisites:** Engineering 1120.03B, Mathematics 1010.03

**ENGI 2331.03A Strength of Materials:** 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 relations of stresses and strains, axial loading applications, torsion of circular sections, stresses and deflection of beams, combined static loading and column action.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** M.H. Mansour

**Prerequisites:** Engineering 1120.03B, Mathematics 1010.03

**ENGI 2340.03A Classical Thermodynamics:**

An introduction to the fundamental concepts and principles of thermodynamics as applied to engineering design problems. Topics in this class include: properties and processes of ideal gases and simple compressible substances, work and heat interactions, energy and the first law of thermodynamics — analysis of control masses and control volumes, entropy and analysis based upon the second law of thermodynamics, performance of selected components (e.g. turbines, compressors, pumps, heat exchangers) and systems (power and refrigeration cycles).

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** D.G. Retailack

**Prerequisites:** Mathematics 1010.03, Chemistry 1020.06

**ENGI 2341.03B An Introduction to Fluid Mechanics:** This class extends the basic concepts of mechanics from solids to fluids. It comprises the study of fluid properties, fluids at rest and in motion. Dimensional analysis is introduced. The fundamental flow-governing equations (conservation of mass, momentum and energy) are derived and applied to a selection of engineering problems.

**Format:** Lecture 3 hours, lab/tutorial 3 hours

**Instructor:** D.G. Retailack

**Prerequisites:** Engineering 1120.03B, 2121.03A, 2340.03A, Mathematics 1010.03, 2480.03

## English

**Location:** 1434 Henry Street, Halifax,  
N.S.  
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### Chair

R. Huebert (494-3411)

### Undergraduate Advisor

Consult Department

### Professors Emeritus

J. Fraser, MA (Oxon), PhD (Minn), FRSC  
J. Gray, MA (Aberd), MA (Oxon), PhD  
(Montreal), FRSC, FRSA  
M.M. Ross, OC, BA (UNB), MA (Tor), PhD  
(Corn), DLitt (UNB), LLD (St Thom), LLD (Dal),  
LLD (Queen's), DLitt (Tront), DLitt  
(Edinburgh), DLitt (Windsor), DSL (Trinity  
College), DLitt (Acadia) FRSC  
S.E. Sprott, MA, BD (Meib), PhD (Col)

### Professors

R. Huebert, BA (Sask), MA, PhD (Pitt)  
M.A. Klug, BA (Minn), MA (Kansas State),  
PhD (Ill)  
P. Monk, BA (Reading), MA (Carleton), PhD  
(Queen's)  
R.J. Smith, BA (Natal), MA (Oxon), PhD  
(Natal) McCulloch Professor in English  
R.R. Tetreault, BA (UBC), MA, PhD (Corn)  
J.A. Wainwright, BA (Tor), MA, PhD (Dal)

### Associate Professors

J.R. Baxter, BA, BEd, MA, PhD (Alta)  
S.A. Cowan, BA (Montana), MA (Yale)  
L.P. Diepaveen, BA (Calvin Col), MA, PhD (Ill)  
M.M. Furrow, BA (Dal), MA, MPhil, PhD (Yale)  
B. Greenfield, BA (York), MA (McG), PhD  
(Columbia)  
A. Higgins, BA (Conn), MA (McG), MA  
(Mesa), MA, PhD (Yale)  
V. Li, BA, MA (UBC), PhD (Cantab)  
D. McNeil, BA (Concordia), MA (UNB), PhD  
(McM)  
C.J. Myers, BA (Sask), MA, PhD (Tor)  
M.I. Stone, BA (Guelph), MA, MPhil (Wat),  
PhD (Tor)

### Assistant Professors

K. Graham, BA (Alta), MA (Tor), PhD  
(Berkeley)  
C. Luckyj, BA, MA, PhD (Tor)  
H.E. Morgan, BA (UBC), MA (Wash), BLitt  
(Oxon), PhD (Wash)  
P. Perkins, BA (Utah), MA, PhD (Dal)  
T. Ross, BA, MA (Carleton), PhD (Tor)  
J.A. Thompson, BA (Western), MA, PhD (Tor)  
C. Wiesenthal, BA, MA (Man), PhD (Alta)  
G. Willmott, BA (Tor), MA, PhD (Duke)

### Adjunct Professor

A.R. Andrews, BA, DipEd, MA (Leeds), PhD  
(Ill), FRSA

### Senior Instructor

L. Choyce, BA (Rutgers), MA (Montclair), MA  
(CUNY)

## Introduction

The study of English literature at Dalhousie is not just the study of the literature of England. Although largely concerned with the rich written heritage of the British Isles, it also includes the study of writing in Canada, the United States, parts of the English-speaking Commonwealth and, indeed, some European countries, in translation. It ranges widely in time from early Anglo-Saxon works of the eighth century through thirteen centuries of changing ideas and language to the still-changing thoughts, feelings and expressions of our own time.

The purpose of English studies at Dalhousie, briefly stated, is the enjoyment and understanding of the written word. Since the word is the principal link between the individual heart and mind and the rest of the world, such studies naturally touch upon philosophy, politics, religion, and the fine arts as well. At the same time, the student is required to think, and to use language with clarity, judgement and imagination.

In more detail, the goals of English studies are to encourage reading as a source of pleasure, knowledge and wisdom, to sharpen the powers of critical judgement required to interpret literary texts, to promote some understanding of the process by which great writing is achieved and indeed to inspire students to their own best expression.

In the first year, ENGL 1000.06R is required of all students who wish to take further English classes. There are about twenty different sections ranging from historical surveys to more eclectic studies. To enable students to choose the one most suited to their inclinations and needs, the English Department and the Registrar's Office have an ENGL 1000.06R supplement which specifies the aims and reading lists of each section. Classes numbered from 2000 to 4099 are especially suited for those concentrating in English, studying it as a complement to their main area, or taking an elective, and classes beyond 4250 are designed as studies of specialized areas for Honours students. Honours classes are open to General students with permission of the Chair and the professor concerned. A supplement describing Upper-year General and Honours classes in detail is available from the English Department.

## Degree Programmes

Students should consult the "Degree Requirements" section of this calendar for specific regulations.

### BA with Honours in English

This degree is a preparation for students going on to advanced study and for other highly-motivated students. It is designed to provide knowledge of the historical development of literature in English and to introduce students to the critical and theoretical paradigms of the discipline. It requires students to take:

- (1) at least fifteen credits beyond the 1000 level
- (2) two credits in a minor subject
- (3) four elective credits not in English
- (4) an additional grade (the "21st grade" - currently met by 0451.00A)
- (5) at least nine and no more than eleven credits in English beyond the 1000 level, of which
  - (a) classes will be selected from the 2000, 3000 and 4000 series;
  - (b) at least five credits must be selected from Groups, A, B and C in the 4000 series; and
  - (c) at least one credit must be taken in each of Groups A, B, and C in the 4000 series.
- (6) Honours students may not take 2000- and 3000- series classes that substantially repeat the material of a 4000-series class in Group A, B, or C which they have already taken.

**NOTE:** For purposes of the honours programme and its requirements, classes in the 4000 series are divided into the following groups:

**Group A (early period):** 4251.06R, 4252.06R, 4253.06R, 4351.06R, 4352.06R, 4360.03R

**Group B (middle period):** 4255.06R, 4256.06R, 4354.06R, 4355.06R, 4356.06R, 4457.06R

**Group C (later period):** 4357.06R, 4453.06R, 4455.06R

**Group D (Special topics):** 4001.03A or B, 4002.03A or B, 4003.03A or B, 4004.03A or B, 4005.03A or B, 4006.03A or B, 4007.03A or B, 4008.03A or B, 4009.03A or B, 4010.03A or B

### BA with Combined Honours

There are several Combined Honours programmes: English and French, English and German, English and History, English and Philosophy, English and Spanish, English and Theatre. Students interested in any of these combinations or any other that involves English and another subject should consult with the Departments concerned.

### BA with Advanced Major in English

This degree is a wide-ranging preparation for a variety of careers, including the teaching of English at elementary and high-school level. It is organized to develop skills in reading, interpreting, and writing about a variety of literary forms. It requires students to take:

- (1) at least twelve credits beyond the 1000 level
- (2) one credit beyond the 1000 level in each of two subjects other than English
- (3) at least six and no more than nine credits in English beyond the 1000 level of which:
  - (a) full- and half-credit classes will be selected from the 2000- and 3000-series, and half-credit classes from the 4000-series.
  - (b) at least three credits must be taken from beyond the 3000-series;
  - (c) at least one half-credit must be taken in the 4000-series;
  - (d) one credit must be taken in poetry, one credit in drama, and one credit in prose or prose fiction; and
  - (e) at least one credit must be taken in literature before 1900.

### BA with Major in English

This degree is a general liberal arts degree with a concentration in English. It permits a wide range of choice in class selection. It requires students to take:

- (1) at least seven credits beyond the 1000 level;
- (2) one credit beyond the 1000 level in each of two subjects other than English;
- (3) at least four and no more than eight credits in English beyond the 1000 level, or which:
  - (a) classes will be selected from both the 2000- and 3000-series; and
  - (b) at least two credits must be beyond the 2000 series.

### Classes Offered

**Note:** Classes marked \* may not be offered every year. Please consult the current timetable on registration to determine if these classes are offered.

**ENGL 1000.06R Introduction to Literature:** Since ENGL 1000.06R consists of sections taught by many different instructors, statements about its objectives and approach must be confined to generalizations. All instructors of ENGL 1000.06R have these two broad objectives in common: (a) to involve students in the serious study of literature; (b) to involve them in the discipline of words so that they will be more critical and responsive readers and more exact and

Imaginative writers. The subject matter varies from section to section. Detailed syllabi of all sections are available. Practice in writing is carried on throughout the year in regular essays. Each section attends three lectures per week. In addition, the tutors attached to each session conduct small discussion groups and personal interviews with students.

Format: Lecture/discussion 3 hours

## Upper-year Classes

Successful completion of ENGL 1000.06R is the prerequisite for entry into Upper-Year classes. For a more complete description of classes and of texts, students should consult the Departmental Supplement for Upper-Year classes.

### Classes in the 2000 Series

The 2000 series includes classes that emphasize genre or literary form, and those that offer broad surveys of literature. Classes in the 2000 series are open to students in their second or third year of studies who have completed ENGL 1000.06R.

\*ENGL 2200.06R **Advanced Composition:** An advanced class in the theory and practice of writing English prose, designed for people who already have some competence and interest in writing. The class is not a "remedial" class and not a "creative writing" class.

Format: Lecture/discussion 3 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2203.06R **Masterpieces of Western Literature:** Intensive reading of selected major works from Western literature, designed to broaden students' outlook on literature and also to increase their familiarity with works that are not only stimulating in themselves but also comprise the basis for the development of English and other literatures.

Format: Lecture/discussion 3 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2204.06R **The European Novel:** An intensive study of about ten representative European novels of the last two hundred years. A considerable amount of attention is paid to the philosophical ideas which are an important feature in many of the novels studied.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2205.06R **Landmarks of English Literature:** This class studies works by many of the most influential British authors from Chaucer to the present century. These landmarks provide some orientation in the literary landscape, and help to make students aware of the diversity available in literary studies. The class is aimed at, but not limited to, English majors.

Format: Lecture/discussion 3 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2207.06R **Canadian Literature:** This class offers an introduction to Canadian poetry and prose written in English. The aim will be to trace the development of Canadian fiction and poetry from the nineteenth century to the present through discussion of selected texts.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

Cross-listed: Canadian Studies

\*ENGL 2208.06R **The English Novel to 1900:** Based on a selection of titles by representative authors, this class is a survey of the early English novel. Attention is given to the rise of the genre as well as to the variety of forms and functions which the novel assumed or served.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2211.06R **Commonwealth Literature:** An introduction to the literature of the British Commonwealth, emphasizing writing from Africa, Australia, the Caribbean and India. The bulk of the literature studied will be modern.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2220.06R **English Drama:** An introduction to some of the major plays and playwrights in the history of English drama. The ability to interpret a dramatic text is of principal concern; some attention may be paid to changes in staging practices from the medieval beginnings of English drama to the recent experimental theatre. The objective of the class as a whole is to sample the richness and diversity of the English dramatic tradition.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

\*ENGL 2221.06R **Fictions of Development:** A study of a variety of literary works (chiefly novels) which portray the crises and conflicts involved in growing up, finding a vocation, and finding oneself. Works from the nineteenth century to the present by Canadian, English and American authors are included, and special attention is given to the connections between art and autobiography, and between literature and psychology, as well as to the influence of gender differences in patterns of human development, and ways of writing about them.

Format: Lecture/discussion 2 hours

Prerequisite: ENGL 1000.06R

Cross-listing: WOST 2200.06R

\*ENGL 2225.06R **Epic, Romance, and Fantasy:** This class offers a consideration of epic, romance, and fantasy. Starting with a consideration of primary epics, it will then go on to take a look at manifestations of the epic spirit in modern works.

Format: lecture 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2226.06R Tragedy:** A study of the nature and method of tragedy in literature. Examples are taken from Greek, Shakespearean, and modern drama, as well as from poetry, and from novels.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2227.06R Comedy and Satire:** The comedian and the satirist are interested in both the laughable and the deplorable antics and eccentricities of human nature. This class concerns itself with their points of view, as expressed in such varied forms as stage comedy, graphic satire, the comic novel, and the humorous essay. It also considers theories of comedy and laughter in their application to a wide variety of literary types. Lectures and class discussions are augmented with play readings, films and other illustrative materials.

**Format:** Lecture/discussion 3 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2228.06R Short Poems in English:**

Forms and themes in the short poem are studied by means of critical reading of poems written in English. Topics may include the following: the self in the short poem, other persons, public events, love, nature, the city, the machine, wit, myth, traditional forms, free verse, the haiku, lyric as song, spoken poetry, poetry in print, concrete poetry, and possibly other topics to suit the class.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2231.06R Modern American and Canadian Novels:** Six Canadian and six American novels are treated as related "pairs", with a view to discovering what qualities are distinctive to each group, and what qualities are shared.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2233.06R Science Fiction and Fantasy:** Selected works of speculative fiction are read for pleasure and studied for understanding. The study emphasizes analysis and evaluation of the works as literature. Non-majors are welcome.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 2234.06R The Short Story:** This class attempts to combine detailed consideration of a wide range of the best short stories of the last 150 years with discussion of general questions about the nature of the genre itself. As much as anything else it is a class in 'reading and writing' intended to improve reading ability and to develop the capacity to understand and interpret literature.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

#### Classes in the 3000 Series

The 3000 series includes classes that focus on periods in national literatures, that take up the descriptive and historical study of the English language itself, and that deal with the theory and history of literary study. Classes in the 3000 series are open to any student who has completed ENGL 1000.06R.

**\*ENGL 3201.06R The English Language:** This class, concerning the English language of today, begins with some general questions about the nature of language, and goes on to investigate the syntax, semantics, phonology, and dialects of modern English, with an ultimate interest in the stylistic analysis and comparison of short literary texts.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3202.06R History of the English Language:** An introduction to the historical development of the English language. The growth of our "word-herd", the evolution of word meanings, the changing patterns of speech sounds, of word forms and of syntactic structures, the distinction of dialects and literary styles are studied through analysis of selected literary texts. ENGL 3201.06R and ENGL 3202.06R are complementary classes.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3206.06R American Literature of the Nineteenth Century:** An introduction to American literature through representative works by major writers from 1800 to 1900. Among those studied are Cooper, Hawthorne, Poe, Emerson, Melville, Whitman, Dickinson, and Twain. Both fiction and poetry are studied. Students are encouraged to discuss the works, and classes usually proceed by a combination of discussion and lecture.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3209.06R Twentieth-Century Fiction:** An introduction to the main thematic and technical trends in the modern novel.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3210.06R Modern Poetry in English:** A study of modern poetry in English focusing on the seminal poets Yeats, Stevens, Pound, Eliot, and Williams. Developments and trends in poetry from the 1930's to the present are also considered. For readers, beginning and more experienced, who wish to get their bearings in modern poetry.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3212.06R British Literature of the Twentieth Century:** A survey introduction to the past seventy-five years of British fiction, drama, and poetry.

**Format:** Lecture/discussion 2 hours

**Prerequisite:** ENGL 1000.06R

**\*ENGL 3213.06R American Literature of the Twentieth Century:** An introduction to poetry, fiction and drama by American writers of the twentieth century.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3214.06R Shakespeare:** An introduction to Shakespeare's career as a playwright, through discussion and interpretation of a dozen or more of his plays.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3215.06R Poetry of the Romantic Period:** An introduction to the spirit of an age and its manifestations in literary art. Examples of shorter and longer lyrics and excerpts from longer narrative and dramatic poems are drawn from the works of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3216.06R The Gothic Novel:** A survey of the origins and development of The Tale of Terror and the Supernatural during the latter half of the eighteenth century and its various manifestations and influences in succeeding fiction. Students will not only chart the chief landmarks of gothic fiction but also explore the various chambers of horror-literature.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3218.06R Medieval Literature:** A study of selected medieval works of Northern Europe, with major emphasis upon the Arthurian legend as found in Malory. Beginning with a look at Nordic, Celtic and Frankish background materials (in translation), one goes on to focus upon late-medieval developments in saga and romance, concluding with a look at some post-medieval uses of the inherited matter in Tennyson, Morris, Lewis and Tolkien. An enriched ENGL 3218.06R is available for Honours credit to students who have previously taken ENGL 4351.06R.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3219.06R Chaucer and his Contemporaries:** A selection from the genres of late medieval literature in English: romances, fabliaux, plays, lyrics, and legends. Some works are studied in translation; others (including Chaucer's) are read in the original Middle English.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3224.06R Renaissance Poetry:** An introduction to English poetry from the early sixteenth to the mid-seventeenth century,

concentrating on authors whose works have exercised a continuing influence: Sidney, Shakespeare, Donne, Jonson, and Milton.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3225.06R Restoration and Eighteenth-Century Literature:** This class will survey literary works in drama, poetry and prose from 1660-1800. Topics to be considered might include the risky business of irony, the rise of the novel, the rise and fall of the heroic couplet, the professionalization of English letters and the changing functions of the poet, the obstacles faced by early women writers, and the relation of literature to politics in an age of emerging democratic capitalism.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3229.06R The Victorian Age:** A survey of selected Victorian texts designed to deconstruct modern myths about the Victorians and to introduce students to the diversity of the Victorian Age. Works by Mill, Tennyson, Arnold, the Brownings, the Pre-Raphaelites, and Wilde demonstrate that Victorian Literature is animated by a spirit of rebellion and a zeal for controversy, marked by innovation and experimentation in literary forms and subjects, and notable for both its passionate defences of individual liberty and its surprisingly modern affirmations of women's rights.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3232 Modern Drama:** An introduction to the major developments in drama from Ibsen to the present. Special attention is given to changes in dramatic style and to the growth of modern theatrical movements. The playwrights represented include Strindberg, Shaw, Pirandello, Brecht, Genet, Ionesco, Pinter, Albee, and Stoppard. A few recent Canadian plays provide a focus for discussion of contemporary trends.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

**\*ENGL 3244.06R Literary Criticism:** A survey of Classical Greek and Latin theory, English critics and some pertinent European writers and trends.

**Format:** Lecture/discussion 2 hours  
**Prerequisite:** ENGL 1000.06R

## Classes in the 4000 Series

Classes in the 4000 series focus on more specialized topics than other classes in the major programme. They are designed for more experienced students in the Honours and Advanced Major programmes. You must have permission of the Department to take classes in the 4000 series.

- \*ENGL 4001.03A or B Studies in an Individual Author I
- \*ENGL 4002.03A or B Studies in an Individual Author II
- \*ENGL 4003.03A or B Studies in Genres I
- \*ENGL 4004.03A or B Studies in Genres II
- \*ENGL 4005.03A or B Studies in National Literatures in English I
- \*ENGL 4006.03A or B Studies in National Literatures in English II
- \*ENGL 4007.03A or B Studies in Literary History I
- \*ENGL 4008.03A or B Studies in Literary History II
- \*ENGL 4009.03A or B Studies in Literary Theory I
- \*ENGL 4010.03A or B Studies in Literary Theory II

**ENGL 0451.00A Introduction to Literary Research:** 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 in his/her own research.

There will be a brief introduction to the history of printing and papermaking. Students will be taken on a tour of the printing shop (Dawson Room) and occasionally guest speakers will lecture on relevant topics. Successful completion of exercises and attendance at lectures one hour a week for the first term will constitute fulfilment of requirements for the class.

Format: Lecture 1 hour, first term only

\*ENGL 4251.06R **Sixteenth-Century Prose and Poetry:** This is a class in the prose and poetry of the English Renaissance from its beginnings to the 1590s. The major writers to be studied are More, Sidney, Spenser, and Shakespeare; brief selections from Wyatt, Surrey, Elyot, Ascham, Hooker, Marlowe and a few others will also be read.

Format: Seminar 2 hours

\*ENGL 4252.06R **Shakespeare and the Drama of His Time:** A selection of plays by Shakespeare, is placed in the context of representative plays by his earlier and later contemporaries, especially Marlowe and Jonson. Students may consult the professor for a list of plays and suggested preliminary reading.

Format: Seminar 2 hours

\*ENGL 4253.06R **Old English:** An introduction to the Old English language (700-1100 AD), followed by a study of some of the prose and minor poems, and, in the second term, of *Beowulf*. Students are also introduced to some aspects of Old English art and archaeology. Some knowledge of a classical or modern European language (preferably German) is desirable, though not essential, and an understanding of traditional grammatical terminology will be helpful. This class is not recommended, except in unusual circumstances, to those who are not thoroughly fluent in modern English.

Format: Seminar 2 hours

\*ENGL 4254.06R **Restoration and Eighteenth-Century Literature:** The emphasis is on three great satirical authors (Dryden, Pope, and Swift), on a study of Restoration drama and on major works of Samuel Johnson. Since the literature of the period is related closely to the culture of the age, some time is spent on the contemporary climate of opinion revealed in the works of a number of writers representative of literary, political, social, and philosophical points of view: Hobbes, Halifax, Pepys, Rochester, Butler, Addison and Steele, Mandeville and Shaftesbury.

Format: Seminar 2 hours

\*ENGL 4255.06R **Poetry and Prose 1660-1800:** This seminar will examine a selection of poetry and non-fictional prose from the Restoration and Eighteenth Century. Although the works of Dryden, Pope, Swift and Johnson will be emphasized, attention will also be paid to a number of works in representative genres (E.G., biography, letters, essays). Time will be spent on some lesser known poets of period, such as the women poets and the poets of sensibility.

Format: Seminar 2 hours

\*ENGL 4256.06R **The Novel from Behn to Austen:** This seminar will examine the development of narrative fiction during the Restoration and the eighteenth century. Selected works will include a number of novels, well-known and not so well-known. Topics might include the constructions of gender, the rise of individualism, changing concepts of realism, and the relation between history and fiction.

Format: Seminar 2 hours

\*ENGL 4351.06R **Middle English:** An introduction to the language and literature of feudal and chivalric England, with the principal emphases being upon Chaucer's poetry and upon the Arthurian story. Through readings and study, the student should gain some historical sense of the language, of the late-medieval social milieu and of the especial flourishing of literature in the late-fourteenth century.

Format: Seminar 2 hours

**\*ENGL 4352.06R Seventeenth-Century Poetry and Prose:** A study of selected poetry and prose of the later Renaissance. Of the poets, Donne and Milton are given special emphasis; Milton's poetry, especially *Paradise Lost*, occupies a major part of the second term.

Format: Seminar 2 hours

**\*ENGL 4354.06R Nineteenth Century Novel:** The novels of the period from Scott and Austen to Hardy are studied.

Format: Seminar 2 hours

**\*ENGL 4355.06R American Literature to 1900:** This class deals with major writers of the 19th century, as well as works from the colonial period which raise important cultural questions.

Format: Seminar 2 hours

**\*ENGL 4356.06R The Romantic Period:** A close reading of the major poetry of Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats. Attention is also given to their critical writings in prose, and to the intellectual, cultural, and historical milieu in which they worked.

Format: Seminar 2 hours

**\*ENGL 4357.06R Modern Canadian Literature:** A study of Canadian fiction and poetry since the 1920's with emphasis on the changing form and content of Canadian writing.

Format: Seminar 2 hours

Cross-listed: Canadian Studies

**\*ENGL 4360.03R Old Norse:** A broad survey of major Old Norse prose and poetic works in translation and an introduction to the comparative study of the very close relation of the early Norse and English languages and literature.

Format: Lecture 1 hour

Prerequisite: One of ENGL 3218.06R, 4253.06R, 4351.06R or instructor's consent

**\*ENGL 4453.06R Twentieth-Century English Literature:** A series of explorations designed to interpret some of the literary texts written in our century and the (British) culture which produced them.

Format: Seminar 2 hours

**\*ENGL 4455.06R Modern American Literature:** In the first term, this class studies 20th-century American fiction. In the second term, modern American poetry is assessed. Classes are a combination of lectures and discussion.

Format: Seminar 2 hours

**\*ENGL 4457.06R Victorian Poetry:** Poems by Tennyson, Robert Browning, Elizabeth Barrett Browning, Arnold and selected

Pre-Raphaelites are studied in the context of the social and political, the religious and scientific ideas current in Victorian England.

Format: Seminar 2 hours

## Environmental Science

### Introduction

Environmental Science applies the findings and principles from all disciplines of science to questions and problems involving the environment of our planet, its oceans, atmosphere, and biosphere. Environmental science is therefore extremely broad and interdisciplinary. Most environmental scientists have primary expertise in a particular discipline, and work co-operatively with specialists in other disciplines to solve environmental problems. They work in a variety of institutions; many work in federal or provincial government laboratories that are engaged in basic research or applied problem-solving. Many more work in private consulting or engineering firms to minimize man's impact on the environment.

### Degree Programmes

Dalhousie University does NOT offer a BSc major in environmental science, nor is there such a Department within the Faculty of Science. Those interested in environmental science as a career are strongly advised to obtain a good grounding in the basic sciences by concentrating their field of study in one subject in order to obtain a major or honours BSc in that discipline. Current programs that provide streams emphasizing environmental subjects are Earth Sciences (particularly Environmental Geology and Hydrogeology) and Marine Biology. Of particular reference is the programme specializing in Earth System Science (see Earth System Science section of this calendar).

Most major or honours programmes allow some freedom in selection of classes, especially with respect to elective classes. In order to assist students in locating classes with particular applications or relevance to environmental issues, we have listed those classes offered within the Faculty of Science, and noted those aspects of each class which relate to the environment. We emphasize that these classes are offered by individual departments, and do not of themselves form part of a general environmental degree program. Consult the individual departments for prerequisites and admission requirements. Above all, be sure that the selection of classes you choose will be sufficient to qualify for a major or honours Bachelor of Science degree in the subject you have chosen for specialization (Note College of Arts and Science section of "Degree Requirements" in this calendar).

After the BSc degree, career options you may wish to consider include:

- Diploma in Meteorology (Consult the Physics or Oceanography departments)
- Graduate study in Oceanography
- Masters degree programme with the School for Resource and Environmental Studies

### Classes Offered Within the Faculty of Science with Particular Relevance to Environmental Science

#### First-year classes (1000 level):

**CHEM 1000.06R The Chemical World:** This class is mainly for B.A. students. It emphasizes descriptive chemistry, i.e. properties of chemical compounds, over quantitative aspects. Many examples and assignments are relevant to environmental science. Principles demonstrated include chemical structure - function relations; quantity/quality considerations for chemicals in the environment; toxicity. Students will be taught to recognize chemical structure and function.

Instructors: T.S. Cameron

#### **CHEM 1010.06R/1030.06R Chemistry:**

These classes are standard 1st-year University chemistry. Both quantitative and qualitative aspects of chemistry are emphasized, and many examples used in class are taken from environmental science. All material covered in these classes is relevant to an understanding in particular of chemicals, cycles, pollution, etc.

Instructors: Staff

**CHEM 1040.06R General Chemistry for the Life and Health Sciences:** This course is similar to CHEM 1010.06 in its rigour and the principles it covers; it also uses the same textbook and the same lab experiments. CHEM 1040 serves as a prerequisite for all second-year chemistry courses, and students should have a background equivalent to Nova Scotia grade 12 chemistry.

In contrast to CHEM 1010.06, however, chemical principles are primarily illustrated by their action in *living* systems. Of particular interest in the environmental context may be: descriptions of the nature and role of particular chemicals (from  $O_3$ ,  $NO_x$ , and  $SO_2$  to select carcinogens and biodegradable surfactants); Michaelis-Menten enzyme kinetics (including non-competitive inhibition by Hg and nerve gases); consequences of the second law of thermodynamics (e.g. entropy-driven pollution); methods used in biochemical and environmental analysis (UV-Vis spectrophotometry, pH measurements, etc.) polyprotic acid equilibria (natural buffer systems); and ionizing radiation (effects on the human body, natural and anthropogenic radioactivity, fission and fusion reactors and bombs).

**Prerequisites:** Students should have a background equivalent to Nova Scotia grade 12 chemistry (N.S. #411)

**Current instructor:** W.A. Aus

**CHEM 1410.03A Introductory Chemistry:** A descriptive introduction to chemistry with emphasis on materials related to life and health sciences. As 1430R, the course is required for Nursing students, who make up the bulk of the class. Consequently, there is an emphasis on the physiological effects of chemicals on the human body. The class consists of three hours of lectures and an optional two-hour tutorial each week. The class discusses the structure of chemical compounds, concentrations of solutions, inorganic and organic compounds, reactions and non-reactive interactions between chemicals. The students learn how to work with concentrations of solutions and how to deduce the structure and something of the properties of a molecule from its name.

**Instructors:** P.D. Pacey  
**Cross-listings:** CHEM 1430.06R

**ESCI 1000.06R/1001.03B Introduction to Geology:** Covers principles of Earth Science including those directly applicable to environmental science - e.g. nature and coupling of lithosphere-hydrosphere-atmosphere-biosphere, rock cycle, geological time, stratigraphy, geological processes and surficial geology, extinctions, scientific method. Applies principles of Earth Science to problems in environmental and resource geology - e.g., mineral and petroleum resources (including environmental problems associated with their recovery and use), groundwater, waste disposal, soils, deserts and desertification, the carbon cycle, glaciation, history and causes of climate change, rivers and floods, slope failure, coastal subsidence, volcanic and earthquake hazards. Lectures cover points noted above, with special class reading and discussion of several topical environmental issues. Field trips illustrate different aspects of geology, including environmental aspects as appropriate for each locality (e.g., shoreline erosion). Labs include the analysis and identification of sediments and rocks, and coverage of the physical basis of the Earth's surface. Students are taught geological time and the time scale; how to read the history of past environmental change from the geological record; specific geological principles (e.g., groundwater flow, the carbon cycle, slope stability) relevant to environmental science, map reading. For more course content information refer to the Earth Sciences section of this calendar.

**Instructors:** F. Medloll, N. Culshaw

**ESCI 1040.03A/1050.03B The Earth and Society:** 1040.03A covers principles of Earth Science including those directly applicable to environmental science (applications mainly covered in 1050.03B) - e.g., nature and coupling of lithosphere- hydrosphere- atmosphere- biosphere, geological time, rock cycle, stratigraphy, geological processes and surficial geology, extinctions, scientific method. Lectures cover points noted above. Field trips illustrate different aspects of geology, including environmental aspects as appropriate for each locality (e.g., shoreline erosion). Students are taught understanding of geological time and the time scale; how to read the history of past environmental change from the geological record.

1050.03B applies principles of Earth Science learned in 1040.03A to problems in environmental and resource geology - e.g., mineral and petroleum resources (including environmental problems associated with their recovery and use), groundwater, waste disposal, soils, deserts and desertification, the carbon cycle, glaciation, history and causes of climate change, rivers and floods, slope failure, coastal subsidence, volcanic and earthquake hazards. A large proportion of class time is spent on environmental applications of Earth Science, with some special reading and discussion on topical environmental problems; three out of four assignments involve problems or reports on environmental/resource geology. Students are taught specific geological principles (e.g., groundwater flow, the carbon cycle, slope stability) relevant to environmental science, map reading. For more course content information refer to the Earth Sciences section of this calendar.

**Instructors:** D. Godfrey-Smith, P.J.C. Ryall, J. Hall

**ESCI 1000.06R Introduction to Environmental Studies:** The intention of this full-credit course is to provide students with an entry-level introduction to the scope and importance of environmental issues that affect us at the local, regional, national and global levels. The course content will deal with three groups of environmental issues; (i) the human population and sociocultural patterns, (ii) sustainability of the use of renewable and non-renewable natural resources, and (iii) environmental degradation caused by pollution and disturbance. The course will be multi-disciplinary in nature, with specialists dealing with issues that reflect their particular expertise. However, this course will also build upon the connections among specific disciplines. The instructional format will involve two lectures per week, and one two-hour tutorial every two weeks. Grading will be by examination

(one at the end of each term), by essay (one per term), by short written assignments, and by participation in discussion seminars.

**Instructors:** Staff

**SCI 1200.06R - An Overview of the Cosmos, Earth, and Life:** The class meets the science distribution requirement for BA students. There are no prerequisites and the class does not count as a prerequisite for any other science class. Students are introduced to selected concepts central to each of the disciplines of Geology, Biology, and Physics, and the origins of our universe, Earth and life on Earth. Emphasis is placed on developing an understanding of the scientific method, its limitations, and its application in society. The principles will be related to environmental concerns. For example the properties of light and radiation are applied to a discussion of global warming. The principles involved in ocean and atmospheric circulation are used to understand present problems of climate and pollution. Biological principles are applied to understand the consequences of changing habitats on biodiversity.

**Instructors:** E. Angelopoulos, P. Reynolds, R. March

### Second-year classes (2000 level)

**BIOL 2002.03B Terrestrial Diversity: (Area II)** A survey of the terrestrial organisms. The class emphasizes the restrictions imposed on terrestrial adaptations by the aquatic origins of the colonizers, discusses the physiology of living in a terrestrial environment, looks at the domestication of plants and animals by man, and speculates on the future diversification of the earth environment and its inhabitants.

**Format:** lecture 2 hr, tutorial 1 hr, lab 3 hr

**Instructors:** A.H. Mills, D.G. Patriquin, R. Scheibling

**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C or better)

**BIOL 2060.03A or B Introductory Ecology: (Area III)** Ecology is the study of the interrelationships of organisms and their environments. The broad subject of ecology focuses upon the interactions of plants and animals, including humans, with each other and with their non-living world. Three levels of ecology are studied: (1) individuals, (2) Populations, (3) Communities and Ecosystems. Assignments and tutorials enlarge upon concepts presented in lecture. Students are instructed in elementary computer techniques and use the computer for most assignments. This class provides an overview of the science of ecology for the informed citizen, and also a good foundation for further work in ecology, marine biology and environmental studies.

**Format:** lecture 3 hours, laboratory/tutorial 3 hours

**Instructor:** C. Beauchamp, R. Doyle, R. Scheibling

**Prerequisite:** BIOL 1000.06R or 1001.06R (Grade C or better)

**Exclusions:** BIOL 2066.03, BIOL 2046.06R

**ECO 2250.06R An Applied Course in Economic Development and the Environment: Concepts, Policies and Projects:** The class is designed around concepts of sustainable development, with emphasis on key issues facing developing countries and less prosperous regions of some industrial nations. There are three main elements: (1) conceptual underpinnings and tensions behind sustainable development; (2) international, national and regional level policies and planning approaches for sustainable development - including lessons from the Rio Summit, the World Bank, CIDA, Canada's Green Plan and the European Regional Development Fund; (3) projects for sustainable development - drawing on case experiences and first-hand field work undertaken as a part of the class programme.

**Format:** Lectures; case work with group presentations, tutorials. (3 hours).

**Instructor:** I. McAllister

**Prerequisite:** introductory economics or permission of instructor.

**ESCI 2201.03A/2202.03B Historical Geology:** This class will cover fundamental global change issues - i.e. from the beginning of time. The student can put these in the context of present global change and assess the differences. Also studies changes in the earth's environment as the earth evolved from a lifeless planet to the present. Principles demonstrated include stratigraphic principles, the present is the key to the past, evolution of all the various life forms. This will be covered in both labs and classroom. Students will be able to place anthropogenic induced changes in context with naturally occurring global change. For more course content information refer to the Earth Sciences section of this calendar.

**Instructors:** P. Schenk

**Prerequisites:** ESCI 1000.06R or ESCI 1040.03A and ESCI 1001.03B. ESCI 2201.03A for ESCI 2201.03B.

**ESCI 2410.03B Environmental and Resource Geology:** Today, and into the foreseeable future, humanity is faced with numerous environmental problems created by natural and human-made causes. In many cases, an understanding of one or more geologic processes is essential in finding an appropriate solution. Environmental geology is geology as it relates to human activities. This course examines how geologic processes and hazards impose constraints on human activities, the geologic aspects of pollution

and waste-disposal problems, the issues associated with the utilization and management of mineral and energy resources, and several other topics. Principles and applications addressed in the course include metallic mineral resources, energy resources (coal, hydrocarbons, nuclear), environmental problems of resource extraction and processing, groundwater as a resource, geologic hazards (flooding, landslides, subsidence, earthquakes, volcanoes) and their mitigation or prevention, role of geology in land use planning, coastal processes and human intervention, geological aspects of solid and liquid waste disposal. Many environmental issues involve a variety of geologic processes. This course provides participants with a broader foundation for the discussion and evaluation of specific environmental issues that involve geologic aspects. Emphasis is placed on the multi-disciplinary nature of environmental sciences and the holistic approach necessary to provide acceptable solutions. For more course content information refer to the Earth Sciences section of this calendar.

Instructors: G.K. Muecke  
Prerequisites: ESCI 1000.06R or ESCI 1040.03A and 1050.03B/1001.03B

**STATS 2080.03A or B Statistical Methods for Data Analysis and Inference:** Statistics is the science of collecting, organizing and interpreting data. It is a particularly essential tool in the study of environmental science. This course gives a fundamental background and techniques in collection and interpretation of data. Principles demonstrated include the importance of experimental design in approaching environmental problems and basic techniques of exploratory data analysis and statistical inference. Students are taught critical analysis and assessment of data used in support of environmental issues.

Instructors: Hamilton, Garner, Bowen  
Cross-listing: MATH 2080.03, ECO 2280.03

**OCEA 2850.06R Introduction to Oceanography:** This course is descriptive in nature. An understanding of the ocean's role as a dominant environmental force is emphasized. Various examples of the importance of the oceans occur throughout.

Instructors: Fournier

#### Third-year classes (3000 level)

**BIOL 3060.03B Environmental Ecology:** This class covers the ecological effects of pollution and disturbance, plus some resource ecology and human population biology. Ecological effects of pollution and disturbance are emphasized. Skills taught include interpretation, some calculation/budget skills.

Instructors: B. Freedman

Cross-listings: ES5120.03B, BIOL 5060.03B

**BIOL 3063.03B Resource Ecology:** This course is concerned with fisheries, wildlife and forest management. Principles demonstrated include geoeconomics, geological control strategies, and genetic conservation strategies. Students are taught familiarisation with the technical literature in several fields.

Instructors: R. Doyle, S. Walde, B. Freedman

**BIOL 3066.03A Plant Ecology:** Various topics within the field of Plant Ecology are discussed. At the ecosystem level, we deal with the cycling of energy and significant nutrients, and with successional changes in these processes. At the autecological level we deal with plant population biology, resource allocation, and physiological ecology. The plant environment is described in terms of energy budgets, soils, and water availability.

Format: lecture 2 hours, laboratory 3 hours, one/two field trips on weekends

Instructor: staff

Prerequisite: BIOL 2060.03

**BIOL 3069.03A Population Ecology:** An examination of selected topics in population ecology. Topics include the effect of species interactions (predation, competition, mutualism) on population fluctuations, cycles and extinction. The relevance of theory to particular case studies such as lynx-hare cycles and biological control of winter moth will be discussed. Recent literature will be emphasized. Written assignments and exams will contribute to the final grades.

Format: lecture/tutorial 3 hours

Instructor: S. Walde

Prerequisites: Introductory Ecology, MATH 1010.03 1060.03, or equivalent

**BIOL 3801.03A Nature Conservation:** The course traces the development of human economy and the resultant impact on the wild environment. Particular attention is paid to human population dynamics, biotic extinctions and land-use patterns. Having identified the causes of impoverishment of biodiversity, the course examines possible cures, including: sustainable development, conservation science and environmental ethics. Special attention is paid to the establishment and management of protected areas.

Format: lecture, tutorial

Instructor: M. Willison

Prerequisites: BIOL 1000.06 or BIOL 1001.06 or SCI 1200.06 or permission of instructor.

**CHEM 3402.03A Identification of Organic Compounds:** This is a class designed to teach skills in the Identification of Organic Compounds. The Earth has been composed of chemicals since its beginning, and as both

nature and man evolve, the range of these continues to increase. The state of the environment around us directly corresponds to its chemical composition and understanding this state therefore requires a knowledge of chemistry. Many substances encountered in the environment are organic molecules and the study of their chemistry is thus important.

The approach used in this class is two-pronged, one using older, classical methods and the other using modern spectroscopic methods. The purpose of studying the older techniques is that they will give valuable experience in the very subjective ability of handling comfortably a wide variety of chemicals. Chemicals have discrete and measurable physical properties. However, the reaction of human beings to many chemicals is a subjective and variable phenomenon - one person may find a certain smell unimportant where someone else may find it repulsive, for example, a pair of well-worn socks. Most people are only comfortable in situations with which they are familiar, and the same is true of handling chemicals - familiarity is crucial in learning how to handle these with confidence (but not with contempt!). This is particularly important in this age of chemophobia since the world needs competent, qualified chemists who can handle molecules with confidence and skill. Students need to acquire the skill of being able to recognize molecules from their appearance, from their smell and from their reactivity, also the skill of knowing how to handle them safely and efficiently. In addition, students need to become comfortable with the powers and limitations of modern analytical procedures. Most substances in real life are mixtures and hence skills at analysis and understanding interactions between compounds in mixtures is fundamentally important to the practice of chemistry. Of course, this also requires modern instrumental methods, the study of which will form the culmination of the skills taught earlier in the class.

**Prerequisites:** A good understanding of the principles taught in Chemistry 2400, as evidenced by a grade of at least C.

**ECO 3350.03A or B Social Cost Benefit Analysis:** This class covers valuation of costs and benefits that are not priced in markets and methods for including such costs and benefits in economic decisions. These costs and benefits may be important in evaluating environmental issues. Principles demonstrated include implications of costs and benefits that do not have market values for various projects and differences between private and social perspectives in assessing projects. Students are taught methods of incorporating environmental concerns in economic analysis and implications of ignoring such concerns.

**Instructors:** T. Pinford  
**Cross-listing:** ECON 5360.03B

**ECO 3332.03A or B Resource Economics:** This class covers resource management decisions - fisheries, forestry, etc. and pollution control regulations - standards versus taxes, etc. Principles demonstrated include optimal sustainable yield - fisheries; and forestry rotation periods. Students are taught applications of economic decision making to resource management and pollution regulation.

**Instructor:** M. Cross

**ESCI 3400.03A Fundamentals of Hydrogeology:** The availability and preservation of sources of potable, fresh water is a major environmental concern. As surface waters have increasingly become polluted, exploration and exploitation of groundwater resources have gained in importance. This course deals with subsurface waters and related geologic aspects of surface waters. The student is introduced to the factors which influence the availability of groundwater, such as the presence of suitable aquifers, water quality, and rate of recharge relative to rate of water use. The geology, geophysics, and geochemistry of groundwater systems can be protected from contamination and, in the case of already polluted aquifers, how they can be restored for future use. Principles discussed in the course include: the hydrologic cycle, principles of groundwater flow, groundwater flow to wells, regional groundwater flow, methods of groundwater exploration, geology of groundwater occurrences, geochemistry of subsurface waters, chemical and physical transport mechanisms in groundwater, water quality, groundwater contamination by point and nonpoint sources, groundwater restoration. Atmospheric and aquatic transport of contaminants are the two major pathways through which harmful pollutants become dispersed. An understanding of groundwater systems and their interaction with surface waters is essential in the study and evaluation of most environmental issues. For students specializing in hydrogeology/environmental geology the course is a pre-requisite for advanced level studies. For more course content information see Earth Sciences section of this calendar.  
**Instructors:** G.K. Muecke, P.J.C. Ryall  
**Prerequisites:** ESCI 2201.03A, 2101.03A, 2102.03B

**ESCI 3410.03B Enhanced Environmental Geology:** The topics and principles treated in this course are similar to those of ESCI 2410.03B. The course is designed specifically for students with a strong background in geology; equivalent to that of a third year Geology major. Selected topics are explored at greater depth using the

accumulated geologic knowledge of the participants. The written and oral presentation of a substantial research project forms an essential part of the course. For example, participants have researched the environmental concerns associated with the various geologic options for the permanent storage of high-level nuclear wastes. For more course content information see Earth Sciences section of this calendar.

**Instructors:** G.K. Muecke  
**Prerequisites:** ESCI 2201.03A, 2202.03B, 3400.03A, 2101.03A, 2102.03B

**SCI 3050.06R Waste Management and the Environment:** This is an Experimental Class Intended for third year students. It examines the topic of waste management from several perspectives: Resource Economics; Pollution Cycles; Public Health Issues; Technological Controls; International Waste Management Practices; Regulation; and Waste Management Planning. It will include 1 1/2 hours per week of lecturing and 3 hours of lab work. In the lab, the students will learn the practical skills involved in conducting a waste audit and developing a waste reduction and recycling plan on the Dalhousie Campus.

**Format:** lecture 1 1/2 hours/laboratory, field trips, 3 hours

**Instructors:** staff  
**Prerequisites:** CHEM 1010.06R OR 1500.06R or equivalent ESCI 1000.06R or 1060.03A/1050.03B

#### Fourth-year classes (4000 level)

**BIOL 4060.03A Marine Mammalogy:** The class will examine the characteristics that mammals, brought with them when they returned to the ocean, the evolution of the difference groups of marine mammals, some of their special adaptations, the roles of marine mammals in oceanic ecosystems and general principles of the marine mammal population biology. Finally we will consider the factors that regulate marine mammal populations and how these influence attempts to manage and conserve them. Assignments will include dissections of a seal and/or porpoise, a review essay on some marine mammal adaptation, exploring a computer model of a marine mammal population, and an examination.

**Format:** lectures/discussion/tutorials 3 hours plus some labs

**Instructors:** I.A. McLaren (plus others)  
**Prerequisites:** BIOL 2060.03 and 3069.03 or see instructors

**BIOL 4650.03B Resource Systems and Economic Development:** (may not be offered in 1993/94) Major theories of natural resource management have evolved rather separately through economic, behavioural and ecological

disciplines. The interphase of ecology with these other disciplines and the criteria which may be used to weigh ecological inputs in economic development planning processes are the major topics to be covered. Current approaches and analytical techniques are described. These illustrate adaptive strategies for long-term resource use, pest and disease control. The course may focus on specialized topics such as fisheries or tropical resource management, as announced in advance. The class includes an introduction to practical problems of project cycles, of defining objectives and of budget analysis. It is open to students from any faculty by permission of the instructor.

**Format:** lecture/seminar 3 hours  
**Instructor:** M. Gardner (Inst. for Resource and Environmental Studies)  
**Cross-listing:** ES 5021.03B

**CHEM 4203.03A or B Environmental Chemistry:** The basic principles of kinetics and chemical equilibria are used to describe the behaviour of metal ions and organic compounds in the aquatic and terrestrial environment. The material covered in this class can be used to better understand the fate of chemicals in the environment and their impact on living organisms. The complexity of the chemical interactions is used to evaluate possible analytical methods for the determination of chemicals in the environment. Topics covered include polyprotic acid base equilibria, distribution of active compounds between gas and solution, Eh - pH diagrams, solubility of oxides, carbonates, and sulphides, complexation equilibria, adsorption onto solids, enzyme kinetics, and the kinetics of distribution of compounds between compartments. A computer programme (Mathcad) is used to derive simple mathematical models suitable for the description of chemical interactions in the environment. The programming environment is such that the chemistry can be illustrated quickly without writing complex programs in traditional computer languages.  
**Instructors:** Robert D. Guy

**OCEA 4120.03A Introductory Physical Oceanography:** An understanding of the role of ocean physics in climate and pollution abatement is applied. Flushing of Halifax Harbour is studied by field trip and term project. Appreciation of ocean's role in global climate control and methods of measuring the exchange rate of estuaries are emphasized.  
**Prerequisite:** MATH 1000.03/1010.03 (Basic calculus, or equivalent)  
**Instructors:** Ruddick

**OCEA 4130.03A Introductory Chemical Oceanography:** An understanding of the role of ocean chemistry in the global carbon cycle, and the links between ocean chemistry and global climate is emphasized. The use of

ocean tracers in inferring ocean circulation processes is demonstrated. Students are taught an understanding of the links between ocean chemistry and global climate and the use of tracers in ocean circulation studies.

Instructors: Moore

**OCEA 4170.03A Introductory Physical and Chemical Oceanography:** Principles applied include oceanic influence on climate and the global cycling of carbon and coastal ocean processes: pollution, nutrient supply mechanisms.

Principles demonstrated include the role of ocean in global climate: physical; carbon cycling; physical controls of nutrient supply in coastal waters; and nutrient chemistry. Emphasized is the overall appreciation of the role of the ocean in global and local environmental issues and methods for computing physical flushing rate of harbours and estuaries - useful in ecosystem and pollution studies.

Instructors: Kelley, Boudreau

Prerequisites: MATH 1000.03A or B and MATH 1010.03A or B (Basic Calculus) or equivalent.

**OCEA 4311.03A/4312.03B Fluid Dynamics I and II:** Several applications of the physics of fluid flow to environmental contexts: channel flows, waves, convection in the ocean and atmosphere, turbulence. Lecture examples all throughout. Laboratory demonstrations and experiments: effects of density stratification and rotation. Students are taught the mathematical modelling and physical understanding of several oceanic and atmospheric flow and mixing phenomena.

Instructors: Bowen/Kelley

Cross-listings: PHYC 4311.03A/4312.03B

**OCEA 4411.03A/4412.03B Dynamic Meteorology I/II:** By understanding how and why the atmosphere flows, the student will learn the dynamical basis of weather and climate. The interaction of many time and space scales of atmospheric phenomena in determining Earth's climate is an important lesson to be applied to environmental studies. Students will obtain an understanding of how the physical laws of fluid motion determine the atmosphere environment.

Instructors: Staff

Cross-listings: PHYC 4411.03/4412.03

**OCEA 4530.03B Introduction to Radiation and Climate:** Introduction to the basic processes responsible for climate; low radiation provides the fundamental forcing for climate; applications include climate change. Knowing how climate works is needed to tackle issues of global change.

Instructors: P. Chylek

Cross-listings: PHYC 4530.03B

## French

**Location:** 1315 LeMarchant Street,  
Halifax, N.S.  
**Telephone:** (902) 494-2430  
**Fax:** (902) 494-2319

### Chair

P. DeMéo (494-2425)

### Undergraduate Advisors

P. DeMéo (494-2425)  
J. Brown (494-2430), Honours  
T. Gordon (494-2430), Majors

### Professor Emeritus

P. Chavy, Agrégé des Lettres (Paris),  
Chevalier de la Légion d'Honneur

### Professors

M. Bishop, BA, BEd (Manchester), MA  
(Manitoba), PhD (Kent, Canterbury)  
J.W. Brown, AB (Miami), MA (Middlebury),  
PhD (Penn)  
P. De Méo, BA, MA, PhD (UCLA)  
B.E. Geaner, BA (Kings), BEd, MA (Dal), Dr.  
de 3e cycle (Toulouse, II)  
W.T. Gordon, BA, MA, PhD (Tor)  
R. Kocourek, State Examination, PhD, CSc  
(Charles U., Prague), McCulloch Professor in  
French, Knight of the Order of Academic  
Palms  
H.R. Runts, MA, MPh, PhD (Kansas)  
M. Sandhu, Licence ès Lettres (Montpellier),  
PhD (Yale), Chevalier dans l'ordre des Palmes  
Académiques  
K. Waterson, BA (Long Island), MA (NYU),  
PhD (CUNY)

### Associate Professors

B. Bednarski, BA (London), MA (Dal), PhD  
(Laval)  
R.G. Bonnel, Licence (Paris), MA (Essex), Dr.  
de 3e cycle (Paris)  
T.P. Carter, BA (Princeton), MA, PhD (Brown)  
M. Myers, DUËL, Licence ès Lettres, MA, Dr.  
de 3e cycle (Strasbourg)  
I.Z. Oore, BA (Tel-Aviv), MA (Waterloo), PhD  
(Western)  
N. Trèves, BSc (American U., Cairo), PhD  
(Rice)

### Lecturer

P.A. Mitchell, AKC (King's College, London),  
BA (London), MA (Dal)

## Introduction

The Department of French offers students not only the opportunity to develop fluency in classes backed up by excellent laboratory and ancillary facilities, but also the possibility of studying the literature and culture of France,

French Canada and the other nations of the French-speaking world, and the linguistic structure and development of French.

Classes are available for beginners and for those with a background in the language who wish to improve and maintain any or all of the following skills: speaking, listening, reading, and writing. Other classes are specially designed for students who are interested in teaching, translation, or other areas of language study. The role of French in Canada and in the Maritimes is stressed in classes in Acadian and Québécois literature and civilization. The literature of France and French-speaking nations is brought to life in classes organized around a theme, a genre, or an historical period.

The Department of French urges students to practice the language as much as possible. The Maisons Françaises are two houses on campus in which students may live with native speakers in a francophone environment. The French Club organizes activities including films, French meals, parties and plays in which all students may participate. Exchanges with Québec and individual student travel and study are encouraged. The Department offers in some years a class off campus in a francophone environment. Please consult the Department for information and see below: Aix-en-Provence.

A BA degree in French with Honours or with Honours in French and another subject combined may lead the student to a career in education, written or oral translation, or may provide the background for careers in many fields, including radio, television, law, social work, public relations, business, diplomacy, journalism and library science. Students considering French as an area of concentration in a BA degree course are invited to discuss the matter at any time (the earlier the better) with a member of the Department. The accent is on the particular needs and aspirations of the individual. An Honours degree is normally required for access to graduate studies: MA, MAT and PhD degrees may be pursued in the Department (see the Calendar for Faculty of Graduate Studies).

Major, Advanced Major or Honours students may, with the approval of the Department of French, take up to one year of work at a University in a francophone environment and receive certain credit at Dalhousie. Scholarships are available for students selected to participate in the Dalhousie/ Aix-en-Provence Year-Abroad Programme, for Honours or Advanced Major students.

The language requirement exemption test in French will be given in the April examination period. Students who would like to write this

test should inform the Registrar's Office by mid January. It is to be noted that passing this language requirement exemption test does not give a credit.

Students considering a career in teaching French are encouraged to discuss their goals and programme as early as possible with Professors DeMéo or Myers.

## Degree Programmes

### BA with Honours in French

This programme offers systematic, comprehensive and individualized study of French language, literature, linguistics and other programme elements both within and without the classroom. It is, therefore, an option which should be considered seriously by any student who, with career or personal objectives in mind, wishes to obtain a strong background in French and by those who plan to teach or earn a graduate degree in French.

Honours students are strongly encouraged to enrich their more traditional learning experience by living in one of the Maisons Françaises and by spending at least one summer in a French-speaking area. Majors or Honours students may, with the approval of the Department, take up to one year of work at a university in a francophone environment and receive certain credit at Dalhousie. Please consult the department for information on programmes available. Please consult the Chair of the Department.

Combined Honours students should consult the Chair before proceeding to see the Honours Advisor. Following is a description of the three different kinds of Honours programmes in French and the requirement for each:

#### I. Concentrated Honours:

##### Classes required in Honours:

- 2000 level: French 2040.06R, 2201.03A/B and 2202.03A/B
- 3000 level: French 3020.06R, 3040.06R, plus one credit in literature and/or culture
- 4000 level: Two 4000 level credits

At least two other French credits 2000 to 4000 level for a total of nine French credits.

"First year" does not necessarily mean FREN 1000-level classes; it refers to any course taken in the first year of study.

An additional grade is required: either an Honours Essay or an Oral Presentation (see document entitled "French Honours Qualifying Examination" obtainable from the Honours Co-ordinator or the Departmental secretary).

#### II. Combined Honours:

From 11-13 credits in French and another subject; not fewer than 4 nor more than 9

may be chosen in either subject. Minimum requirements for the Combined Honours programme are as follows: 2040.06R, 2201.03A/B, 2202.03A/B, 3040.06R plus a minimum of one full credit in language, literature and/or culture at the 3000-level. An additional credit is required: either an Honours Essay or an Oral Presentation (see document entitled "French Honours Qualifying Examination" obtainable from the Honours Co-ordinator or the Departmental secretary).

#### III. Honours Certificate:

The Honours Certificate is an option for continued study open to anyone who has previously completed a BA major programme in French. Normally, it consists of five full credits of course work plus one additional credit: either an honours essay or an oral interview based on class work and /or a specific topic. Requirements for the honours certificate are similar to those for the concentrated honours programme, but will vary according to individual circumstances.

### BA with Advanced Major in French

Students who may not be eligible for the Honours Programme are encouraged to enter the Advanced Major degree programme in French

#### Departmental requirements:

##### Classes required in Advanced Major:

- 2000 level: French 2040.06R, 2201.03A/B and 2202.03A/B
- 3000 level: French 3040.06R plus two other 3000 level French credits
- 4000 level: One 4000 level French credit

Notice that students wishing to change to an Honours Programme may do so, if the quality of their work justifies it. Those who might wish to do so should also take FREN 3020.06R (required for Honours), and consult the Chair or the Honours Advisor.

### BA with Major in French

Students should consult the Chair or a Department Advisor about the choice of classes.

#### Departmental Requirements

##### Classes required in Major:

- 2000 level: French 2040.06R, 2201.03A/B and 2202.03A/B
- 3000 level: French 3040.06R plus one other 3000 level French credit

Classes other than those required may be chosen freely in consultation with the Major Advisor, according to the students' desire to obtain a general knowledge of the field, or a greater concentration in specific areas such as Literature, Linguistics, French-Canadian Studies, etc.

Students wishing to change to an Honours Programme may do so during the second or third year of studies, given sufficient standing. Those wishing to do so, or to continue in Graduate Studies after obtaining a BA Major in French, should consult the Chair or the Honours Advisor.

## Classes Offered

Classes marked \* may not be offered every year. Please consult the current timetable on registration to determine if these classes are offered.

First year classes (FREN 1000.06R, FREN 1001.06A, FREN 2000.06R, FREN 2001.06B, FREN 1020.06R, FREN 1040.06R) may require a regular tutorial session in addition to the three hour weekly class.

**FREN 1000.06R Français pour débutants/Beginners French:** This class, intended for students with little or no previous instruction in French, covers a sufficient range of basic linguistic structures and high-frequency vocabulary to enable students to engage in simple, everyday communication on a variety of subjects. Classes are conducted in French as much as possible with a view to developing competence in "real-life" communication, both oral and written. Work done in the three hours of class per week is supplemented with both oral and written exercises in the Dalhousie Learning Laboratory and with reading assignments, compositions, and written exercises to be completed outside of class. Students are also introduced to significant aspects of French, French-Canadian, and other francophone cultures. Upon completion of FREN 1000.06R, students wishing to complete the study of basic French language structures and to increase their written and spoken fluency should enroll in FREN 2000.06R. Students who have completed Grade 12 French within the last two years may not register for FREN 1000.06R. (They should register for FREN 1020.06R or FREN 1040.06R.)

Instructor: Staff  
Format: Lecture 3 hours, language lab 3 hours

**FREN 1001.06A/FREN 2001.06B Français pour débutants: Niveaux I & II/Beginners French: Levels I & II:** This class offers students the opportunity to do the work of FREN 1000.06R and FREN 2000.06R, normally a two-year programme, in one academic year. FREN 1001.06A and FREN 2001.06B each give one full credit. Neither is counted towards a Major in French, but completion of this work permits entry into the Major or Honours programmes. Students who have completed Grade 12 French within the last two years may not register for FREN

1001.06A/ FREN 2001.06B. (They should register for FREN 1020.06R or FREN 1040.06R).

Instructors: E. Gesner, T.P. Carter  
Format: Lecture 5 hours, language lab 6 hours

**FREN 1020.06R Révision de français oral et écrit/Spoken and Written French in Review:** This is the usual first-year class for those students who have studied French throughout high school. Designed to develop proficiency in speaking and listening skills, as well as in reading and writing. Classes are taught only in French and involve much oral practice: discussions, exercises, etc. are based on a wide variety of reading and listening materials. Short written exercises and regular compositions reinforce this work. The basic structures of French are reviewed through independent study and classroom practice. Listening comprehension assignments are done in the Learning Laboratory in the Kiliam Library. It is assumed that students are familiar with the basic structures of French, although it is expected that students have not full control of them. Should a student wish to take both FREN 1020.06R and FREN 1040.06R, then only one (1) full credit would be allowed. Students who have completed Grade 12 French within the last 2 years must register for either FREN 1020.06R or FREN 1040.06R.

Instructor: Staff  
Format: Lecture 3 hours, language lab 1-2 hours

**FREN 1040.06R Grammaire, vocabulaire et style/ French Grammar, Vocabulary and Style:** The class is given entirely in French. Main emphasis will be on structural elements, vocabulary building and correct expression, with consistent parallel attention paid to spelling and pronunciation. The manuals will include a grammar book, and a selection of literary texts to be discussed. A variety of tests and assignments will be used, such as grammar exercises, dictations, translations and compositions.

Instructors: R. Kocourek, I. Oore, M. Sandhu, N. Trèves  
Format: Lecture/Discussion 3 hours  
Prerequisite: Grade 12 French within the last 2 years or equivalent  
Exclusion: FREN 1020.06R

**FREN 1080.06R Pratique de la lecture/French for Reading:** Development of the ability to read contemporary French prose with ease and accuracy. Emphasis is on the acquisition of skills that facilitate reading. Students are encouraged to become familiar with the best French-English dictionaries and to use them judiciously, to learn large blocks of vocabulary by recognizing word families, and to grasp the meaning of unknown words from context wherever possible. Classroom work involves a

grammar review, study and discussion of a wide variety of readings as well as correction of prepared translations and sight translations (from French to English only). FREN 1060.06R is given in English and is not, by itself, suitable for students who plan to major in French. It may, however, be taken by those with no prior training in French or as an additional first-year option for those taking FREN 1020.06R or FREN 1040.06R. This course satisfies the Bachelor of Arts Language Requirement.

Instructors: K. Waterson and staff  
 Format: Lecture 3 hours  
 Enrolment: Limited to 30

**FREN 2000.06R Français pour débutants: Niveau II/Beginners French: Level II: No student may enrol in FREN 2000.06R without having first completed FREN 1000.06R or without the Chair's permission.** This class continues the work begun in FREN 1000.06R, focusing on more advanced forms of expression including the vocabulary, verb forms, and syntactic structures necessary for communication at a relatively high level of abstraction and complexity. As in FREN 1000R, all classes are conducted as much as possible in French, with additional practice provided through the Dalhousie Learning Laboratory and through regular reading and writing assignments. Reading selections drawn from the press and the literature of French-speaking cultures continue to be a regular part of the work, in the interest of deepening and enriching the students' understanding of the people whose language they are studying. (Credit awarded for FREN 2000.06R may not be counted towards a Major in French but the completion of this work permits entry into the Major or Honours programmes.) Students who have completed FREN 1020.06R and FREN 1040.06R are not permitted to take FREN 2000.06R.

Instructor: Staff  
 Format: Lecture 3 hours, language lab 3-6 hours

**FREN 2001.06B:** See FREN 1001.06A above.

**Note:** All classes above this level are given entirely in French.

**FREN 2021.03A or B/FREN 2022.03A or B Études pratiques/Practice in Language Skills:** Follows FREN 1020.06R or FREN 1040.06R or FREN 1000.06R/2000.06R. It is normally taken in the second year of study and provides the opportunity to practice and improve language skills already acquired. Each year eight sections are chosen from among the twenty options listed below. Each section focusses upon a broad cultural topic via which language skills are developed. No prior knowledge of the topic is supposed. Various readings lead to discussions and oral presentations. Descriptions for sections offered in a specific year may be obtained in

April from the Department. All classes and assignments are entirely in French. A maximum of two sections may be taken under the class designation of FREN 2021.03A or B and FREN 2022.03A or B.

- Section 01: Le Journalisme: I. Oore
  - Section 02: La Société française à travers la littérature: R. Bonnel
  - Section 03: La Civilisation francophone de l'Afrique occidentale et des Antilles: M. Bishop
  - Section 04: Etudes acadiennes I: H. Runte
  - Section 05: Monuments culturels de Paris: R. Kocourek
  - Section 06: Aspects visuels de la culture française: J. Brown
  - Section 07: La Guerre des ondes: W.T. Gordon
  - Section 08: La France et ses photographes: K. Waterson
  - Section 09: Québécois et Québécoises célèbres: B. Bednarski
  - Section 10: Aspects du Canada contemporain: E. Gesner
  - Section 11: Ecritures féminines I: N. Trèves
  - Section 12: L'Art en France depuis la Révolution: M. Bishop
  - Section 13: Voyages culturels à travers la France: R. Kocourek
  - Section 14: Etudes acadiennes II: H. Runte
  - Section 15: Publicités télévisées: J. Brown
  - Section 16: Aspects de la France contemporaine: E. Gesner
  - Section 17: Pour comprendre les médias: W.T. Gordon
  - Section 18: Le Québec à travers les textes: I. Oore
  - Section 19: Ecritures féminines II: N. Trèves
  - Section 20: TBA
- Instructor: As above  
 Format: Lecture 3 hours  
 Cross-listed: Canadian Studies, in part

**\*FREN 2031.03A or B Interprétation/Simultaneous Translation:** Practical introduction, given in the language lab, to oral English-French and French-English translating (interpreting) with emphasis on fluency, vocabulary building and comparative syntactico-stylistic analysis.

Instructor: H. Runte  
 Format: Lecture 3 hours in language lab, supplementary lab hours

**\*FREN 2032.03A or B La phonologie I/Phonology I:** Using widely varied texts and recordings, this class studies the basic sounds (phonemes) of French, and the essential non-phonemic features of the language (rhythm, stress, intonation, etc.) It helps students master French phonemes, understand the role of non-phonemic features in oral communication and use the latter to develop self-expression and audio-comprehension.

**Instructor:** K. Waterson  
**Format:** Varied participatory activities, short lectures, language lab  
**Prerequisites:** FREN 1020.06R, FREN 1040.06R or equivalent  
**Exclusion:** FREN 2030.03A or B

**\*FREN 2033.03A or B La phonologie II/Phonology II:** This class continues, with an increased emphasis on self-expression and communicative ability, the work of French 2032.03A or B.

**Instructor:** K. Waterson  
**Format:** Varied participatory activities, short lectures, language lab  
**Prerequisites:** FREN 2032.03A or B or FREN 2030.03A or B or instructor's consent

**FREN 2040.06R Études pratiques de stylistique/ Intermediate Composition:** This class constitutes a detailed and comprehensive review of grammar by means of various exercises including dictations, translations, compositions and summaries. It involves a study of written style and manner of expression.

**Instructors:** R. Kocourek, R. Bonnel, I. Oore, M. Sandhu  
**Format:** Lecture 3 hours

**\*FREN 2050.03A or B La Structure des dictionnaires français/Structure of French Dictionaries:** This class is an introduction to the use of French and French-English dictionaries. Emphasis is on linguistic problems that are essential for dictionary users in comprehending texts and expressing ideas. Introductions to two first-rate French dictionaries will be studied. A reader of cultural or literary texts will serve as a source of questions to be raised in exercises, discussions, assignments, and tests.  
**Instructor:** R. Kocourek  
**Format:** Lecture 3 hours

**FREN 2201.03A/FREN 2202.03B Introduction à la littérature/ Introduction to French Literature:** A survey of literature in French from the Middle Ages to the 20th Century, presenting selected works of prose, poetry and theatre from France, Quebec, Acadia and other francophone areas. Introduction to general notions of literary history and to the basic concepts involved in reading literary texts. Attention is paid to the development of both oral and written expression of ideas.  
**FREN 2201.03A and FREN 2202.03B may be taken consecutively. Classes involve, principally, group discussion, and lecture.**  
**Instructors:** M. Bishop, H. Runte, N. Trèves  
**Format:** Lecture 3 hours

**\*FREN 2203.03A or B Approches du texte littéraire/ Approaches to Literary Texts:** An introduction to the critical reading of a selection of literary texts (various genres and periods) with an emphasis on Québec

literature. The close analysis of short texts will lead to discussions of the broader nature of recurring images and myths as well as central themes.

**Instructor:** I. Oore  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 1020.06R, FREN 1040.06R or FREN 2000.06R  
**Cross-listed:** Canadian Studies

**FREN 3000.03A or B Cours supérieur de français oral/ Advanced Oral French Workshop:** Class discussions and oral presentations based on themes of contemporary concern. This class may be offered on or off campus in the summer in an intensive fashion. This class is intended to build vocabulary, perfect facility of expression (fluency) and style. Reading and research are necessary for the oral presentations.  
**Instructor:** Staff  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** 2000-level French class

**FREN 3020.06R Linguistique/Linguistics:** This class will interest future linguists, literary specialists and language teachers, as well as translators and public servants concerned with bilingualism. Its main objective is to improve and refine the students' understanding of the French language and to explain the major areas of its study. Culturally interesting literary excerpts will be used to observe and to analyse linguistic problems in texts. Each student will prepare two reports on linguistic topics. Assignments based on practical problems of pronunciation, spelling, grammar, vocabulary and meaning will complement the syllabus.  
**Instructor:** R. Kocourek  
**Format:** Lecture 3 hours  
**Prerequisite:** 2000-level French class

**\*FREN 3025.03A or B Les Parlers acadiens: Introduction linguistique/Linguistic Introduction to Acadian Dialectology:** An examination of the phonetic, morphosyntactic and lexical systems of various Acadian speech communities, with emphasis on the Acadian dialects of Nova Scotia. Frequent comparisons will be made between these dialects and both standard French and Québécois. Recorded and written materials are used.  
**Instructor:** E. Gesner  
**Format:** Lecture 3 hours  
**Prerequisite:** Corequisite or permission of instructor  
**Corequisite:** FREN 3020.06R  
**Cross-listed:** Canadian Studies

**FREN 3040.06R Stylistique/Advanced Composition:** This class develops further the skills acquired in FREN 2040.06R. Through a variety of exercises, students are taught to express themselves in clear, accurate, idiomatic French, and to perform a number of

tasks of a practical nature: writing reports, summaries, letters, etc. A good knowledge of grammar is essential.

Instructors: M. Sandhu and Staff  
 Format: Lecture 3 hours  
 Prerequisite: FREN 2040.06R

**FREN 3081.03A/FREN 3082.03B Didactique du français langue seconde à l'école secondaire/Methods of Teaching French at the Secondary Level:** Open only to students who have demonstrated adequate competence in French language and culture (passing a French language proficiency exam is required). Students taking this class are normally completing a BEd. Other students interested must consult the instructor. A consideration of foundations of second language teaching moves to a discussion of methodology, techniques, materials (including visual aids), and testing. Emphasis is on developing teaching strategies which enable students to use French as a tool for authentic self-expression, orally and in writing. Directed observation of experienced teachers and practice in the development of teaching skills are integral parts of the class. Evaluation is based upon class participation (microteaching, oral reports, contributions to discussions), written projects, lesson plans, and examinations.

Instructors: P. De Máo, M. Myers  
 Format: Lecture 3 hours  
 Corequisite: FREN 3081.03A  
 Cross-listing: EDUC 4841.03A/EDUC 4842.03B

**\*FREN 3085.03B Didactique du français langue seconde à l'école élémentaire et en immersion/ Methods of Teaching French in the Elementary School and Immersion:** This class focuses on specific methods and materials appropriate for the elementary-age child in the French core programme and/or Immersion. Students taking this class are normally completing a BEd.

Instructor: M. Myers  
 Format: Lecture 3 hours

**FREN 3100.06R Civilization de la France/Civilization of France:** An attempt, through talks, reading, discussion and slide presentations, to understand and to suggest fruitful ways of studying, from an English-speaking Canadian point of view, what is essential in French culture and outlook.

Instructors: M. Sandhu, J. Brown  
 Format: Lecture/discussion 3 hours  
 Prerequisite: 2000-level French class

**\*FREN 3200.03A or B Appréciation de la littérature/ Literary Appreciation:** An approach to the critical reading of various periods of French literature. The class offers discussion of representative works of major writers, centering either on genre, theme, or period and involving close textual analysis. It

also includes some discussion of past and current theories of literature. See department for specific details in any given year.

Instructor: M. Bishop et al  
 Format: Lecture/discussion 3 hours  
 Prerequisite: FREN 2201.03A/FREN 2202.03B

**\*FREN 3250.03A or B Les femmes écrivains: du temps des cathédrales à celui des Editions des femmes/French Women Writers through the centuries:** A chronological survey based on the study of literary texts by French Women Writers, this class will attempt to analyze the society of the time, the way it portrayed women and their role, and the overall condition of women. Emphasis will be given each time to a special period/authors within the context of the survey. Students taking the class as a Women's Studies class may write their essays and exams in English.

Instructor: N. Trèves  
 Format: Lecture/discussion 3 hours  
 Recommended: FREN 2201.03A/FREN 2202.03B

Cross-listed: WOST 3250.03

**\*FREN 3300.03A or B La littérature médiévale/ Mediaeval French Literature:** Textual analyses of selected works representing the major literary genres (epic, romance, theatre, poetry) from the chansons de geste to François Villon (most texts in modern French translations). The discussion of the origins and the development of a national French literature provide a convenient introduction to critical approaches to literary texts.

Instructor: H. Runte  
 Format: Lecture/discussion 3 hours  
 Prerequisite: FREN 2201.03A/FREN 2202.03B

**\*FREN 3400.03A or B La littérature du seizième siècle/ 16th-Century French Literature:** Reliving the awakening, bloom and decline of the Renaissance period in literature and language through the works of Marot, Rabelais, Du Bellay, Ronsard, Montaigne and the poets of the baroque. The century's concern with the French language provides a convenient introduction to the study of the development of modern French.

Instructor: N. Trèves  
 Format: Lecture/discussion 3 hours  
 Prerequisite: FREN 2201.03A/FREN 2202.03B

**\*FREN 3500.03A or B La littérature du dix-septième siècle/17th-Century French Literature:** This class examines representative works by three major seventeenth-century French dramatists: Corneille, Molière and Racine. It explores their vision of humanity and the world and assesses their contribution to French literature and the history of ideas.

Instructor: K. Waterson

**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**\*FREN 3600.03A or B La littérature du dix-huitième siècle/18th Century French Literature:** An introduction to the literature of the 18th century which includes works by such authors as Voltaire, Rousseau, Diderot and Marivaux. Each year the readings and class discussions will be centered on a different theme (for example: the hero, women, love, wealth and power).

**Instructor:** R. Bonnel  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**\*FREN 3700.03A or B La littérature du dix-neuvième siècle/19th Century French Literature:** An introduction to the main literary movements of the 19th century: Romanticism, Realism, Symbolism. Focus is on representative authors and/or texts belonging to one or more of these trends.

**Instructor:** J. Brown  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**\*FREN 3800.03A or B Théâtre et poésie du vingtième siècle/ French Theatre and Poetry of the 20th Century:** Poetry and Theatre, 1900-1990. Study of modern poetry from Dada and Surrealism to the work of contemporary poets such as Yves Bonnefoy, Jacques Dupin and Michel Deguy; and of modern theatre from Jarry to Beckett, Ionesco and beyond.

**Instructor:** M. Bishop  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**\*FREN 3810.03A or B Prose et théorie littéraire du 20<sup>e</sup> siècle/ 20th Century Prose and Literary Theory:** Analysis of a broad selection of short prose by major novelists of the 20th century from Gide, Proust and Aragon but with emphasis upon the more recent work of Beckett, Sarraute, Simon, Duras, Le Clézio and Cixous. Parallel discussion will be centered upon the literary theory of critics such as Bachelard, Poulet, Starobinski, Barthes and Derrida.

**Instructor:** M. Bishop  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**FREN 3900.03A/FREN 3901.03B La littérature canadienne française/French-Canadian Literature:** In-depth study of a few major works of French-Canadian literature with emphasis on the period from 1945 to the present day. Each class deals with a specific genre (e.g.

FREN 3900.03A Poetry, FREN 3901.03B Novel) and choice of genre may differ from year to year.

**Instructors:** B. Bednarski, I. Oore  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**Cross-listed:** Canadian Studies

**\*FREN 3910.03A or B Études acadiennes/Acadian Studies:** Critical investigation into the historical, socio-cultural, linguistic and literary significance of past and present Acadian writing. May follow Acadian Studies (FREN 2021.03A/2022.03B).

**Instructor:** H. Runte  
**Format:** Lecture/discussion 3 hours  
**Prerequisite:** FREN 2201.03A/FREN 2202.03B

**Cross-listed:** Canadian Studies

**\*FREN 4001.03A Histoire du français - Moyen Âge/History of French - The Middle Ages:** Advanced research into selected topics in Old and Middle French - manuscript studies; pallography; historical phonetics, morphology and syntax; the cultural-literary context of linguistic development; etc.

**Instructor:** H. Runte  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French class

**\*FREN 4002.03B Histoire du français - époque moderne/History of French - The Modern Period:** Advanced research into selected topics - the emergence of a national language, the problem of orthography, usage and the development of normative grammars, the evolution of vocabulary, epochal phenomena (Rhétoriciens, the Baroque, Préciosité, the Revolution, scientific French, argot), etc.

**Instructor:** H. Runte  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French class

**\*FREN 4010.03A or B Grands linguistes du vingtième siècle/Great Linguists of the 20th Century:** How did French-speaking linguists of the 20th century contribute to the understanding of the language? Interpretation of passages by six linguists (such as Saussure, Bally, Tesnière, Guillaume, Gougenheim, Martinet) will show how interesting questions were asked, and how new answers and methods enriched the field of language study. Class reports, discussions, assignments.

**Instructor:** R. Kocourek  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French class

**\*FREN 4011.03A or B La Lexicologie/Lexicology:** How can French vocabulary be studied and structured? What is its formation (derivation, composition, metaphor, borrowing, abbreviation, etc.), its

meaning, its development? Class reports, discussions and lexical assignments are important components of this class.

Instructor: R. Kocourek  
 Format: Seminar 3 hours  
 Prerequisite: FREN 3020.06R

\*FREN 4012.03A or B *Aspects de la structure du français/Aspects of French Structure*: Students will help select, from the many problems of French phonology, graphonomy, grammar, lexical formation and semantics, the ten subjects to be examined in detail. Lectures and readings will be complemented by students' reports. Culturally relevant excerpts from literary masterpieces will be used for discussion and assignments.

Instructor: R. Kocourek  
 Format: Seminar 3 hours  
 Prerequisite: FREN 3020.06R

\*FREN 4015.06R *Cours supérieur de version/Advanced Translation into English*: Development of awareness of the expressive resources of French by dealing with problems and techniques of translation into English. The texts of weekly translation assignments, which account for 50% of the final grade, progress from expository and descriptive prose to poetry. Topics introduced through lectures and oral class reports include categories of translation, style, context and choice, context and meaning, ambiguity, verb systems of French and English, textual redundancy, simultaneous interpretation, and translation of metaphors. Occasionally, alternate English translations of a French text are studied for revealing contrasts.

Instructor: W.T. Gordon  
 Format: Seminar 3 hours  
 Prerequisite: FREN 3020.06R

\*FREN 4041.03A or B *Cours avancé de stylistique littéraire/Advanced Composition*: This class presents an in-depth study of style. The class has as a goal to teach students to express themselves with elegance and refinement.

Instructor: Staff  
 Format: Lecture 3 hours  
 Prerequisite: FREN 3040.06R

\*FREN 4300.03A or B *Le roman courtois/Courtly Novels*: A close literary analysis of mediaeval French Arthurian romances. Texts in bilingual (Old French/French) editions.

Instructor: H. Runte.  
 Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

\*FREN 4301.03A or B *La Poésie courtoise/Courtly Poetry*: A stylistic and socio-cultural study of French courtly love poetry from the 9th to the 15th centuries. Early texts in modern French translations.

Instructor: H. Runte

Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

\*FREN 4400.03A or B *Poésie de la renaissance: théorie et pratique/Renaissance Poetry: Theory and Practice*: A seminar-style study of poetic theories and practices from the Rhétoriqueurs to the Pléiade and to Malherbe.

Instructor: N. Trèves  
 Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

Recommended: FREN 3400.03A or B

\*FREN 4401.03A or B *La pensée philosophique, politique et morale de la renaissance/Philosophical, Political and Moral Thought of the Renaissance*: An in-depth study of major currents of Renaissance thought: humanism, scientific awakening, the beginning of *littérature engagée*, and the emergence of the moralists and philosophes.

Instructor: N. Trèves  
 Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

\*FREN 4500.03A or B *L'aventure intellectuelle du grand siècle/The Intellectual Adventure of 17th-Century France*: This class examines, at an advanced level, a major writer, movement, genre or theme in 17th-century French literature. As the focus may vary frequently please consult the professor for detailed information on the topic and format.

Instructor: K. Waterson  
 Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

\*FREN 4600.03A or B *Le siècle des lumières: forme et philosophie/The Enlightenment: Form and Philosophy*: An in-depth study of the French Enlightenment which treats some of the longer works by major authors and introduces the student to secondary authors whose works are also of significant literary, philosophical or historical value. The study is unified by an examination of recurring philosophical ideas and literary themes important to understanding the development of new genres and styles. Please consult the professor for information on the theme treated and the works to be studied in any given semester.

Instructor: R. Bonnel  
 Format: Seminar 3 hours  
 Prerequisite: 3000-level French literature class

\*FREN 4700.03A *La révolution romantique/The Romantic Revolution*: Romanticism is viewed primarily as a rebellious and creative force which greatly contributed to the reshaping of traditional

society. The origins, main themes and trends of the movement are studied with an attempt to show Romanticism as a European movement, the impact of which was felt in fields beyond the boundaries of literature. Classes are conducted as seminars; students are required to do a great deal of personal research, to prepare exposés and to participate in class discussions. The choice of texts depends largely on the students' previous experience; they include works by Mme de Staël, Chateaubriand, Lamartine, Hugo, Vigny, G. Sand and others.  
**Instructor:** J. Brown  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French literature class

\*FREN 4701.03B *Le roman du dix-neuvième siècle/ The Nineteenth-Century Novel:* Intensive study of the work of a major novelist of the 19th century: e.g., Stendhal, Flaubert, Balzac, Zola; a study of his place in the development of the novel and of his contribution to the genre. The class involves a considerable amount of reading, regular reports, and exposés.  
**Instructor:** J. Brown  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French literature class

\*FREN 4710.03A or B *Du symbolisme au surréalisme/ From Symbolism to Surrealism:* Analysis of the evolution of French literature from the various symbolist manners of Verlaine, Rimbaud, Mallarmé, Lautréamont and Laforgue, through the period of Jarry and Dada, to the aspirations and paradoxes of Surrealism viewed, principally, through the work of Breton, Eluard, Aragon and Desnos.  
**Instructor:** M. Bishop  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French literature class

\*FREN 4800.03A *Le théâtre moderne de Claudel à Chérid/ Modern Theatre from Claudel to Chérid:* In all, eight plays are studied, four from each author. The works offer a contrast in philosophical content and reveal technical problems involved in their stage presentation.  
**Instructor:** M. Bishop  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French literature class

\*FREN 4801.03B *Le Nouveau Roman/Anti-novels of the 20th Century:* In this class we are mainly interested in fictional techniques: how the author creates his illusion. Each of the works selected for detailed study is important due to the author's rejection of conventional ideas regarding the form of the novel.  
**Instructor:** M. Bishop  
**Format:** Seminar 3 hours

**Prerequisite:** 3000-level French literature class

\*FREN 4811.03A or B *La poésie francophone de Perse et Char à Senghor et Césaire/Francophone Poetry from Perse and Char to Senghor and Césaire:* Discussion of the works of five or six major francophone poets of the modern period, chosen from: Perse, Reverdy, Claudel, Char, Frénaud, Senghor, Tchicaya, Césaire, Glissant, Miron and others.  
**Instructor:** M. Bishop  
**Format:** Seminar 3 hours  
**Prerequisite:** 3000-level French literature class

FREN 4900.06A or B *Field Experience:* See class description for EDUC 4900, in the Education section of this calendar.

\*FREN 4902.03A/FREN 4903.03B *Écrivains québécois contemporains/ Contemporary Québec Writers:* In depth study of one or more contemporary Québec writers.  
**Instructors:** B. Bednarski/I. Oore  
**Format:** Seminar 2 hours  
**Prerequisite:** 3000-level French literature class  
**Cross-listed:** Canadian Studies

\*FREN 4904.03A or B *Écrivaines québécoises/ Quebec Women Writers:* This class will explore the condition of women as revealed in texts by Québec women writers. In any given year different writers and time periods will be covered, and a variety of genres may be included.  
**Instructors:** B. Bednarski/I. Oore  
**Format:** Lectures/discussion 2 hours  
**Recommended:** FREN 2201.03A/2202.03B and at least one third-year literature class, preferably French Canadian  
**Cross-listed:** WOST 4250.03A or B; Canadian Studies

FREN 4994.03A/FREN 4995.03B, FREN 4996.03A/FREN 4997.03B, FREN 4998.03A/FREN 4999.03B: *Recherches indépendantes/ Independent Research:* May only be taken with the approval of the Chair.  
**Instructor:** Staff  
**Format:** Independent study/seminar  
**Prerequisite:** 3000-level French literature class

## German

Location: 1355 LeMarchant St., Halifax,  
N.S.  
Telephone: (902) 494-2181  
Fax: (902) 494-1997

### Chair

H.-G. Schwarz (494-1092/2161)

### Undergraduate Advisor

J. Curran (494-1091/2161)

### Professors

F.W. Gaede, PhD (Freib) (McCulloch Professor  
in German)

H.-G. Schwarz, MA (Munich), PhD (McG)

### Associate Professor

D. Steffen, PhD (Gott)

### Assistant Professor

J.V. Curran, BA (Hons), MA (Dal), PhD  
(Newcastle upon Tyne)

E.A. Spence, BA (Hons), MA, PhD (UBC), on  
leave

## Introduction

German, the most widely used language in Central Europe, is spoken by approximately 100 million people as their native tongue in Austria, Germany, Switzerland and some parts of Eastern Europe. The cultural, economic, and scientific role of the German-speaking countries makes the knowledge of German indispensable to the study of most academic disciplines.

The departmental programme "German Studies" is the investigation of German culture and its place in the formation of the modern world. The programme concentrates on significant aspects of the cultural tradition of the German-speaking countries. From Luther to Nietzsche, Freud, and Marx, German writers have moved men and nations to change the course of the world. The literary and intellectual development of Germany culminated around 1800 in the epoch of Classicism. The authors of this epoch (Lessing, Herder, Hegel, Goethe, Schiller) founded their writings on a thorough knowledge of the cultural tradition of Europe, especially Greek culture. As scientists, historians, and politicians they described in their literary works, problems and questions of a universal nature. They became the first historians of literature and created the discipline of aesthetics. The universality of the authors of German classicism explains their present day relevance and makes the study of German important and attractive.

Major or honours students may, with the approval of the Department of German, take up to one year (5 full credits) of work at a University in a German-speaking country and receive credit at Dalhousie. The Department has exchange arrangements with the universities of Heidelberg and Munich. In addition there is a "visiting scholars" programme which brings distinguished scholars from Germany to Dalhousie. Visiting scholars for 1994/95 are Professors P. Michelsen and F. Strack from the University of Heidelberg.

## Degree Programmes

The following programmes are normally followed, other possibilities do exist. Students considering a degree in German are advised to consult with the undergraduate advisor of the Department.

### BA with Honours in German

- 1000 level: German 1000.06 or 1010.06  
2000 level: Seven credits at or above the 2000 level  
3000 level: Two credits at the 3000 level or higher, in addition to those listed above

### Combined Honours

It is possible for a student to take an honours degree combining German with another subject. Any student intending to take such a combined honours degree should consult with the two respective departments to arrange the details of such a programme.

### BA with Advanced Major in German

- 1000 level: German 1000.06 or 1010.06  
2000 level: Three credits at or above the 2000 level  
3000 level: Three credits at the 3000 level or higher, in addition to those listed above

### BA with Major in German

- 1000 level: German 1000.06 or 1010.06  
2000 level: Two credits at or above the 2000 level  
3000 level: Two credits at the 3000 level or higher, in addition to those listed above

## Classes Offered

Note: Classes marked \* are not offered every year. Please consult the timetable on registration to determine if this class is offered.

## German Language Studies

### Introductory Classes Offered

**GER 1000.06R German for Beginners:** GER 1000.06R is a seminar class for beginners only, and no previous knowledge is required. Its equivalent is two years of German in high school with a final mark of 75% or better. The class emphasizes the spoken language, and provides the student with a thorough knowledge of basic grammar. Language laboratory work and attendance of small conversation groups are required as are writing tutorials five or six times during each term. Passing this class fulfills the first year writing requirement.

Instructors: Staff  
Format: Seminar 3 hours  
Prerequisites: None

**GER 1010.06R German for Beginners:** An introductory language class, using the same methods and goals as GER 1000.06R. This class does not fulfill the writing requirement for beginning students.

Instructors: Staff  
Format: Seminar 3 hours  
Prerequisites: None

**GER 1050.06R German Reading Course for Beginners:** Students acquire a knowledge of basic vocabulary and grammatical structures sufficient to understand newspapers and texts in the humanities and sciences. No previous knowledge of German is required. The class is taught in English. Attendance at writing tutorials is required five or six times during each term. For purposes of admission to advanced classes in German it is equivalent to GER 1000.06R. This class fulfills the writing requirement for first-year students.

Instructor: H.-G. Schwarz  
Format: Seminar 3 hours  
Prerequisites: None

**GER 1060.06R German Reading Course for Beginners:** An introductory reading class using the same methods and goals as GER 1050.06R. This class does not fulfill the writing requirement for beginning students.

Instructor: H.-G. Schwarz  
Format: Seminar 3 hours  
Prerequisites: None

**GER 1000.06R/1050.06R or GER 1010.06R/1060.06R Intensified German:** lecture 6 hours, lab 2 hours. Either of these combinations is recommended for students who desire rapid progress in the German language.

### Intermediate Classes

Intermediate classes are based on GER 1000.06R, GER 1010.06R, GER 1050.06R, GER 1060.06R, high school German Grade 10, 11, 12 or an equivalent basic knowledge. A combination of GER 2000.06R and GER

2020.06R serves as an accelerated intermediate German class and is designed for students who want to make rapid progress in the language.

**GER 2000.06R Intermediate German:** The main aim is to develop a certain degree of speaking fluency as well as reading and writing skills. Language Laboratory work is required. Small conversation classes once a week as an aid to speaking fluency are compulsory.

Instructors: E. Spence, J. Curran  
Format: Seminar 3 hours  
Prerequisites: Any of GER 1000.06R, 1010.06R, 1050.06R, 1060.06R

**\*GER 2020.06R Exercises in Translation and Composition:** English and German texts from various periods of different types will be translated. These translations lead to the discussion of specific difficulties of grammar and construction. Students must prepare translations or compositions for each class.

Instructor: J. Curran  
Format: Seminar 2 hours  
Prerequisites: GER 1000.06R, GER 1010.06R or equivalent

**GER 2050.03A or B German Reading I:** This is a seminar specifically intended for students who do not fit into our normal programme offerings. Please consult departmental advisor.

**GER 2051.03A or B German Reading II:** This is a seminar specifically intended for students who do not fit into our normal programme offerings. Please consult departmental advisor.

**GER 3000.06R Advanced German:** Translations, readings, essays and discussions will promote fluency in the language on the advanced level.

Instructor: J. Curran  
Format: Seminar 2 hours  
Prerequisites: GER 2000.06R or equivalent

**GER 3010.03A Advanced Translation I: German-English:** German texts of various kinds are used to deal with techniques and problems of translating from German into English. The class includes discussion of such things as translation theories, elements of style and questions of ambiguity and textual redundancy.

Instructor: E. Spence  
Format: Seminar 3 hours  
Prerequisite: GER 2000.06R or equivalent

**GER 3011.03B Advanced Translation II: English - German:** English texts of various kinds are used to deal with the techniques and problems of translating from English into German. The class includes discussion of

such things as translation theories, elements of style and questions of ambiguity and textual redundancy.

Instructor: E. Spence

Format: Seminar 3 hours

Prerequisites: GER 2000.06R or equivalent

### Study of German Literature and Culture

\*GER 2150.06R **Goethe's Faust**: A close reading of Goethe's *Faust*, comparing the German original and an English translation, will give rise to questions about translation techniques, the theory of drama and the reshaping of a legend. While Goethe's masterpiece stands at the centre, Marlowe's inspired play, *Doctor Faustus*, a sixteenth-century version of the legend, will also be discussed in detail. Assignments will involve research into later echoes of the Faust legend as well.

Instructor: J. Curran

Format: Lecture/discussion 2 hours

Prerequisites: None

GER 2200.06R **Introduction to German Literature**: A study of texts representing major periods of German Literature. Special emphasis is on the interaction between literature, society and other forms of art. The class also serves as an introduction to literary criticism. The language of instruction is English; the texts are in German.

Instructor: H.-G. Schwarz

Format: Seminar 2 hours, tutorial 1 hour

Prerequisites: GER 2000.06R or equivalent or a reading knowledge of German

\*GER 2300.06R **In Pursuit of Freedom from Luther to Nietzsche**: A study of major modern writers with special emphasis on Hegel's *Philosophy of Right*. This class is taught in English and uses English translations.

Instructor: D. Steffen

Format: Seminar 2 hours

Prerequisites: A general introduction to literature, culture or philosophy

\*GER 2400.06R **German Art and Literature**:

This class gives an introduction to modern German Art and Literature. Special emphasis is on the interaction between art and literature, particularly the themes and styles shared by visual and literary expression during the various epochs of modernity.

Instructor: H.-G. Schwarz

Format: Seminar 2 hours

Prerequisites: GER 2000.06R or equivalent

\*GER 2450.06R **Kant and the History of German Idealism**: A study of Kant's relation to modern Rationalism and Empiricism, and an inquiry into the principles of Idealism.

Instructor: D. Steffen

Format: Seminar 2 hours

Prerequisite: GER 2000.06R or GER 2200.06R or King's Foundation Year

GER 3051.03A or B **Advanced Reading I**:

This is a seminar at the advanced level specifically intended for students who do not fit into our normal programme offerings. Please consult departmental advisor.

Instructor: H.-G. Schwarz

Format: Seminar 2 hours

Prerequisites: Any 2000-level course

GER 3052.03A or B **Advanced Reading II**:

This is a seminar at the advanced level specifically intended for students who do not fit into our normal programme offerings. Please consult departmental advisor.

Instructor: H.-G. Schwarz

Format: Seminar 2 hours

Prerequisites: Any 2000-level course

\*GER 3100.06R **German Literature and Thought from Reformation to Enlightenment**:

A study of German literature between the 16th and 18th centuries as a direct reflection of the important religious, social and philosophical developments after the Reformation and during Absolutism.

Instructor: F. Gaede

Format: Seminar 2 hours

Prerequisites: GER 2200.06R or GER 2400.06R

\*GER 3150.06R **Goethe and the Enlightenment**:

A study of German literature and thought of the time which preceded and witnessed the great revolutions of the 18th century.

Instructor: D. Steffen

Format: Seminar 2 hours

Prerequisites: GER 2200.06R or GER 2400.06R

\*GER 3200.06R **Goethe and Romanticism**: A study of Goethe, Hölderlin, Kleist, and Novalis.

Instructor: D. Steffen

Format: Seminar 2 hours

Prerequisites: GER 2200.06R or GER 2400.06R

\*GER 3240.06R **Literature of the 19th Century**:

A discussion of essential literary texts which throw a critical light on the growing forces of materialism and positivism.

Instructor: F. Gaede

Format: Seminar 2 hours

Prerequisites: GER 2200.06R or GER 2400.06R

\*GER 3250.06R **Modern German Literature**:

Modern authors as witnesses of the political catastrophes and social changes of our century: a study of the plays of B. Brecht and of selected prose texts of Fr. Kafka, Th. Mann and G. Grass.

Instructor: F. Gaede

Format: Seminar 2 hours

**Prerequisite:** GER 2200.06R or GER 2400.06R

**\*GER 3050.06R History and Theory of the German Novel:** Representative works from the Baroque Age to the 20th Century are studied and the principles of the genre discussed.

**Instructor:** S. Gaede

**Format:** Seminar 2 hours

**Prerequisite:** GER 2200.06R or GER 2400.06R and another literature class.

**Exclusion:** GER 3050.06R

**\*GER 4100.06R Aesthetic Theory:** An historical study of the development of literary theory.

**Instructor:** F. Gaede

**Format:** Seminar 2 hours

**Prerequisite:** GER 2200.06R or GER 2400.06R and another literature class

**\*GER 4200.06R Seminar on Hegel's Phenomenology of Spirit:** The Phenomenology of Spirit, published in 1807, was Hegel's first major work. He intended to write an introduction to philosophy by demonstrating the necessity of the advance from the most immediate form of knowledge to absolute knowledge. To achieve this he had to write the Phenomenology as an introduction to his own philosophy.

**Instructor:** D. Steffen

**Format:** Seminar 2 hours

**Prerequisite:** GER 2200.06R or GER 2400.06R

**\*GER 4250.06R Studies in German Idealism:** This seminar is specifically intended for students in the advanced major and honours degree programmes. The specific content of the seminar varies from year to year, but is always related to some aspect of Idealism.

**\*GER 4500.03A or B Special Topics Course I:** This is an intensive research seminar dealing with selected topics to be announced.

**\*GER 4501.03A or B Special Topics Course II:** This is an intensive research seminar dealing with selected topics to be announced.

**\*GER 4600.06R Special Topics Class:** This is an intensive research seminar dealing with selected topics to be announced.

## Health Professions, Interdisciplinary

The following classes are offered as electives for students in the Faculty of Health Professions. For details on elective requirements refer to the calendar entry for the appropriate school or college. These classes may not be offered every year; Consult the current timetable.

**HLTH 3000.03B An Interdisciplinary Approach to Health Promotion:** This course will offer an opportunity for students to interact with their peers and practitioners in the health field who are pursuing studies in similar and different disciplines for the purpose of discussing how to enhance the health of our world. The concepts and theories that frame the current understanding of Primary Health Care and Health Promotion will be used to guide the intellectual inquiry.

The course will have a one and a half hour large group lecture each week followed by a one and a half hour small group tutorial session. The tutorial groups will be facilitated by community leaders and the lectures will be offered by representatives of different disciplines and different aspects of community practice.

**Format:** 3 lecture hours/week  
**Prerequisite:** None

**HLTH 3001.03 Drug Issues: An Interdisciplinary Perspective:** Drug use issues of interest to health professionals will be explored. Topics covered will assist students in considering methods of identifying and preventing or diagnosing and treating drug-related problems and will include information on promoting appropriate drug use attitudes and behaviours. Students will have the opportunity to study these topics from an interdisciplinary perspective.

**Format:** 2 lecture hours/week, 1 tutorial hour/week

**Prerequisite:** None

**Restriction:**

Restricted to Health Professions students or by permission of instructor.

**HLTH 4900.03A An Interdisciplinary Approach to Gerontology (Social Perspectives):** This is a multidisciplinary class in Gerontology with a focus on the presentation of historical and current research studies in the field of social gerontology, primarily from a Canadian perspective. This class represents the wide range of study which is reflected in most of the sciences and humanities.

**Format:** 3 lecture hours/week

**Prerequisite:** SOSA 1000.06R, SOSA 1050.06R; SOSA 1100.06R; or SOSA 1200.06R

**Cross-listing:** SOSA 2060

**HLTH 4910.03B An Interdisciplinary Approach to Gerontology (Health Perspectives):** This multidisciplinary class in Gerontology focuses on the presentation of health issues and relevant research studies in the field of aging. Various health professionals working with this age group participate to emphasize the interdisciplinary nature of gerontology, the importance of teamwork effectiveness and to help the learners develop an awareness of the need for the development of a comprehensive and appropriate health care system that meets the needs of older persons.

**Credit Hours:** 3

**Format:** 3 lecture hours/week

**Prerequisite:** HLTH 4900.03A

# 234 Health Services Administration

## School of Health Services Administration

**Location** 1234 Seymour Street, Halifax,  
N.S. B3H 3M3  
**Telephone:** (902) 494-7097  
**Fax:** (902) 494-8849

### Director of School

Lawrence J. Nestman, BComm (Seak), CA,  
MHSA (Alta)

### Professor Emeritus

A. Peter Ruderman, BS, MA, PhD (Harvard),  
MBA (Chicago)

### Associate Professor

L. McIntyre, MD, MHSc (Tor), FECPC

### Assistant Professors

G. Johnston, BSc(Hons) (McG), MHSA (Alta),  
PhD (Western)

K. Rondeau, BSc(Hons), BLT (Regina), DIA,  
MA, MBA (Concordia)

### Lecturers

W. Cochrane, BA(Hons), LLB (Dal)

M. Davies, BSc (MSVU), BEd (UPEI), MHSA  
(Dal), CHE

W.S. Kelzer, BA (UPEI), MA (Queen's), MDiv  
(McGill), MHSA (Dal)

E. Langille, BA, MA (Dal)

A. McGuire, BN (McGill), MHSA (Dal)

B. Oke-Kennedy, BN, MHSA (Dal)

P. O'Brien, RN, BN, MHSA (Dal)

## Introduction

The School of Health Services Administration offers a certificate in Health Services Administration (CHSA) programme which prepares students for a career in health care at the managerial level. It also meets the needs of those currently employed in the health care sector in a managerial capacity, particularly, middle managers in medium and large institutions, administrators in small facilities, and employees in public health, long-term care, primary care, and multi-service centres.

The programme seeks to provide a conceptual background for the increasingly complex managerial tasks that need to be performed in health institutions and health-related governmental departments. An effort is made to balance political, social, cultural, medical, and psychological approaches to understanding the health care delivery system with those of the management sciences.

All students must observe the University and Academic Regulations described in the calendar.

## Part-time Study

Students may complete the CHSA programme through part-time study at the rate of not more than two and a half credits during the academic year.

## Application Procedure

Applicants must meet the Dalhousie University undergraduate admission requirements to warrant consideration into this programme.

Application forms are available from the Office of the Registrar, Dalhousie University. Applications should be submitted as early as possible, and not later than June 1 in the academic year in which studies are to commence.

Further information on the Certificate in Health Services Administration programme may be obtained from: School Administrator, School of Health Services Administration, Dalhousie University, 1234 Seymour Street, Halifax, Nova Scotia, B3H 3M3, (902) 494-7097.

## Curriculum

The one-year programme features both an academic and results-oriented curriculum. Students accepted into the CHSA programme take the following half-credit classes:

**HEAS 2000.03A Canadian Health Care Delivery System**

**HEAS 2200.03B Epidemiology and Health Planning**

**HEAS 2300.03B Health Law and Quality Assurance**

**HEAS 2400.03B Health Care Economics**

**HEAS 4001.03A Management Process in Health Services**

**COMM 2301.03A or B or R Organizational Behaviour**

**COMM 1101.03A or B or R Financial Accounting**

**ECON 1101.03A or B Principles of Microeconomics**

one credit elective as approved by the School

## Classes Offered

**HEAS 2000.03A Canadian Health Care Delivery System:** The course is designed to provide an overview of the health care

Industry in Canada, and more specifically in Nova Scotia. Aimed specifically at supervisors, middle management, and administrators, the existing trends in health care from a provincial perspective will be reviewed. The goal of this course is to provide the student with a snapshot view of the existing health care system, its past development, and future direction.

Credit Hours: 3

Instructor: A. McGuire

Format: Lecture and Seminar 2 hours

Prerequisite: None

**HEAS 4001.03A (Section 02) Management Process in Health Services:** This course is aimed at providing a general overview of the structure, process, and environment of health care organizations for supervisors and middle managers. The goal of this course is to facilitate the development of students' administrative insights, problem solving skills, and managerial judgement. Further to this objective, this course seeks to inform students about some of the roles, functions, and values of key actors in contemporary health service organizations.

Credit Hours: 3

Instructor: B. Oke-kennedy

Format: Lecture and Seminar 2 hours

Prerequisite: None

**HEAS 2200.03B Epidemiology and Health Planning:** The first half of this course is a general, introductory course in the principles of epidemiology. In this course discussion will concentrate on occurrence of disease and injuries in human populations, examine methods of determining the causes of illness and death, and analyze conclusions which have been gained through the application of epidemiological studies. The second half of the course will use lectures, readings and case discussions to explore national, provincial, regional and institutional health planning initiatives. How these initiatives influence planning and service delivery at the program level will also be examined.

Credit Hours: 3

Instructor: W.S. Keizer, M. Davies

Format: Lecture and Seminar 2 hours

Prerequisite: HEAS 2000.03

**HEAS 2300.03B Health Law and Quality Assurance:** The object of the first half of this course is to give students an overview of law as it relates to health care management. It is designed to make students aware of actual or potential legal problems that they may face at the managerial level. The second half of the course will provide an introduction to the concept of quality management in health care. Course content will include the traditional models of quality assurance, risk management and utilization management as they are currently practised in Canadian health care facilities. The concept of Total Quality

Management will be introduced to demonstrate how it compares/contrasts with the traditional models.

Credit Hours: 3

Instructors: W. Cochrane, P. O'Brien

Format: Lecture and Seminar 2 hours

Prerequisite: HEAS 2000.03

**HEAS 2400.03B Health Care Economics:**

This course is designed to introduce students to an economics perspective of the health care system, and, to encourage them to use economic analysis when evaluating health care issues. This course builds upon the introductory microeconomics course; therefore, but its primary objective is to specifically examine resource allocation decisions in health care markets.

Credit Hours 3

Instructor: E. Langille

Format: Lecture and Seminar 2 hours

Prerequisite: ECON 1101.03, HEAS 2000.03

## History

**Location:** 1411 Seymour Street, Halifax, N.S.  
**Telephone:** (902) 494-2011  
**Fax:** (902) 494-2176

### Chair

Enquire at Department (494-2011)

### Undergraduate Coordinator

Enquire at Department (494-2011)

### Professors Emeritus

J.E. Flint, MA (Cantab), PhD (Lond), FR HistS, FRSC  
 P.B. Waite, MA (UBC), PhD (Tor), FRSC

### Professors

M.S. Cross, BA, MA, PhD (Tor)  
 J.E. Crowley, AB (Princ), MA (Mich), PhD (Johns Hopkins)  
 J. Fingard, BA (Dal), MPhil, PhD (Lond), FRSC, Dean, Faculty of Graduate Studies  
 J.L. Parpart, BA (Brown), MA, PhD (Boston)  
 N.G.O. Pereira, BA (Williams), MA, PhD (UC Berkeley)  
 L.D. Stokes, BA (Tor), MA, PhD (Johns Hopkins)  
 G.D. Taylor, BA, PhD (Penn), Dean, Faculty of Arts and Social Sciences  
 M. Turner, BA, MA (Manc), PhD (Lond)

### Associate Professors

S.J. Brooks, BA (Dal), MA (McG), DPhil (Oxon)  
 G. Hanlon, MA (Tor.), Dr.de 3e cycle (Bordeaux)  
 C.J. Neville, BA, MA (Carleton), PhD (Aberdeen)  
 J.T. O'Brien, BA (Wisconsin), MA, PhD (Rochester)  
 D.A. Sutherland, BA (MtA), MA (Dal), PhD (Tor)  
 D.R. Woolf, BA (Queens), DPhil (Oxon), FR HistS

### Assistant Professors

R. Bleasdale, BA, MA, PhD (Western)  
 C. Danyak, BA (Concordia), MA, PhD (McG)  
 S. Tillotson, BIS (Waterloo), MA, PhD (Queen's)

## Introduction

A sense of history is a primitive need felt by individuals and by groups. Just as people need to know who they are and how they arrived where they are, groups, races, classes, states and nations need a sense of their own past as part of their culture.

The academic study of history, therefore, is concerned to discover as much as possible of the reality of the past and to interpret

human behaviour in its changes through time. It is a unique subject, scientific in the way it uses evidence, but still an art because the reconstruction of the past requires a disciplined imagination and an effective rhetoric for the communication of meaning.

The contemporary world is one of intensive specialization, in which the varieties of human knowledge have increased well beyond the capacity of any individual to command them all. These developments have reinforced the role of history as the foundation of a person's education, because history can never draw frontiers around itself to exclude any branch of human knowledge, although individual historians will want to select that portion of it especially relevant for them. History's field of study will always be the entirety of the human experience.

The subject of history does not have a monolithic body of knowledge. Historical understanding is a matter of interpretation, of offering explanations for events and movements which are subject to constant revision by scholars. Arguments, scepticism and controversy are thus the very stuff of history. The history student does not merely acquire a particular mass of information, but learns to think independently.

## Degree Programmes

A degree in history provides an appropriate background for students planning to enter professional careers in fields such as law, education and journalism, as well as those interested in pursuing graduate study in history or related social science and humanities disciplines.

Classes in the History Department are grouped numerically in several geographical, chronological, subject and other areas: for example, Canadian, American, British, African, Medieval and Early Modern European, Modern European, Women, Science and Technology, etc. Students are strongly encouraged to select a distribution of classes from different areas in order to experience the variety and richness of history.

Students who wish to build up a greater specialization in history than the minimum requirements outlined below may do so by taking classes of an historical nature given by the Departments of Classics, Economics, Music, Philosophy, Political Science, Spanish, Theatre, etc.

Students who wish to concentrate in a particular area of history should consider acquiring the appropriate language skills, especially if they intend to pursue graduate study in it.

## General and Honours BA

There are no prerequisites for entry into the programme at the 1000- and 2000-levels; however, some 2000-level classes may exclude first-year freshman students. A first year history course is recommended for prospective majors or honours students but is not mandatory.

Students who wish to major in history in the three-year (15 credits) programme are urged to choose one or two 1000- or 2000-level history classes in their first year. They must take a minimum of four and preferably five, but no more than eight additional credits above the 1000-level, of which at least two must be beyond the 2000-level.

Students who wish to pursue the Advanced Major (four years, 20 credits) programme must complete all the requirements for the three-year degree. In addition, they must take a minimum of two credits (one at the 3000-level and preferably HIST 4600.03A or B or HIST 4985.03A or B, when offered), for a total of at least six but not more than nine credits in history, above the 1000-level.

Students who wish to pursue an Honours Degree in history must also complete all the requirements for the three-year degree. In addition, they must take two required classes (HIST 4990.06R and, when offered HIST 4985.03A or B, ) and a further number of classes, preferably at the 3000- and 4000-levels, for a total of at least nine but not more than eleven credits above the 1000-level in history. It is also possible to complete a combined Honours Degree in history and another subject, in which case the student should consult the Undergraduates or Honours Coordinators in both Departments.

The following outline presents the minimum departmental requirements for each programme and should be read in conjunction with the general requirements of the Faculty. Students who intend to major or honour in history might wish to consult the department's undergraduate coordinator to have their plan of study approved, preferably before entering the second year.

### Honours in History (4 year)

Please note that applications for Honours in History are not considered by the Department until the winter term of the student's third year. Please enquire at the Department for the relevant deadline.

#### Departmental requirements:

##### Classes required in Honours:

**2000 level:** Seven credits at or above the 2000 level

**3000 level:** Two credits at 3000 level or higher  
**4000 level:** HIST.4990.06R, HIST 4985.03A or B (if offered)

### Advanced Major in History (4 year)

#### Departmental requirements:

**2000 level:** Two to three credits at or above the 2000 level  
**3000 level:** Three credits at or above the 3000 level

In their fourth year of study Advanced Major students are required to take two credits in history, one of them at the 3000- or 4000-level.

### Major in History (3 year)

#### Departmental Requirements

##### Classes required in Major:

**2000 level:** Two to three credits at or above the 2000 level  
**3000 level :** Two credits at or above the 3000 level

#### Types of Classes

There are several different types of classes offered by the History Department. At the 1000- and 2000-level, classes are lecture format, three hours per week, with tutorials featured in some classes. 1000-level classes are intended for students taking a History class as an isolated elective. 2000-level classes begin more specialized study of an area of History as a major or minor.

3000- and 4000-level classes provide opportunities to follow up on interests developed in previous classes. There are two types of classes at the 3000- and 4000-levels: 'lecture/discussion' and 'seminar'. 'Lecture/discussion' classes combine lectures at an advanced level with class discussion. These classes are usually limited to 35 in enrolment. 'Seminar' classes are smaller in size, usually limited to 15, and involve individual presentations by students in class. These classes are particularly recommended for Honours students and prospective Honours students.

### Classes Offered

**NOTE:** Not every class is offered every year. Please consult the current timetable on registration to determine if these classes are offered.

**HIST 1001.03A Medieval Europe:** An introduction to the thousand years between the Barbarian invasions of the fourth, fifth and sixth centuries and the beginnings of modern Europe. Original sources in translation are

used to illustrate the medieval world view. Students are acquainted briefly with a wide range of topics, political, cultural and social. Particular attention is paid to developing a basic appreciation of the richness of an age often characterised as "dark" and unknowable.

Instructor: C.J. Neville  
 Format: Lectures/tutorials 3 hours  
 Exclusion: Former HIST 1000.06R students

**HIST 1002.03A or B Renaissance to Revolution, 1500-1789:** This course is designed to serve as an introduction to the major themes and events in European history. Students will become acquainted with the importance of regional geography, and with the basic concepts and processes in social, religious, economic, political and cultural history.

Instructor: G. Hanlon  
 Format: Lectures 3 hours  
 Exclusion: Former HIST 1000.06R students

**HIST 1003.03A or B Modern Europe: From the French Revolution to the Cold War:** An introductory survey of the history of Europe from 1789 to approximately 1956. Emphasis will be upon the major political and intellectual developments in France, Germany and Russia, but other national areas as well as social and economic issues will also receive some attention.

Instructors: N.G.O. Pereira  
 Format: Lectures 3 hours  
 Exclusion: Former HIST 1000.06R students

**HIST 1050.06R The Modern World:** Open the morning newspaper or tune in the evening news. Crises, conflicts and controversies parade before us in a seemingly random and inexplicable fashion. Where did the problems that confront us today originate? Can an understanding of the past provide guidelines for dealing with the complex issues of the present? Historians cannot foretell the future, but they can provide perspectives that relate the events of our own time to broader trends of political, economic and social development in the modern world. This class seeks to introduce students to history as an on-going process, linking the present to the past.

Instructor: G.D. Taylor  
 Format: Lectures 3 hours

**HIST 1100.06R The British Isles from Prehistory to 1688:** The British heritage is one very important element in our history. This class, intended as an introduction to British history, with focus not simply on Britain as a nation, but on the growth of a distinctive British culture and civilization over 2000 years. England, Scotland, Wales, and Ireland will each be examined, separately and in relationship, as will connections between the British Isles and foreign or colonial

territories in Europe and ultimately in North America. The first term will trace British history from the Druidic era through the successive invasions of Romans, Anglo-Saxons and Danes, the Norman Conquest and the reintegration of the island in to Europe, and the formation of national languages and cultures in the late Middle Ages. In the second term the focus will be on social, economic, and cultural developments of the period from 1399 to 1688, including colonial expansion, religious reform and dissent, and the growth of representative institutions. Instruction will be by lecture, supplemented by audio-visual presentation, and class discussion where possible.

Format: Lectures 3 hours  
 Instructors: D.R. Woolf/C.J. Neville

**HIST 1200.06R Canada: An Introductory Survey:** An overview of the Canadian experience 1200, from initial contact between natives and newcomers, to contemporary debate over such issues as immigration policy and evolving federalism. Emphasis is placed on the themes of change and conflict in terms of the economy, society and politics.

Instructors: D. Sutherland/C. Danyak  
 Format: Lectures 3 hours  
 Cross-listed: Canadian Studies

**HIST 1300.06R History of the United States:** This class surveys the broad contours of the American experience from the Jamestown settlement to the Reagan revolution. It examines the historical development in the United States of republican government, democratic society, and the constitutional conflicts decided by the Civil War. In addition to such political concerns, the class pays particular attention to the economic development of the United States, her unusual racial and ethnic patterns, and her propensity for generating and absorbing reform movements. Students attracted to third and fourth year classes in the history of the United States should consider History 1300 early in their university career.

Instructor: J.T. O'Brien  
 Format: Lectures 3 hours

**HIST 1400.06R Europe and the Third World:** Passing this class fulfills the first year writing requirement; this class is therefore an introduction to university level work and provides training in study habits, analysis of problems and essay writing by examining six "units of study" in turn. Each unit is concerned with a major phenomenon in the history of European expansion overseas and its impact on non-European peoples, ranging from 16th century America to twentieth century nationalism and decolonization. For each unit there are lectures and tutorials and students write six essays, one per month in each unit.

Instructors: Staff

**Format:** Lectures/tutorial 3 hours

**HIST 2001.03A or B Early Medieval Europe:** An investigation of the period between the fourth and the twelfth centuries. Major themes of lectures and tutorials include the mingling and exchange of Roman traditions with the Barbarian cultures in the fifth and sixth centuries, the creation of the feudal states of Europe following the disintegration of the Carolingian Empire, the development of monasticism, church-state relations, the Gregorian Reform and the Investiture Contest, the rise of papal government, the twelfth-century Renaissance, peasant life and popular culture. Original sources in translation are used to familiarise students with the medieval world view.

**Instructor:** C.J. Neville

**Format:** Lectures/tutorials 3 hours  
**Recommended:** HIST 1001.03A or B

**HIST 2002.03A or B Later Medieval Europe:** A study of the period beginning with the pontificate of the greatest of the medieval popes, Innocent III, and ending with the emergence of the early modern European states. After a preliminary introduction to the nature of medieval society at the end of the twelfth century attention is turned to a variety of themes, political, social, cultural, economic and religious. These include the Crusades, church-state relations, heresy, peasant life and peasant rebellions, political thought, varieties of medieval law, architecture and literature, and the concept of decline, or the "autumn" of the Middle Ages. Students make use of original sources in translation.

**Instructor:** C.J. Neville

**Format:** Lectures/tutorials 3 hours  
**Recommended:** HIST 1001.03A or B or HIST 2001.03A or B or both

**HIST 2006.03A or B After Columbus: The Old World and the New, 1450-1650.** The commercial and colonial expansion of Europe into the Americas. Topics of particular interest are the relations of Europeans and indigenous peoples, the ecological consequences of colonization, the use of unfree labour, the role of technology, the establishment of settler colonies, the effect of overseas communication on European culture, and the role of colonial expansion in the development of the world economy.

**Instructor:** J.E. Crowley

**Format:** Lectures/discussion 3 hours  
**Recommended:** HIST 1002.03A or B  
**Exclusions:** Former HIST 2010.03A or B and first-year students

**HIST 2007.03A or B The Atlantic World: European Empires in the Americas, 1650-1800:** The development of the European colonial societies after their initial settlement and the establishment of their staple economies in the sixteenth and seventeenth centuries. The topics of chief

interest are the predominance of colonial trade in Europe's large-scale commerce, the role of the colonies in European conflicts, the renewal of exploration, the development of the colonies' internal economies, and their revolts against European rule.

**Instructor:** J.E. Crowley

**Format:** Lectures/discussion 3 hours  
**Recommended:** HIST 1002.03A or B, HIST 2006.03A or B

**Exclusions:** Former HIST 2013.03A or B and first-year students

**HIST 2008.03A or B Enlightenment and Revolutionary Europe, 1716-1816**

**HIST 2014.06R State and Society in Early Modern Europe, 1550-1750:** This course deepens some of the topics treated in HIST 1002.03 and examines the development of the modern state in the context of the pre-industrial societies. The states to be studied are the Spanish Empire, the Dutch republic, the Ottoman Empire in Turkey and the Balkans, the French monarchy, the Austral Empire, and a few smaller states such as Tuscany, Prussia, Sweden, and Poland.

**Format:** Lectures/tutorial, 3 hours

**Instructor:** Gregory Hanlon

**Prerequisites:** None, HIST 1001.03A or B or HIST 1002.03A or B recommended

**Exclusion:** Former HIST 2008.03R students

**HIST 2015.03A or B War and Society in Early Modern Europe 1550-1750:** The class deals with the presence of war in European societies, and how states and societies adapted and transformed under the impetus of the desire to achieve victory against an adversary. Among specific topics the class will deal with the transformation of tactics and technology on land and sea; the creation of modern tax systems; problems of supply and recruitment; ideologies of the military function; the creation of standing armies; the impact of hostilities on society.

**Format:** Lecture 2 hours, tutorial 1 hour

**Instructor:** Gregory Hanlon

**Prerequisite:** Hist 1002.03 or some equivalent Early Modern Europe

**HIST 2020.06R Imperial and Soviet Russia: A survey of Russian history from the time of Peter the Great to the present. Emphasis is on themes of continuity in the process of modernization, as well as upon elements of discontinuity such as the Great Reforms of Alexander II, the Revolutions of 1917, the collectivization of the peasantry under Stalin, etc.**

**Instructor:** N.G.O. Pereira

**Format:** Lectures/tutorials 3 hours

**Recommended:** HIST 1001.03A or B or HIST 1002.03A or B or HIST 1050.06R or HIST 1400.06R

**Exclusion:** First-year students (except with permission of instructor)

**Cross-listing:** RUSS 2021.06

**HIST 2021.03A or B Soviet Russia:** Survey of Soviet Russia from 1917 to the present. Topics discussed will include the Revolution of 1917, the Civil War and War Commission, NEP, Collectivization, the Great Purges, WWII, and the Post-Stalin era.

**Instructor:** N.G.O. Pereira

**Format:** Lectures/tutorial, 3 hrs

**Prerequisite:** None

**Exclusion:** HIST 2020.06R

**HIST 2030.06R Germany in the Nineteenth and Twentieth Centuries:** Selected topics in the history of Germany during the past two centuries, including the growth of nationalism and liberalism, the role of Prussia, industrialization, Bismarck and the political parties, civil-military relations, the rise, rule and destruction of Nazism, and the post-war development of the Federal and German Democratic Republics up to national reunification in 1990.

**Instructor:** L.D. Stokes

**Format:** Lectures/tutorial 3 hours

**Recommended:** HIST 1001.03A or B, or HIST 1002.03A or B, or HIST 1003.03A or B, or HIST 1050.06R, or HIST 1400.06R

**Exclusion:** First-year students

**HIST 2040.06R Modern France, 1700-1992:**

The class covers the last two centuries of political, social, economic and cultural history in Europe's pre-eminent nation. More specifically we examine the transition from a traditional rural society with a precocious state, through the French Revolution and its political and social repercussions. Throughout the 19th and 20th centuries France, perhaps more than any other single nation, mirrors developments in all aspects of the contemporary Western world.

**Instructor:** G. Hanlon

**Format:** Lectures/tutorial 3 hours

**Recommended:** HIST 1001.03A or B, or HIST 1002.03A or B, or HIST 1003.03A or B

**HIST 2060.06R Italy after the Renaissance:**

Why does the Western world's most advanced economy and culture enter into prolonged decline after 1620? Here we deal with the theme of "decadence" from which Italy has emerged only in the last half of the 20th century. The class explores how advantages became handicaps, how governments tried to stem a decline of which they were acutely aware, of how society reacted to crisis, and the roles of ideology in fashioning responses. The class will also focus on those aspects in which there was no decline.

**Instructor:** G. Hanlon

**Format:** Lectures 3 hours

**Recommended:** HIST 1001.03A or B, or HIST 1002.03A or B

**Exclusion:** HIST 2061.03A or B

**HIST 2061.03A or B Civilization of Baroque Italy 1550-1700:** The class will deal with Italy at the period of its greatest influence on Western Civilization, in its various aspects. The class will survey the political, social, economic, and cultural history of the peninsula and how it fits into the European context.

**Format:** Lecture/Tutorial

**Instructor:** G. Hanlon

**Prerequisite:** HIST 1002.03 or some Early Modern Europe

**Co-requisite:** HIST 1002.03

**Exclusion:** HIST 2060.06R

**HIST 2062.03A or B Italy from the Risorgimento to Fascism, 1848-1945:**

Selected topics in the history of nineteenth and twentieth century Italy, including the role of Piedmont in the creation of the national state, regionalism and modernization, the political weaknesses of liberal Italy, and the origins, rule and fall of the Fascist regime.

**Instructor:** L.D. Stokes

**Format:** Lectures/tutorial 3 hours

**Recommended:** HIST 1001.03A or B, or HIST 1002.03A or B, or HIST 1003.03A or B, or HIST 1050.06R, or HIST 1400.06R

**Exclusion:** First-year students

**HIST 2081.06R Twentieth Century Europe in Literature, Art and Film:** A survey of contemporary European history that employs representative works of literature, art, architecture and film as well as traditional published records and monographic accounts to introduce students to major events of the twentieth century: the two world wars, the Russian Revolution, the political systems of Italian Fascism, German Nazism and Soviet Communism, the Holocaust and others.

**Instructor:** L.D. Stokes

**Format:** Lectures/tutorial 3 hours (audio-visual facilities as needed)

**Recommended:** HIST 1001.03A or B, or HIST 1002.03A or B, or HIST 1003.03A or B, or HIST 1050.06R, or HIST 1400.06R

**Exclusion:** First-year students

**HIST 2101.03A or B Medieval England:** This class examines some of the major social, political, economic and cultural themes in English history from the reign of Alfred the Great to the Wars of the Roses. Major topics of study include the development and maturation of the English church, the impact of the Norman Conquest on Anglo-Saxon government and society, the development of the common law system, English

monasticism, constitutional struggles in the later medieval period, war with France and Scotland. In an effort to understand and appreciate more fully the culture of medieval England detailed consideration is given to contemporary sources, in translation.

Instructor: C.J. Neville

Format: Lectures/tutorials 3 hours

Recommended: HIST 1001.03A or B, or HIST 2001.03A or B, or HIST 2002.03A or B

**HIST 2104.03A or B England under the Tudors, 1485-1603:** An introduction to the major events, personalities and developments in the political, social and economic history of sixteenth-century England. Issues to be studied include: the formation of a national state; the beginnings of inflation; the Reformation and dissolution of the monasteries; the mid-Tudor "crisis"; and the achievements of the Elizabethan age.

Instructor: D.R. Woolf

Format: Lectures/tutorials 3 hours

Recommended: HIST 1001.03A or B, or HIST 1002.03A or B

Exclusions: HIST 2102.03A or B, HIST 2103.06R, and first-year students

**HIST 2105.03A or B England under the Stuarts, 1603-1688:** This sequel to HIST 2104A or B studies the principal events of the seventeenth-century English history, with reference to developments in Scotland and Ireland. Among the topics to be discussed: the character of Stuart kingship; the crisis of the aristocracy; the fear of catholicism at home and abroad; the causes and course of the civil war 1642-49; the importance of Parliament; the Cromwellian Regime; the Restoration; and the Revolution of 1688.

Instructor: D.R. Woolf

Format: Lectures/tutorials 3 hours

Recommended: HIST 1001.03A or B, or HIST 1002.03A or B

Exclusions: HIST 2102.03A or B, HIST 2103.06R, and first-year students

**HIST 2111.03A or B Modern Britain to 1884:** A survey of the development of British society from the reign of George III to the late Victorian era. This class will examine the emergence of class society, movements of popular protests, political reform, the growth of empire, and cultural change.

Instructor: S. Brooke

Format: Lectures/tutorials 3 hours

**HIST 2112.03A or B Modern Britain from 1884 to the Present:** This class will examine the development of British society from 1884 to the present day, touching upon the experience of Britain in two world wars, the growth of the welfare state, the decline of

Britain's empire and economy, the upheavals of the 1960's and 1970's and the emergence of Thatcher.

Instructor: S. Brooke

Format: Lectures/tutorials 3 hours

Recommended: HIST 2111.03A or B

**HIST 2151.03A or B Scotland from the Late Middle Ages to Culloden:** A survey of major themes in Scottish history from the fifteenth century to the Jacobean era. After a general introduction to Scotland's geographical and cultural inheritance, students will proceed to a review of such topics as crown-magnate relations in the late Middle Ages, religious life in pre-Reformation Scotland, the coming of the Reformed Kirk, Highlanders vs. Lowlanders, the problem of the Borders, the unions of 1603 and 1707, education and poor law in early modern Scotland, the Scottish Revolution, and the Jacobite rebellions.

Tutorial discussions will be based on prepared readings. Throughout the class emphasis will be placed on recent re-interpretations of traditionally held views with respect to these so-called "dark ages" in Scottish history.

Instructor: C.J. Neville

Format: Lectures/tutorials 3 hours

**HIST 2152.03A or B Scotland since 1745:** A survey of major themes in the history of "North Britain" from the last Jacobite rebellion of 1745 to the present. Topics to be dealt with include the Scottish Enlightenment, the Age of Improvement, radicalism and repression, the Clearances and emigration to North America, agitation for parliamentary reform, Scottish Chartism, Walter Scott and Scottish Romanticism, Scottish cities in the Victorian era, Scottish socialism, Scotland in the Depression, the Second World War, the ascendancy of Labour, Scottish nationalism, North Sea oil, and the legacy of underdevelopment.

Instructor: D.A. Sutherland

Format: Lectures/tutorials, 3 hours

**HIST 2202.03A or B Canada's Industrial Revolutions, 1850-1950:** A study of Canada's transition from a pre-industrial society to a leading industrial nation. Principal themes for discussion include urbanization, the rise of the factory and mass production, the impact on home and family, the revolution in transportation and communications, weapons development, and patterns of consumption. Special attention is given to the role of technology.

Instructor: R. Bleasdale

Format: Lectures/tutorials 3 hours

Recommended: HIST 1200.06R or equivalent introductory class in Canadian history

Cross-listed: Canadian Studies

**HIST 2211.03A or B Social History of Canada before 1870:** This class examines the social

history of pre-Confederation Canada through such topics as social control, violence and protest, women and domestic life, regionalism and marginal peoples, and the transformation of the economy.

**Instructor:** C. Danyak  
**Format:** Lecture/tutorial 2 hours (evening)

**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 2210.06R students

**HIST 2212.03A or B Social History of Canada Since 1870:** This class examines the social history of Canada since Confederation through such topics as the impact of industrialization, social classes, conflict, the role of women, the state and social development, and relationships among the wide variety of social groups in Canada.

**Instructor:** C. Danyak  
**Format:** Lecture/tutorial 2 hours (evening)

**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 2210.06R students

**HIST 2221.03A or B Rough Justice: Order, Disorder and Canadian Popular Culture to the 1890s:** This class investigates the character of popular culture, the diversions, recreations and forms of community control engaged in by Canadians, and the attempts by authorities and the law to bring order to the culture. Topics range widely over the broad scope of popular culture, from sports, drinking and prostitution to religious organisation. Study of the mechanisms and institutions for imposing order includes the criminal law, industrial discipline, and more respectable forms of cultural activity.

**Instructors:** R. Bleasdale/M. Cross  
**Format:** Lectures/tutorials 3 hours

**Cross-listed:** Canadian Studies  
**Exclusions:** Former HIST 3241.03A or B, HIST 3242.03A or B, HIST 3280.03A or B, HIST 3281.03A or B students

**HIST 2222.03B Rough Justice: Order, Disorder and Canadian Popular Culture, 1890s to the Present:** This class continues the study of Canadian popular culture described in HIST 2221.03A or B, from the turn of the century to the present.

**Instructors:** R. Bleasdale/M. Cross  
**Format:** Lectures/tutorials 3 hours

**Cross-listed:** Canadian Studies  
**Exclusions:** Former HIST 3241.03A or B, HIST 3242.03A or B, HIST 3280.03A or B, HIST 3281.03A or B

**HIST 2230.06R Canada in the Twentieth Century:** A survey of the roots of contemporary Canada, which studies the origins of our current issues and problems by

focusing on Canadian political developments, as well as on economic and social structures, French-English relations and provincial and regional disparities.

**Instructors:** R. Bleasdale/C. Danyak  
**Format:** Lectures/tutorials 3 hours

**Cross-listed:** Canadian Studies  
**Recommended:** HIST 1200.06R or an equivalent introductory class in Canadian history

**HIST 2260.03A or B True Believers 1800-1914: The Left and Right in Canadian Politics:** The class will study the ideas and practices of Canadian political movements of the Left and the Right. We will attempt to understand why such movements have risen and declined, and what significance they have had for Canadian politics and society. Topics will include: the Tory ruling groups of the early 19th century and their Reform opponents; the Rebellions of 1837-8; religious and ethnic extremism; labour and farmer movements; imperialism.

**Instructor:** M. Cross  
**Format:** lectures/tutorials 3 hours

**HIST 2261.03A or B True Believers 1914 to Present: The Left and the Right in Canadian Politics:** The class will study the ideas and practices of Canadian political movements of the Left and the Right. We will attempt to understand why such movements have arisen and declined, and what significance they have had for Canadian politics and society. Topics will include: the Progressive movement; the CCF and NDP; Communism and Fascism; Social Credit; the radical right and the New Left; the Reform Party.

**Instructor:** M. Cross  
**Format:** Lectures/tutorials 3 hours

**HIST 2270.06R The Atlantic Provinces:** survey of Maritime and Newfoundland history from the beginnings of European penetration to the "triumph of Canadianization." Attention is given to the interaction of environment and culture which has given rise to a durable but nevertheless vulnerable regional character. The class seeks to define internal patterns of social change and social conflict while simultaneously placing regional development within a broader national and international context.

**Instructors:** J. Fingard/D. Sutherland  
**Recommended:** HIST 1200.06R or an equivalent introductory class in Canadian history

**Cross-listed:** Canadian Studies

**HIST 2331.03A or B Colonial North America, 1600-1760:** A comparison of French and British colonies in North America before the American Revolution, the class studies the interaction of indigenous peoples and Europeans, the establishment of settler

societies, the development of domestic and state economics, and the conflicts of imperial interests.

**Instructor:** J. Crowley  
**Format:** Lectures 3 hours  
**Recommended:** HIST 1300.06R or 1200.06R

**HIST 2332.03A or B Nineteenth Century America:** In 1800 slightly more than 5 million persons lived in the United States, farmed for a living, and owned land, but by 1900 a majority of the country's 76 million inhabitants neither owned nor farmed their own lands. Clearly much changed in nineteenth century America: the nation's western boundary shifted from the Mississippi to the Pacific; cities and factories altered her landscape; her slave system, the world's largest, was destroyed in the first great industrial war of our time; and by 1900 she was the most powerful industrial producer on the globe. The nature and consequences of these and other major developments are the subjects considered in this class.

**Instructor:** J.T. O'Brien  
**Format:** Lectures/tutorials 3 hours  
**Recommended:** HIST 1300.06R  
**Exclusion:** Former HIST 2330.06R and first year students.

**HIST 2333.03A or B Twentieth Century America:** This class traces the political and economic history of the United States from the turn of the century to the Reagan era. Particular emphasis is placed on broad trends of change in those years: the growth of large private and public bureaucracies and their impact on traditional values; the continuing influence of racial and ethnic divisions on American politics; the role of the media on political organizations and practices; and the growing interconnections of foreign policy, military commitments and economic resources in the years since the Second World War.

**Instructor:** G.D. Taylor  
**Format:** Lectures/discussion 3 hours  
**Recommended:** HIST 1300.06R or a similar survey class in U.S. history  
**Exclusion:** Former HIST 2330.06R students

**HIST 2335.03A or B Modern American Culture:** American mass culture has become familiar to billions throughout the world in this century. One would be hard pressed to discover in Germany, Japan, Brazil or Canada, with college students unfamiliar Elvis, Hollywood, adolescence, IQ, McDonald's, the Blues, Superbowl, or the Pill. In this class the concern is with the historical development of these cultural phenomena rather than with their export to the rest of the world. Lectures and readings focus on such matters as changing moral standards for young Americans, fashion and gender roles, food and film. Recordings and movies supplement the lectures.

**Instructor:** J.T. O'Brien  
**Format:** Lectures/tutorials 3 hours  
**Recommended:** HIST 1300.06R  
**Exclusion:** First-year students

**HIST 2370.03A or B Age of Imperialism 1870-1970:** Deals with the last hundred years of the activities of the imperial powers, their impact on the world, their rivalries among themselves and the resistance they provoked on every continent. Different forms of conquest are discussed and illustrated, the shifting power balance among the imperial powers is traced, and the growth of national resistance movements and their ideologies investigated. The class gives particular emphasis to the United States as the most important imperial power of the period, to its role in Latin America and to the ideologies which inform resistance movements.

**Instructor:** M. Turner  
**Format:** Lectures/discussion 3 hours

**HIST 2381.03A or B Latin America: Underdevelopment and Revolution:** Outlines key developments in Latin America from the independence wars to the present - the growth of nationalism, the impact of British and American capital and the development of the anti-imperialist struggle - in relation to Argentina, Brazil, Chile, Peru, Central America and Cuba.

**Instructor:** M. Turner  
**Format:** Lectures/discussion 3 hours  
**Exclusion:** Former HIST 2380.03A or B, and HIST 2382.03A or B students

**HIST 2410.03A or B Tropical Africa Before 1800:** A study of some of the major themes of African pre-colonial history through an examination of the interim politics and development of African states and societies in tropical Africa. It will focus on the impact of immigration, slavery and Islamic penetration on African society.

**Instructor:** J. Webster  
**Format:** Lecture/tutorial 3 hours  
**Recommended:** HIST 1400.06R

**HIST 2421.03A or B Colonial Africa:** Examines the history of Africa from the period of European colonial rule (1884) to the emergence of independent African states in the 1960s. The class will analyze the material basis of colonial society; culture, class and social change during the colonial period; issues around changing gender roles; and the nationalist struggle and decolonization.

**Instructor:** J.L. Parpart  
**Format:** Lectures/tutorials 3 hours  
**Recommended:** HIST 1400.06R

**HIST 2422.03A or B Independent Africa:** A study of Africa from the early 1960s to the present. The class will examine neo-colonial myths and realities, class, party and state in Africa, economic development and

underdevelopment, and the quest for national stability during the current crisis. The class will look at the impact of structural adjustment on women's and men's lives and the current struggles in Southern Africa.

Instructor: J.L. Parpart  
 Format: Lectures/tutorials 3 hours  
 Recommended: HIST 1400.06R

**HIST 2501.03A or B The Middle East to the First World War:** Begins with the historical geography and the linguistic and cultural divisions of the region. Examines the emergence of Islam, its basic doctrines, and the Islamic view of politics and history. With this background concentration is then on the nineteenth century, looking at the impact of European influences, the problem of "reform" in the Turkish and Iranian empires, the British occupation of Egypt, revolutions of the early twentieth century, the origins of Zionism and the impact of the First World War.

Instructor: J.E. Flint  
 Format: Lectures/discussion 3 hours  
 Prerequisite: Completion of first year university

Recommended: HIST 1400.06R  
 Exclusion: First-year students

**HIST 2502.03A or B The Middle East since the First World War:** Begins with the impact of British and French imperial designs after 1918, the Balfour Declaration on Palestine, the creation of new Arab states and the Republic of Turkey. This leads to an examination of secular reform versus Islamic traditionalism, Arab nationalism, rise of the oil industry and the impact of the Second World War, the emergence of the state of Israel, the revolutions in Egypt and Iraq, the rise of OPEC, the fall of the monarchy in Iran and the nature of Khomeini's Islamic Revolution.

Instructor: Staff  
 Format: Lectures/discussion 3 hours  
 Prerequisite: HIST 2501.03A or B  
 Exclusion: First-year students  
 Cross-listing: HIST 5502.03

**HIST 2800.06R History of India:** This class will examine the period from the late 18th century and the beginnings of British rule to the present day. The principal themes include: religion and social structure over two centuries of profound political and economic change; the modernization of the Indian economy; the rise of nationalism and national political organizations; and India's place in the world affairs.

Instructor: Staff  
 Format: Lectures/discussion 3 hours  
 Recommended: HIST 1400.06R  
 Exclusion: HIST 2801.03A or B

**HIST 2995.03A or B History of Modern Medicine, 1800-1950:** This class examines the state of medicine in 1800, 1850, 1900 and 1950, and the transition of American and Canadian medicine from a low status,

ineffective, poorly trained group of competing sects to what it is today. For each of the four periods the emphasis is on medical training, the diagnostic and therapeutic capabilities of physicians, their views on disease etiology, their attempts to control the size and quality of the profession and to prohibit the entry of women, and the scientific background to their views.

Instructor: J. Farley  
 Format: Lectures/discussion 3 hours  
 Exclusion: Former HIST 2295.03A or B students  
 Cross-listed: BIOL 3404.03A

**PLEASE NOTE:** Students are advised to check the format of the 3000-level classes, whether 'lecture/discussion' or 'seminar'. Seminars are marked with an asterisk (\*).

**\*HIST 3001.03A or B Medieval Civilization:** Each year one or more particular topics are chosen, broad enough to be used as central themes in the context of which medieval civilization may be closely examined; for instance, monasticism, universities, peasants and popular culture. Such topics are studied in some depth, where possible using original sources in translation, and recent periodical literature and/or monographs. Students master the basic work in certain areas, but are also encouraged to develop particular topics more thoroughly. Class discussions are used to unravel contentious or difficult aspects. Students are expected to contribute to such discussions and to write one or two well argued and documented papers. Some prior knowledge of medieval European history is essential.

Instructor: C.J. Neville  
 Format: Seminar, 2 hours  
 Prerequisite: HIST 2001.03A or HIST 2002.03B or HIST 2101.03A

Recommended: HIST 1001.03A  
 Exclusions: Former HIST 3000.06R and HIST 3002.03B students  
 Cross-listing: HIST 5701.03

**HIST 3002.03A or B The Medieval Church:** This class does not attempt to provide a chronological survey of the development of the Western church, but is an advanced seminar dealing with topics which have no strict chronological limits. Subjects of study include monasticism, heresy, education and the universities, town and cathedral, lay-clerical conflict, and "popular" concepts of religion. Each year one or more topics are examined in detail, with the help of original documents in translation, and using recent periodical literature and/or monographs. Students prepare versions of a well-researched paper, and class discussions are used to explore related materials and readings in greater depth. Some prior knowledge of medieval European history is essential.

**Instructor:** C.J. Neville  
**Format:** Lectures/discussion, 3 hours  
**Prerequisites:** HIST 2001.03A or HIST 2002.03B or HIST 2101.03A

**Recommended:** HIST 1001.03A  
**Exclusions:** Former HIST 3021.03A and 3022.03B students  
**Cross-listing:** COMR 3008.03A or B

**HIST 3003.03A or B England in the Later Middle Ages:** Beginning around the reign of Edward I (1272-1307), attention is given to political, institutional, religious and social aspects of English history prior to the Tudors. This period includes the deposition of two reigning monarchs, the Scottish Wars of Independence, the Hundred Years' War, the Black Death, Wycliffite heresy and the Lollards, and the so-called "Wars of the Roses". It is therefore of exceptional interest and variety. Each year one or more topics of study are chosen for detailed consideration, where possible making use of original sources (in translation), and with the help of recent periodical literature. Class discussions are used to explore particularly difficult or controversial questions, and all students write one or two well argued and documented papers. Some knowledge of English medieval history is essential.

**Instructor:** C.J. Neville  
**Format:** Lectures/discussion, 3 hours  
**Prerequisites:** HIST 2101.03A  
**Recommended:** HIST 1001.03A or HIST 2001.03A or HIST 2002.03B  
**Exclusions:** Former HIST 3009.03A, HIST 3007.03B and HIST 3010.08R students

**\*HIST 3004.03A or B Crime and Society in Post-Conquest England:** This class explores the development of the criminal law in England between 1066 and 1500. After some introductory lectures by the instructor on the legacy of Anglo-Saxon legal notions and the creation of the royal system of justice known as the "eyre", attention is given to a study of the development of a more sophisticated hierarchy of courts: the local tribunals presided over by justices of the peace and sheriffs, itinerant sessions headed by the justices of assize, and the central court of King's Bench. The origins and elaboration of particular offenses, including treason, felony (murder, rape, arson, burglary and larceny) and trespass are examined. Emphasis is placed on the social aspects of crime in medieval England, and extensive use is made of recent periodical literature dealing with crime and its effect in this period.

**Instructor:** C.J. Neville  
**Format:** Seminar 2 hours  
**Prerequisites:** HIST 2101.03A or B, or HIST 2001.03A or B, or HIST 2002.03A or B  
**Recommended:** HIST 1010.03A or B, HIST 2104.03A or B

**Exclusions:** Former HIST 3009.03A or B, HIST 3007.03A or B, and HIST 3010.08R students  
**Cross-listing:** HIST 5704.03

**\*HIST 3005.03A or B The Early Modern Mind: European Thought and Culture, 1450-1700:** The purpose of this class is to provide students who have an interest and some background in early modern European history with more advanced study of the major issues and themes in European cultural history from the advent of printing to the dawn of the Enlightenment. Students will discuss writings by seminal authors such as Bacon, Montaigne, Bayle and Descartes, in addition to secondary works. The emphasis throughout will be not only on "high culture" but also on its relationship to society as a whole and to popular customs and rituals. Topics to be discussed include the impact of print, utopian thought, the witch craze, urbanization and civic consciousness, the writing of history, aspects of the scientific revolution, and the growth of religious toleration and scepticism.

**Instructor:** D.R. Woolf  
**Format:** Seminar 2 hours  
**Prerequisites:** One 2000- or 3000-level class in medieval or early modern European history, or instructor's consent  
**Recommended:** HIST 2005.03A or B, HIST 2008.03A or B, HIST 2008.03A or B  
**Exclusion:** Former HIST 3011.03A or B students  
**Cross-listing:** HIST 5705.03

**\*HIST 3006.03A or B Renaissance and Reformation Europe, 1348-1559:** A survey of the major themes, subjects, and personalities in western European history from the Italian Renaissance to the beginnings of the Protestant Reformation in the sixteenth century. Topics to be covered include the rise of Italian city-states, Italian humanism, the arts, the emergence of centralized monarchies in northern Europe, religious sentiment, and the reform movement. Although most areas of western Europe will be dealt with, the focus will be on Italy, France, and Germany.

**Instructor:** D.R. Woolf  
**Format:** Lectures/discussion, 2 hours  
**Prerequisites:** Any first- or second-year European history class  
**Exclusion:** Former HIST 2005.03R students

**HIST 3040.06R Culture and Behaviour in Early Modern France, 1550-1750:** This class explores the characteristics and complexities of elite and popular culture between the wars of religion and the Enlightenment. Emphasis is placed on the traditional universe of Early Modern civilization and the process it

underwent in a variety of domains: religion, education, sociability, deviance, social organization, etc.

Instructor: G. Hanlon  
 Format: Lectures/discussion, 2 hours  
 Prerequisite: Any European Medieval or Early Modern history or literature

**\*HIST 3051.06R Fascist and National Socialist Movements in Europe, 1900-1945:**

The origins, ideologies, social composition, leadership, rise to power and rule of the two principal fascist and national socialist movements, those of Mussolini's Italy and Hitler's Germany, as well as similar phenomena in other European countries between the world wars, are studied comparatively to distinguish them from Soviet communism and other varieties of authoritarianism and totalitarianism.

Instructor: L.D. Stokes  
 Format: Seminar/lecture/discussion 2 hours

Prerequisite: One 2000-level class in European or modern British history

Recommended: HIST 2030.06R, HIST 2062.03A or B, HIST 2081.06R, HIST 2020.06R, HIST 2022.03A or B, HIST 2040.06R

Exclusion: Former HIST 3051.06A or B

**\*HIST 3052.06R Europe and World War Two:**

Selected topics on the origins, course and aftermath of the Second World War as this involved Europe, including Nazi foreign and occupation policies, strategic and political decision-making by the Allied and Axis powers, national resistance movements, and the wartime origins of the Cold War.

Instructor: L.D. Stokes  
 Format: Seminar/lecture/discussion 2 hours

Prerequisite: One 2000-level class in European or modern British history

Recommended: HIST 2030.06R, HIST 2062.03A or B, HIST 2081.06R, HIST 2020.06R, HIST 2040.06R

Exclusion: Former HIST 2052.03A or B, or HIST 3052.06A or B students

**\*HIST 3055.06R The Holocaust: The Destruction of the Jews of Europe, 1933-1945:** The destruction of most of European Jewry by Nazism and its helpers during the Second World War is studied in the context of centuries-old religious anti-Semitism, nineteenth century Jewish emancipation and the emergence of racist ideology, the political and social situation of Jews in eastern and western Europe after World War I, "legal" and bureaucratic

persecution of German Jews culminating in mass killing at Auschwitz and other death camps, the response of bystander nations to the perpetration of genocide, and finally the creation of the state of Israel in relation to the Holocaust.

Instructor: L.D. Stokes  
 Format: Seminar 2 hours  
 Prerequisite: One 2000-level class in European or modern British history

Recommended: HIST 2030.06R, HIST 2062.03A or B, HIST 2501.03A or B, HIST 2502.03A or B, HIST 2020.06R, HIST 2040.06R

Exclusion: Former HIST 1990.06R (section 07) students

**\*HIST 3090.03A or B Russian Society:** Some basic institutions of Russian society are considered in their historical context, with special attention to the role of the Party and Marxism-Leninism, official culture and literature, the workings of the economy, and social stratification.

Instructor: N.G.O. Pereira  
 Format: Seminar 2 hours  
 Prerequisite: Reading knowledge of Russian (at least two years of language study) and some Russian history

Recommended: RUSS 1000.06R, RUSS 2000.06R

Cross-listing: HIST 5090.03, RUSS 3090.03

**\*HIST 3092.03A or B Russian Topics:** Topics to be studied and researched will vary from year to year. They may include the sources of Bolshevism/Leninism, the doctrine of peaceful coexistence, the position of national minorities, the role of literature (official and samizdat) and the press, the Cult of Personality, Khrushchev's "Thaw", Brezhnev, Borbachev, and Yeltsin.

Instructor: N.G.O. Pereira  
 Format: Seminar 2 hours  
 Prerequisite: One 2000-level class in history  
 Recommended: HIST 2020.06R, HIST 2022.03A or B, HIST 2030.06R, HIST 2040.06R, HIST 2062.03A or B

**\*HIST 3105.03A or B The English Civil War: Society, Religion and Politics, 1603-1660:** An advanced class on one of the most tumultuous and eventful periods in British history, that leading up to and including civil war and revolution 1642 to 1660. Select primary sources will be used in addition to secondary works. Topics to be studied include the social structure of early Stuart England; the Church and its critics; foreign policy; radical politics; the military course of the war; religious sectarianism; and the impact of the war and its aftermath on the populace.  
 Instructor: D.R. Woolf

**Format:** Seminar 2 hours  
**Prerequisite:** Any second year class in British history  
**Exclusion:** The former History 3104.06R  
**Recommended:** HIST 2105.03A or B, HIST 2106.03A or B, HIST 2005.03A or B, HIST 2008.03A or B

**\*HIST 3106.03A or B England in the Age of Industrial Revolution:** This class examines in some depth major themes in English history from the reign of George III through the Victorian era, including the British response to revolutions in America and France, the Napoleonic wars, the movement for Parliamentary reform, and the growth of industrialization.

**Instructor:** Staff  
**Format:** Seminar 2 hours  
**Prerequisite:** One 2000-level class in English history  
**Recommended:** HIST 2111.03A or B, HIST 2112.03A or B, HIST 2131.03A or B, HIST 2132.03A or B

**HIST 3112.03A or B England, 1867-1914:** This class concentrates upon the late Victorian and Edwardian Period in British History, from 1867 to the outbreak of the first World War. It will touch upon such subjects as urbanization, class politics, and culture, the transformation of the monarchy, the problem of poverty, women's emancipation, and the Irish Question.

**Instructor:** S. Brooke  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** One of the following: HIST 2111.03A or B; 2112.03A or B; 3113.03A or B; 3114.03A or B; 3116.03A or B; 2030.06R; 2331.03A or B; 2332.03A or B; or instructor's consent.

**HIST 3113.03A Britain in the Age of the First World War, 1914-39:** This class examines in depth major themes in modern British history from the first World War to the outbreak of the second, including the experience and impact of war, the problem of Ireland, the rise of labour, women's struggles, the great depression and the appeasement of the dictators in the 1930s.

**Instructor:** S. Brooke  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** One of the following: HIST 2111.03A or B; 2112.03A or B; 3112.03A or B; 3314.03A or B; 3116.03A or B; 2030R; 2081.06R.

**HIST 3114.03B Britain from the Second World War to Thatcher, 1939-1990:** This class examines in depth major themes in British history from the outbreak of the

Second World War to the emergence of the 'Thatcher Phenomenon', including the war experience, the post-war labour governments and the welfare state, the affluence of the 1950s and 1960s, Suez, the Immigrant experience, and social and economic decline in the 1970s, ending with the election of Margaret Thatcher in 1979.

**Instructor:** S. Brooke  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** One of the following: HIST 2111.03A or B; 2112.03A or B; 3112.03A or B; 3113.03A or B; 3116.03A or B; 2030.06R; 2081.06R

**\*HIST 3115.03A Socialism and Working-Class Politics in Britain, 1880's-1990's:** The last century in Britain has witnessed two intertwined developments: the full participation of the working-class in politics and the rise to power of a socialist party, the Labour party. This class will cover three aspects of that history: the development of working-class culture and politics (in particular through the union movement); the shaping of socialist ideology in Britain; and the emergence and development of the Labour party. It will embrace social, economic, and intellectual history, covering such topics as the "New Unionism" of the 1880's, working-class culture in Britain; the General Strike; the Labour governments of 1945-51, and, throughout, the arguments over ideology.

**Instructor:** S.J. Brooke  
**Format:** Seminar 2 hours  
**Prerequisite:** As this is an advanced seminar in British history, the instructor's permission is required for registration.

**\*HIST 3116.03A or B Advanced Seminar in British History: Culture, Class, and Society in Twentieth-century Britain:** How does culture reflect social and political change? This class sets out to explore this question in the context of modern British society. Using a variety of texts, such as films like *My Beautiful Launderette*, the photographs of Bill Brandt and Humphrey Spender, the plays of John Osborne, Howard Brenton, and Caryl Churchill, art, architecture, and popular forms of culture, this seminar will examine how issues such as class tension, social change, the decline of empire and the beginning of a multi-racial society, changes in women's status, and other political and social developments represented in twentieth-century Britain, from the First World War to the present day.

**Format:** Seminar, 2 hours  
**Instructor:** S.J. Brooke  
**Prerequisite:** As this is an advanced seminar in British history, the instructor's permission is required for registration.

**Cross-listing:** HIST 5116.03

**HIST 3220.03A or B Youth Culture in Canada, 1950's to 1970's:** The 1950's and 1960's were decades of often startling social change throughout North America in general and Canada in particular. This class will attempt to understand these changes and their impact on our society. The primary focus of the investigation is the popular youth culture of the time, the culture of "sex, drugs and rock n' roll." The class will look at economic and social factors underlying youth culture, at some of the major thinkers who influenced it (such as Marshall McLuhan and Herbert Marcuse), and the responses of authority to youth culture.

**Format:** lecture/tutorial 3 hours

**Instructor:** M.S. Cross

**Prerequisite:** One previous history class

**Recommended:** HIST 2220.06R

**Cross-listing:** HIST 5222.03 and Canadian Studies

**HIST 3222.03A or B Topics in Canadian Social History, 19th and 20th Centuries:** This seminar will explore major themes in Canadian social development. The topics discussed will vary from year to year but will emphasize such themes as: changing values in Canadian society; the nature of popular cultures; the relationship of order and disorder; the family; gender relations; and social classes.

**Instructor:** M. Cross

**Format:** Seminar 2 hours

**Prerequisite:** A class in Canadian History

**Cross-listing:** Canadian Studies

**HIST 3225.03A or B Crime, Punishment and the Criminal Law in Canadian Society:** This class examines crime and the criminal law as they relate to broader changes within society and the economy of New France, British North America, and Canada. Moving from the nineteenth century through to the 1980's, it analyses the shifting patterns of crime; the changing definitions of crime and punishment; the social, economic, political, and ideological significance of the criminal law; and the influence of Britain, the United States, and France on legal developments.

**Instructor:** R. Bleasdale

**Format:** Seminar or lecture/discussion 2 hours

**Prerequisite:** One previous history class

**Recommended:** HIST 2221.03A or B, and HIST 2222.03A or B

**Cross-listed:** Canadian Studies

**HIST 3226.03A or B Law and Justice in Canadian Society, to 1890:** Discussion begins with an exploration of concepts of law and justice among native Peoples prior to and during the occupation of the continent by the French and British. The class pursues crime and the criminal law as they relate to broader changes within the society and economy of New France, British North America, and

Canada. We analyse shifting patterns and perceptions of crime and punishment; the social, economic, political, and ideological significance of the criminal law; the influence of Britain, France and the United States on legal developments.

**Instructor:** R. Bleasdale

**Format:** Lecture/Discussion

**Recommended:** one previous history class

**Exclusion:** HIST 3225.03A or B

**Cross-listing:** Canadian Studies

**HIST 3227.03A or B Criminal Law, Crime and Punishment in Canadian Society, 1890 to the present:** Continuing the approach and themes of HIST 3226.03A or B, this class studies crime, punishment, and the criminal law as they reflect social, economic, political, and ideological developments. As appropriate these are placed within their international context, and in particular linked to the American system of law and justice. We pay attention to the impact of technological change on crime, detection of crime enforcement mechanisms, and alternative means and methods of punishment.

**Instructor:** R. Bleasdale

**Format:** Lecture/Discussion

**Recommended:** one previous history class

**Exclusion:** HIST 3225.03A or B

**Cross-listing:** Canadian Studies

**HIST 3228.06R Religion in Canada:** When Canadians have built cities, gone to war, founded economic empires, fallen in love, designed school systems, and elected governments, religion has often been a decisive factor. Sometimes religion has been the decisive factor. What is "religion" in Canada? In the course of this extensive historical study of life in Canada from the 16th century to the present, a variety of answers will be explored. A detailed syllabus is available from the Department of Comparative Religion.

**Instructor:** C.T. Sinclair-Faulkner

**Format:** lecture and seminar 3 hours

**Prerequisite:** COMR 2001.03A or B or

COMR 2002.03A or B or

permission of the instructor

**Cross-listing:** COMR 3003.06R

**HIST 3230.03A or B Labour and Community in Nineteenth-Century Canada:** The experience of Canadian workers during the transition to an industrial capitalist society. Topics include pre-industrial work patterns, new forms of discipline and the employment relationship, varieties of collective protest and organization, and changes in the structure of the family and community.

**Instructor:** R. Bleasdale

**Format:** Seminar or lecture/discussion, 2 hours

**Prerequisite:** One previous history class

**Cross-listed:** Canadian Studies

**HIST 3231.03A or B The Canadian Working Class: The Twentieth Century Experience:** The development of the Canadian working-class movement from 1896 to the present. Topics include the degradation of work, the question of international unions, labour in politics, women and trade unions, the role of the state in industrial relations, and working-class culture in mass society.

**Instructor:** R. Bleasdale  
**Format:** Seminar or lecture/discussion, 2 hours

**Prerequisite:** One previous history class  
**Cross-listed:** Canadian Studies

**HIST 3245.03A or B French Canada:** Given in English for English-speaking students, this class traces the development of French-Canadian society through the study of political and social developments. While the emphasis is on developments in Quebec, French-Canadians in the Maritimes, Ontario and the West will also be studied.

**Instructor:** S. Tillotson  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** One class in Canadian history, or instructor's consent

**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 2240.03A or B students

**HIST 3255.03A or B The Age of Macdonald and Laurier:** A seminar comprehending the society and politics of Canada from Confederation to the First World War. Themes of particular importance are imperialism, nationalism, and racism; the clash of nationalism; the opening of new frontiers; politics and ideology.

**Instructor:** Staff  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** A survey of Canadian history  
**Cross-listed:** Canadian Studies

**HIST 3260.03A or B History of the Canadian West:** This class takes a thematic approach within a chronological framework, exploring social, economic and political topics in the development of Western Canada. Among the themes considered are Native economies, political dissent, labour radicalism, ethnic relations, and federal-provincial relations.

**Instructor:** C. Danyak  
**Format:** Seminar or lecture/discussion 2 hours

**Prerequisite:** A class in Canadian history  
**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 2250.03A or B students

**HIST 3261.03A or B The Rural Experience in Canada:** The rural experience has dominated Canada's past and continues to exert a strong influence in the present. This class explores the contours of Canadian rural life, examining the impact of rural politics, economics, social

relations and ideologies upon Canadian development. Specific themes will vary from year to year.

**Instructor:** C. Danyak  
**Format:** Seminar

**Prerequisite:** A survey of Canadian history  
**Cross-listed:** Canadian Studies

**\*HIST 3272.03A or B Themes in the History of Atlantic Canada:** This class provides students an opportunity to broaden their knowledge of historical trends in the region through archival research based on specific selected themes, which vary from year to year.

**Instructor:** Staff  
**Format:** Seminar, 2 hours  
**Prerequisite:** One class in Canadian history  
**Cross-listed:** Canadian Studies

**\*HIST 3273.03A or B Nova Scotia: Pre-Confederation:** An exploration of character and circumstances in the history of provincial society, from the era of European "invasion" to the debate over entry into British American union.

**Instructors:** D. Sutherland/J. Fingard  
**Format:** Seminar 2 hours  
**Prerequisite:** One Canadian History class or instructor's consent

**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 3270.06R

**\*HIST 3274.03A or B Nova Scotia: Post-Confederation:** An exploration of the transformation of provincial society in response to the onset of Canadianization and industrialization.

**Instructors:** D. Sutherland/J. Fingard  
**Format:** Seminar 2 hours  
**Prerequisite:** One Canadian History class or instructor's consent

**Recommended:** HIST 3273.03A  
**Cross-listed:** Canadian Studies  
**Exclusion:** Former HIST 3270.06R

**\*HIST 3286.03A or B The Urban Experience in Canada:** The rise of the city stands as one of the most crucial changes to have taken place in our collective past. This class explores the reasons for and the impact of urbanization within Canada. Emphasis is on developments from the mid nineteenth century to the present.

**Instructor:** D. Sutherland  
**Format:** Seminar 2 hours/week  
**Prerequisite:** One class in history  
**Cross-listed:** Canadian Studies

**HIST 3292.03A or B Wealth and Power in North America:** Business enterprises have played a major role in shaping the social and political as well as economic development of the United States and Canada over the past two hundred years - perhaps more so than in most other modern nations. This class explores the growth and significance of business in the history of these two countries.

Among the topics covered are: entrepreneurship, technical innovation and economic growth; the rise of big business and management organization; the convoluted and controversial linkages of business and government; and the emergence of multinational enterprises and their impact on Canadian-American relations.

**Instructor:** G.D. Taylor

**Format:** Lectures/discussion 2 hours

**Prerequisite:** One class in Canadian or U.S. history, or an appropriate class in a related discipline.

**Recommended:** A survey class in U.S. or Canadian history

**Cross-listed:** Canadian Studies

**Exclusion:** Former HIST 3291A or B students

**HIST 3302.03A or B Technology and History in North America:** The effects of technology on our lives are ever-present, from debates over acid rain and nuclear reactors to promises of a glowing future for Canada through "high-tech" enterprises and supercomputers. The continuing impact of technical innovation has been a central feature of the history of Canada and the United States, going back even to the period before the Industrial Revolution of the nineteenth century. The harnessing of science and technology to industrial and military uses in our own time has fuelled both rapid economic growth and controversies over the benefits and costs of technological changes for the household, the workplace, the environment, politics and society in North America.

**Instructor:** G.D. Taylor

**Format:** Lectures/discussion, 2 hours

**Prerequisite:** One class in Canadian or U.S. history, or an appropriate class in a related discipline.

**Recommended:** A survey class in U.S. or Canadian history

**Cross-listed:** Canadian Studies

**HIST 3331.03A or B The United States, Canada and the World:** During the past century both nations of North America evolved from sparsely settled agricultural societies to complex industrial nations with increasing influence on, and dependence upon, developments throughout the rest of the world. This class traces the rise of the United States in global, political, and economic affairs, and reviews the role of the United States in the transformation of Canada since the early 19th century. The class focuses on diplomatic affairs, military conflict and cooperation, the rise of multinational enterprise, and the impact of technology in shaping America's relations with Canada and the world.

**Instructor:** G.D. Taylor

**Format:** Seminar, 2 hours

**HIST 3334.03A or B U.S. Foreign Policy in the 20th Century:** As neighbours, interlinked by geography, economic patterns and (to some extent) common political and cultural traditions, Canada and the United States have had a close though not always smooth relationship over the past two hundred years. But that relationship has often been shaped by broader changes in international political, military and economic affairs, and - particularly in the twentieth century - U.S. foreign policies that affect Canada are determined by events and concerns far removed from North American shores. This class traces the history of Canadian-American relations in the context of these broader trends in United States foreign policy, and global political and economic developments.

**Instructor:** G.D. Taylor

**Format:** Lectures/discussion 3 hours

**Recommended:** A survey class in U.S. or Canadian History

**Cross-listed:** Canadian Studies

**Exclusions:** Former HIST 3330.06R and HIST 3331.03 students

**HIST 3341.03A or B Revolutionary America, 1780-1820:** Topics of particular interest are the popularization of politics, the social conflicts related to neutralism and Loyalism, the development of a national political economy and constitutional tradition, and the cultural changes associated with republican government and egalitarian ideology.

**Instructor:** J.E. Crowley

**Format:** Lectures/discussion, 2 hours

**Prerequisite:** One 2000-level class in U.S. history, or HIST 2131.03A or B

**HIST 3350.03A or B Family and Community in North America, 1600-1900:** The family in North American society, from when the family was a model for social relations to the time when it was idealized as a private refuge. Among the topics considered are the role of the family in rural and urban communities, the demographic transition from high fertility and mortality, the reduction of the family's economic and educational autonomy, the role of ideology in shaping sex roles and childbearing; and the relations of family and community according to ethnic group, class, and economic setting.

**Instructor:** J.E. Crowley

**Format:** Lectures/discussion, 2 hours

**Prerequisite:** One second-year class in American or Canadian history

**Recommended:** A class in the sociology or social anthropology of the family

**Cross-listing:** WOST 3300.03A or B

**\*HIST 3360.03A or B Enslavement and Emancipation: African-Americans in the U.S. South to 1900:** This class examines slavery as a system of racial subordination and economic exploitation. Attention is given to

the social, familial, and cultural life of the slaves, the role of slavery in shaping southern nationalism and national racial beliefs, and to reconstruction after the Civil War.

**Instructor:** J.T. O'Brien  
**Format:** Seminar 2 hours  
**Prerequisite:** HIST 1300.06R or one second-year U.S. history class  
**Recommended:** HIST 2332.03A or B

**\*HIST 3361.03A or B The American Civil War and Reconstruction:** The Civil War, occasioned by the formation of the Southern Confederacy and the Union government's refusal to recognize the existence of a separate southern nation, was a pivotal moment in the history of the United States. This class will examine the causes of the war, the forces behind slave emancipation, the military fortunes of the two combatants, and the efforts undertaken by the victorious society, to alter the polity of the defeated South.

**Instructor:** J.T. O'Brien  
**Format:** Seminar 2 hours  
**Prerequisite:** HIST 1300.06R or second-year U.S. history class  
**Recommended:** HIST 2332.03A or B

**\*HIST 3366.03A or B Industry, Unionism, and Workingmen in the United States, 1873-1940:** America's rise to industrial pre-eminence shot forward after the Civil War. By 1900 she had the most productive industrial economy in the world, as well as one of the world's bloodiest labour histories. The growth of unions, however, proceeded much more slowly. Indeed, unionization of mass production industries was not achieved until late in the 1930s with the spread of the CIO and the revitalization of the AFL. This class examines the fitful history of American unions from the beginning of the depression of the 1870s to the end of the Great Depression of the 1930s.

**Instructor:** J.T. O'Brien  
**Format:** Seminar 2 hours  
**Prerequisite:** HIST 1300.06R or one second-year U.S. history class  
**Recommended:** HIST 2332.03A or B, HIST 2333.03A or B, HIST 2334.03A or B

**HIST 3368.03A or B From Roosevelt to Reagan: The United States since 1929:** This class examines in depth some of the major features of American political and economic history in the period since the Great Depression. Some of the major themes covered are: the rise and fall of the New Deal coalition; the impact of the media on politics; the emergence of the "Imperial Presidency" and conflicts with Congress; the "military-industrial complex" and the growth of the Sunbelt; and controversies over the

relationship between government and business in the context of global economic competition.

**Instructor:** G.D. Taylor  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** HIST 1300.06R or an equivalent introductory class in U.S. History  
**Recommended:** Any 2000-level class in U.S. history

**\*HIST 3390.03A or B The Caribbean: Underdevelopment and Revolution:** Caribbean wealth and Caribbean revolutions have made the islands a focus of imperial rivalries for more than three centuries. This class deals with the impact of twentieth century imperialism and the emergence of nationalism and socialism. Particular attention is paid to Cuba.

**Instructor:** M. Turner  
**Format:** Seminar 2 hours  
**Prerequisite:** One second-year Arts class

**HIST 3440.03A or B African History from Oral Tradition:** For students who have a keen interest in African history, the class concentrates upon a restricted geographic area and considers myths of origin, allegory and symbolism in oral traditions, how political leaders become national deities through ancestor worship and how feminist movements of the past have been handled by male chroniclers.

**Instructor:** Staff  
**Format:** Seminar, 2 hours  
**Prerequisite:** Any 2000-level class on African history

**Recommended:** HIST 2410.03A or B

**HIST 3451.03A or B South Africa to 1860:** Examines the history of South Africa before the coming of the mineral revolution. Themes include the nature of Khol and San societies, the expansion of Bantu-speakers, Dutch settlement and administration of the Cape area, the rise of the Zulu, Shaka's empire and the mfecane, the British takeover from the Dutch, the impact of the humanitarian movement and the Great Trek, African states and kingdoms in the nineteenth century and the formation of the Boer Republics.

**Instructor:** J. Parpart  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** HIST 2131.03A or B, HIST 2132.03A or B, HIST 2421.03A or B, HIST 2422.03A or B or permission of instructor.

**Exclusion:** Former HIST 3450.06R students

**HIST 3452.03A or B South Africa since 1860:** The class examines not only the changes in race relations and politics, but also the effects of mining and other industries on rural and urban societies after the discoveries

of diamonds and gold. Themes will include British policies and the "imperial factor", the growth of Afrikaner and African nationalism, the Boer War and unification, the development of apartheid and South Africa's relations with the wider world.

**Instructor:** J. Parpart  
**Format:** Lectures/discussion, 2 hours  
**Prerequisites:** HIST 2421.03A or B, HIST 2422.03A or B, HIST 3451.03A or B, HIST 3461.03A or B, HIST 3462.03A or B

**Recommended:** HIST 3451.03A or B, HIST 2131.03A or B, HIST 2132.03A or B

**Exclusion:** Former HIST 3450.06R students

**\*HIST 3461.03A or B Women and Development in Africa:** This class examines the economic, political and social roles of African women from precolonial to modern times. It analyzes women not as objects, but as actors who participate in the political and economic processes which affect their lives. The class will examine development and feminist theory in the light of recent debates over women and development issues.

**Instructor:** J.L. Parpart  
**Format:** Seminar 2 hours  
**Prerequisite:** A core class in either International Development Studies or Women's Studies or a class on Africa in the History Department or permission of the instructor.

**Cross-listing:** WOST 3310.03A or B, HIST 5461.03

**\*HIST 3462.03A or B Distortion or Development: African History:** An examination of economic change in tropical Africa, with particular attention to the question of economic development and underdevelopment. From the premercantilist period to the current crisis.

**Instructor:** J. Parpart  
**Format:** Seminar 2 hours  
**Prerequisite:** HIST 2422.03A or B  
**Cross-listing:** HIST 5462.03

**\*HIST 3610.03A or B Women in Capitalist Society: the North American Experience:** An examination of the impact of industrialization and urbanization on "woman's sphere" in society and of the emergence of various strains of feminism in the nineteenth and twentieth centuries.

**Instructor:** Judith Fingard  
**Format:** Seminar 2 hours  
**Prerequisite:** One class in Canadian or American history or in Women's Studies.  
**Cross-listing:** WOST 3305.03A or B, HIST 5610.03, Canadian Studies

**\*HIST 3612.03A or B Women in Socialist Countries:** Investigates the progress made towards the achievement of equal status for women in societies dedicated in principle to equality for all. Case studies will range from Cuba to China.

**Instructor:** M. Turner  
**Format:** Seminar, 3 hours  
**Prerequisite:** One second-year Arts class  
**Cross-listing:** WOST 3330.03A or B, HIST 5612.03

**HIST 3750.03A or B History of Seafaring:** An examination of our maritime heritage with the cooperation of the staff of the Maritime Museum of the Atlantic. Within the context of these overlapping periods - the age of discovery, the age of sail, and the age of steam - the focus is on the development of merchant and naval fleets; the roles of the state, capital, and labour; and the features of seafaring culture. Special emphasis is given to the shipping industries and maritime traditions of this region.

**Instructor:** J. Fingard  
**Format:** Lectures/discussion, 2 hours  
**Prerequisite:** One class in history or permission of the instructor  
**Cross-listed:** Canadian Studies

**HIST 4001 .03A or B Directed Readings:**

**Format:** This is a class of individual instruction. Students may only register for this course with the written permission of a Faculty member and the Undergraduate Coordinator.

**HIST 4350.03A or B People and Things: Material Culture in History:** A seminar for advanced undergraduates on Material Culture Studies in social and cultural History. The class discusses the theoretical, cross-cultural, and historical considerations involved in the interdisciplinary study of material culture -- economic technology, household comforts, architecture, clothing, even the landscape itself. The chief interpretative issues deal with the relation between consumption patterns and economic, social and cultural change. Early modern northwestern Europe, particularly Britain and its colonies, provides the context for examples of empirical research.

**Instructor:** J. Crowley  
**Format:** Seminar  
**Prerequisite:** HIST 3350.03/WOST 3300.03, or instructor's permission

**\*HIST 4500.03A or B Topics in Modern History:** This seminar is specifically intended for students in the Advanced Major and Honours degree programmes in History. The specific content of the seminar varies from year to year, but generally involves

examination of a subject in history in some depth, and may include an historiographical, comparative or interdisciplinary dimension.

**Instructor:** Staff

**Format:** Seminar 2 hours

**Prerequisite:** Enquire at Department

**Cross-listing:** HIST 5500.03

**\*HIST 4985.03A or B The Varieties of History: Historiography in the Twentieth Century:** This class, intended for Honours and Advanced Major students in History, will begin with a brief survey of the writing of history from the Middle Ages to the nineteenth century, and then proceed to an examination of the major schools, approaches, and sub-disciplines within the historical profession in the twentieth century. Topics to be covered include the following: the nature of historical knowledge, historical "relativism", Marxism, the "Annales" school, oral history, psychohistory, quantitative history, Feminism and others. No background in statistics is required. Classes will meet weekly to discuss assigned readings and each student will investigate an historian or historical school of his/her choice for a term paper.

**Instructor:** D.R. Woolf  
**Format:** Seminar 2 hours  
**Prerequisite:** Concurrent enrolment in HIST 4990.06R or Instructor's consent  
**Recommended:** A class in modern intellectual history or PHIL 2540.06R  
**Cross-listing:** HIST 5985.03

**HIST 4990.06R Honours Essay in History:** All history Honours students and those in combined Honours programmes in which history is their principal subject must write a substantial essay on a topic to be chosen in consultation with the undergraduate coordinator and an individual faculty supervisor.

**Instructor:** Staff  
**Format:** Honours Essay  
**Prerequisite:** Admission to History Honours Programme.

**HIST 4990.06R Honours Essay in History:** All history Honours students and those in combined Honours programmes in which history is their principal subject must write a substantial essay on a topic to be chosen in consultation with the undergraduate coordinator and an individual faculty supervisor.

**Instructor:** Staff  
**Format:** Honours Essay  
**Prerequisite:** Admission to History Honours Programme.

## Humanistic Studies in Science

Attention is drawn to the following classes, offered in several departments. All of these classes are concerned with the humanistic aspects of scientific thought and its development.

Classes marked \* are not offered every year. Please consult the timetable on registration to determine if these classes are offered.

### History of the Sciences

\*Biology 3402.03A/COMR 3502.03A/History 3072.03A/Science Interdisciplinary 4000.03A or B, The Rise of Modern Science: E.L. Mills

\*History 2995.03A or B The History of Modern Medicine: J. Farley

\*History 3075.03A or B History of Tropical Medicine: J. Farley

Biology 4864.03B/Oceanography 5331.03B/Science Interdisciplinary 4001.03B History of Marine Sciences: E.L. Mills

Psychology 4580.06R History of Psychology: J.W. Clark

### Philosophy of the Sciences

\*Philosophy 2410.03A Philosophy of Psychology: T. Tomkow

\*Philosophy 2420.03B Philosophy of Biology: R. Campbell

Biology 3410.03B Man in Nature: K.E. von Maltzahn

\*Comparative Religion 3532.03A or B Mystical Consciousness and Modern Science: R. Ravindra

\*Comparative Religion 3533.03A or B Spirituality and Ecology: R. Ravindra

\*Comparative Religion 3503.03A or B Nuclear Bomb Survival and Morality: R. Ravindra

## International Development Studies

**Location:** Multidisciplinary Centre, 1444  
Seymour Street, Halifax, N.S.  
**Telephone:** (902) 494-3814  
**Fax:** (902) 494-2176

### Coordinator

Dr. J.H. Barkow (494-6747/3814)

### Undergraduate Advisor

Dr. J.H. Barkow (494-6593)

### Emeritus Professors

K.A. Heard, (Political Science)

P. Ruderman, (Health Administration)

### Faculty

J.H. Barkow (Sociology and Social Anthropology)  
J. Benoit (Henson College)  
M.E. Binkley (Sociology and Social Anthropology)  
M. Bishop (French)  
D. Black (Political Science)  
A. Chett (Chemistry)  
R. Clarke (Resource and Environmental Studies)  
P. Gardiner Barber (Sociology and Social Anthropology)  
J.E. Holloway (Spanish)  
O. Kamura (Biology)  
J.M. Kirk (Spanish)  
B. Lesser (Economics)  
T.J. Li (Sociology and Social Anthropology)  
E. Mann Borgese  
R.I. McAllister (Economics)  
L. McIntyre (Health Services Administration)  
J.L. Parpart (History and Women's Studies)  
R. Ravindra (Comparative Religion)  
T.M. Shaw (Political Science)  
A.M. Sinclair (Economics)  
C.T. Sinclair-Faulkner (Comparative Religion)  
R. Smith (English)  
K. Sullivan (Education)  
D. Vander Zwagg (Law)  
D. Williams (Maritime School of Social Work)  
M. Willison (Biology)

### Introduction

"The right to development must be fulfilled so as equitably to meet developmental and environmental needs of present and future generations." (extract from Agenda 21 of the UN Conference on Environment and Development in Rio de Janeiro, June 1992).

Dalhousie University and Saint Mary's University are coordinating resources to offer an undergraduate degree in international

development studies. This reflects a commitment by both universities to the concept of sustainable development, not only for those privileged to live in Canada and other wealthy nations - but also for those in the Third World.

To foster greater understanding through study, teaching, research and shared field experiences of North-South partnerships and development, distinctive BA major and honours degree programmes enable students to work within interdisciplinary frameworks on both university campuses, as well as to draw upon the international development experiences from over twenty overseas linkage programmes currently engaged in by Dalhousie and Saint Mary's Universities.

Normally students are eligible to join the IDS programme at the start of their second year of university studies, once appropriate classes in at least two of the major participating social science/humanities' disciplines have been completed.

Students with a background in science are also welcomed in this programme and every effort will be made to design study frameworks to explore how science can contribute to sustainable development and to encourage their interest in science within an international context.

All IDS students are encouraged to acquire competence in basic statistics and research design, e.g. Political Science 2249.06R, as well as in one relevant language in addition to English, e.g. French, Spanish, Russian, through appropriate classes and supporting activities.

Students are encouraged to enter the combined honours or advanced major programmes, which provide opportunity further to integrate their IDS studies with those of an approved arts or science field e.g. IDS and History, IDS and Biology. Students should bear these two options in mind, particularly if they plan to pursue graduate studies.

For a full listing of Saint Mary's University faculty and classes in IDS, please consult the current Saint Mary's University academic calendar. IDS core and other classes are usually available each summer through the "Halifax Summer School in International Development". Halifax is the Maritime regional centre for official and non-governmental organizations active in international development and the IDS programme encourages links with them, especially in terms of development education, international exchanges and data resources. In addition to the Dalhousie and Saint Mary's Universities library collections (general, law, environmental, medical and science libraries)

and computer facilities, resource and reading materials on international development can be found in the following units:

## Dalhousie University

International Institutes for Transport and Ocean Studies

International Student Centre

Lester Pearson Institute for International Development

School of Resource and Environmental Studies

## Saint Mary's University

Asian Studies Programme

Gorsebrook Research Institute

International Education Centre

Centre for Latin American and Caribbean Development

## Mount Saint Vincent University Library

## The Halifax and Dartmouth Public Libraries

## Degree Programmes

Students should consult the "Degree Requirements" section of this calendar for specific requirements.

## Honours in International Development Studies

### Departmental requirements:

**1000 level:** Completion of appropriate first-year classes in at least two of the major participating social science or humanities disciplines (that is, Comparative Religion, 1000.06R, 2000.06R; Economics, 1100.06R; History, 1050.06R, 1400.06R; Political Science, 1100.06R, 1103.06R, 1501.06R; Sociology and Social Anthropology, 1000.06R, 1050.06R, 1100.06R; or Spanish 1100.03A or B, 1110.03A or B).

### Advanced Classes Required

- IDS 2000.06R
- IDS 3000.06R
- IDS 4010.06R (with honours essay requirement)
- The equivalent of two full credit classes at or above the 2000-level in each of two established IDS disciplines. See below for the listing of International Development Studies classes.

**NOTE:** a minimum of the equivalent of five full-credit classes must be at the 3000-level or above.

## Advanced Major in International Development Studies

### Departmental requirements:

**1000 level:** Completion of appropriate first-year classes in at least two of the major participating social science or humanities disciplines (that is, Comparative Religion, 1000.06R, 2000.06R; Economics, 1100.06R; History, 1050.06R, 1400.06R; Political Science, 1100.06R, 1103.06R, 1501.06R; Sociology and Social Anthropology, 1000.06R, 1050.06R, 1100.06R; or Spanish, 1100.03A or B, 1110.03A or B).

### Advanced Classes Required

- IDS 2000.06R
- IDS 3000.06R
- IDS 4010.06R (without the honours essay requirement)
- The equivalent of two full credit classes at or above the 2000-level in each of two established IDS disciplines. See below for the listing of International Development Studies classes.

**NOTE:** a minimum of the equivalent of five full-credit classes must be at the 3000-level or above.

## Major in International Development Studies

### Departmental Requirements

#### Classes required in Major:

**1000 level:** Completion of appropriate first-year classes in at least two of the major participating social science or humanities disciplines (that is, Comparative Religion 1000.06R, 2000.06R; Economics 1100.06R; History 1050.06R, 1400.06R; Political Science 1100.06R, 1103.06R, 1501.06R; Sociology and Social Anthropology, 1000.06R, 1050.06R, 1100.06R; or Spanish 1100.03A or B, 1110.03A or B).

### Advanced Classes Required

- IDS 2000.06R

- IDS 3000.06R plus the equivalent of one full-credit class at or above the 3000-level from the IDS list below.
- The equivalent of one full-credit class at or above the 2000-level in each of two established IDS disciplines. See below for the listing of International Development Studies classes.

## Classes Offered at Dalhousie University

### Core Required Classes

**IDS 2000.06R Introduction to Development Studies:** This is the entry level course for IDS majors and others wishing a broad overview of the themes and issues which define the study of international development. By means of lectures and discussion groups, students will be encouraged to gain a critical understanding of, for example, economic development, participatory development, development planning and policy, sustainable development, and how these contribute to, or impede social justice at the national and international levels.

**Format:** lectures and seminars  
**Prerequisites:** Two first year classes as indicated above under (1)

**IDS 3000.06R Seminar in Development Studies:** This course is a sequel to 2000.06R, and will focus on theoretical perspectives and development strategies regarding global, regional and national policies.

**Format:** Seminar  
**Prerequisite:** IDS 2000.06R

### IDS Special Classes

**IDS 3100.03A/3101.03B Special Topics in International Development Studies:** staff. A half-year reading class on a particular aspect of international development taught only by special arrangement between individual IDS major or honours students and individual instructors associated with the programme. Available in summers as well as regular sessions.

**Format:** Individual tutorial  
**Prerequisite:** IDS 2000.06R  
**Cross-listing:** IDS 3100.03 is cross-listed with SQA 3110.03

**IDS 3201.06R International Development Studies Through Canada World Youth:** Structured tutorials before and after Canadian World Youth (CWY) assignments. This class is intended for CWY participants who wish to earn academic credit related to their work in the Third World. It consists of pre-departure tutorials and post-return paper preparation based on an agreed research topic. IDS faculty will attend CWY orientations. CWY registrants will receive supervised readings in

development studies, and directions for field observations. They will be required to keep a journal of their observations and to prepare a research proposal for which they will collect materials while in the Third World. On returning to Canada they will communicate regularly with their advisor as they prepare a brief report on their field experience and an original research paper for evaluation.

**Format:** Individual tutorial with selected IDS faculty  
**Prerequisite:** None, although high school/university global studies is desirable

**IDS 3202.06R/ 4001.03A/ 4002.03B/ 4003.03R/ 4100.06R Special Topics in International Development Studies:** See class description for IDS 3100.03A/3101.03B, above.

**Prerequisite:** IDS 3000.06R  
**Cross-listing:** IDS 4003.03 is cross-listed with EDUC 4873.03

**IDS 4010.06R Honours Essay Practicum in International Development Studies:** Advanced seminar in theory and methodology leading to preparation and defence of honours essay.

**Format:** Seminar  
**Prerequisites:** IDS 2000.06R and IDS 3000.06R

**IDS 4210.06R Gender and Development:** The class will discuss the subject of gender and development in developing countries and in Canada. It aims to help students develop their theoretical understanding, research skills, and policy analysis in this new field of study. It will focus on issues such as education, work, health, the role of the state, and empowerment. Students taking the class at the graduate level will be expected to attain a higher level of achievement and may be required to do additional assignments.

**Format:** Seminar.  
**Prerequisites:** IDS 3000.06R or equivalent  
**Cross-listing:** SMU-IDS 622.1, 623.2 & SOC 422.1, 423.2

**Listing of Classes** routinely accepted within International Development Studies at Dalhousie University. It is possible to take a number of other classes, but only after approval by the coordinator. Some of these other classes are taught at Dalhousie, some at Saint Mary's. Students are thus encouraged also to review the current Saint Mary's calendar offerings.

**Note:** Classes marked "\*" are not offered every year so please consult the current timetable, in addition to the calendars, when registering.

### Biology

The importance of an understanding of biology for informed contribution to enabling sustainable development to become a reality

cannot be over-emphasized. While the class specifically identified as part of the IDS programme is Biology 4650.03B (Resource Systems and Economic Development), students are also encouraged to explore additional, appropriate biology classes with officials of the Biology Department.

- \*BIOL 4650.03B Resource Systems and Economic Development

## Comparative Religion

Understanding religion and its influences on human behaviour involves grasping both the meaning of faith in the lives of participants and the critical analysis of outside observers.

- \*COMR 2001.03A or B Judaism
- \*COMR 2002.03A or B Christianity
- \*COMR 2003.03A or B Islam
- \*COMR 2011.03A or B Hinduism
- \*COMR 2012.03A or B Chinese and Japanese Religions
- \*COMR 2013.03A or B Buddhism
- \*COMR 3014.03A or B Love and Death in World Religions
- \*COMR 3015.03A or B Myths, Symbols and Rites
- \*COMR 3532.03A or B Mystical Consciousness and Modern Science
- \*COMR 3502.03A or B The Rise of Modern Science
- \*COMR 3533.03A or B Spirituality and Ecology

## Earth Sciences

Geology lies behind many of the environmental problems facing humanity today - while energy and mineral resources provide an underpinning of many of the development plans of Third World nations.

- ESCI 2410.03B Environmental and Resource Geology

## Economics

A grasp of economic frameworks whereby societies allocate resources (human resources, natural resources and capital) is a prerequisite for understanding development plans and national prospects, development projects and foreign aid, the constraints and possibilities for sustainable development.

- \*ECON 2238.03A Industrial Revolution in Europe
- \*ECON 2239.03B European Economy in Historical Perspective
- \*ECON 2241.03A Comparative Economic Systems: National Economies

\*ECON 2250.06R Applied Class in Economic Development and the Environment

\*ECON 3242.03B Comparative Economic Systems: Economic Organization and Planning

\*ECON 3317.03B Poverty and Inequality

\*ECON 3330.03A or B International Trade

\*ECON 3333.03A or B Theories of Economic Development

\*ECON 3336.03B Regional Development

\*ECON 3350.03A or B Social Cost Benefit Analysis

\*ECON 3432.06R Regional Economics

\*ECON 4431.03A or B International Payments

## English and Spanish

Language skills are obviously important for effective communication for those wishing to pursue international development studies; but through the study of languages important insights about culture and development experience are also to be gleaned. The IDS programme encourages students minimally to study one additional (relevant) language to English.

### English

- \*ENGL 2211.06R Commonwealth Literature

### Spanish

- \*SPAN 2069.03A or B Central America to 1979
- \*SPAN 2070.03A or B Area Studies on Mexico and Central America
- \*SPAN 2109.03A or B Cuba from Colonial Times to 1961
- \*SPAN 2110.03A or B The Cuban Cultural Revolution
- \*SPAN 2130.03A or B Latin American Dictators in the Novel
- \*SPAN 2210.03A or B The Novel of the Mexican Revolution
- \*SPAN 2230.03A or B Contemporary Latin American Prose, Part I
- \*SPAN 2240.03A or B Contemporary Latin American Prose, Part II
- \*SPAN 3050.06R Culture and Society of the Dominican Republic
- \*SPAN 3070.03A or B Contemporary Latin American History

## Environmental Studies

Most environmental scientists have primary expertise in a particular discipline and work cooperatively with specialists from other

disciplines to solve environmental problems. Dalhousie does not offer a BSc major in environmental science - however, current programmes that provide streams emphasizing environmental subjects include Earth Sciences (particularly Environmental Studies) geology and hydrogeology, economics 2250.06R, marine biology and political science 3585.03A.

ESC1 2410.03B Environmental and Resource Geology

POL 3585.03A or B Politics of the Environment

POL 3590.06R Politics of the Sea

## Health Services Administration

Should resources be allocated to urban hospitals or rural clinics, advanced systems for surgical procedures for heart disease or basic primary health care programmes. Often, in a developing nation, the choices are difficult and resources extremely limited. Appropriate health services are an essential underpinning for sustainable development.

\*MHTA 5200.03B Principles of International Health

## History

Just as people need to know who they are and how they arrived there, groups, races, classes, states and nations need a sense of their own past as part of their culture and to guide their future development choices.

HIST 2006.03A or B After Columbus: Early European Imperialism In the Americas 1450-1650

HIST 2007.03A or B The Atlantic World: The Expansion of Europe, 1650-1800

\*HIST 2131.03A The Rise of the British Empire

\*HIST 2132.03B The Fall of the British Empire

\*HIST 2334.03A or B The United States, Canada and the World

\*HIST 2370.03A or B The Age of Imperialism 1870-1970

\*HIST 2381.03A or B Latin America: Underdevelopment and Revolution

\*HIST 2421.03A or B Colonial Africa

\*HIST 2422.03A or B Independent Africa

\*HIST 2501.03A or B The Middle East to the First World War

\*HIST 2502.03A or B The Middle East Since the First World War

\*HIST 3390.03A or B The Caribbean: Underdevelopment and Revolution

\*HIST 3440.03A or B African History from Oral Tradition

\*HIST 3451.03A or B South Africa to 1860

\*HIST 3452.03A or B South Africa since 1860

\*HIST 3461.03A or B Women and Development in Africa

\*HIST 3462.03A or B Distortion or Development: African History

\*HIST 3612.03A or B Women in Socialist Countries

\*HIST 3910.06R Health, Hunger, and Population in History

## Political Science

Political Science is valuable for individuals who want to know more about the values, laws, institutions and policy mechanisms that govern their lives in society, and, as well, the differences between their systems of government and those in other countries.

\*POL 2300.06R Comparative Politics

POL 2500.06R World Politics

\*POL 3302.03A or B Comparative Development Administration

POL 3303.03A or B Human Rights and Politics

POL 3315.03A or B African Politics

POL 3340.03A or B Approaches to Development

\*POL 3360.03A or B Politics In Latin America

POL 3531.03A or B The UN in World Politics

POL 3535.03A or B The New International Division of Labour

POL 3540.03A Foreign Policies of Third World States

POL 3544.03A or B Political Economy of Southern Africa

\*POL 3585.03B Politics of the Environment

\*POL 3590.06R The Politics of the Sea

## Sociology and Social Anthropology

Sociology provides a context within which students learn to think critically about their social environment. Social Anthropology aims at generalizations by comparing structures and processes in major institutions within societies (kinship, political, economic and religious) as well as between societies.

SOSA 2001.06R Ethnology in a Global Context

\*SOSA 2100.06R Environment and Culture

\*SOSA 2190.06R Comparative Perspectives on Gender

\*SOSA 2400.06R Health and Illness  
Across Cultures

SOSA 3060.03A or B Social Change and  
Development

\*SOSA 3206.03A or B Ethnicity,  
Nationalism, and Race

\*SOSA 3211.03A or B Continuity and  
Change in Rural Societies

\*SOSA 3231.03A or B Psychological  
Anthropology

### Women's Studies

It is important to recognize the implications of gender issues and to be sensitive to how these are viewed in different cultural circumstances. Hence, students are strongly advised to participate in at least one of the following WOST classes.

IDS 4210.06R Gender and Development

WOST 2800.06R Comparative  
Perspectives on Gender

WOST 3310.03A or B Women and  
Development in Africa

WOST 3330.03A or B Women in Socialist  
Societies

### The IDS 'Earth Summit' Prize on Sustainable Development:

A special prize is being awarded to the best essay paper submitted by an IDS student on a theme of direct relevance to the Rio Earth Summit. The prize is only open to Dalhousie and Saint Mary's IDS students at the undergraduate level. Essays should be submitted to the Dalhousie University Coordinator (typed) by 15 March 1994. An interdisciplinary panel will adjudicate. The essay may be written as part of a regular class or specifically for the competition. Additional details can be obtained from the Coordinator's Office at Dalhousie University.

### Seminars and Conferences

All IDS students are encouraged to attend the Killam Lecture Series for 1993-94, as well as the seminar series that are regularly sponsored through the Pearson Institute, the Gorebrook Institute and SRES. Students are encouraged to incorporate, in their programmes, classes which enable them to take advantage of Dalhousie's commitment to ocean studies, health and sustainable development.

## Linguistics

Various departments offer classes in linguistics or in some aspect of linguistic study in the broad sense:

- Classics (several classes in Greek and Latin)
- English (\*ENGL 3201.06R The English Language, \*ENGL 3202.06R History of the English Language, ENGL 4253.06R Old English, ENGL 4351.06R Middle English)
- French (\*FREN 2050.03A or B Structure of French Dictionaries, \*FREN 3020.06R Linguistics, \*FREN 3025.03A or B Linguistics, FREN 4001.03A History of French - The Middle Ages, FREN 4002.03B History of French - The Modern Period, \*FREN 4010.03A or B Great Linguists of the 20th Century, \*FREN 4011.03A or B Lexicology, \*FREN 4012.03A or B Aspects of French Structure, \*FREN 4015.06R Advanced Translation into English)
- German (various classes)
- Philosophy (PHIL 3300.03A or B Philosophy of Language, \*PHIL 4510.03A or B Topics in the Philosophy of Language, and other relevant classes in logic and on the work of Frege, Russell or Wittgenstein, for example.)
- Psychology (2190.03 Language and the Brain, 3150.03 Introduction to Hearing and Speech Mechanisms)
- Russian (RUSS 4000.06R The Structure of Contemporary Standard Russian, RUSS 4950.03A or B, RUSS 4960.03A or B, RUSS 4990.06R Russian Special Topics)
- Sociology and Social Anthropology (SOSA 3081.03A or B Sociolinguistics)

**Note:** Classes marked \* may not be offered every year. Please consult the current timetable on registration to determine if these classes are offered.

Further information about these classes will be found under the departmental listings. It should be noted that some of the classes listed may not be offered in the current year.

## Math, Statistics, & Computing Science

Location: Chase Building  
Telephone: (902) 494-2572  
Fax: (902) 494-5130

**Chairperson of Department**  
R.P. Gupta

### Emeritus Professors

M. Edelstein, MSc (Jerusalem), DSc (Technion-Haifa)  
S. Swaminathan, MA, MSc, PhD (Madras)  
A.J. Tingley, PhD (Minnesota)

### Professors

P. Borwein, MSc, PhD (UBC)  
J.C. Clements, MA (UBC), PhD (Tor)  
A.A. Coley, PhD (Lond)  
K.A. Dunn, MSc, PhD (Tor)  
C.A. Field, MSc, PhD (Northwestern) (Director of Statistics)  
P.A. Fillmore, MSc, PhD (Minnesota), FRSC  
G. Gabor, MSc, PhD (Eotvos)  
L.A. Grünenfelder, PhD (ETH Zurich)  
R.P. Gupta, MSc (Agra), PhD (Delhi)  
P. Keast, PhD (St. Andrews)  
K.J.M. Moriarty, MSc (Dal), PhD (Lond)  
R.J. Nowakowski, MSc, PhD (Calg)  
R. Paré, MSc, PhD (McG)  
H. Radjavi, MA, PhD (Minnesota)  
M.A. Shepherd, MSc, PhD (Western)  
P.N. Stewart, MA (Berkeley), PhD (UBC)  
W.R.S. Sutherland, MSc, PhD (Brown)  
K.K. Tan, PhD (UBC)  
A.C. Thompson, PhD (Newcastle upon Tyne)  
R.J. Wood, MSc (McM), PhD (Dal) (Director of Mathematics)

### Associate Professors

K. Dilcher, MSc, PhD (Queen's)  
A. Farrag, MSc (SFU), PhD (Alberta)  
D. Hamilton, MA, PhD (Queen's)  
C.S. Hartzman, MS (Purdue), PhD (Colorado)  
K.P. Johnson, MSc (Tor), PhD (Brandeis)  
C.C.A. Sastri, MSc (Andhra), PhD (New York)  
K. Thompson, PhD (Liverpool) (NSERC University Research Fellow) (Jointly with Oceanography)

### Assistant Professors

A. Aimudevar, PhD (Tor)  
K. Bowen, PhD (California)  
Q. Gao, PhD (Waterloo)  
K.E. Manchester, MSc, PhD (Tor)  
A. Sedgwick, PhD (Tor) (Co-op Director and Director of Computing Science)  
B. Smith, MA (Calgary), PhD (Berkeley)  
S. Srinivas, PhD (Ind. Inst. of Sc.)

### Lecturers

E. Cameron, MA (Oxon)  
D. Trueman, MSc (Tor)

### Computer Systems Manager

D. Trueman, MSc (Tor)

### Learning Centre Director

P. Stevens, MSc (Delft)

### Statistical Consultant

W. Blanchard, BSc (Dal)

### Postdoctoral Fellows

W. Jaworski, PhD (Queen's)  
T. Kosik, PhD (Calgary)  
D. McManus, MSc (Dublin), PhD (Alberta)  
B. Placha, PhD (Bielefeld)  
S. Richman, PhD (Virginia)  
T. Trappenberg, MSc, PhD (Aachen)  
E. Woolgar, PhD (Tor)  
H-K. Xu, PhD (Xi'an Jiaotong)

### Visiting Professors

M. Omladic (Ljubljana)  
P.Y. Wu (Taiwan)

### Adjunct Professors

M. Seattle (MtA)  
F. Bennett (MSVU)  
P. Cablilo (Acadia)  
R. Dawson (St. Marys)  
V. Huse-Eastwood (Acadia)  
H.S.P. Jones, (UCIS)  
L. Oliver (Acadia)  
M. Rahman, (TUNS)  
R. Roebrough (MtA)  
S. Sanilevici (Dal)  
C. Watters (Acadia)  
D. Zhuang (MSVU)

### Cross Appointments

B. Eastwood (Community Health and Epidemiology)  
M. Crowley (Education)

Information concerning programmes and classes in Mathematics follows immediately below. For Computing Science or Statistics, please refer to the corresponding section of this Calendar.

## Mathematics

Location: Chase Building  
 Telephone: (902) 494-2572  
 Fax: (902) 494-5130

### Director of Division

R.J. Wood

### Faculty Advisors

R.J. Wood (Undergraduate)  
 L. Grunfelder (Honours)  
 W.R.S. Sutherland (Graduate)  
 A. Sedgwick (Co-op)

## General Interest Classes

The Division offers several classes for non-majors who would like to know something about Mathematics.

- Math 1000.03/1010.03: This core calculus class is the starting point for any degree programme in the sciences.
- Math 1001.03/1002.03: A class designed especially for B.A. students and others who wish to know something about the historical and cultural aspects of mathematics.
- Math 1060.03: An Introduction, through examples drawn from a wide variety of disciplines, to the basic ideas of statistics.
- Math 1110.03/1120.03: Linear algebra and calculus arranged to meet the needs of commerce students, but of interest to anyone wishing a brief introduction to either of these topics.

## Degree Programmes

One full credit in Mathematics other than Mathematics 1001.03/1002.03 and 1110.03/1120.03 is required for a BSc degree.

Students should consult the "Degree Requirements" section of this calendar for specific regulations.

### Honours in Mathematics

#### Departmental Requirements

##### Classes required in Honours:

- 2000 level:** Math 2000.06 (or 2001.03/2002.03 or 2480.03/2490.03); 2030.03/2135.03 and 2505.03. Two and one-half other credits at or above the 2000 level - not including classes listed below.
- 3000 level:** Math 3030.06 and 3500.06

**4000 level:** Two credits at or above the 4000 level. Honours Qualifying Result.

Students may choose programmes with a concentration in Applied Mathematics, Computing Science, Pure Mathematics or Statistics. Students wishing to concentrate in Computing Science should consider Combined Honours in Mathematics and Computing Science, and examine the separate Calendar entry for Computing Science. Students wishing to concentrate in Statistics should consider Honours in Statistics or Combined Honours in Mathematics and Statistics, and examine the separate Calendar entry for Statistics. All honours programmes must be approved by the Chairperson. Students wishing to take an Honours degree concentrating in Applied Mathematics are advised to consider a programme similar to the following:

**Year 2:** 2001.03A; 2002.03B; 2030.03A; 2135.03B; 2505.03B; 2060.03A; 2060.03B; 2300.03A; Co-op Seminar and one elective class

**Year 3:** 3500.06R; 3030.06R; 3110.03A; two of 3210.03, 3300.03A, 3260.03B, an appropriate statistics class; 1 1/2 elective classes

**Year 4:** 4400.03; the remaining two of 3210.03, 3300.03A, 3260.03B, an appropriate statistics class; 1 1/2 other classes at the 4000 level; 2 elective classes.

Students wishing to take an Honours degree concentrating in Pure Mathematics are advised to consider a programme similar to the following:

**Year 2:** 2001.03A; 2002.03B; 2030.03A; 2135.03B; 2505.03B; another half mathematics class; 2 elective classes

**Year 3:** 3500.06R; 3030.06R; another full mathematics class; 2 elective classes

**Year 4:** 4010.03A; 4140.03A; three other full mathematics classes, at least one of which is at the 4000 level; 1 elective class.

It is recommended that the additional mathematics classes include a statistics class, an applied class and a class in algebra, topology or complex variables.

**Honours Comprehensive Examination:** The Honours Comprehensive Examination in mathematics consists of a written paper of about 20-30 pages researched and prepared by the student during the spring term. The topic is decided on in conjunction with the supervisor of the Honours seminar. The paper is also presented to the seminar. The Honours Comprehensive Examination in statistics requires successful completion of Statistics 8880.

## Combined Honours

Students interested in taking honours in mathematics or statistics and another subject as a combined 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 or statistics and another subject should, however, bear in mind that the work in either subject would probably be insufficient for admission to a regular graduate programme. A qualifying year would usually be necessary.

## Advanced Major and Major in Mathematics

### Departmental Requirements

#### Classes required in Advanced Major:

**2000 level:** Math 2000.06 (or 2001.03/2002.03 or 2480.03/2490.03), Math 2030.03 and 2040.03 (or 2135.03).

One other credit at or above 2000 level - not including classes listed below.

**3000 level:** Three credits at or above the 3000 level

#### Classes required in Major:

**2000 level:** Math 2001.06 (or 2001.03/2002.03 or 2480.03/2490.03), Math 2030.03 and 2040.03 (or 2135.03)

**3000 level:** Two credits at or above the 3000 level

Majors in Mathematics are strongly urged to include Computing Science 1400.03, 1410.03 as part of their programme.

Students wishing to concentrate in Applied Mathematics, Pure Mathematics or Statistics are advised to consider modelling their programmes on the first three years of the Mathematics or Statistics Honours programmes.

Those students who wish to arrange inter-disciplinary programmes (with such fields as Physics, Chemistry, Biology, Engineering, Psychology and Economics) are invited to discuss their interests with the department.

## Co-operative Education Programmes

The Co-operative Education Programme is an integrated programme of 8 academic terms and 4 work terms of relevant industrial/laboratory employment. The work terms, each of 4 months duration, are spent in industrial and laboratory positions. The work experience helps students see the

applicability of their training in mathematics, statistics and computing science and helps them make intelligent career choices. Upon successful completion of the programme the student's transcript indicates that the programme was a cooperative one.

A Co-op degree normally takes 4 1/3 years. The co-op programmes are available either as an Advanced Major (20-credit) degree programme or as an Honours degree programme.

There are three Advanced Major Co-op programmes; one in each division of the Department.

There are four Honours Co-op programmes available within this Department, in the areas of:

- Mathematics
- Mathematics and Computing Science combined
- Computing Science
- Statistics

A Combined Honours Co-op degree, combining Mathematics or Computing Science or Statistics and another appropriate subject, is possible. Students interested in such a programme should consult the Director of Co-op Education.

Students who are interested in Co-operative Education Programmes in the Department should consult the Co-operative Education in Science entry in this calendar for further information.

### Departmental Requirements

#### Classes required for Honours Co-op:

**2000 level:** Math 2001.03/2002.03 (or 2480.03/2490.03); 2030.03/2135.03 and 2505.03B. Two and one half other credits at or above the 2000 level - not including classes listed below.

**3000 level:** Math 3030.06 and 3500.06

**4000 level:** Two credits at or above the 4000 level. Honours Qualifying Result.

**4 Co-op Workterms:** 8891.12, 8892.12, 8893.12, 8894.12

#### Classes required in Advanced Major Co-op:

**2000 level:** Math 2001.03/2002.03 (or 2480.03/2490.03), Math 2030.03 and 2040.03 (or 2135.03)

One other credit at or above the 2000 level - not including classes listed below.

**3000 level:** Three credits at or above the 3000 level

**4 Co-op Workterms:** 8891.12, 8892.12, 8893.12, 8894.12

## Prerequisites and Performance Test

The prerequisites listed in the class descriptions indicate the mathematical background expected of students entering that class, but may be waived with the consent of the instructor. In addition to the listed prerequisites students may write a short preliminary performance test before enrolling in the following classes: 0010.00R, 1000.03A or B, 1080.03A or B, 1110.03B, and 1120.03A.

These preliminary tests are held regularly during the summer and during fall registration. Students are urged to make arrangements for taking these tests as soon as possible. Further information is obtainable by contacting the department or the Math Learning Centre (902-494-2484).

## Classes Offered

Class descriptions for Computing Science can be found in the calendar under Computing Science. Class descriptions for Statistics can be found in the calendar under Statistics.

Credit may not be obtained twice for the same class even if the numbers have been changed.

Classes with the designation (MLC) are supported by the tutorial services of the Math Learning Centre.

Classes marked with an asterisk (\*) may not be offered every year.

**MATH 0010.00R Pre-University Mathematics, "Classroom Version":** This class does not count as part of the regular student class load. This class is designed for students who do not have the usual prerequisite for first-year math classes (i.e. N.S. Math 441), or for others who wish to strengthen their background in mathematics. The class begins with a review of algebra, use of variables, exponents, absolute value, factoring methods and solution of equations and inequalities. This leads to graphing and the functional approach which is the focus of the class. Functions studied include linear, quadratic, inverse, exponential, logarithmic and trigonometric. Throughout the year, there is strong emphasis on the use of mathematical models to solve application problems. Students completing this class should not only be adept at the mechanics of mathematics, but also have an understanding of the uses of these skills. After successful completion of this class, the student will have the necessary prerequisite for any first-year university mathematics, statistics or computing science class. Students register and pay for this class at Henson College, Centre for Continuing Studies, 8100 University Avenue.

**Format:** Lecture 3 hours, (non-credit class), MLC

**Prerequisite:** Performance test

**Note:** Mathematics 1000.03 and Mathematics 1010.03 introduce the basic ideas of the calculus, and together constitute a solid foundation for study in the Sciences (Physics, Chemistry, Biology, etc.), as well as for further study in Mathematics. Students who require one or both of these classes, but are uncertain of their ability to handle them, are invited to make use of the diagnostic and remedial services offered in the Mathematics Learning Centre, located in the basement of the Chase Building.

**MATH 1000.03A or B or R Differential and Integral Calculus:** A self-contained introduction to differential and integral calculus. The topics include: functions, limits, differentiation of polynomial, trigonometric, exponential and logarithmic functions, product, quotient and chain rules, applications of differentiation, antiderivatives and definite integrals, integration by substitution. A sequel to this class is Mathematics 1010.03.

**Format:** Lecture 3 hours, tutorial 1 hour, MLC

**Prerequisite:** Nova Scotia Mathematics 441 or equivalent

**Exclusion:** Credit will be given for only one of Mathematics 1000.03, 1120.03

### \*MATH 1001.03A Mathematics for Liberal

Arts Students I: For students who wish to become acquainted with mathematics as an art rather than as a tool for the sciences. A selection of elementary topics will be discussed with a view to illuminating historical and cultural aspects of the subject. Required work will include a series of written reports on assigned readings and a major essay. This class cannot be used to satisfy the B.Sc. mathematics requirement.

**Format:** Lecture 3 hours, MLC

**Prerequisite:** None

### \*MATH 1002.03B Mathematics for Liberal

Arts Students II: Same as 1001A above, but with a different set of topics. Either one or both of 1001.03A and 1002.03B may be taken for credit. This class cannot be used to satisfy the BSc Mathematics requirement.

**Format:** Lecture 3 hours, MLC

**Prerequisite:** None

**MATH 1010.03A or B Differential and Integral Calculus:** A continuation of the study of calculus with topics including: techniques of integration, elementary differential equations and applications, Riemann sums, parametric equations and polar coordinates, sequences and series, Taylor series.

**Format:** Lecture 3 hours, tutorial 1 hour, MLC

**Prerequisite:** MATH 1000.03

**MATH 1060.03A or B Introductory Statistics for Science and Health Sciences:** See class description for STAT 1060.03 in the Statistics section of this calendar.

**MATH 1110.03A or B Finite Mathematics for Commerce:** This class provides an introduction to the methods of finite mathematics with special emphasis on applications to business. Topics include linear equations, systems of linear equations, matrices, determinants, matrix inverses, linear programming including the simplex method, an introduction to nonlinear functions and the elements of the mathematics of finance. This class replaces half of the previous class Math 1100R. This class may not be used to partially satisfy the requirement that BSc students must have at least one full university class in mathematics.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** Nova Scotia Mathematics 442 or equivalent

**MATH 1120.03A or B Calculus for Commerce:** This is an elementary calculus class with special emphasis on applications to business. Topics include functions, limits, rate of change, derivatives, one variable optimization and curve sketching, exponential functions, logarithmic functions, functions of several variables, Lagrange multipliers, elementary integration. This class replaces half of the previous class Math 1100R. This class may not be used to partially satisfy the requirement that BSc students must have at least one full university class in mathematics.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** Nova Scotia Mathematics 442 or equivalent  
**Exclusion:** Credit can be given for only one of MATH 1120.03, and MATH 1000.03

**\*MATH 1500.06R Calculus:** This class is intended primarily for students who anticipate taking an honours programme in the physical or mathematical sciences. The topics of Mathematics 1000.03/1010.03 are covered, but in greater depth. MATH 1500.06 is equivalent as a credit to MATH 1000.03/1010.03.

**Format:** Lecture 3 hours, tutorial 1 hour  
**Prerequisite:** High standing in Nova Scotia Mathematics 441 or equivalent  
**Exclusion:** Credit can be given for only one of MATH 1000.03/1010.03 and 1500.06

**MATH 1670.03A Discrete Structures I:** This class together with MATH 2670.03 offers a survey of those areas in Mathematics which may be classified as dealing with discrete structures. Areas covered include set theory, mathematical induction, number theory, relations, functions, algebraic structures and introductory graph theory. The topics to be

discussed are fundamental to most areas of Mathematics and have wide applicability to Computing Science.

**Format:** Lecture 3 hours  
**Prerequisites:** Nova Scotia Mathematics 441 or equivalent  
**Cross-listing:** COMP 1670.03

**MATH 2000.06R Intermediate Calculus:** This class deals with the calculus of functions of several variables. Topics include: continuous functions and their fundamental properties, partial derivatives and applications, multiple integrals, geometry of Euclidean vector spaces with emphasis on three dimensions, elementary differential equations.

**Format:** Lecture 3 hours, MLC  
**Prerequisite:** MATH 1010.03  
**Exclusion:** Students who take MATH 2000.06 may not also receive credit for 2001.03/2002.03 or 2480.03/2490.03

**MATH 2001.03 A or B:** This is the first half of Math 2000.06; essentially it deals with differential calculus of functions of several variables. It is meant primarily for co-op students who cannot take a year-long class.

**Format:** lecture, 3 hours  
**Prerequisite:** MATH 1010.03  
**Exclusion:** Credit can be given for only one of the following classes: MATH 2000.06, 2480.03, and 2001.03.

**MATH 2002.03A or B:** This is the second half of Math 2000.06 and is a continuation of MATH 2001.03.

**Format:** lecture, 3 hours  
**Prerequisite:** MATH 2001.03  
**Exclusion:** Credit can be given for only one of the following classes: MATH 2000.06, 2490.03 and 2002.03.

**MATH 2030.03A Matrix Theory and Linear Algebra I:** This class, together with Mathematics 2040.03, is a self-contained introduction to Matrix Theory and Linear Algebra. Topics include: vector spaces, linear transformations, determinants, systems of linear equations. Students should note that this is a second-year class and, although it has no formal first-year prerequisites, mathematical maturity and an ability to handle formal proofs at the level of a student who has completed Mathematics 1000 is expected.  
**Format:** Lecture 3 hours, MLC  
**Prerequisite:** Nova Scotia Mathematics 441 or equivalent

**MATH 2040.03B Matrix Theory and Linear Algebra II:** This class is a continuation of Mathematics 2030.03. Topics include: similarity, diagonalization, inner product spaces.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** MATH 2030.03 and 1000.03

**Exclusion:** Credit can be given for only one of MATH 2040.03 and 2135.03

**\*MATH 2050.06R Problems in Geometry:** This class is organized around a sequence of stimulating geometrical problems. A set of approximately 20 challenging problems is given to the students at the beginning of the year. The students are expected to attempt these problems throughout the year. Good students should be able to do some of these problems and are encouraged to present their solutions to the class for extra credit on the final grade. These problems are chosen so that their solutions use a wide variety of geometrical ideas (from Combinatorial, Projective, Inversive, Transformational, Topological, Differential and Non-Euclidean Geometry).

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 1010.03  
**Exclusion:** Credit can be given for only one of MATH 2050.06 and MATH 2051.03.

**\*MATH 2051.03A or B Problems in Geometry:** A half class on such material from MATH 2050.06 as time permits.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 1010.03  
**Exclusion:** Credit can be given for only one of MATH 2050.06 and MATH 2051.03.

**MATH 2080.03A or B Introduction to Probability and Statistics I:** See class description for STAT 2080.03 in the Statistics section of this calendar.

**MATH 2080.03B Statistical Methods For Data Analysis & Inference:** See class description for STAT 2080.03 in the Statistics section of this calendar.

**MATH 2135.03B Linear Algebra:** This class is a continuation of MATH 2030.03. Topics include: similarity, diagonalization, inner product spaces. It is intended for honours students only.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2030.03  
**Exclusions:** Credit can be given for only one of MATH 2040.03 and 2135.03

**MATH 2300.03A or B Mathematical Modelling I:** This class is designed to provide a bridge between introductory calculus and the applications of mathematics to various fields. By using fundamental calculus concepts in a modelling framework, the student investigates meaningful and practical problems chosen from common experiences encompassing many academic disciplines, including the mathematical sciences, operations research, engineering and the

management and life sciences. Some simple user-friendly computer packages will be introduced.

**Format:** Lecture 3 hours, MLC  
**Corequisite:** MATH 2030.03 and MATH 1000.03  
**Cross-listing:** COMP 2300.03, STAT 2300.03

**MATH 2480.03A/2490.03B Intermediate Calculus for the Engineering Programme:** The topics for these two half classes include functions of several variables, partial derivatives, multiple integrals, indeterminate forms, improper integrals, infinite series, power series, Taylor and MacLaurin series, matrices, determinants, systems of linear equations, complex numbers, elementary ordinary differential equations.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** MATH 1010.03  
**Exclusion:** Students who take MATH 2480.03/2490.03 may not also receive credit for 2000.06, 2001.03, 2002.06

**MATH 2505.03B Introductory Analysis:** For honours students and other serious students of mathematics. Topics include: the axioms for the real number system, geometry and topology of Euclidean space, limits, continuity, differentiability, the inverse and implicit function theorems.

**Format:** Lecture 3 hours  
**Prerequisites:** Good standing in MATH 2001.03

**\*MATH 2540.03A Basic Set Theory:** An introduction to the basic topics of set theory, including equivalence relations, order, recursion, the axiom of choice, ordinals and cardinals.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 1000.03

**\*MATH 2600.03 A or B Theory of Interest:** A detailed examination of the theory of simple and compound interest. The syllabus includes the material on which the theory of interest portion of Examination 4 in the Society of Actuaries examination series is based. Some of the topics are: nominal and effective rates of interest and discount, force of interest, annuities, perpetuities, price of bonds, callable bonds, special topics. This class should appeal to students in mathematics, economics and commerce. Students interested in an actuarial career should take this class and are urged to consult the department for guidance in class selection and additional information.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** MATH 1010.03 or 1110.03  
**Cross-listing:** STAT 2600.03

**MATH 2670.03B Discrete Structures II:** See class description for COMP 2670.03 in the Computing Science section of this calendar.

**\*MATH 2800.03A or B Applied Mathematics for the Life Sciences:** This class is intended as a preparation for the mathematical aspects of advanced classes in ecology, genetics and physiology and is designed primarily for honours students in the biological sciences. The topics to be covered include complex numbers, linear algebra, difference equations and differential equations. Students are introduced to each topic through examples drawn from appropriate areas of biology and physiology. Computer software packages such as MINITAB, MATLAB and MAPLE are used to solve specific problems. This class is not given every year and students interested should consult the department. Students interested in the applications of mathematics should also consider MATH 2300.03 and/or MATH 3260.03.

**Format:** Lecture 3 hours, MLC  
**Prerequisites:** MATH 1000.03 and BIOL 1000.06

**SCI 3000.06R Science Fundamentals:** An interdisciplinary class that stresses the motivations, methodologies, and responsibilities of scientists, and provides extensive formal instruction in written and oral communication of scientific material. For details, see main calendar entry "Science, Interdisciplinary." The status of this class (elective, minor, or major credit) varies from department to department; check with your undergraduate advisor.

**MATH 3030.06R Abstract Algebra:** In this first class in abstract algebra the following topics are treated: groups, sub-groups, factor groups, homomorphisms, rings, ideals, Euclidean domains, polynomial rings, fields, unique factorization, irreducible polynomials, Sylow theorems, solvability of polynomial equations, Galois theory, and the Jordan canonical form.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2040.03 or 2135.03

**\*MATH 3040.03A or B Metric Spaces and Elementary Topology:** Topics include: metric spaces: bounded-, totally bounded-, compact- and complete sets in metric spaces; Lipschitz and contraction mappings; topological spaces; open and closed sets, bases; continuity, compactness, connectedness.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and 2135.03 (or 2040.03)

**\*MATH 3050.06R Differential Geometry and Tensor Analysis:** The material consists of two parts. The first part discusses the theory of curves and surfaces in three-dimensional Euclidean space. Topics include: theory of curves; surfaces, first and second fundamental forms, Gaussian and mean curvature, formulae of Weingarten and Gauss, geodesic curvature and geodesics. The second part consists of an introduction to

Riemannian geometry, and, if time permits, an introduction to general relativity as an application of Riemannian geometry. Topics include: foundations of tensor calculus, differentiable manifolds, foundations of Riemannian geometry, absolute differentiation and connexions.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and 2135.03 (or 2040.03)

**\*MATH 3070.03A or B Theory of Numbers:** The following topics are discussed: congruences and residues; elementary properties of congruences; linear congruences; theorems of Fermat, Euler and Wilson; Chinese remainder theorem; quadratic residue; law of quadratic reciprocity; Legendre, Jacobi and Kronecker symbols, arithmetic functions; algebraic fields; algebraic numbers and integers; uniqueness of factorization, definition and elementary properties of ideals; ideal classes and class number.

**Format:** Lecture 3 hours  
**Prerequisite:** MATH 2040.03 (or 2135.03)

**\*MATH 3080.03A or B Introduction to Complex Variables:** An introduction to the basic elements of complex analysis. Topics include: complex numbers, functions, differentiation and integration in the complex plane, some special mappings, series in general, Taylor and Laurent Series, residues, some principles of conformal mapping theory.

**Format:** Lecture 3 hours  
**Prerequisite:** MATH 2000.06

**MATH 3090.03A Advanced Calculus I: An Introduction to Fourier Series.** Topics covered include half range expansions, expansions on other intervals, convergence theorems, differentiation and integration of Fourier Series and the Complex form of Fourier Series. Also an introduction to special functions, including Gamma and Beta functions and orthogonal polynomials and some of their properties is given. Additional topics covered include some implicit function theorems and an introduction to transformations.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and MATH 2030.03

**Exclusion:** Credit cannot be given for both MATH 3090.03A and MATH 3500.06

**MATH 3100.03B Advanced Calculus II:** Topics covered include properties of functions defined by integrals: differentiation under the integral sign, tests for the convergence of improper integrals, improper multiple integrals and functions defined by improper integrals. Also considered is the Fourier integral and various other integral transforms, a review of

multiple integrals and vector field theory. Green's, Stokes' and the divergence theorems and related matters are also considered.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 3090.03

**Exclusions:** Credit cannot be given for both MATH 3500.06 and 3100.03B.

**MATH 3110.03A Differential Equations:** One of the aims of this class is to give students the ability to analyze and solve a number of different types of differential equations.

Wherever possible, applications are drawn from the fields of physics, chemistry, biology, and other areas. The class is intended mainly for mathematics students interested in applications and for science students who wish to be able to solve problems arising in their major areas of interest.

**Format:** Lecture 3 hours, MLC  
**Prerequisite:** MATH 2000.06

**MATH 3120.03B Differential Equations:** The topics discussed are of great importance to any student interested in applied mathematics. Areas include Fourier series, orthogonal polynomials, Sturm-Liouville problems, the classical partial differential equations, and some applications to physics, chemistry and engineering.

**Format:** Lecture 3 hours  
**Prerequisite:** MATH 3110.03

**\*MATH 3170.03A Introduction to Numerical Linear Algebra:** For description see Computing Science 3170.03A.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 1010.03, 2030.03 and COMP 1410.03

**Cross-listing:** COMP 3170.03A

**\*MATH 3210.03B Introduction to Numerical Analysis:** Some more advanced aspects of numerical linear algebra, including the Power Method and the QR Algorithm are examined. Various acceleration procedures for iterative processes are examined. Several forms of interpolating polynomials including Newton, Lagrange and Hermite are considered. Finite differences are also introduced. Numerical differentiation and integration is examined. In particular, interpolatory, Gaussian, Romberg and adaptive quadrature are discussed, and error estimates considered. Polynomial splines and some of their properties are introduced. Methods for solving nonlinear equations including the Newton-Raphson method are considered. Special attention is paid to finding the roots of a polynomial. Throughout, the difficulties of implementing the various methods are discussed, and illustrated via assignments. Finally, some indication of the difficulties involved in multidimensional numerical analysis is given.

**Format:** Lecture 3 hours  
**Prerequisites:** Instructor's permission

**Cross-listing:** COMP 3210.03B, and previously part of 3200.08R

**MATH 3280.03A or B Mathematical Modelling II:** This class is an introduction to mathematical modelling and analysis using intermediate level calculus and elementary differential equations. It includes such topics as "can we prove mathematically that relativistic effects explain the procession in the perihelion of Mercury?"; "is there truth to the legend of Samson and the Euler column?"; "how do we quantify and analyse traffic flow?"; "how does mathematics prove that a guitar is more musical than a drum?"; and "what is an economically optimal forest harvesting strategy?"

**Format:** lecture 3 hours  
**Prerequisite:** MATH 3110.03 (may be taken concurrently)

**MATH 3300.03A Optimization I:** This class is an introduction to the concepts and applications of linear and nonlinear programming. Topics include the simplex method for linear programming, duality and sensitivity analysis, convex programming, Kuhn-Tucker and Lagrange multiplier conditions, numerical algorithms for unconstrained and constrained problems. Some of these topics are illustrated by means of interactive computer packages.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and 2040.03

**MATH 3310.03B Optimization II:** This class continues the study of the topics in 3300.03. Additional topics to be covered include network flow theory, graph theoretic matching problems, shortest route problems, discrete dynamic programming models, and combinatorial optimization with emphasis on integer programming problems.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and 2040.03

**\*MATH 3320.03A or B Applied Group Theory:** This interdisciplinary half-class is intended for third and fourth-year undergraduate and first-year graduate students in Chemistry, Mathematics and Physics. With some additional reading in Physics, it is equivalent to Physics 4480.03A. Topics include: review of matrices, fundamentals of groups, normal subgroups, homomorphisms, representations, character, orthogonality, symmetry groups in crystallography, role of symmetry groups in quantum physics and chemistry, normal modes and molecular vibrations.

**Format:** Lecture 3 hours  
**Prerequisites:** MATH 2000.06 and 2030.03  
**Cross-listing:** PHYC 4480.03/6480.03

**\*MATH 3330.03A or B Graph Theory and Combinatorics:** The following topics are discussed: elements of graph theory, paths and cycles, Eulerian graphs, trees, planar

graphs and the Euler polyhedral formula, Hamiltonian graphs, chromatic numbers, the five-colour theorems; items to be selected from the following topics to suit class: graphs and matrices, graphs and groups, extremal problems, and enumeration problems.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 2000.06 and 2040.03

**\*MATH 3340.03A or B Regression and Analysis of Variance:** See class description for STAT 3340.03, in the Statistics section of this calendar.

**\*MATH 3360.03A or B Probability:** See class description for STAT 3360.03, in the Statistics section of this calendar.

**\*MATH 3380.03A or B Sample Survey Methods:** See class description for STAT 3380.03, in the Statistics section of this calendar.

**\*MATH 3460.03 A or B Intermediate Statistical Theory:** See class description for STAT 3460.03 in the Statistics section of this calendar.

**MATH 3500.06R Intermediate Analysis:** Mathematics 3500.06 continues the analysis sequence begun in Mathematics 2505.03. Topics include: number systems, metric spaces, compactness, continuous functions on metric spaces, Stone-Weierstrass theorem, Arzela-Ascoli theorem, sequences and series of functions and their properties, inverse and implicit function theorems, extrema, co-ordinate transformations.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 2135.03, 2505.03

**Exclusions:** Credit cannot be given for both MATH 3500.06 and 3090.03A, or for both MATH 3500.06 and 3100.03B

**MATH 4010.03A or B Introduction to Measure Theory and Integration:** A discussion of Lebesgue's theory of measure and integration on the real line. The topics include: the extended real number system and its basic properties; the definition of measurable sets, Lebesgue measure and the existence of non-measurable sets; the Lebesgue Integral; differentiation of monotonic functions (e.g. the Cantor function), absolute continuity, the classical Lebesgue spaces, Fourier series.

**Format:** Lecture 3 hours

**Prerequisite:** MATH 3500.06

**Cross-listing:** MATH 5010.03

**\*MATH 4020.03A or B Analytic Function Theory:** A second half-class in complex function theory. Topics include: review of analytic complex functions including topological properties of the plane, Mobius mappings, exponential, logarithmic, trigonometric and related functions, integration and the Cauchy theorem.

Cauchy's integral formula, residues, harmonic functions, analytic continuation, entire and meromorphic functions, some results of conformal mapping, including the Riemann mapping theorem.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3080.03 and either 3100.03 or 3500.06

**Cross-listing:** MATH 5020.03

**\*MATH 4025.03A or B Commutative Algebra I:** This introduction to commutative algebra includes a selection of the following topics: prime and maximal ideals, primary decomposition, Noetherian rings, Hilbert's Basis Theorem and the Nullstellensatz.

**Format:** lecture, 3 hours

**Prerequisite:** Math 3030.06 or equivalent

**Cross-listing:** MATH 5025.03

**\*MATH 4035.03A or B Commutative Algebra II:** This class will examine some geometric applications of the material developed in Commutative Algebra I. Topics will include plane curves and Bezout's theorem, cubic curves, higher dimensional varieties, and an introduction to the Riemann-Roch Theorem.

**Format:** lecture, 3 hours

**Prerequisite:** Math 4025.03

**Cross-listing:** MATH 5035.03

**\*MATH 4045.03A or B Advanced Algebra I:** Topics may include: structure of groups, rings, fields, and modules; Galois theory. Other topics of special interest may be covered.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3030.06

**Cross-listing:** MATH 5045.03

**\*MATH 4055.03A or B Advanced Algebra II:** Topics may include: Algebras over a field, classical representation theory of groups and algebras, lattices, Boolean algebra. Additional topics may be covered at the discretion of the instructor.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3030.06

**Cross-listing:** MATH 5055.03

**\*MATH 4060.06R Advanced Statistical Theory:** See class description for STAT 4060.06, in the Statistics section of this calendar.

**\*MATH 4065.03A or B Algebraic Geometry:** an introduction to the basic concepts of algebraic geometry.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3030.06

**Cross-listing:** MATH 5065.03

**\*MATH 4070.03A or B Topics in Number Theory:** The course is intended to give an introduction to both analytic and algebraic number theory. Following a short review of basic notions from elementary number theory, there will be a detailed discussion of quadratic

reciprocity and some of its applications and extensions. The main topics from analytic number theory will be arithmetic functions a Dirichlet L-series, resulting in a proof of Dirichlet's theorem on primes in arithmetic progressions. Finally, some fundamental properties of algebraic number fields will be discussed, with some emphasis on quadratic and cyclotomic fields.

**Format:** Lecture 3 hours

**Prerequisites:** Math 3070.03

**Cross-listing:** MATH 5070.03

**\*MATH 4080.03A or B Time Series Analysis**  
**!!:** See class description for STAT 4400.03 in the Statistics section of this calendar.

**\*MATH 4090.03A or B Probability:** A mathematically rigorous treatment of probability theory in Euclidean space. Topics include the definitions and properties of random variables and their distribution functions, various convergence concepts, the Borel-Cantelli lemma, weak and strong laws of large numbers, characteristic functions, central limit theorems. Although the necessary measure theory is introduced, a previous analysis class is an asset.

**Format:** Lecture 3 hours

**Prerequisite:** Mathematics 3360.03 and a third year analysis class

**Cross-listing:** STAT 4090.03/5090.03, MATH 5090.03

**\*MATH 4130.03A or B Analysis of Algorithms:** See class description for COMP 4130.03A or B in the Computing Science section of this calendar.

**\*MATH 4135.03A or B Introduction to Category Theory:** Categories, functors, natural transformations and adjointness are introduced with emphasis on examples drawn from undergraduate Mathematics and theoretical Computer Science. The calculus of diagram chasing, limits, colimits and Kan Extensions is explored in detail to provide a thorough foundation for subsequent specialized classes.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3030.06 or permission of the instructor.

**Cross-listing:** MATH 5135.03

**\*MATH 4140.03A or B Introduction to Functional Analysis:** An introduction to the basic principles of functional analysis including the following topics: infinite dimensional vector spaces, normed spaces, inner-product spaces, Banach and Hilbert spaces, linear and continuous linear functionals, the Hahn-Banach Theorem, the principle of uniform boundedness, dual spaces, weak\* topology, and the Alaoglu theorem, the open mapping and closed graph theorems, and consequences and applications.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 2135.03 and 3040.03 or 3500.06

**Cross-listing:** MATH 5140.03

**\*MATH 4180.03A or B Functional Analysis:** Topics include: topological vector spaces, locally convex spaces, normability, function spaces, strict convexity, uniform convexity, reflexive spaces, support functionals, geometry of convex sets and other topics.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 4140.03

**Cross-listing:** MATH 5150.03

**\*MATH 4180.03A or B Operator Theory:** An introduction to the theory and applications of continuous linear operators on Hilbert spaces, culminating with the spectral theorem, and including such topics as spectrum; adjoint; symmetric, self-adjoint, unitary, and normal operators; polar decomposition; differential and integral operators;  $C^*$  algebras; Gelfand's Theorem; and the spectral theorem.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 4010.03 and 4140.03

**Cross-listing:** MATH 5160.03

**\*MATH 4170.03A or B General Topology:** An introduction to topological spaces, and includes the following topics: classification in terms of cardinality of bases, separation, etc., product spaces, Tychonoff theorem, compactness, compactifications, Tychonoff spaces, metrization.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3040.03 or 3500.06

**Cross-listing:** MATH 5170.03

**\*MATH 4180.03A or B Introduction to Algebraic Topology:** An introduction to algebraic topology and including the following topics: homotopy type and the fundamental group, geometry of simplicial complexes, homology theory of complexes, chain complexes, homology groups for complexes, subdivision, induced homomorphisms, axioms for algebraic topology, singular homology, the singular complex, properties of cell complexes.

**Format:** Lecture 3 hours

**Prerequisite:** MATH 4170.03

**Cross-listing:** MATH 5180.03

**\*MATH 4190.03A or B Differential Equations:** Mathematics 3120 is recommended. Topics covered include existence and uniqueness theorems, continuity of solutions, Floquet theory, autonomous differential equations and their relation to dynamical systems and flows, periodic solutions and the Poincaré-Bendixson theorem.

**Format:** Lecture 3 hours

**Prerequisites:** MATH 3500.06 (3090.03 and 3100.03) and 2030.03/2040.03 or 2135.03

**Cross-listing:** MATH 5190.03

**\*MATH 4200.03A or B Differential Equations - Qualitative Theory:**

Qualitative theory is concerned with what can be determined about the phase-portrait and the general behaviour of solutions of differential equations even though those solutions are not explicitly exhibited. Topics are selected from Liapunov stability theory, stable and unstable manifolds of singular points and periodic solutions, classification of plane singular points, structural stability, differential equations on manifolds and Hamiltonian systems. Various equations occurring in applications are qualitatively analysed. The precise topics and equations covered depend on the specific interests of the instructor and the students.

Format: Lecture 3 hours

Prerequisite: MATH 4190.03

Cross-listing: MATH 5200.03

**\*MATH 4220.03A or B Introduction to Partial Differential Equations:**

This class is the first half of a two term sequence designed to introduce the student to the theoretical and numerical aspects of partial differential equations. Topics to be covered include: review of the theory of ordinary differential equations, classification of partial differential equations, solution of first order equations, the diffusion equation and random walk, Fourier Series and transforms, generalized functions, eigenfunction expansions.

Format: Lecture 3 hours

Prerequisite: MATH 3110.03

Cross-listing: MATH 5220.03

**\*MATH 4230.03A or B Partial Differential Equations:**

This class continues the study of partial differential equations begun in 4220.03A. Topics to be covered include: The Rayleigh-Ritz method, Green's Functions, finite difference methods of solution, an introduction to the finite element method.

Format: Lecture 3 hours

Prerequisite: MATH 4220.03

Cross-listing: MATH 5230.03

**\*MATH 4270.03A or B Numerical Software:**

See class description for COMP 4270.03A or B in the Computing Science section of this calendar.

**\*MATH 4300.03A or B Optimal Control Theory and Applications:**

Initially the classical calculus of variations is studied and the sufficiency conditions emphasized. A constructive solution of the Euler equations is presented. Then the modern theory of optimal control is developed using techniques of mathematical programming. This approach is applied to a variety of problems such as economic growth theory, inventory control and regulator problems. Numerical methods are also presented.

Format: Lecture 3 hours

Prerequisite: Consent of instructor

Cross-listing: MATH 5300.03

**\*MATH 4310.03A or B Nonlinear Programming:**

A thorough introduction to the mathematical problem of optimizing a real-valued function of  $n$  variables subject to a system of constraints. Theoretical topics include the theory of convex sets and functions, directional derivatives, the Karush-Kuhn-Tucker optimality conditions, and dual problems. Several algorithms will be developed for the numerical solution of problems, including quasi-Newton and barrier methods. Software packages will be used to solve several practical applications.

Format: Lecture 3 hours

Prerequisites: Math 3500.06 (or 3090.03 and 3100.03) and 2135.03 (or 2040.03)

Cross-listing: MATH 5310.03

**\*MATH 4400.03A or B Mathematical Modelling III:**

This class is concerned with the construction, analysis and interpretation of mathematical models in the natural sciences with an emphasis on industrial applications. Specific applications of potential theory, diffusion phenomena and wave propagation will be examined in detail. A brief introduction to the calculus of variations approach to the optimal control of dynamical systems will be given and some recent applications discussed.

Format: Lecture 3 hours

Prerequisites: required Mathematics 3110.03, recommended Mathematics 3120.03

Cross-listing: MATH 5400.03

**MATH 4650.03A or B Relativity and Cosmology:**

A review of differential geometry will be given followed by an introduction to the general theory of relativity. Various topics will be discussed, including: linearized theory and gravitational radiation, spherically symmetric metrics and the Schwarzschild Solution, gravitational collapse, black holes, and cosmology.

Format: Lecture 3 hours

Prerequisites: Math 3050.06R or permission of the instructor.

Cross-listing: PHYC 4650.03/5650.03, MATH 5650.03

**\*MATH 4660.03A or B Automata and Computability:**

See class description for COMP 4660.03, in the Computing Science section of this calendar.

MATH 8700.00 (non-credit) Co-op Seminar I

MATH 8891.12 Co-op Work Term I

MATH 8892.12 Co-op Work Term II

MATH 8893.12 Co-op Work Term III

MATH 8894.12 Co-op Work Term IV

## Microbiology and Immunology

**Location:** Sir Charles Tupper Medical Building, 7th Floor  
**Telephone:** (902) 494-3587  
**FAX:** (902) 494-5125

### Head of Department

K.B. Easterbrook

### Undergraduate Advisors

D.B. Stoltz (494-2590)  
C. Stuttard (494-6566)  
D.W. Hoskin (494-6509)

### Professors

R. Anderson, PhD (Cologne), (Viral Pathogenesis)  
K.B. Easterbrook, PhD (ANU), (Structure and Function in Microorganisms, Bacterial Spines)  
G.C. Johnston, PhD (York), (Genetic Control of Cell Division)  
S.H.S. Lee, PhD (Dal), (Diagnostic Virology; Interferon)  
D.E. Mahony, PhD (McG), (Bacteriology; Bacteriocins, Toxins and Plasmids of Clostridia)  
K.R. Rozee, PhD (Dal), (Microbial Pathogenesis; Epidemiology)  
D.B. Stoltz, PhD (McM), Undergraduate Studies Coordinator, (Biology of Parasitic Insects; Insect Virology)  
C. Stuttard, PhD (Dublin), (Microbial Genetics)

### Associate Professors

R.I. Carr, MD (Tor), PhD (Rockefeller), Prof., Medicine (Rheumatology) (Immunoregulation; CNS Immune System Interactions and Auto Immune Diseases)  
P.S. Hoffman, PhD (Virginia Polytech.), Graduate Studies Coordinator, (Microbial Pathogenesis)  
A.C. Issekutz, MD (Dal), FRCP(C), Prof., Pediatrics (Inflammation)  
T. Lee, PhD (Glasgow) (Molecular Immunology; Transplantation Immunology)  
R. Rajaraman, PhD (Dal), Asst. Prof., Medicine (Cancer Cell Biology; Cell-Extracellular Matrix Interactions)

### Assistant Professors

M.A. Drabot, PhD (Dal) (Viral Diagnostics and Pathogenesis)  
R. Duncan, PhD (Guelph) (Molecular Basis of Viral Host-Range Restriction)  
G. Faulkner, PhD (Dal) (Ultrastructural Analysis of Infection and Cancer Cells)  
D.J.M. Haldane, MBChB (Dundee), FRCP(C) (Medical Microbiology)

D.W. Hoskin, PhD (McG) (Immunology; Natural Suppressor Cells; MHC-Unrestricted Killer Cells)

T.B. Issekutz, MD (Dal), FRCP(C), Assoc. Prof., Pediatrics (Cell-Mediated Immunity)  
A.W. Stadnyk, PhD (McM) (Intestinal Inflammation; Cytokines)

## Introduction

The Department of Microbiology and Immunology is involved in teaching and research in several vital areas of biomedical endeavour including molecular and medical microbiology, virology, immunology and microbial genetics.

The Microbiology programme is designed to familiarize the student with the biology and pathogenesis of viruses, bacteria, yeast and multicellular parasitic organisms. Advanced classes deal specifically with selected aspects of virology, molecular mechanisms of pathogenesis, microbial genetics, cell and molecular biology.

A set of classes in molecular genetics has been identified to meet the needs of honours Microbiology or Biochemistry students who hope to pursue further study in molecular and genetic approaches to fundamental problems. These classes provide solid grounding in bacterial and eukaryotic gene structure and function, regulation and evolution, and both practical and theoretical presentations of recombinant DNA methods (genetic engineering).

They can be taken along with classes in metabolism, enzymology, bacteriology, virology and immunology and provide a good practical grounding for fields as diverse as genetic diagnosis and gene therapy, forensics, industrial microbiology and molecular evolution (see below and the Biochemistry listings and consult departmental advisors).

The Department also has a significant teaching programme in Cellular and Molecular Immunology. The Immunology programme is designed for students interested in fundamental questions in molecular immunology, tumour immunology, autoimmunity or inflammation, and defences against microbial infection.

These programmes provide the education needed for professional activities after graduation or for graduate studies in microbiology or immunology.

## Degree Programmes

There is a 4-year "advanced major" programme in Microbiology but no 3-year programme leading to a Microbiology major. MICR2100.06A is a prerequisite for most other microbiology classes offered at Dalhousie. Students interested in an honours programme (see below) should consult with

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the departmental advisors, preferably prior to registration for 2nd year classes. Biology majors are advised that classes in Microbiology and Immunology DO count toward a BSc in Biology even though they are not cross-listed with the Biology Department.

Students should consult the "Degree Requirements" section of this calendar for specific regulations.

## BSc with Honours in Microbiology

This programme is designed to give students the best possible preparation for future graduate work or a professional career in microbiology or immunology. Students applying for admission to this programme must have obtained a grade of B- or better in BIOL 1000.06R or BIOL 1001.06R and must, in their 2nd year, obtain a grade of B- or better in MICR 2100.03A. Students should consult an undergraduate advisor (D. Stoltz; C. Stuttard; D.W. Hoskin) at their earliest convenience.

### Departmental Requirements

#### Classes required in Honours:

<b>1000 level:</b>	Biology 1000.06, Chemistry 1010.06 or 1500.06 or 1040.06, and 2 half-classes from Math 1000.03, 1010.03 or 1060.03
<b>2000 level:</b>	MICR 2100.03, Biol 2020.03, 2030.03, BIOC 2200.03, CHEM 2400.06
<b>3000 level:</b>	BIOC 3400.03
<b>4000 level:</b>	MICR 4900.06

In addition to the above 4.5 classes, at least one half class at the 3000 - 4000 level in the 4 following core subjects: MICR 3033.03, 3114.03, 3115.03, 3118.03 (or BIOL 3100.03, 3113.03, 4113.03 substituting for MICR 3118.03).

The remaining 2.5 credits (to make a total of 9) are to be taken from the list provided below (the classes listed are all considered to belong to the discipline of microbiology and/or immunology): MICR 3033.03, 3114.03, 3115.03, 3118.03, 4022.03, 4024.03, 4026.03, 4027.03, 4037.03, 4038.03, 4114.03, 4115.03, 4118.03, 4301.03, 4302.03, 4801.03.

BIOC 4403.03, 4404.03, 4803.03, 4802.06

BIOL 3100.03, 3113.03, 3322.03, 4101.03, 4113.03

For students wishing to specialize in molecular genetics, the following classes are strongly recommended: MICR 3033.03B, MICR 4037.03A/MICR 4038.03A, MICR 4118.03A, MICR 4403.03A, MICR 4404.03B and MICR 4801.03A. Students should also consult an undergraduate advisor.

For students wishing to specialize in the area of immunology the following classes are recommended: MICR 3033.03B, 3115.03A, 4115.03B; BIOC 3200.03A, MICR 4026.03A, 4027.03B, 4301.03A, 4302.03B, 4801.03A. Immunology students should consult the Immunology undergraduate advisor, Dr. D.W. Hoskin.

#### Notes:

1. In the 4 half-classes taken at the 3000 level to fulfil the core subjects requirement described above, students must maintain a B average with no grade less than B-.
2. The minor can be in any subject (excluding Microbiology); this includes Biology and Biochemistry.
3. The honours research thesis (MICR 4900.06R) can be done in either the Microbiology, Biochemistry or Biology Departments (or in other departments in the Faculty of Science or Medicine if appropriate). The thesis work, however, must be relevant for the Department. Similarly, it should be noted that Biology majors may conduct their honours thesis project (i.e., BIOL 4900.06) in this Department.
4. Students should be aware of Academic Regulation 19. Students should also note that certain advanced classes require a particular grade be achieved in the prerequisite class and/or permission of the instructor be obtained for registration in the class, or both.

## BSc with Combined Honours in Microbiology and Biochemistry

Students in this programme must complete 11 credits above the 1000 level in Microbiology and Biochemistry. The required classes in Biochemistry are BIOC 2200.03B, 3200.03A, 3300.03B, 3400.03A and 4803.03A. Students must also get 2 credits in 4 core subject areas in Microbiology and Immunology. In addition, students must take MICR 2100.03A, BIOL 2020.03A or B, BIOL 2030.03A or B and either MICR 4900.06R or BIOC 4802.06R. The remaining 4.5 credits must include at least 1 full credit from each Department at the 4000 level (excluding MICR 4900.06R and BIOL 4802.06R).

## BSc with Combined Honours in Microbiology and Biology

Students in this programme must complete the core requirements of each department. Students are required to maintain an average grade of B in core classes with no grade lower than B-. Biology 1000.06R should be taken in year 1, and Microbiology 2100.03A in year 2. Research

thesis work can be carried out in either Department. Advisors: D.B. Stoltz (Microbiology); J. Wright (Biology).

## Advanced Major in Microbiology

### Departmental Requirements

#### Classes required in Advanced Major:

- 1000 level:** Biology 1000.06 or 1001.06; Chemistry 1010.06
- 2000 level:** three credits at or above the 2000 level not including those listed above
- 3000 level:** three credits at or above the 3000 level

## Classes Offered

**Note:** Owing to the combined pressures of student numbers and a dearth of available space, the names of students not appearing on the first day of class may be deleted from class lists; students are therefore advised that being signed into the class is no guarantee of late admission.

**MICR 1100.03A:** See class description in Nursing section of this calendar. **NOTE:** Students registering in this class must also register for either a morning or afternoon laboratory session.

**MICR 2020.03B General Microbiology:** This class is geared to students in pharmacy and in other health-oriented programmes. It provides a brief introduction of microbial structure, physiology and genetics in relation to microbial pathogenesis. General concepts and practices of sterilization and disinfection, antibiotics and immunity will be examined with emphasis on mechanism of action. Bacterial, fungal, parasitic and viral pathogens of medical importance will be discussed according to the mode of entry, transmission, clinical features, prevention and chemotherapy. Laboratory sessions using demonstration and/or experimentation are designed to complement the lectures and to provide a practical appreciation of the isolation, identification, cultivation and control of microorganisms.

**Instructor:** S.H.S. Lee  
**Format:** lecture 3 hours, lab 3 hours  
**Prerequisite:** BIOL 1000.06R or instructor's consent

**Cross-listing:** PHYT 2070.03A

**MICR 2100.03A Introductory Microbiology and Immunology:** An introduction to the basic concepts of microbiology and immunology through lectures, laboratory sessions and demonstrations. Topics include the structure, growth, genetics and physiology of selected groups of microorganisms and viruses, as well as basic immunology. This is normally a required class

for Microbiology honours students; as such, it is directed primarily to second year students (admission of others requires permission of the instructor). Lab section assignments are made during the first lecture period.

Consequently, because of limits to lab space, students not attending that lecture may be denied admission to the class **EVEN IF THEY ARE ALREADY REGISTERED**. In particular, students must be registered prior to admission to laboratory periods, beginning in the second week of each term. Students wishing to repeat the class must have approval to do so from the class coordinator. MICR2100.03A is the preferred route into other microbiology offerings.

**Instructor:** D.B. Stoltz  
**Format:** lecture 2 hours, lab 3 hours  
**Prerequisite:** a grade of B- or better in BIOL 1000.06R or BIOL 1001.06R.

**Note:** Biology students taking BIOL 2101.03B are advised that this class may be used as a prerequisite into 3000-level Microbiology classes provided that a grade of B or better has been obtained.

**MICR 3033.03B Microbial Genetics:** Heredity in bacteria and their viruses, with principal emphasis on mutation, gene transfer, and genetic mapping; DNA repair, recombination, and restriction; molecular approaches to genetic analysis and gene expression on microorganisms (e.g., gene cloning, DNA sequencing).

**Instructors:** C. Stüttard, C. Barnes  
**Format:** lecture 2 hours, lab/tutorial 3 hours  
**Prerequisites:** MICR 2100.03A or BIOL 2101.03B (with a grade of B or better), BIOL 2030.03, or instructor's consent

**MICR 3114.03A Virology:** Viruses are extremely efficient parasitic nucleic acids that have played, and continue to play, significant roles in the analysis of gene organization and expression, cancer biology, molecular pathogenesis, cell biology, biotechnology, gene therapy and molecular evolution. This introductory class is designed to give the student an appreciation for the diversity of viruses and their biological interactions with the host at both a cellular and organismal level. Topics discussed include virus structure, assay, characterization, gene organization and expression, host-cell interactions, cell transformation and pathogenesis. The lecture material relies on concepts introduced in BIOL 2200.03 and BIOL 2020.03 and complements material presented in other classes such as immunology, cell biology, biochemistry, molecular biology and gene expression.

**Instructor:** R. Duncan, D.B. Stoltz, guest lecturers  
**Format:** lecture 3 hours

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**Prerequisite:** normally includes all of MICR 2100.03A (or BIOL 2101.03B with a grade of B or better), BIOC 2200.03, BIOL 2020.03

**MICR 3115.03A Immunology:** This class is designed to provide the student with an understanding of the fundamental principles of cellular and molecular immunology. Lectures will focus on mechanisms governing the generation and regulation of cell-mediated and humoral immune responses. Topics to be discussed include cells and tissues of the immune system, the structure and synthesis of antibodies, complement pathways, T cell subsets and their functions, hypersensitivity reactions and the genetics of the immune response.

**Instructor:** D.W. Hoskin  
**Format:** lecture 3 hours  
**Prerequisite:** MICR 2100.03A or BIOL 2101.03B (with a grade of B or better), a 2000-level class in cell biology, or instructor's consent

**MICR 3118.03B Medical Bacteriology:** A survey of several bacterial groups with particular attention devoted to bacteria of medical interest. Attention is given to those criteria which are regarded as important in the classification of bacteria, and to the techniques used to identify particular species.

**Instructor:** D.E. Mahony  
**Format:** lecture 2 hours, lab 3 hours  
**Prerequisite:** grade of B- or better in MICR 2100.03A or grade of B or better in BIOL 2101.03B

**MICR 4022.03A or B Microbial Ultrastructure Project:** A research project using one or more of the skills acquired in MICR 4024.03A, selected by the student in consultation with an instructor.

**Instructors:** G.T. Faulkner, D.B. Stoltz, K.B. Easterbrook  
**Prerequisite:** MICR 4024.03A or instructor's consent  
**Cross-listing:** MICR 5022.03A or B

**MICR 4024.03A Microscopy:** The class is concerned with biological ultrastructural analysis concentrating on transmission and scanning electron microscopy. The importance of a proper understanding of the physical and chemical principles governing technical procedures such as fixation, freeze-fracture, colloidal gold probes, stereology, autoradiography, x-ray microanalysis and photography is emphasized. During laboratory periods students have the opportunity through individual projects to participate in some of the techniques covered in the lectures. This class is designed primarily for honours and graduate students.

**Instructors:** G.T. Faulkner, K.B. Easterbrook, D.B. Stoltz

**Format:** lecture 3 hours, no formal lab  
**Prerequisite:** instructor's consent  
**Cross-listing:** BIOC 4024.03A/5024.03A, MICR 5024.03A

**MICR 4026.03A The Mammalian Cell as a Microorganism:** The class considers recent advances and current concepts in cellular and molecular biology with reference to the mammalian cell cultured in vitro. The following general areas are discussed: cell cycle; differentiation; somatic cell aging; extracellular, cytoplasmic and nuclear matrices; transmembrane interactions; gene expression; growth factors and their receptors; hybridoma technology; mutagenesis and somatic cell and molecular genetics.

**Instructor:** R. Rajaraman  
**Format:** lecture 3 hours  
**Prerequisite:** BIOL 2030.03A or B or BIOL 2020.03 or instructor's consent  
**Cross-listing:** MICR 5026.03A

**MICR 4027.03B Molecular Mechanisms of Cancer:** The class considers recent cellular and molecular biology of cancer cells viewed as microorganisms in vivo. Students participate by giving seminars on recent articles and by writing term papers on selected topics. The following general areas are discussed: types of tumours; the transformed phenotype; extracellular matrix and neoplasia; hormones and neoplasia; anchorage and growth control; analysis of malignancy by cell fusion; transformation by DNA and RNA viruses, and by radiation; chemical carcinogenesis; oncogenes; interferon and cancer; reverse transformation and chemoprevention of cancer; immunoresponse and cancer; anti-oncogenes, transgenic mice in cancer research and cellular basis of metastasis.

**Instructor:** R. Rajaraman  
**Format:** lecture/seminar 3 hours  
**Prerequisite:** MICR 4026.03A or instructor's consent  
**Cross-listing:** MICR 5027.03B

**MICR 4037.03A Genetics of Industrial Bacteria:** We review specific aspects of genetic structure, regulation, transmission and recombination in bacteria that are used to synthesize medically and commercially useful products. The principal focus is on *Streptomyces* spp., and includes consideration of genome architecture and stability, and genetic control of morphological and physiological development. Seminars consider recent research in the field.

**Instructor:** C. Stuttard  
**Format:** lecture/seminar 3 hours  
**Prerequisite:** MICR 3033.03B  
**Cross-listing:** MICR 5037.03A

## **MICR 4038.03A Molecular Biology of Yeast:**

The class will focus on the use of genetics and molecular genetics in the investigation of a wide variety of cellular activities in the yeast *Saccharomyces cerevisiae*, including: genome organization, regulation of gene expression at both transcriptional and translational levels, signal transduction, role of oncogenes, secretion, and control of proliferation. Wherever possible, the role of particular yeast gene products will be compared to homologues found in other eukaryotic cells including mammalian cells. This class will consist of lectures and student seminars and will rely heavily on the recent primary literature. Participants in the class will be encouraged to discuss and evaluate recent advances in the areas of genetics and molecular biology.

**Instructor:** C. Barnes, G. Johnston

**Format:** lecture/seminar 4 hours

**Prerequisite:** MICR 3033.03B

**Cross-listing:** MICR 5038.03A

## **MICR 4114.03B Topics in Basic and Medical Virology:**

A class for advanced students designed to look in detail at selected aspects of virology. The class consists of lectures and student seminars revolving around current advances in virological research. Laboratory sessions expose students to basic methods associated with virology including tissue culture, phage assays, viral macromolecular synthesis and analysis of host cell interactions.

**Instructors:** R. Duncan, D.B. Stoltz, M.

Drebot, K.B. Easterbrook

**Format:** lecture 2 hours, lab 3 hours

**Prerequisite:** grade of B- or better in MICR 3114.03A

**Cross-listing:** MICR 5114.03B

## **MICR 4115.03B Immunology of Host**

**Resistance:** An advanced class in which students read and discuss research papers taken from the current literature in immunology. While all major areas of immunology are discussed, particular emphasis is placed on mechanisms involved in the host immune response to pathogens and tumour cells.

**Instructor:** D.W. Hoskin

**Format:** lecture/discussion 3 hours

**Prerequisite:** a minimum grade of B in MICR 3115.03A

**Cross-listing:** MICR 5115.03B

## **MICR 4118.03A Molecular Pathogenesis:**

An advanced class on the molecular basis of bacterial pathogenesis. The class will use selected bacterial pathogens to develop basic principles regarding genes, regulatory mechanisms and the molecular function of gene products in surface colonization, invasion, intracellular growth and toxin production. The class will be taught from

reviews and original research papers and will emphasize the use of modern molecular biological tools in problem solving.

**Instructor:** P.S. Hoffman

**Prerequisite:** MICR 3033.03B plus an advanced class in Bacteriology (MICR 3118.03B preferred)

**Cross-listing:** MICR 5118.03A

**MICR 4301.03A Immunobiology:** An advanced class designed to examine the experimental approaches which have led to our current knowledge of the biological characteristics of the immune system, including its cells and the interactions between them; the idiotypic network; antigen processing and presentation; the mucosal immune system; CNS-immune system interactions; and both normal and pathological autoimmunity. Cytokines and inflammation; the host response to infection; lymphocyte migration; and immunodeficiency will also be discussed.

**Instructors:** R. Carr, T. Issekutz, A. Issekutz

**Format:** lecture and discussion 3 hours

**Prerequisite:** MICR 3115.03A and/or Instructor's consent

**Cross-listing:** MICR 5301.03A

**MICR 4302.03B Molecular Immunology:** An advanced class which investigates the molecules involved in the generation and expression of immune responses. Topics typically include the structure and function of cytokines, the generation of antibody diversity by immunoglobulin gene rearrangement, the structure and function of cell surface receptors such as the T cell antigen receptor, MHC and adhesion molecules, and the molecular interactions which lead to immune non-responsiveness. This class is offered on alternate year to MICR 4303.03B.

**NOTE:** This class is not offered in 1994/95.

**Instructors:** T. Lee, A.W. Stadnyk, B.

Pohajdak

**Format:** lecture, student presentations, discussion

**Prerequisite:** MICR 3115.03A and/or Instructor's consent

**Cross-listing:** BIOL 4302.03B

**MICR 4303.03B Granulocytes and the Immune Response:** An advanced class dealing with the contribution of granulocytes to immunologic function. Mast cells, basophils, neutrophils, macrophages, NK cells and eosinophils will be considered with respect to their unique functions and contribution to a variety of immune effector mechanisms. This class is offered on alternate year to MICR 4302.03B.

**Instructors:** T. Lee, A.W. Stadnyk, B.

Pohajdak

**Format:** lecture, student presentations, discussion

# 276 Microbiology and Immunology

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**Prerequisites:** MICR 3115.03A and  
Instructor's consent

**Cross-listing:** BIOL 4303.03B

**MICR 4403.03B Genes and Genomes:** See  
class description for BIOC 4403.03B in the  
Biochemistry section of this calendar.

**MICR 4404.03A Gene Expression:** See class  
description for BIOC 4404.03A in the  
Biochemistry section of this calendar.

**MICR 4601.03A Laboratory Techniques in  
Molecular Biology:** This class consists of a  
series of laboratory modules covering  
techniques used in molecular biology and  
immunology (each of 4 weeks duration, 6  
hours per week). The class is intended  
primarily for honours and graduate students.  
Students should consult with the class  
coordinator regarding eligibility and availability  
of space.

**Instructor:** G.C. Johnston

**Format:** lab 6 hours

**Cross-listing:** BIOL 4012.03A/5012.03A,  
BIOC 4603.03A/5603.03A,  
MICR 5601.03A

**MICR 4700.06R Special Topics:** Consult  
Department.

**MICR 4701.03A/4702.03B Special Topics:**  
Consult Department. This class is intended to  
permit further study of a specific topic of  
interest, or to correct a deficiency in a  
student's programme.

**MICR 4900.06R Honours Research and Thesis  
Coordinator:** D.B. Stoltz

# Music

**Location:** Dalhousie Arts Centre, 5th floor, University Ave., Halifax, N.S.  
**Telephone:** (902) 494-2418  
**Fax:** (902) 494-1637

## Chair

W.H. Kemp (494-1142)

## Student Advisors

W.H. Kemp (494-1142) - BMus, BA  
 P. Perron (494-1926) - MusEd

## Professors

D.M. Farrell, BA (St. Norbert Col), MMus, PhD (Wisc), (Theory and Composition)  
 W.H. Kemp, MusBac, MusM (Tor), AM (Harv), DPhil (Oxon) (Theory, History and Choral)  
 C. van Feggelen, (Guitar and Lute)  
 D.P. Schroeder, AMus, BA, MA (Western) PhD (Cantab), (Theory and History)

## Associate Professors

P. Djokic, BMus, MMus (Julliard), (Violin)  
 E. Gonnella-Walch, Dipl of Art (Dundee Col of Art), LRAM (Royal Academy Lond), (Voice)  
 P.A. Perron, BMus (McG), MMusEd (Holy Names College), (Music Education)  
 I. Stodola, BMus (Chic), MMus (Julliard), (Piano)  
 J.S. Tittle, BS (Kent State), MM, DMA (Wisc), (Theory and Composition)  
 T. Zonneveld, Dipl (Teach), Dipl (School Mus), Dipl (Performance), (Royal Conservatory, The Hague), (Piano)

## Assistant Professors

G. Servant, BMus (Dal), MMus, DMA (Hartt)

## Part-Time Faculty

N. Babineau (mus.ed. string studies)  
 T. Hill, MA (Calif, Davis), (mus.ed. band studies)  
 D. MacDonald, BMusEd (Dal), Dipl Mus (Paris) MMA (McGill) (organ and church music)  
 R. MacKay (Band Director)  
 D. Palmer (Jazz studies)

## Applied Skills Instructors

**Flute:** P. Creighton BMus (Tor);  
 E. DuBois, BMus (Rochester), MMus (Emporia State)  
**Oboe:** Suzanne Lemieux  
**Clarinet:** J. Rapsom  
**Bassoon:** I. Rothwell  
**Recorder:** P. Evans  
**Saxophone:** D. Palmer  
**Horn:** R. McCosh  
**Trumpet:** J. Stern, BMus, MMus (New England Conservatory)  
**Trombone and Tube:** H. Schoales

**Cello:** S. Walt  
**String Bass:** L. Turofsky, BMus (Tor);  
 M. Kasper  
**Percussion:** J. Faraday  
**Harpichord:** D. MacDonald

## Staff Piano

**Accompanist:** H. Murray, BAHonMus, LRCT (Tor) ARCCO  
**Technician:** F. Haines

## Introduction

The resources of the Music Department provide a thorough discipline to those whose demonstrated talent and specific pre-university training qualify them for specialization in music studies. Certain classes and ensembles are available to the non-specialist student who wishes to increase both musical awareness as a listener and involvement as a performer.

In the Bachelor of Music Programme, the Department offers training to the prospective professional musician: performer, composer, theorist, historian or critic. Future teachers instructing in the elementary and secondary school classroom are provided with methods, skills and field experience in the Bachelor of Music Education Programme. In our society today there are many vocations in which a working knowledge of various aspects of music is a desirable part: librarianship, media programming and production, arts management, recreational and therapeutic work, to name only a few. A carefully chosen BA (General) or combined Honours BA or BSc programme could furnish a basic equipment for further studies in preparation for such professions. The truly contemporary listener, too, must acquire style-specific tools, if there is to be an informed response to the musical experience.

Thus the University's Music Department is ready to serve many needs within a general standard of excellence. Crafts and skills, history, practice and appreciation are presented in studies flexible enough to be useful to each student's identity as a musical person.

## Classes for Non-Majors

Classes offered as arts electives for non-majors are as follows:  
 MUS 1000.06R Listening to Music  
 MUS 1001.03A Materials of Music  
 MUS 1002.03B Introductory Music Theory  
 MUS 1010.06R Music and Culture  
 MUS 2007.06R Guitar and Lute  
 MUS 2008.06R Modern Guitar  
 MUS 2087.06R Electronic and Experimental Music  
 \*MUS 2011.06R History of Opera  
 \*MUS 2012.06R Music and Psychology  
 \*MUS 2013.06R The Evolution of Jazz

- \*MUS 2015.06R Music and Cinema
- \*MUS 3084.03B Women in Canadian Music

Other classes in Music may be taken by special permission of the department.

**Note:** Classes marked \* are not offered every year. Please consult the current timetable on registration to determine if this class is offered.

## Degree Programmes

### Foundational Classes

These classes are for those prospective music majors who, in the opinion of the auditioning faculty, indicate University-level talent and aptitude in performance but who are in need of a more prolonged exposure to pre-major levels of music literature, theory and related skills.

Students admitted to this level enrol in the BA Non-major Music Foundational Classes Programme, and may take a maximum of five full-credit classes.

#### Curriculum

- MUS 1100.06R Foundational Aural Skills
- MUS 1000.06R Listening to Music
- MUS 1001.03A Materials of Music
- MUS 1002.03B Introduction to College Music Theory
- Required Writing Class (from another department - see Degree Requirements 1.2 for a list of writing classes)
- Second non-music elective full-credit

#### Special Notes:

1. Music classes MUS 1000.06R, MUS 1001.03A, and MUS 1002.03B, although credit classes, may not be counted toward the BMus, BMusEd, or BA degree with a major in Music; however, they may be counted as electives in other BA or BSc Degree Programmes.
2. All students registered in the Foundational Classes shall not enrol in the First Year Classes of the Bachelor of Music Core Curriculum until all prerequisites for those classes are completed.
3. The foundational music classes and the required writing class must be taken in the same academic year.

### Standard for Foundational Classes

#### Minimum grades:

- MUS 1100.06R - B
- MUS 1000.06R - C
- MUS 1001.03A - C
- MUS 1002.03B - C
- Writing Class - C
- Each Elective - C

## Bachelor of Music (BMus)

The BMus is a four-year programme with sixteen out of twenty classes in music. Upon successful completion of the second year, students may choose to concentrate in performance, music history and literature, or composition, or elect the unconcentrated programme.

#### Common Curriculum

**First Year:** MUS 1000-level Applied Skills; MUS 1350.03A History of Music I (Med./Ren.) MUS 1351.03B History of Music II (Baroque); MUS 1201.03A Theory I; MUS 1202.03B Theory II; MUS 1270.03R Aural Perception I; MUS 1271.03R Keyboard Skills I; and an Arts and Social Sciences or Science Elective, one full credit (Writing Class Elective).

**Second Year:** MUS 2000-level Applied Skills; MUS 2350.03A History of Music III (Classical); MUS 2351.03B History of Music IV (Romantic); MUS 2201.03A Theory III; MUS 2202.03B Theory IV; MUS 2270.03R Aural Perception II; MUS 2271.03R Keyboard Skills II; and an Arts and Social Sciences or Science Elective, one full credit.

#### Concentration in Performance

**Third Year:** MUS-3000 level Applied Skills; MUS 3281.03R Form and Analysis I; MUS 3351.03B Music Since 1950; MUS 3280.03R Counterpoint; MUS 3282.03R Orchestration; MUS 3199.03R Recital; Music Elective, one half credit; and an Arts and Social Sciences or Science Elective, one full credit.

**Fourth Year:** MUS 4000-level Applied Skills; MUS 4199.03R Area Graduation Requirement (Recital); MUS 4281.03R Form and Analysis II; Music Elective, 2 credits; and an Arts and Social Sciences or Science Elective, one full credit.

**Note:** Church Music Option - Organ majors may complete a curriculum in church music by successful achievement in the following classes taken in the Third and Fourth Years: MUS 4271.03R, MUS 4370.03R, MUS 4199.03R, and the half-credit class in church music offered at the Atlantic School of Theology and taken through letter of permission.

#### Concentration in Composition

**Third Year:** MUS 3000-level Applied Skills; MUS 3281.03R Form and Analysis I; MUS 3351.03B Music Since 1950; MUS 3280.03R Counterpoint; MUS 3282.03R Orchestration; MUS 3210.06R Composition; and an Arts and Social Sciences or Science Elective, one full credit.

**Fourth Year:** MUS-4000 level Applied Skills; MUS 4280.03R Advanced Harmony and Counterpoint; MUS 4281.03R Form and Analysis II; MUS 4210.06R Composition; MUS 4299.03R Area Graduation Requirement (Composition); Music Elective, one half credit; and an Arts and Social Sciences or Science Elective, one full credit.

### Concentration in History and Literature

**Third Year:** MUS 3000-level Applied Skills; MUS 3281.03R Form and Analysis I; MUS 3361.03B Music Since 1950; MUS 3280.03R Counterpoint; MUS 3282.03R Orchestration; MUS 3362.03A Music in Canada to 1950; Music elective; one half credit; and an Arts and Social Sciences or Science Elective, one full credit.

**Fourth Year:** MUS 4000-level Applied Skills; MUS 4281.03R Form and Analysis; MUS 4368.03A or B & MUS 4369.03A or B Special Studies; MUS 4399.03R Area Graduation Requirement (Theatrical); Music Elective, one credit; and an Arts and Social Sciences or Science Elective, one full credit.

### Unconcentrated Programme

**Third Year:** MUS 3000-level Applied skills; MUS 3281.03R Form and Analysis I; MUS 3361.03B Music Since 1950; MUS 3280.03R Counterpoint; MUS 3282.03R Orchestration; Music elective, one full credit; and an Arts and Social Science or Science elective, one full credit.

**Fourth Year:** MUS 4000-level Applied Skills; MUS 4282.03R Form and Analysis; MUS 4599.03R Graduation Requirement, Unconcentrated; Music Elective, two credits; and an Arts and Social Science or Science elective, one full credit.

### Standards

All students wishing to enter third year required Music classes other than MUS 3361.03B in the BMus programme must successfully complete their MUS 2000-level Applied Skills and MUS 2202.03B, MUS 2270.03R and MUS 2271.03R and achieve an overall average of B- in the music classes of the first and second years, including a minimum standing of C in each of MUS 1201.03A, MUS 1202.03B, MUS 2201.03B and MUS 2202.03B, and a minimum of B- in each of their MUS 2000-level Applied Skills, MUS 1270.03R and MUS 2270.03R. Students failing to demonstrate the required standards in MUS 2270.03R must repeat the class, but, with the permission of the Department, those with an otherwise satisfactory academic achievement may do so concurrently with their third year curriculum, within the five full classes or as an approved overload.

Students wishing to enter the concentration in performance must achieve an average of B+ in their MUS 1000- and MUS 2000-level Applied Skills; in history and literature, an average of B+ in MUS 1350.03A, MUS 1351.03B, MUS 2350.03A and MUS 2351.03B and demonstrate acceptable writing ability; in composition, submit one or more original pieces for assessment by the composition faculty.

Students in the BMus programme must maintain a minimum standing of B- in each of the music classes of the third and fourth years.

Students who at the end of the third year have not obtained at least five credits of B or better in their music classes above the 1000 level will not be admitted to the fourth year without the explicit recommendation of the Department and the prior approval of the Committee on Studies.

Students must achieve a minimum standing of C in each of their Arts and Social Sciences or Science electives.

### Bachelor of Music Education (BMusEd)

The four-year B.Mus.Ed. programmes in elementary and secondary music education offer training in an instrument or in voice; theoretical and historical knowledge; aural and keyboard skills; the methods and repertoires needed by the music teacher in the classroom; and the foundational principles of education. Observation and field experience in classroom settings constitute an important part of the programmes. These programmes lead to certification by the Nova Scotia Department of Education.

In the First and Second Years students will enrol in the Bachelor of Music programme common curriculum (q.v.); Second Year students are advised to take two Education Foundation half credit classes. After successful application to the Department students will proceed to the B.Mus.Ed. programmes, Third and Fourth Years, choosing between curricula in Classroom Music or Instrumental Music. Normally these programmes are as follows:

#### Classroom Music

**Third Year:** MUS 3000-level Applied Skills; MUS 3400.06R Elementary Methods; MUS 3470.03R Field Experience; MUS 3160.03A Conducting; MUS 3161.03B Choral Technique; MUS 3351.03B History of Music VI - Music Since 1950; Music 3471.03R Solfa; and a half credit elective in Music or Music Education.

**Fourth Year:** MUS 4000-level Applied Skills; MUS 4400.03R Secondary Methods; MUS 4470.03R Field Experience; MUS 4482.03A

Choral Arranging; Education 4450.06R and one-half Education Foundation credit; and one full credit elective in Music, Music Education, or Arts and Social Sciences or Science.

#### Instrumental Music

**Third Year:** MUS 3000-level Applied Skills; MUS 3351.03B History of Music VI - Music Since 1950; Either MUS 3480.03R Band Instruments or MUS 3481.03R String Instruments; MUS 3400.06R Elementary Methods; and MUS 3470.03R Elementary Field Experience; MUS 3160.03A Conducting; MUS 3471.03R Solfa; and a half credit in Music or Music Education.

**Fourth Year:** MUS 4000-level Applied Skills; MUS 4400.03R Secondary Classroom Teaching Methods; MUS 4470.03R Secondary Classroom Field Experience; MUS 3282.03R Orchestration; either MUS 4481.03R Band Methods and Field Experience or MUS 4483.03R String Methods and Field Experience; and Education 4450.06R and one-half Education Foundation credit.

#### Bachelor of Music Education/Bachelor of Education (BMusEd/BEd)

The five year BMusEd/BEd integrated programmes in elementary and secondary music education combine the curricula of the B.Mus. Ed. programmes with additional training in either elementary classroom teaching or a second teachable subject appropriate for secondary school. The B.Mus.Ed./B.Ed. leads to certification by the Nova Scotia Department of Education.

In the First and Second Years students will enrol in the Bachelor of Music programme common curriculum (q.v.); Second Year students are advised to take a class in a co-required second "teachable subject" as their elective. After successful application to the Department and to the School of Education (the application to be supported by the Chair of the Department), students will proceed to the three senior years of the programmes, choosing between Classroom Music and Instrumental Music, and the elementary or secondary school teaching option. The fifteen and one-half credits, Years III-V, are as follows:

#### Classroom Music

##### Third Year:

- MUS 31\_\_06R Applied Skills
- MUS 3351.03B History of Music VI
- MUS 3400.06R Elementary Methods
- MUS 3470.03R Elementary Field Experience
- MUS 3160.03A Conducting
- MUS 3471.03R Solfa Pedagogy in the Classroom

MUS 3161.03B Choral Techniques  
Music or Music Education Elective:  
one-half credit

##### Fourth Year:

- MUS 41\_\_06R Applied Skills
- MUS 4400.03R Secondary Methods
- MUS 4470.03R Secondary Field Experience
- MUS 4482.03A Choral Arranging
- EDUC 4450.06R Psychology and Special Education
- EDUC 1/2 Anti-Racism class
- Elementary
- FASS .06R Co-required class in English, History, Math or Science
- Secondary
- FASS .06R Co-required class in 2nd teachable subject

##### Fifth Year:

- EDUC 4900.06R Field Experience
- EDUC 4873.03R Further Education Studies
- EDUC 1/2 Foundation Classes
- EDUC 1/2 Foundation Classes
- EDUC 1/2 Foundation Classes
- Elective 1/2 One-half class elective in Music, MusEd or FASS
- Elementary
- EDUC .06R Language Arts/Reading Methods
- EDUC 1/2 Math Elective
- EDUC 1/2 Methods Elective
- Secondary
- FASS .06R Co-required class in 2nd teachable subject
- EDUC .06R Methods Class in 2nd teachable subject

#### Instrumental Music

##### Third Year:

- MUS 31\_\_06R Applied Skills
- MUS 3351.03B History of Music VI
- MUS 3400.06R Elementary Methods
- MUS 3470.03R Elementary Field Experience
- MUS 3160.03A Conducting
- MUS 3471.03R Solfa Pedagogy in the Classroom
- MUS 3282.03R Orchestration
- Music or Music Education: one-half credit

##### Fourth Year:

- MUS 41\_\_06R Applied Skills

MUS 4400.03R Secondary Methods

MUS 4470.03R Secondary Field Experience

MUS 3480.03R Band Instruments

or

MUS 3481.03R String Instruments

EDUC 4450.06R Psychology and Special Education

EDUC 1/2 Anti-Racism class

Elementary

FASS .06R Co-required class in English, History, Math or Science

Secondary

FASS .06R Co-required class in 2nd teachable subject

**Fifth Year:**

EDUC 4900.06R Field Experience

EDUC 4873.03R Further Education Studies

EDUC 1/2 Foundation Class

EDUC 1/2 Foundation Class

EDUC 1/2 Foundation Class

MUS 4481.03R Band Methods and Field Experience

or

MUS 4483.03R String Methods and Field Experience

Elementary

EDUC .06R Language Arts/Reading Methods

EDUC 1/2 Math Elective

EDUC 1/2 Methods Elective

Secondary

FASS .06R Co-required class in 2nd teachable subject

EDUC .06R Methods class in 2nd teachable subject

**Co-requirements**

**Elementary:** A student must complete a minimum of 3 full classes from English, History, Math, and Science. It is recommended that courses be selected from each area.

**Secondary:** A student must complete a minimum of 3 full classes above the 1000 level in a teachable subject. Teachable subjects are English, French, History, Math, Biology, Chemistry, Physics, Economics, and Geography.

To assure all requirements are fulfilled, and to select electives where available in the programmes, students must consult with the Music Education Advisor and the School of Education BEd Programmer.

**Standards**

All students wishing to enter third year required Music classes other than MUS 3351.03B in either the BMusEd or BMusEd/BEd programme, must successfully complete their MUS 2000-level Applied Skill, MUS 2202.03B, MUS 2270.03R and MUS 2271.03R and achieve an overall average of B- in the music classes of the first and second years, including a minimum standing of C in each of MUS 1201.03A, MUS 1202.03B, MUS 2201.03A and MUS 2202.03B, and a minimum of B- in each of their MUS 2000-level Applied Skills, MUS 1270.03R and MUS 2270.03R. Students failing to demonstrate the required standard in MUS 2270.03R must repeat the class. In order to qualify for the award of a BMusEd or BMusEd/BEd degree, candidates must have obtained a minimum overall average of B in their music and music education classes above the 2000 level and maintain a minimum average of B in both their education and teachable subject Arts and Social Sciences or Science classes. With special permission, a student in the BMusEd or BMusEd/BEd programme may give a graduation recital instead of a final jury exam.

**Bachelor of Education in Music (BEd)**

A student possessing an appropriate four-year undergraduate degree in Music from a recognized university may apply for a 6.5 credit B.Ed. programme in elementary and secondary music education, which leads to certification by the Nova Scotia Department of Education.

Applications must be received by the School of Education by **April 30**. Subsequently potential B.Ed. students in music education must complete their audition-interview with the Department of Music by **June 30**. The applicant must pass a written exam in theory, a keyboard proficiency test and an ear training exam (slight singing and dictation), the equivalent to the final examination standards of Second Year (Music 2202.03B, 2270.03R, 2271.03R). Failure to demonstrate satisfactory standards in any of these areas will require the student to enrol in the appropriate Second Year classes in addition to the six classes listed below. The applicant also must demonstrate proficiency in his or her chosen performance idiom.

Successful applicants proceed to a curriculum which normally is as follows, noting that they may apply for transfer of credits in approved equivalent classes.

**Music**

MUS 3400.06R Elementary Music Methods

**MUS 3470.03R Elementary Music Field Experience**

**MUS 4400.03R Secondary Music Methods**

**MUS 4470.03R Secondary Music Field Experience**

**Elective in Music or Music Education (one half credit)**

## Education

**EDUC 4450.06R (1 credit);**

**EDUC 4873.03R (.5 Credit); and,**

**Education Foundations (1.5 credits including a .5 class in each of Sociology, Philosophy, and History of Education)**

Since the normal maximum number of classes that may be taken in any academic year is 5, students are advised to take the remaining credits in summer school prior to or following the actual year of study. Students are cautioned to consult the School of Education for the prospective availability of required education classes in summer school and to note the regular summer school tuition costs apply to those classes.

## Standards

To complete successfully the programme of study, the candidate must obtain a minimum overall average of B in his/her music and music education classes above the 2000 level, and a minimum average of B in the Education classes.

## Bachelor of Arts (Major in Music)

### Departmental Requirements

#### Classes required in Major:

**1000 level:** Music 1350.03A, 1351.03, 1201.03 and 1202.03, 1270.03, 1271.03, Music 1000 level applied skills

**2000 level:** At least two credits

**3000 level:** At least two credits

Classes in subjects other than Music, to a maximum total of 8 full credit classes including the writing class (in compliance with Degree Requirements 1.2), may be selected in consultation with the Department to suit a student's individual needs and interests. Music Education classes are not considered applicable to this degree. Students in the BA (General) programme enrolled in Applied Skills classes are required to pass jury examinations.

Students wishing to transfer from another institution into this programme may be required to enrol in an Applied Skills Class at the First-Year level, depending upon the standard of their performance proficiency demonstrated in the audition-interview.

## Bachelor of Arts and Bachelor of Science (Combined Honours Programmes)

Students may enrol in a combined honours programme with the joint approval of the Music Department and the department of the allied subject (in compliance with degree requirement 1.3.3).

## Academic Dismissal/Voluntary Withdrawal

Students required to apply for readmission to a university degree programme in Music must also submit to the department a supplementary readmission form. When a student in a Music degree programme has been dismissed on academic grounds and one of the classes failed is Applied Skills, that student must take a new audition upon application for readmission. When a student formerly registered in a music degree programme has been absent from the university for more than two years for reasons other than academic dismissal, it shall be within the discretion of the Music Department to require a new audition and/or validation tests before continuing in that programme.

## Classes Offered

### Classes Designed for Non-Majors

**MUS 1000.06R Listening to Music:** Designed for the interested listener who desires to acquire an informed response to musical experiences. A knowledge of musical notation and terminology is not a prerequisite except for Foundational Music students assigned to this class.

The class includes a survey of the evolution of music from primitive cultures to the modern age; music in contemporary society; music in non-Western civilizations; music and image; music and the related arts; the art and psychology of listening.

**Instructor:** W.H. Kemp  
**Format:** Lecture 3 hours

**MUS 1010.06R Music and Culture:** This is an interdisciplinary class, presented as a series of topics, with music discussed in relation to literature, cinema, painting, gender, social change, religion, ecology, as well as issues of perception, semiotics, proportion and audience reception. Various types of music will be discussed, including European and Canadian music, world music, popular music, music of men and women, and music of living composers or musicians. Evaluation is based on assignments and listening exams. This class fulfills the first-year writing class requirement.

**Instructor:** D. Schroeder

Format: Lecture/discussion 3 hours

**MUS 2007.06R Guitar and Lute:** For students with a serious interest in classical guitar and lute playing and for whom it is not possible to provide individual instruction. Basic playing technique and the history of fretted instruments.

**SIGNATURE REQUIRED**

Instructor: C. van Feggelen

Format: Lab 2 hours

Prerequisites: Personal interview with instructor

**MUS 2008.06R Modern Guitar:** A class for students with a serious interest in preparing for studio guitar playing and including jazz, folk, rock and accompanying idioms. Class instruction and ensemble playing in improvisation, score reading, chording and arranging.

**SIGNATURE REQUIRED**

Instructor: C. van Feggelen

Format: Lab 2 hours

Prerequisites: Interview with instructor

**MUS 2015.06R Music and Cinema:** A survey of music used in Cinema in Europe, the United States and Canada from the earliest sound films to the present, covering the four following categories: opera on film, notable film scores, music as film subject, and music used in a special way in films. The types of films used will include feature-length works, documentaries, animations and experimental works.

Instructor: D. Schroeder

Format: Lab (Screening) and Lecture 4 hours

Exclusion: Music Majors

The following classes, subsequently described, are also directed to non-majors:

MUS 1001.03A Materials of Music

MUS 1002.03B Introductory Music Theory

MUS 2087.06R, MUS 2287.06R Electronic and Experimental Music

\*MUS 2011.06R, \*MUS 3311.06R History of Opera

\*MUS 2012.06R, \*MUS 3312.06R Music and Psychology

\*MUS 2013.06R, \*MUS 3313.06R The Evolution of Jazz

\*MUS 3084.03B, \*MUS 3364.03B Women in Canadian Music

**Classes Designed for Music Majors**

N.B.: The following classes designed for music majors are available to non-majors with the permission of the instructor.

**Studies in Music History and Literature**

**MUS 1350.03A History of Music I:** A study of music in Western Civilization to 1600, including style, cultural contexts, and non-Western influences.

**SIGNATURE REQUIRED**

Instructor: W.H. Kemp

Format: Lecture 3 hours

Prerequisite: Permission of the instructor

Co-requisites: Normally, for Music majors, MUS 1201.03A, MUS 1270.03R, MUS 1271.03R

**MUS 1351.03B History of Music II:** A study of the history and literature of music in the Baroque period (c. 1600-1750) with an emphasis on the development of style and performance practices.

**SIGNATURE REQUIRED**

Instructor: W.H. Kemp

Format: Lecture 3 hours

Prerequisite: MUS 1350.03A

Co-requisites: Normally, for Music majors, MUS 1202.03B, MUS 1270.03R, MUS 1271.03R

**MUS 2350.03A History of Music III:** A detailed study of the history, literature and cultural contexts of music from C. 1750 to 1830.

**SIGNATURE REQUIRED**

Instructor: D. Schroeder

Format: Lecture 3 hours

Prerequisites: MUS 1202.03B, MUS 1350.03A, MUS 1351.03B

Co-requisite: Normally, for Music majors, MUS 2201.03A

**MUS 2351.03B History of Music IV:** A detailed study of the history, literature and cultural contexts of music from C. 1830 to 1950.

Instructor: D. Schroeder

Format: Lecture 3 hours

Prerequisites: MUS 2201.03A, MUS 2350.03A

Co-requisites: Normally, for Music majors, MUS 2202.03B

**\*MUS 3311.06R History of Opera:** An historical and analytical survey of operatic compositions from 1600 to the present day; opera as drama; changing tastes in operatic productions; operetta and musical comedy.

Instructor: Staff

Format: Lecture 3 hours

Prerequisite: Permission of the Department

**\*MUS 3312.06R Music and Psychology:** The interrelationship of music and psychology, as it relates to and informs the listener, student, educator and professional musician. Topics include a) the perception of tones as a foundation for the appreciation of musical experiences, music as passing time and as information; b) musical taste and aesthetics from a psychological point of view; c) the social psychology of music; d) theories of learning and of behaviour as appropriate to musical training and performance; e) the diagnostic and evaluative testing of musical aptitude and ability; f) the function of music in therapy and in special education. A

rudimentary knowledge of musical notation is a prerequisite to this study; no previous classes in Psychology are necessary.

Instructor: W.H. Kemp  
Format: Lecture 3 hours  
Prerequisites: Permission of the Department

**\*MUS 3313.06R The Evolution of Jazz:** A survey of the historical and social background of jazz and its musicians. The evolution of jazz styles is illustrated in live performances as well as on recordings. A knowledge of musical notation is not a prerequisite to this class.

Instructor: D. Palmer  
Format: Lecture 3 hours

**MUS 3350.03A or B Music in the Middle Ages and Renaissance:** A detailed study of the development of Western music in the Medieval and Renaissance periods with an emphasis on style, cultural contexts and performance practices.

Instructor: staff  
Format: Lecture 3 hours  
Prerequisites: MUS 1202.03B, MUS 1350.03A, or permission of the Instructor

**MUS 3351.03B Music Since 1950:** A detailed study of the history, literature, cultural contexts and practices of music from C. 1950 to the present; the roots of the "new" music in earlier twentieth century composition.

**SIGNATURE REQUIRED**

Instructor: S. Tittle  
Format: Lecture 3 hours  
Prerequisites: Normally, for Music majors, MUS 2202.03B, MUS 2351.03B

**\*MUS 3352.03A Chamber Music, to 1800:** A study in depth of the history and repertoire of chamber music from the Renaissance to Classicism.

Instructor: Staff  
Format: Lecture 3 Hours  
Prerequisites: MUS 2202.03B, 2350.03A

**\*MUS 3353.03B Chamber Music, 19th and 20th Centuries:** A study in depth of the history and repertoire of chamber music of the Romantic and modern schools.

Instructor: Staff  
Format: Lecture 3 Hours  
Prerequisites: MUS 2202.03B, 2351.03B

**\*MUS 3354.03A Keyboard Music to 1750:** A study of the music stringed keyboard instruments by the English virginalists and Italian cembalists of the late 16th and early 17th centuries, the French clavecinists of the 17th and 18th centuries, and the music of D. Scarlatti, J.S. Bach and Handel.

Instructor: staff  
Format: Lecture 3 Hours  
Prerequisites: Permission of the Department

**\*MUS 3355.03B Piano Literature, 19th and 20th Centuries:** A study of the music for piano from the Viennese Classicists of the 18th century through to representative examples of the repertoire from the second half of the 20th century.

Instructor: staff  
Format: Lecture 3 Hours  
Prerequisites: Permission of the Department

**MUS 3361.03A History of Dance:** The class will explore the development of dance from the Basse dances of the Middle Ages, through the birth of ballet to the dances of today; it will include an introduction to dance notation as well as the practical and theoretical aspects of historical dance.

**SIGNATURE REQUIRED**

Instructor: P. Richards  
Format: Lecture 2 hours  
Cross-listing: LEIS 3157.03

**MUS 3362.03A Music in Canada to 1950:** An historical survey of music in Canada to 1950: the socio-economic factors essential to the successful transplantation and growth of European musical culture in Canada; Indigenous Canadian music and nationalism in Canadian composition; Canadian composers from the Colonial era to 1950; experience in Research skills through the preparation of a study paper on an historical or contemporary topic.

Instructor: W. H. Kemp  
Format: Lecture 2 Hours; individual tutorial  
Prerequisites: Permission of the Department

**\*MUS 3363.03B Music in Canada since 1950:** The development of musical life in Canada from the end of World War II until the present day; special emphasis on contemporary Canadian composers and an analytical study of their work.

**SIGNATURE REQUIRED**

Instructor: W. H. Kemp  
Format: Lecture 2 Hrs; individual tutorial

Prerequisites: Permission of the Department

**\*MUS 3364.03B Women in Canadian Music:** An historical review of the contribution to the growth of music in Canada by women composers, performers, and educators; the life and works of major 20th Century Canadian women composers Violet Archer, Norma Beecroft, Jean Coulthard and Barbara Pentland; a survey of the younger generation of contemporary Canadian women composers.

Instructor: W. H. Kemp  
Format: Lecture 2 Hours  
Prerequisite: Permission of the Department

**\*MUS 3370.03R Performance Practice:** The principles of performance practice in 18th and 19th-century music will be discussed in the context of treatises, contemporary accounts, manuscripts and early editions. Areas to be

covered include instruments, ornamentation, dance-related music, and problems of interpreting expression markings.

**SIGNATURE REQUIRED**

**Instructor:** D. Schroeder  
**Format:** Seminar 2 hours  
**Prerequisites:** MUS 1350.03A, MUS 1351.03B, MUS 2350.03A, MUS 2351.03B

**MUS 4388.03A or B or R Topics in Music:**

This is an intensive study of selected topics announced annually.

**SIGNATURE REQUIRED**

**Instructor:** Staff  
**Format:** Seminar 2-3 hours  
**Prerequisites:** MUS 1350.03A, MUS 1351.03B, MUS 2350.03A, MUS 2351.03B

**MUS 4387.03A or B or R Topics in Music**

**History:** This is an intensive study of selected topics announced annually.

**SIGNATURE REQUIRED**

**Instructor:** Staff  
**Format:** Seminar 2-3 hours  
**Prerequisites:** Mus 1350.03A, MUS 1351.03B, MUS 2350.03A, MUS 2351.03B

**MUS 4388.03A/4389.03B Special Studies:**

Individually directed research and writing under the supervision of an appropriate member of the Department.

**SIGNATURE REQUIRED**

**Instructor:** Staff  
**Prerequisites:** MUS 2350.03A, MUS 2351.03B, MUS 3350.03A and MUS 3351.03B

**\*MUS 4370.03R The Organ and Its**

**Literature:** The historical development of the organ, and the interrelationship between organ construction and repertoire from the Renaissance to the present day.

**SIGNATURE REQUIRED**

**Instructor:** D. MacDonald  
**Format:** Lecture 3 Hours  
**Prerequisites:** Permission of the Department

**MUS 4399.03R Area Graduation Requirement (Thesis)**

**Theory and Related Skills**

**MUS 1001.03A Materials of Music:** An introduction to University music studies for prospective music majors recommended by audition to foundational level classes in music; also open to non-majors. A knowledge of music reading and rudiments is presumed. Extensive work in rudiments applied to all aspects of music learning; the phenomenon of the tonio-melodic, harmonic and formal; modes, pentatonic scale formation, dissonances, 2-part writing to encompass these; non-tonal formations; acoustics. **Note:** auditioned students will be advised to take a

year of private studies if their preparedness falls below the introductory level.

**Instructor:** T. Zonneveld  
**Format:** Lecture 2 hours

**MUS 1002.03B Introductory Music Theory:**

Also open to non-majors. Rhythm and phrase structures, "musica ficta" and elementary modulation in two- and three-part writing. Comparison of tonality, atonality, modality, and chromatic tonality, exploration of chord building triadic and otherwise, simple (bar) chording; elementary diatonic harmony previewing the start of MUS 1201.03A; four-part writing as an immediate transition to MUS 1202.03B.

**Instructor:** T. Zonneveld  
**Format:** Lecture 2 hours  
**Prerequisite:** MUS 1001.03A

**MUS 1201.03A Music Theory I:** A survey of musical phenomena in general, subsequently of tonal music in particular. The material in this survey is immediately applied to two- and three-part writing, stressing both the harmonic and the contrapuntal dimensions.

**SIGNATURE REQUIRED**

**Instructor:** S. Tittle  
**Format:** Lecture 3 hours  
**Prerequisites:** Permission of the Department, plus Royal Conservatory of Toronto Grade II Theory equivalent or MUS 1001.03A/MUS 1002.03B  
**Co-requisites:** MUS 1270.03R, MUS 1271.03R

**MUS 1202.03B Music Theory II:** A concentration upon a complete grounding in the traditional four-part writing skills, culminating in the study of the dominant seventh and elementary modulation.

**SIGNATURE REQUIRED**

**Instructor:** S. Tittle  
**Format:** Lecture 3 hours  
**Prerequisites:** MUS 1201.03A or permission of the Department  
**Co-requisites:** MUS 1270.03R, MUS 1271.03R

**MUS 1270.03R Aural Perception I:** A class designed to correlate with MUS 1201.03A and MUS 1202.03B. Melodic, harmonic, rhythmic, textural and stylistic factors are visualized, performed and dictated systematically. Lab work in ear-training and sight-singing is done three times per week. Each student is a member of a small working section.

**SIGNATURE REQUIRED**

**Instructor:** T. Zonneveld  
**Format:** Lab 3 hours  
**Prerequisite:** Permission of the Department; MUS 1001.03A/1002.03B or equivalent  
**Co-requisites:** MUS 1201.03A & MUS 1202.03B, MUS 1271.03R

**MUS 1271.03R Keyboard Skills I:** The development of basic skills in sight reading, score reading and harmonized accompaniment at the keyboard.

**SIGNATURE REQUIRED**

Instructor: E. Fraick  
 Format: Lab 2 hours  
 Prerequisites: Permission of Department;  
 MUS 0071.00R or equivalent

**MUS 2201.03A Music Theory III:** A continuation of Theory II, covering the study of altered chords, modulation to all closely related keys, and the relationship of harmony to melody, phrasing, rhythm, meter and performance issues. Emphasis is placed on concepts of functional tonality by means of written exercises in four-part harmony and analysis of 18th and 19th century music.

**SIGNATURE REQUIRED**

Instructor: D. Farrell  
 Format: Lecture 3 hours  
 Prerequisites: MUS 1202.03B, MUS 1270.03R, MUS 1271.03R  
 Co-requisites: MUS 2270.03R, MUS 2271.03R

**MUS 2202.03B Music Theory IV:** The study of chromatic harmony and complex modulation. Exercises may include some texture other than four-part choral style, and analysis includes forms such as binary, ternary, sonata, rondo and variation.

**SIGNATURE REQUIRED**

Instructor: D. Farrell  
 Format: Lecture 3 hours  
 Prerequisites: MUS 2201.03A  
 Co-requisites: MUS 2270.03R, MUS 2271.03R

**MUS 2270.03R Aural Perception II:** This class provides further practice in melodic and harmonic dictation and sight-singing; it correlates with MUS 2201A and 2202B. A special component deals with solmization skills in sight reading.

**SIGNATURE REQUIRED**

Instructor: D. Farrell  
 Format: Lab 2 hours  
 Prerequisites: MUS 1201.03A & MUS 1202.03B, MUS 1270.03R, MUS 1271.03R  
 Co-requisites: MUS 2201.03A, MUS 2202.03B, MUS 2271.03R

**MUS 2271.03R Keyboard Skills II:** A continuation of MUS 1271.03R.

**SIGNATURE REQUIRED**

Instructor: Staff  
 Format: Lab 2 hours  
 Prerequisites: MUS 1201.03A & MUS 1202.03B, MUS 1270.03R, MUS 1271.03R  
 Co-requisites: MUS 2201.03A, MUS 2202.03B, MUS 2270.03R

**\*MUS 3270.03R Aural Perception III:** Advanced sight-singing and dictation. Singing music of all periods on solfa syllables and letter names with emphasis on contemporary music. Dictation of modulating excerpts in four-part chorales. Chromaticism, modality, whole-tone and contemporary music are studied along with musical examples of more rhythmic complexity. Also included: singing and dictation of atonal compositions, advanced chords, sing and play exercises.

Instructor: P. Perron  
 Format: Lab 2 hours  
 Prerequisites: MUS 2202.03B, MUS 2270.03R, MUS 2271.03R

**MUS 3280.03R Counterpoint:** The development of skills in polyphonic architecture in two- and three-voice 18th century contrapuntal style using canonic techniques. An introduction to 18th century counterpoint: inventions, canons, and fugal expositions, etc.

**SIGNATURE REQUIRED**

Instructor: D. Farrell  
 Format: Lecture 2 hours  
 Prerequisite: MUS 2202.03B

**MUS 3281.03R Form and Analysis I:** Analytic study of the form and context of selected late eighteenth and nineteenth century compositions in various styles and idiom.

**SIGNATURE REQUIRED**

Instructor: Staff  
 Format: Lecture 2 hours  
 Prerequisites: MUS 2202.06B, 2350.06A, 2351.06B

**MUS 3282.03R Orchestration:** A survey of the development of the orchestra and the orchestral instruments with an introduction to acoustics. Technique in the deployment of instrumental combinations is emphasized through practical exercises in scoring for a medium-sized orchestra common in the 20th century.

**SIGNATURE REQUIRED**

Instructor: Staff  
 Format: Lecture 2 hours  
 Prerequisite: MUS 2202B

**MUS 4280.03R Advanced Harmony and Counterpoint:** The application of acquired harmonic and contrapuntal technique to various instrumental and vocal textures and forms; chorale prelude and fugue.

**SIGNATURE REQUIRED**

Instructor: Staff  
 Format: Lecture 2 hours  
 Prerequisites: MUS 2202.03B, MUS 3280.03R and 3281.03R

**MUS 4281.03R Form and Analysis II:** Analytic study of the form and content of selected twentieth century compositions in various styles and idioms.

**SIGNATURE REQUIRED**

**Instructor:** Staff  
**Format:** Lecture 2 hours  
**Prerequisites:** MUS 2202.03B, MUS 2350.03A, MUS 2351.03B, MUS 3280.03R and 3281.03R

**Composition**

**MUS 2287.06R Electronic and Experimental Music:** Introduction to the experimental Sound Studio. Recording, mixing, and tape manipulation techniques; analysis and composition of tape music; voltage control concepts, synthesizer theory and practice. Composition and live performance with electronics; group improvisation with both studio and personal resources. Design and execution of live performance situations which may include verbal, visual and other theatrical elements.

**SIGNATURE REQUIRED**

**Instructor:** S. Tittle  
**Format:** Lab 3 hours  
**Prerequisite:** Interview with Instructor

**MUS 3210.06R, MUS 4210.06R Composition I, II:** Particular works are analyzed to serve as a springboard for original composition by the student. Students' works are evaluated in small group discussions and in individual tutorial sessions.

**SIGNATURE REQUIRED**

**Instructor:** S. Tittle, D. Farrell  
**Prerequisites:** Permission of the Department, an interview with the instructor, and the submission of a folio of original compositions for assessment by the composition faculty.

**\*MUS 4271.03R Basso Continuo, Service Playing and Accompaniment:** This class is designed to teach elementary principles of basso continuo and realization of figured bass as well as the practical study of the role of the organ in worship. Students will gain experience in continuo playing through ensemble participation. Topics for study in service playing include solo and anthem accompaniment, hymn playing, and examination of various forms of service music.

**SIGNATURE REQUIRED**

**Instructor:** D. MacDonald  
**Format:** Lab 2 hours  
**Prerequisite:** Departmental consent and an interview with the instructor

**MUS 4282.03A Choral Arranging:** See MUS 4482A, Music Education.

**Instructor:** D. Farrell  
**Format:** Lecture 2 hours

**MUS 4299.03R Area Graduation Requirement (Composition)**

**Performance**

**Note:** The various levels of applied study indicate the year of study in the Department and are not intended solely as an indication of relative standard. Term gradings are based upon progress as well as upon the actual performing standard displayed in the jury examination.

Classes offered in all band and orchestral instruments, guitar and lute, piano, organ, harpsichord, recorder, voice. Normally all students receive a one hour weekly individual lesson in their major performance idiom. In addition to the one-hour lesson, and appropriate to the idiom, group instruction in technique and repertoire may be a required part of all sequences of Applied Skills classes.

Applied Skills classes are designated as follows:

- MUS 1101.06R, MUS 2101.06R, MUS 3101.06R, MUS 4101.06R: Voice I, II, III, IV
- MUS 1102.06R, MUS 2102.06R, MUS 3102.06R, MUS 4102.06R: Guitar I, II, III, IV
- MUS 1103.06R, MUS 2103.06R, MUS 3103.06R, MUS 4103.06R: Piano I, II, III, IV
- MUS 1104.06R, MUS 2104.06R, MUS 3104.06R, MUS 4104.06R: Organ I, II, III, IV
- MUS 1105.06R, MUS 2105.06R, MUS 3105.06R, MUS 4105.06R: Violin I, II, III, IV
- MUS 1106.06R, MUS 2106.06R, MUS 3106.06R, MUS 4106.06R: Viola I, II, III, IV
- MUS 1107.06R, MUS 2107.06R, MUS 3107.06R, MUS 4107.06R: Cello I, II, III, IV
- MUS 1108.06R, MUS 2108.06R, MUS 3108.06R, MUS 4108.06R: Double Bass I, II, III, IV
- MUS 1109.06R, MUS 2109.06R, MUS 3109.06R, MUS 4109.06R: Flute I, II, III, IV
- MUS 1110.06R, MUS 2110.06R, MUS 3110.06R, MUS 4110.06R: Oboe I, II, III, IV
- MUS 1111.06R, MUS 2111.06R, MUS 3111.06R, MUS 4111.06R: Clarinet I, II, III, IV
- MUS 1112.06R, MUS 2112.06R, MUS 3112.06R, MUS 4112.06R: Bassoon I, II, III, IV
- MUS 1113.06R, MUS 2113.06R, MUS 3113.06R, MUS 4113.06R: Saxophone I, II, III, IV
- MUS 1114.06R, MUS 2114.06R, MUS 3114.06R, MUS 4114.06R: French Horn I, II, III, IV
- MUS 1115.06R, MUS 2115.06R, MUS 3115.06R, MUS 4115.06R: Trumpet I, II, III, IV
- MUS 1116.06R, MUS 2116.06R, MUS 3116.06R, MUS 4116.06R: Trombone I, II, III, IV
- MUS 1117.06R, MUS 2117.06R, MUS 3117.06R, MUS 4117.06R: Tuba I, II, III, IV
- MUS 1118.06R, MUS 2118.06R, MUS 3118.06R, MUS 4118.06R: Percussion I, II, III, IV

MUS 1119.06R, MUS 2119.06R, MUS 3119.06R, MUS 4119.06R: Lute I, II, III, IV  
 MUS 1120.06R, MUS 2120.06R, MUS 3120.06R, MUS 4120.06R: Harpichord I, II, III, IV  
 MUS 1121.06R, MUS 2121.06R, MUS 3121.06R, MUS 4121.06R: Recorder I, II, III, IV

**MUS 4150.06R Advanced Applied Skill:** By special permission of the Department a student may enrol in a fifth year of an applied skill, subject to enrolment quotas and budget.

**MUS 1100.06R Foundational Applied Skills:** By special recommendation some music majors may be advised by the Auditioning Committee to begin individual lessons at a level prerequisite to 1000-level Applied Skills classes.

**MUS 3160.03A Conducting:**  
**SIGNATURE REQUIRED**

Instructor: P. Djokic  
 Format: Lab 2 hours  
 Prerequisites: MUS 2202.03B, MUS 2270.03R, MUS 2271.03R

**MUS 3161.03B Choral Techniques:** Study of the distinctive features of conducting choral ensembles with emphasis on rehearsal technique, score preparation, interpretation and group methods of building vocal tone. Practical experience in conducting.

**SIGNATURE REQUIRED**

Instructor: W.H. Kemp  
 Format: Lab 2 hours  
 Prerequisites: MUS 2202.03B, MUS 2270.03R, MUS 2271.03R, MUS 3160.03A

**MUS 4198.03R Church Music Internship:** This class is restricted to students in the Fourth Year of the BMus Organ and Church Music Programme. Under the guidance of the liturgical and musical staff of the Atlantic School of Theology, students will prepare and perform Services pertaining to the principal church denominations. In the second term, students will be assigned to a minimum of three representative city churches, for observation and practice of the Service, supervised by the Department in collaboration with the city church musicians and clergy participating in the programme.

Instructor: D. MacDonald, Staff Coordinator  
 Prerequisite: Permission of the Department  
 Restriction: Restricted to 4th year BMus Organ and Church Music students.

**MUS 3199.03A or R Recital:** Required of all third year Bachelor of Music students whose concentration is in Performance.

**MUS 4199.03A or R Area Graduation Requirement (Recital)**

## Unconcentrated BMUS

**MUS 4599.03R Graduation Requirement, Unconcentrated:** Students in the Unconcentrated B.Mus. Program must receive Departmental approval to fulfil their graduation requirements with one of the following: (1) a single-topic thesis (2) two essays (on different topics) (3) a half recital and an essay (4) a lecture-recital (with supporting documentation).

Instructor: Staff

## Music Education

Prerequisites for all classes: permission of the Department, and an interview with the designated member of the Music Education faculty.

### Core Classes

**MUS 3400.06R Elementary Classroom Teaching Methods:** An Introduction to the development of a music programme at the elementary level. Emphasis is on how to teach song materials, movement and creativity, reading and writing skills and what to listen for in music. The educational philosophies of Kodaly and Orff are examined in some detail. Solmization, hand signs, rhythm names and body co-ordination are some of the skills to be developed.

**SIGNATURE REQUIRED**

Instructor: P. Perron  
 Format: Lecture 3 hours  
 Cross-listing: EDUC 4890.08

**MUS 3470.03R Elementary Classroom Field Experience:** Students must spend a minimum of 100 hours in various elementary schools during the school year practice teaching (75%) and observing master teachers (25%). This consists of one morning per week during the university year and a three week period in April-May.

**SIGNATURE REQUIRED**

Instructor: P. Perron

**MUS 3471.03R Solfa Pedagogy in the Classroom:** An in-depth study of the theoretical and practical aspects of solfa and related ear training skills pertaining to students taking music education. The melodic, rhythmic and harmonic features of aural perception will be studied through sight-singing and dictation emphasizing the pedagogical aspects of the moveable do system, hand-sign singing, singing on absolute letter names, and the use of rhythm names and stick notation.

**SIGNATURE REQUIRED**

Instructor: P. Perron  
 Format: Lab 2 hours  
 Prerequisites: MUS 2270.03R  
 Co-requisite: MUS 3400.06R and/or MUS 4400.03R

**MUS 3480.03R Band Instruments:** A practical introduction to the principal band instruments. Group instruction is offered in flute, oboe or bassoon, saxophone, trumpet or French horn, trombone and tuba, and percussion. This class normally is restricted to students majoring in wind, brass or percussion instruments.

**SIGNATURE REQUIRED**

Instructor: J. Stern, Staff Coordinator  
Format: Lab 2 hours

**MUS 3481.03R String Instruments:** A practical introduction in group lessons to the instruments of the string orchestra. This class normally is restricted to students majoring in a string instrument.

**SIGNATURE REQUIRED**

Instructor: N. Babineau, Staff Coordinator  
Format: Lab 2 hours

**MUS 4400.03R Secondary Classroom Teaching Methods:** An introduction to the development of a music programme at the secondary level. Emphasis is on how to teach a general music class exploring the use of song materials, music theory, movement and creativity and listening skills.

**SIGNATURE REQUIRED**

Instructor: P. Perron  
Format: Lecture 1 1/2 hours  
Cross-listing: EDUC 4891.03

**MUS 4470.03R Secondary Classroom Field Experience:** Students must spend a minimum of 100 hours in various secondary school classrooms during the school year practice teaching (75%) and observing master teachers (25%). This consists of one morning per week during the university year and a three week period in April-May.

**SIGNATURE REQUIRED**

Instructor: P. Perron

**\*MUS 4480.03R Band Instruments II:** A continuation of MUS 3480C.  
Instructor: J. Stern, Staff Coordinator  
Format: Lab 2 hours

**MUS 4481.03R Band Methods and Field Experience:** A survey of the literature for band, band methods for schools and purchase and maintenance of band instruments; supervised band leadership practice in the school setting.

**SIGNATURE REQUIRED**

Instructor: T. Hill  
Format: Lab 2 hours  
Prerequisite: MUS 3480.03A

**MUS 4483.03R String Methods and Field Experience:** A survey of literature and string methods for schools and purchase and maintenance of string instruments; supervised string teaching practice in the school setting.

**SIGNATURE REQUIRED**

Instructor: N. Babineau  
Format: Lab 2 hours

Prerequisites: MUS 3481.03R or permission

**Electives**

**\*MUS 4490.03A or B Orff Method and Practice, Level One, Basic:** An introduction to Carl Orff's Music for Children designed for the elementary school classroom teacher and music specialists; the material is also suitable for those using music in the pre-school, recreational or studio setting. Emphasis is on how to apply the four principal elements of the Orff approach - speech, movement, rhythm and melody - to the teaching of basic musical concepts (beat, rhythm, simple metre, pentatonic scale, fundamental Bourdon, phrasing, form and notation). Creative procedures and teaching methods are explored using song, Orff instruments and the recorder.

**SIGNATURE REQUIRED**

Instructor: Staff  
Format: Lecture and Practicum  
Prerequisite: Permission of the Department

**\*MUS 4491.03A or B Orff Method and Practice Level Two, Intermediate:** A continuation of MUS 4490.03A or B at the intermediate level. Emphasis is on the acquisition and practice of procedures and methods of the Orff approach using increasingly developed musical materials and constructs (complete scale repertoire, melodic formulation, harmonic relationships and chordal formations, cross-rhythms and irregular metres, rondo and antiphony). Advanced training is given in instrumental technique (recorder, hand drum, mallets, etc.). The Orff approach is applied to ways of musically interpreting and improvising children's speech, recitation, poetry, and drama.

**SIGNATURE REQUIRED**

Instructor: Staff  
Format: Lecture and Practicum  
Prerequisites: MUS 4490.03A or B or a similar class in Basic Orff; an interview with the Department.

**MUS 4482.03A Guitar in the Classroom:** Introductory guitar instruction including vocal/choral accompanying methods and techniques for the school classroom setting, tablature reading and finger-style playing, development of skills in a variety of accompaniment and rhythmic figurations. Practical applications will be available in MUS 3470.03R/4470.03R.

**SIGNATURE REQUIRED**

Instructor: C. van Feggelen  
Format: Lab 2 hours

**MUS 4471.03A, B, or R Field Projects:** Under supervision, students design a project that results in an in-depth study of the theoretical and practical aspects of a particular area of music education. The project entails library

research as well as working with specialists in the field.

**MUS 4482.03A Choral Arranging: Arranging for school choral ensembles.**

Instructor: D. Farrell

Format: Lecture 2 hours

Prerequisite: MUS 3282.03R

## Ensembles

Participation in both large and small ensembles is required of all students whose major field of study is music in each of the years of the degree programmes. Details of specific participation requirements are available in the Department of Music.

Membership in the various ensembles is open to the University and the community by audition.

Following is a list of the ensembles sponsored by the Department of Music:

**MUS Dalhousie Chorale (W.H. Kemp):**  
I. 0161.00, II. 0261.00, III. 0361.00, IV. 0461.00, V. 0561.00, Found. 0061.00

**MUS Dalhousie Chamber Choir (W.H. Kemp):**  
I. 0152.00, II. 0252.00, III. 0352.00, IV. 0452.00, V. 0552.00, Found. 0052.00

**MUS Dalhousie Symphonic Wind Ensemble (Staff):** I. 0153.00, II. 0253.00, III. 0353.00, IV. 0453.00, V. 0553.00, Found. 0053.00

**MUS Dalhousie Chamber Orchestra (P. Djokic):** I. 0154.00, II. 0254.00, III. 0354.00, IV. 0454.00, V. 0554.00, Found. 0054.00

**MUS Dalhousie Jazz Ensemble (D. Palmer):** I. 0155.00, II. 0255.00, III. 0355.00, IV. 0455.00, V. 0555.00, Found. 0055.00

**MUS Dalhousie Brass Ensemble (Staff):** I. 0156.00, II. 0256.00, III. 0356.00, IV. 0456.00, V. 0556.00, Found. 0056.00

**MUS Dalhousie Musica Antiqua (Staff):** I. 0157.00, II. 0257.00, III. 0357.00, IV. 0457.00, V. 0557.00, Found. 0057.00

**MUS Dalhousie Percussion Ensemble (J. Faraday):** I. 0158.00, II. 0258.00, III. 0358.00, IV. 0458.00, V. 0558.00, Found. 0058.00

**MUS Dalhousie Opera Workshop (G. Servant):**  
I. 0159.00, II. 0259.00, III. 0359.00, IV. 0459.00, V. 0559.00, Found. 0059.00

**MUS Guitar Ensemble (C. van Feggelen):**  
I. 0160.00, II. 0260.00, III. 0360.00, IV. 0460.00, V. 0560.00, Found. 0060.00

**MUS Small Ensembles (staff coaches):** I. 0161.00, II. 0261.00, III. 0361.00, IV. 0461.00, V. 0561.00, Found. 0061.00

**MUS Accompanying:** I. 0162.00, II. 0262.00, III. 0362.00, IV. 0462.00, V. 0562.00, Found. 0062.00

**MUS Dalhousie Orchestra (by invitation):** I. 0163.00, II. 0263.00, III. 0363.00, IV. 0463.00, V. 0563.00, Found. 0063.00

**MUS Nova Scotia Youth Orchestra (by invitation, and Department permission):** I. 0164.00, II. 0264.00, III. 0364.00, IV. 0464.00, V. 0564.00, Found. 0064.00

**MUS New Music Ensemble (S. Tittle):** I. 0166.00, II. 0266.00, III. 0366.00, IV. 0466.00, V. 0566.00, Found. 0066.00

## Neuroscience

**Location:** Psychology Department, Life Sciences Centre  
**Telephone:** (902) 494-3417  
**FAX:** (902) 494-8585

### Programme Advisors

I.A. Meinertzhagen (494-2131)  
 S.R. Shaw (494-2047)

### Introduction

The last two decades have witnessed the remarkable emergence of a new, interdisciplinary field called Neuroscience which has as its primary goal the understanding of the brain. Neuroscience is a rapidly developing research area which includes all aspects of the structure and function of nervous systems. Neuroscience involves a variety of experimental strategies to understand nervous systems. These include molecular, biochemical, behavioral, anatomical, physiological, and developmental approaches. Although firmly grounded in the natural sciences, the scope of Neuroscience also encompasses fundamentally important philosophical issues, such as the nature of human thought and its mechanism. The programme outlined below represents all of these approaches, with an emphasis on behaviour as the adaptive product of neural activity. Knowledge obtained from research in Neuroscience is applied to a variety of human health problems, including neurological conditions such as those occurring in Alzheimer's disease, Parkinsonism, and a variety of drug- or injury-induced behavioral disorders. Research in Neuroscience is also contributing new information related to the major psychiatric disorders, including affective disorders and the schizophrenias.

### The BSc (Honours) Programme

This programme is intended to serve as a preparation for graduate work in neuroscience, biological psychology, medicine, human communication disorders and related fields. Its interdisciplinary nature is reflected in the participation of faculty from several departments in the programme, which is offered through the Department of Psychology. Students interested in the Neuroscience degree programme should consult with either I.A. Meinertzhagen or S.R. Shaw in the Department of Psychology early in their undergraduate careers, preferably by the end of their first year of study. Admission is often deferred until the end of the second year, however.

### Structure

In the first year of study, students are required to take classes which provide a firm grounding in the physical and biological sciences. In subsequent years, the programme includes 9 credits in classes drawn from Neuroscience, Psychology and Biology. These include a number of required core classes which emphasize the acquisition and application of laboratory skills. Note that students intending to obtain an Honours degree in Neuroscience may not use Psychology as their minor subject, nor may Psychology Honours students use Neuroscience as a minor subject. It is anticipated, but not required, that Neuroscience Honours students will have Biology as their minor subject. In that case, classes cross-listed with classes in Biology cannot count for credit towards both the Neuroscience programme and the Biology minor.

Students wishing to take Combined Honours in Neuroscience and a second discipline, e.g. Biology, Biochemistry, should consult with a programme advisor. In general, the required classes of the honours programme in Neuroscience will be required of all such students, except PSYO 2000.03A. Thus, the minimum programme after year I is NESC 2071.03A, NESC 2072.03B, one full credit in Biology (BIOL 2020.03A or B and an extra half credit), NESC 3370.03A, 3371.03B, 3440.03B, one of the listed Neuroscience seminar classes (half credit), and (for those students who take Neuroscience as a major subject of a combined honours programme) NESC 4500.06R (honours thesis).

### Departmental Requirements

#### Classes required in major:

- 2000 level:** NESC 2071.03, 2072.03, PSYO 2000.03, BIOL 2020.03, BIOC 2200.03 or BIOL 2030.03 or BIOL 2001.03 or BIOL 2002.03 or BIOL 2100.03 plus two half credits selected from NESC 2140.03, 2150.03, 2160.03, 2170.03, 2190.03, 2270.03 or 2370.03, PSYO 2160.03, or BIOL 2012.03
- 3000 level:** NESC 3370.03, 3371.03 and 3440.03 plus one and one half credits selected from NESC 3000.06, 3050.06, 3070.06, 3071.06, 3150.03, 3160.06, 3260.03, 3270.03, 3590.03, 3760.03, PSYO 3040.06, 3500.06
- 4000 level:** NESC 4500.06 plus two half classes selected from NESC 4000.03, 4050.03, 4070.03,

4160.03, 4374.03 or  
4375.03 plus two half classes  
at 3000 or 4000 level from  
the lists above

**Other required classes:**

BIOL 1000.06, CHEM 1010.06 or 1030.06,  
MATH 1000.03 and 1010.03 or 1500.03,  
PSYO 1000.06 or 1010.06 or 1500.06,  
PHYC 1100.06 or 1300.06.

**Recommended:** It is recommended that students take Psychology 3500.06 (Statistical Methods) in either their third or fourth year of study.

**Notes:**

1. In designing the first year of study, students should consider the requirements for a BSc degree as outlined in Section 1 of the Degree Requirements.
2. BIOL 2020.03A (Cell Biology) and BIOL 3440.03B (Neuroanatomy; same as NESC 3440.03B) cannot be counted as credits toward completing a minor in Biology.
3. Students are encouraged to consider the following classes as electives. Courses marked with an asterisk are recommended electives in the first or second year of study: BIOC 4301.03B (Biochemical Communication); BIOL 3012.03A or BIOC 3200.03A (Introduction to Biol. Chemistry); BIOL 3013.03B/BIOC 3300.03B (Intermediary Metabolism); BIOL 3014.03B/BIOC 3400.03B (Nucleic Acid Biochemistry and Molecular Biology); \*CHEM 2400.06R (Organic Chemistry); PHIL 3480.03A or B (Mind and Brain); \*PHYC 1100.06R/1300.06R (Introductory Physics).

## Classes Offered

**NESC 2071.03A Introduction to Neuroscience:** This class introduces a number of aspects of this field emphasizing analyses which are precise at the neuronal level. A general introduction is provided by the vertebrate visual system, concentrating upon the analysis of visual information in the mammalian visual cortex. This is followed by consideration of muscle spindles and other receptors of the motor nervous system; a brief treatment of the anatomy of the mammalian brain and a more detailed analysis of the cerebellum; the other major components of the motor pathways to the spinal cord; spinal reflexes and the integrative action of neurons.

**Format:** lecture 3 hrs  
**Instructor:** I.A. Meinertzhagen  
**Prerequisites:** PSYO 1000.06 or 1010.06 or 1500.06 or BIOL 1000.06 and 2020.03 or consent of instructor.

**Cross-listing:** PSYO 2071.03A

**NESC 2072.03B Cellular Neurobiology:** Building on the knowledge of holistic aspects of brain function gained in NESC 2071.03A, this class explores the neuronal basis of activity in all nervous systems. Starting with an analysis of the structure of neurons, the function of nerve cells will be explored with respect to the ionic and molecular basis of resting potentials and of electrical activity in nerve cells; synaptic transmission; the release and postsynaptic action of synaptic transmitters; aspects of the neurochemistry of synaptic transmitters and of drug action; and glial cells. Cellular phenomena relevant to neurological dysfunction will be discussed.

**Format:** lecture 3 hrs  
**Instructor:** S.R. Shaw  
**Prerequisites:** PSYO/NESC 2071.03 or consent of instructor

**Cross-listing:** PSYO 2072.03B

**NESC 2140.03A or B Learning:** Traces the experimental study of learning from the turn-of-the-century research of Pavlov and Thorndike to the present. Development of the field of animal learning is described in terms of the ways in which particular conceptions of the learning process have guided experimentation, and have in turn been revised on the basis of the outcomes of that experimentation. Some important concepts discussed are: association, attention, biological constraints on learning, classical conditions, discrimination, expectancies, law of effect, learning-performance distinction, operant conditioning, S-S and S-R bonds, and stimulus control. The value of various approaches is discussed with respect to several goals: (1) providing general principles of learning; (2) understanding the behaviour of particular species; (3) direct application to human problems. Emphasis is on understanding why researchers in animal learning do what they are currently doing (given the goals and the historical context), rather than on learning a number of facts about animal learning.

**Format:** lecture 3 hours  
**Instructor:** V. LoLordo  
**Prerequisites:** PSYO 1000.06 or 1010.06 or 1500.06

**Cross-listing:** PSYO 2140.03

**NESC 2150.03A or B Perceptual Processes:** Perception deals with the way in which our senses provide us with information about our environment. This class focuses on the process by which sensory experiences are coded, how they are interpreted by the nervous system, and how experience modifies perception.

**Format:** lecture 3 hours  
**Instructor:** J. McNulty  
**Prerequisites:** PSYO 1000.06 or 1010.06 or 1500.06 or BIOL 1000.06

**Cross-listing:** PSYO 2150.03

**NESC 2170.03A or B Hormones and Behaviour:** An introduction to the endocrinological bases of mammalian social behaviour. Emphasis is on the mechanisms by which the hormones of the hypothalamus, pituitary gland, gonads and adrenal gland control sexual, aggressive and maternal behaviour. Other topics covered are: hormone receptors in the brain; the menstrual cycle and human reproduction; puberty, sex differences in the brain; the pineal gland; neuro-transmitters; pheromones; crowding and social stress.

**Format:** lecture 3 hours  
**Instructor:** R.E. Brown  
**Prerequisite:** PSYO 1000.06 or 1010.06 or 1500.06 or BIOL 1000.06  
**Cross-listing:** PSYO 2170.03

**NESC 2190.03A or B Language and the Brain:** This class is an introduction to the study of languages that are considered as symbolic functions of the human brain. The main topics are the common properties and organizing principles of languages; the acquisition of languages by children; the brain structures involved in language and the effects of brain damage on language disorders.

**Format:** lecture 3 hours  
**Instructor:** M. Yoon  
**Prerequisite:** PSYO 1000.06 or 1010.06 or 1500.06  
**Cross-listing:** PSYO 2190.03

**NESC 2270.03A or B Human Neuropsychology:** This class explores not only normal but also abnormal brain function, as revealed by the consequences of trauma, disease, and surgical intervention. Aphasia, epilepsy, the role of certain brain chemicals in behaviour, cerebral asymmetry, localization of brain function are examples of topics covered.

**Format:** lecture 3 hours  
**Instructor:** M. Ozler  
**Prerequisite:** PSYO 1000.06 or 1010.06 or 1500.06  
**Cross-listing:** PSYO 2270.03

**NESC 2370.03A or B Drugs and Behaviour:** An introduction to behavioural psychopharmacology. The lectures involve basic anatomy, physiology and chemistry of the nervous system. Behavioral effects and underlying mechanisms of various psychoactive drugs will be discussed. Specific topics will cover alcohol, tobacco, amphetamines, cocaine, opiates, hallucinogens, tranquillizers and antipsychotic drugs.

**Format:** lecture 3 hours  
**Instructor:** S. Nakajima  
**Prerequisite:** PSYO 1000.06 or 1010.06 or 1500.06  
**Cross-listing:** PSYO 2370.03

**SCI 3000.06R Science Fundamentals:** See class description in Science, Interdisciplinary section of this calendar.

**NESC 3000.06R Independent Research in Modern Neuroscience:** Primarily for students wishing further experience and understanding of neuroscience research. A student in the class chooses a member of staff who serves as an adviser throughout the academic year, and under whose supervision independent research is conducted.

**Format:** lab 4 hours  
**Instructor:** Staff  
**Prerequisites:** PSYO 2000.03 or NESC 2071.03A and previous or concurrent enrolment in two other 3000-level classes; and the prior consent of the instructor

**Cross-listing:** PSYO 3000.06

**NESC 3050.06R Perception:** This class considers the way in which information about the world is provided by the senses and how we use this information in our behaviour. The material falls into four sections. (1) The methodological and theoretical problems peculiar to the study of sensation and perception; (2) The transformation of physical stimulus energy into neural energy; (3) The physiological and psychophysical analysis of the sensory systems with particular emphasis on vision; and (4) The development of perception and its relation to the anatomical and physiological development of the sensory pathways. The experimental work has been selected for its importance in the theoretical understanding of perceptual processes and consists of a general introduction to the apparatus and methods used in perceptual research.

**Format:** lecture 3 hours, lab 2 hours  
**Instructor:** D.E. Mitchell  
**Prerequisites:** PSYO 2000.03 and 2150.03  
**Cross-listing:** PSYO 3050.06

**NESC 3070.06R Physiological Psychology:** Physiological psychology is concerned with the biological explanation of psychological phenomena. Students should have a working knowledge of concepts and methods in experimental psychology. Emphasis is on psychological issues with the answers sought in physiological terms. Labs will involve stereotaxic surgery on the rat.

**Format:** lecture 2 hours, lab 3 hours  
**Instructor:** S. Nakajima  
**Prerequisite:** PSYO 2000.03 and permission of the instructor  
**Cross-listing:** PSYO 3070.06

**NESC 3075.03A or B Physiological Psychology:** In Physiological Psychology we study current theory and research about the relation between brain function and behaviour. More specifically, the focus is upon the psychological consequences of

physiological events in the nervous system. Among the topics included might be selections concerning brain processes underlying: hunger and thirst, sexuality and reproduction, arousal and attention, memory systems, movement and motor control, tactile senses and pain perception, states of consciousness, emotion and stress, speech and language.

Format: lecture 3 hours  
 Instructor: M. Ozler  
 Prerequisite: PSYO 2000.03 and one of PSYO 2071.03, 2270.03, 2370.03

Cross-listing: PSYO 3075.03

**NESC 3150.03A or B Introduction to Hearing and Speech Mechanisms:** Hearing and speech are two behavioral capacities of fundamental importance to normal human communication. This lecture class is designed to provide a basic understanding of the peripheral and central neural mechanisms of hearing, and of some psychological and physiological processes involved in speech production and speech perception. The class is intended for those students anticipating more advanced training in neural mechanisms of hearing, speech science, human communication disorders and/or audiology. The class emphasizes normal hearing and speech mechanisms, but will address pathology where evidence from pathological subjects is pertinent to understanding normal function. Class content: Introductory acoustics; structure and function of the outer and middle ears; structure and function of the cochlea; hair cell physiology and sensory transduction; coding of simple and complex sounds in the auditory nerve; sound localization mechanisms as an example of the correspondence between the physical properties of the stimulus, neural sensitivity and behavioral performance; theories of speech production; theories of speech perception; acoustic and linguistic contributions to speech perception.

Format: lecture 3 hours  
 Instructor: D.P. Phillippe  
 Prerequisites: PSYO 2160.03 or 3050.03; NESC 2071.03A, 2072.03B strongly recommended

Cross-listing: PSYO 3150.03

**NESC 3160.06R Ethology:** Ethology is the biological study of behaviour. It uses psychology, genetics, physiology, ecology and evolutionary theory to solve problems in the development, function and causation of behaviour across all animal species. These diverse approaches to the study of animal behaviour are presented in naturalistic and experimental situations. In laboratory exercises qualitative and quantitative records of behaviour are made in the field and in the

laboratory. There are several group research projects (first term) and an individual research project (second term).

Format: lecture 2 hours, lab 2 hours  
 Instructor: J. Fentress  
 Prerequisites: PSYO 2160.03 or BIOL 1000.06

Cross-listing: PSYO 3160.06

**\*NESC 3260.03A or B Biological Rhythms:** The temporal structure of animal and human physiology is governed by both homeostatic mechanisms and by a system of biological clocks. These internal clocks generate rhythms with various periods in virtually every physiological and behavioral system. Daily (circadian) clocks are the most prominent; they generate rhythms in sleep, reproduction, intellectual performance and many other functions. This class examines the nature of these biological clocks and their physiological substrates, with an emphasis on the neural mechanisms involved in rhythm generation and synchronization in a variety of species. It also explores the hypothesized role of circadian mechanisms in sleep disorders, jet lag and depression.

Format: lecture 3 hours  
 Instructor: B. Rusak  
 Prerequisites: PSYO 1000.06 or 1010.06 or 1500.06 or BIOL 1000.06

Cross-listing: PSYO 3260.03

**NESC 3270.03A or B Developmental Neuroscience:** This class introduces students who are already familiar with the structural organization and functional properties of the mature nervous system to aspects of neural development, especially at the cellular level. The first part of the class will link the early events of neural development to general embryonic development. Cell determination, pattern regulation, cell production, cell-lineage analysis, and neuronal differentiation, movement and migration will be discussed. Special attention will then be given to later developmental events such as neuronal growth cones, cell death, growth factors, neuron-neuron interactions and synapse formation using invertebrate and vertebrate examples.

Format: lecture 3 hrs  
 Instructor: M. Yoon  
 Prerequisites: NESC 2071.03A and 2072.03B

Cross-listing: PSYO 3270.03

**NESC 3370.03A or B Neuroscience Laboratory I:** The two classes 3370.03 and 3371.03 (see next entry) are coordinated and provide introduction to several techniques used in contemporary neuroscience. The following information applies to these classes as a pair, between which the exact distribution of experimental approaches may vary from year to year according to availability of equipment and material, and

numbers enrolled. Usually, electrical recording methods from several types of preparation are emphasized in 3370.03, while detailed neuroanatomically-based approaches are favoured in 3371.03. Regularly scheduled labs with students working in groups of 2 or 3 under supervision are supplemented by occasional lectures, in both classes. Students become familiar with electrical recording and stimulation methods and related techniques, currently using both sensory and motor system preparations. Neuroanatomical analysis is introduced by way of techniques usually selected from the following: Golgi impregnation of neurones, immunocytochemistry, dye-tracing of connections, and electronmicroscopy of the visual system or central nervous system. Lab II (3371.03) usually runs in the second term for selected, advanced students, building upon foundations laid in 3370.03 but using different practical approaches.

**Format:** lab 3 hours  
**Instructor:** S.R. Shaw  
**Prerequisites:** NESC 2071.03A and 2072.03B, or 3270.03A, and consent of instructor  
**Cross-listing:** PSYO 3370.03

**NESC 3371.03A or B Neuroscience Laboratory II:** For a description of this neuroscience lab class, see the entry under 3370.03 above; usually, 3371.03 is coordinated closely with 3370.03.

**Format:** lab 3 hours  
**Instructor:** I.A. Melnerzhagen  
**Prerequisites:** NESC 3370.03 and instructor's consent  
**Cross-listing:** PSYO 3371.03

**NESC 3440.03B Neuroanatomy:** A survey of the histology, development and organization of the central nervous systems, with emphasis on the developmental and structural relationships between spinal cord and brainstem. The organization of cranial nerves and microanatomy of the brain stem is discussed. The organization of sensory and motor systems is presented in detail. The cerebral cortex, cerebellum, basal ganglia, and limbic system are also covered.

**Format:** lecture and lab 3 hours  
**Instructor:** D.A. Hopkins (Anatomy and Neurobiology Dept.)  
**Prerequisites:** BIOL 2020.03A or B  
**Cross-listing:** ANAT 2100.03B, BIOL 3440.03

**NESC 3590.03A or B Perceptual Development:** This class examines the development of visual and auditory capacities in human infants and in a variety of animal species with sensory systems like our own. The neural events that underlie these developmental changes in the various sensory pathways will be discussed. The class will

also grapple with the old question of how early sensory experience influences our perceptual abilities.

**Format:** lecture 3 hours  
**Instructor:** D. Mitchell  
**Prerequisite:** PSYO 2000.03  
**Cross-listing:** PSYO 3590.03

**\*NESC 3760.03A or B Neuroethology:** Neuroethology is the study of the neural bases of animal behaviour. The class will emphasize cellular approaches toward understanding the integrative mechanisms of the nervous systems which underlie complex behaviours. Feature detectors, command systems and motor programme generators will be examined in depth using examples from vertebrate preparations. Cellular bases of higher order functions such as motivation, learning and choice will be explored if time permits.

**Format:** lecture 2 hours  
**Instructor:** Staff  
**Prerequisites:** PSYO 2000.03 or 2160.03 or NESC 2071.03 or 2072.03 or BIOL 2020.03 or instructor's consent  
**Cross-listing:** PSYO 3760.03

**NESC 4000.03A or B Senior Seminar:**

**Format:** lecture 2 hours  
**Instructor:** Staff  
**Cross-listing:** PSYO 4000.03

**\*NESC 4050.03A or B Topics in Perception:**

This class explores the neural basis of perception, emphasizing the visual, tactile and auditory senses.

**Format:** lecture 2 hours  
**Instructor:** Staff  
**Cross-listing:** PSYO 4050.03

**NESC 4070.03B Neuroscience Seminar:**

**Format:** lecture 2 hours  
**Instructor:** Staff  
**Prerequisites:** PSYO 2071.03 and 2072.03 and 3270.03 or consent of the instructor.  
**Cross-listing:** PSYO 4070.03, ANAT 5070.03

**NESC 4160.03A or B Topics in Behavioral Biology:**

**Format:** 2 hours  
**Instructor:** Staff  
**Cross-listing:** PSYO 4160.03

**NESC 4374.03A Introduction to Pharmacology I:**

This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions in mammals including man. The interaction of drugs with the central and peripheral nervous systems will be covered. Factors which affect the blood levels of drugs (absorption, distribution, metabolism

and elimination) will be considered, together with the mechanisms by which drugs act and their potential uses.

**Format:** lecture 2 hours or 2 hours

**Instructors:** H.A. Robertson, J. Blay  
(Co-ordinator)

**Prerequisite:** permission of the co-ordinator

**Cross-listing:** BIOL 4404.03A, BIOC  
4804.03, PHAR 5408.03

**NESC 4375.03B Introduction to Pharmacology II:** This class is intended to cover specific aspects of drug action in greater depth than 4371.03A and to provide students with practical expertise in pharmacology. The laboratory component consists of prescribed exercises using varied techniques.

**Format:** lecture 3 hours, lab 3 hours

**Instructors:** H. Robertson, J. Blay  
(Co-ordinator)

**Prerequisite:** Permission of Co-ordinator

**Cross-listing:** BIOL 4405.03B, BIOC  
4405.03, PHAR 5407.03

**NESC 4500.06R Honours Thesis:** The purpose is to acquaint the student with a current problem and the related research procedures in experimental neuroscience. Each student works with a staff member who advises the student about research in the major area of interest and closely supervises an original research project carried out by the student. The students meet together occasionally throughout the year to describe their proposed research and their progress. Each student must submit a formal written report of the completed research. The final grade is based upon the originality and skill displayed in executing the project, with emphasis upon the submitted report and an oral presentation.

**Instructor:** J.W. Clark and Staff

**Restriction:** Restricted to honours students  
in their graduating year

**Cross-listing:** PSYO 4500.06

## School of Nursing

**Location:** Forrest Building, 5869  
University Avenue, Halifax,  
N.S. B3H 3J5

**Telephone:** (902) 494-2535

### Academic Staff 1994-95

#### Director

Joyce Black, BN (Dal), MEd (Media) (Boston);  
DipPH (Dal), EdD (UBC), RN

#### Professors

Barbara Keddy, BScN (MSVU), MA, PhD  
(Dal), RN

Judith A. Ritchie, BN (UNB), MN, PhD  
(UPitts), RN

Miriam Stewart, BScN (McM), MN (Dal), RN,  
PhD (Dal)

#### Associate Professors

Margaret Arkie, BN (Dal), MS (Boston), PhD  
(Texas-Austin), RN

Joyce Black, BN (Dal), MEd(Media) (Boston),  
DipPH (Dal), Ed D (UBC), RN

Barbara L. Downe-Wamboldt, BN, MEd,  
Dip.PH (Dal), PhD (U Texas-Austin) RN

Heather D. Fraser-Davey, BScN (MSVU),  
DipTSN (Dal) MSc (A)(McG), PhD (Dal), RN

Frances Gregor, BN, MN (Dal), RN

Geraldine Hart, BN (McG), MSN (UBC), RN

Mona June Horrocks, BSN (UBC), MS  
(PsychN), MS (CHN), DCMH (UCSF), AED  
(Tor)

Jean M. Hughes, BN (Dal), MS (Boston), RN

Elizabeth Lamble, BSc (Home Ec) (Acad), MPH  
(Nutrition) (Mich), PDT, FCDA

Lynette L. Mensah, BN (Dal), MA, DPHN  
(Dal), SCM (England), RN

Marilyn S. Riley, BN (Dal), MScN (Western),  
RN

Carol L. Smille, BScN (UBC), MSc (Ed) (Dal),  
RN

Denise Sommerfeld, BScN (MSVU), MSN  
(UBC), RN

Deborah L. Tamlyn, BN (McG), MEd (Ott),  
PhD (Dal), RN

Gailly Wong, BScN (MSVU), MScN (Western),  
RN

Shirley Wong, BScN (MSVU), MScN  
(Western), RN

#### Assistant Professors

Celeste Barrett, BN (Memorial), MScN  
(Western), RN

Mary Lou Ellerton, BScN (Ott), MN (McG), RN

Ruth E. May, BA (Wellesley), CNM, RN

Donna M. Meagher-Stewart, BScN (MSVU),  
MS (McM), RN

Patricia Melanson, BScN (Ott), MN (Dal), RN

Norma J. Murphy, BN (Dal), MScN (UBC), RN

Florence Myrick, BN (Mem), MScN (Western),  
RN

Gail Tomblin Murphy, BN, MN (Dal), RN

#### Lecturers

Keith Cocksell, DipOP&CHN (Dal), BPharm  
(UBradford), RN

Ruth Martin-Misener, DipOP&CHN, BScN  
(Dal), RN

Rosemarie A. Pogoda, CertCHN (Man), RN

Adele R. Vukic, BN (Dal), RN

C. Faith Wight Moffatt, BN (MUN), MS  
(Boston), RN

#### Senior Instructors - Skills Laboratory

Eloise Bethune, BScN (MSVU), RN

Barbara Bleasdale, BN (Dal), RN

#### Honorary Appointments

Kathryn Allen, BN (Dal), MSc(N) (Tor), RN

Marilyn Bacon, BA (York), MEd (Tor), RN

Margaret Jean Bayer, BN (Dal), MEd (Acadia),  
PhD (Dal)

Hope Beanlands, BN (UNB), MN (Dal)

Ruby Blois, BScN (MSVU), CHE, RN

Janet Braunstein, BScN (Cornell), MPH (Minn)

Sue Daniels, BScN (MSVU), MN (Dal), RN

Joan Hamilton, BN (Dal), MSN (McGill)

Marilyn Johnson, BScN (Ottawa), RN

Janet Knox, BN (UNB), MN (Dal)

Ann Miller, RN, SCM (GB), MN (Cal)

Louisa Patterson, BN (UNB), MN (Dal)

Pam Reid, BN (UNB), MSc (Dal), RN

Sheila Ross, BN (McG), MN (Dal)

Marguerite Rowe, BN (Dal), MEd (Calgary), RN

Phyllis Runciman, BSc, MPhil, MSc (N)  
(Edinburgh), RGN, SCM, HVcert

Elaine Shuttleworth, BN (Winnipeg), MPA  
(Winnipeg), RN

Catherine Turner, BN (Dal), MN (Dal), RN

Deborah Vandewater, BN, MN (Dal)

David Whitehorn, BSc (Mich), MScN (Yale),  
PhD (Wash)

Heather Young, BN (Mem), MScN (Western)

#### Cross Appointments

Karen Mann, BScN (Dal), MSc (Dal), PhD  
(Dal), Associate Dean, Faculty of Medicine

Jerome Singleton, BA (Waterloo), MS (Penn  
State), PhD (Maryland)

- Associate Professor, School of Recreation,  
Physical & Health Education

#### Preceptors

Many nurses, health-care professionals and persons in other disciplines give of their time and expertise to assist in the education of the nursing students in all years of all programmes. These valuable preceptors are too numerous to list, but are a vital part of the programme. Names can be obtained by contacting the School of Nursing.

## Introduction

The School of Nursing was organized in 1949. In 1961 the School of Nursing became a constituent part of the newly established Faculty of Health Professions. Currently the School offers an undergraduate programme for basic and Post RN students, a Masters of Nursing programme and a 15-month programme leading to a diploma in Outpost and Community Health Nursing. The School also had an international linkage project with the University of Dar es Salaam in Tanzania to assist with the development of the first baccalaureate nursing programme for that country and in the education of their nurse teachers.

## School of Nursing Regulations

1. All students are required to observe the University Regulations and Academic Regulations as described in this calendar.
2. As an academic requirement, students are assessed in each year on their aptitude and fitness for the profession of Nursing. A student who, in the judgement of the faculty, fails to attain a satisfactory standard in this assessment may be required to withdraw from the School.
3. Students in the Baccalaureate Degree Programmes are responsible for (a) the purchase of uniforms including shoes and a watch with a sweep hand or a digital watch with seconds display, (b) cost of accommodation and travel while on a clinical experience in areas outside the Metro area including the summer clinical. Additional expenses are incurred by the student in the Basic Baccalaureate Degree Programmes for field experience, books, first aid course, CPR course, graduation pin, equipment, and nurse registration examinations. Each student must also purchase name tags and crests from the University.
4. Also because of enrolment limits on class size, all part-time students who wish to change their status to full-time must present this request in writing to the Associate Director of Undergraduate Programmes by March 1.
5. Adviser-Advisee System. Each student is assigned to a faculty member from the academic advising committee to help them plan their academic programme and to discuss academic progress or difficulties.
6. Students wishing to appeal a decision based on faculty regulations or decisions should follow the School Appeal Procedure.

## School of Nursing Appeal Procedure

It is recognized that both students and faculty have rights and responsibilities and further, that as the University is a complex system, a student may experience difficulty in determining how to express dissatisfaction. This document is provided as a guideline for students and faculty in solving dissatisfactions.

## Definitions

**Appeal:** A request for alteration of a decision which is based on School or Faculty regulations (academic matters).

The University has established a system which allows the student the opportunity to appeal an academic decision made by faculty. This appeal can be heard at three different levels within the University: (1) School, (2) Faculty, and (3) Senate. Appeals are heard in the School by the Committee on Studies, at the Faculty level by the Faculty Committee on Studies, and at the Senate level by the Senate Academic Appeals Committee.

## Procedure for Undergraduate Appeals

Undergraduate appeals in the School will be heard by the Committee on Studies. Appeals may be made to the Committee on Studies on academic matters. Please see regulations in the Calendar and the Student Manual.

### 1.1 Waiver of a Regulation

If a student wishes to request a waiver of a regulation of the School, Faculty or University, as set out in the Calendar, the following procedure is suggested:

- (a) the student should discuss the request with the academic advisor;
- (b) the academic advisor will inform the student to direct the request in writing to the Committee on Studies, where a decision will be made.
- (c) if the student is not satisfied with the decision, it may be appealed to the Committee on Studies, Faculty of Health Professions.
- (d) in an appeal, the student should submit a summary of the appeal and the reason, in writing, to the Chair of the Committee on Studies, Faculty of Health Professions.

These appeals will be dealt with by the Committee on Studies at the next scheduled meeting.

## 1.2 Reassessment of a Grade for a Non-clinical Class

When a student desires that a grade be reassessed, the following procedure will be followed:

- (a) the student applies to the Registrar for a grade to be assessed. There is a fee for this appeal. The request must be made by March 1 for first term grades, September 1 for spring session grades and November 1 for summer session grades.
- (b) the Registrar informs the Director of the School that such a request has been made.
- (c) the Director will forward the request to the Committee on Studies. When a paper or exam is to be reread, the Committee on Studies will appoint a reader. The reader will be a person knowledgeable in the subject area and is not directly involved with the student or the class.
- (d) the Committee on Studies is to receive the original marked copy. The Committee on Studies will provide the reader with an identical unmarked paper, a copy of the objectives, assignment and grading guide.
- (e) the reader will submit a grade to the Committee on Studies within ten days of receiving the examination or paper.
- (f) the student will receive a written copy of the reader's assessment of the term paper.
- (g) the Chair of the Committee on Studies will inform the student, the Director and the Associate Director.
- (h) the student may appeal such a reassessment to the Committee on Studies, Faculty of Health Professions.

**NOTE:** This procedure is followed after all normal professor(s)/student discussion (bergaining) regarding the grade.

## 1.3 Reassessment of a Grade for a Clinical Class

Students may seek a reassessment of a grade in a clinical class, if in their opinion an inaccurate assessment has been made in the evaluation of their clinical performance. It is strongly recommended that informal discussion with faculty member(s) involved in the assignment of the clinical grade be pursued.

1.3.1 If the student is still dissatisfied with the assigned grade, then the formal review process is as follows:

- (a) The request for review shall be made by letter to the Registrar's Office accompanied by the required fee as quickly as possible but by March 1 for first term grades, July 1 for second term grades, September 1 for spring

session grades, and November 1 for summer session grades. The Registrar's Office shall forward the request for review to the Director of the School of Nursing.

- (b) A supporting letter to the above request, which describes the purpose(s) of the appeal, the situation surrounding it and the expectations of the student appealing the grade, will be sent to the Director of the School of Nursing by the student.

1.3.2 Upon notification of the request for review, the Director will: (a) refer the matter to the Committee on Studies (by forwarding a copy of the above letter and request), and (b) inform the faculty member(s) involved of the request for review.

1.3.3 The student is responsible for providing all necessary documentation for the appeal, including all written assignments and evaluations, to the Chair of the Committee on Studies within one week of beginning the process.

- (a) The faculty member(s) involved will review the documentation received to ensure that it is complete.

1.3.4 The faculty member(s) involved may also review the documentation and assigned grade and report any change to the Committee on Studies within three days.

1.3.5 The Committee on Studies will meet within ten days of the Director informing the Committee of the appeal.

1.3.6 The Committee shall elect three of its members as a review board. One of these members may be a student enrolled in the School of Nursing.

- (a) Faculty who have taught the student in the current academic year are not eligible for the review board.
- (b) In the event that it is impossible to strike a review board from the Committee on Studies membership, another faculty member(s) will be appointed by the Committee on Studies to be on the review board.
- (c) The review board will select its own Chair.
- (d) The review board must consider both due process and whether or not course objectives were met.

1.3.7 The student and the faculty member shall be given the opportunity to meet the review board or shall meet at the request of the members of the board.

- (a) The student has the right to review all documentation connected to the appeal.
- (b) Both parties shall have the opportunity of being present to hear each other's presentation.

- (c) All proceedings will be taped (for secretarial exactness) and tapes will be erased as soon as the appeal procedure has been resolved within the School of Nursing.

**1.3.8** The members of the review board shall meet and decide on the final grade on the basis of the information given to them.

- (a) They shall report their decision to the Chair of the Committee on Studies within twenty-one days of their appointment.

**1.3.9** The student and faculty member(s) shall be given a copy of the review board's recommendations by the Chair of the Committee on Studies.

**1.3.10** The Chair of the Committee on Studies shall report the results of the decision to the Director.

**1.3.11** If the student is still not satisfied with the grade, the next level of appeal is the Faculty Committee on Studies.

## **Bachelor of Science (Nursing) for Basic Students**

### **1. Degree Requirements**

A student must obtain a minimum cumulative GPA of 2.00 throughout the entire undergraduate programme. A student must accumulate a minimum of 123 credit hours and have successfully completed all compulsory classes, as well as the necessary number of elective classes. The degree must be completed within 8 years of commencing nursing classes, although credit will be given for classes that are up to ten years old by the date the degree is completed.

### **2. Grade Point Average Standards (GPA)**

The grade point average system is described in the Academic Regulations. School regulations relating to GPA apply to students whose initial registration in the School was in the Fall of 1990 or earlier. Consult calendar of the appropriate year.

### **3. Grades**

A letter grade system is used to evaluate performance. The following grades are considered passing: A+, A, A-, B+, B, B-, C+, C, C-, D, and P except in nursing classes where a student must attain a C in both theory and clinical/laboratory components. F, F, and INC are failing grades. ILL and W are considered neutral.

### **4. Requirements for Promotion**

Besides meeting the GPA requirements students must meet the following requirements for promotion:

**Year I to Year II:** A student must pass all first year level classes in order to advance to second year nursing classes.

**Year II to Year III:** A student must pass all second year nursing classes, Microbiology 1100.03A and Statistics 1080.03A or B.

**Year III to Year IV:** A student must pass all third year nursing classes with the exception of N3210.04 A or B.

### **5. Normal Workload**

The programme consists of 126 credit hours (21 credits); these are divided to give the following yearly normal workload:

**Year I:** a normal workload is considered 30 credit hours (5 credits)

**Year II:** a normal workload is considered 36 credit hours (6 credits)

**Year III:** a normal workload is considered 30 credit hours (5 credits)

**Year I:** a normal workload is considered 30 credit hours (5 credits).

## **Bachelor of Science (Nursing) for Registered Nurses**

### **1. Degree Requirements**

A student must obtain a minimum cumulative grade point average of 2.00 throughout the entire undergraduate programme. A student must accumulate a minimum of 78 credit hours and have successfully completed all compulsory classes, as well as the necessary number of elective classes. The degree must be completed within six years of commencing the nursing classes, although credit will be given for classes that are up to ten years old by the date the degree is completed.

### **2. Other Regulations**

Students must submit proof Nurse Registration as an active practicing member in Nova Scotia or their province/country of residence each year they are enrolled in the School of Nursing classes. All other regulations are as outlined in the BScN Basic stream in the University Calendar, including Immunization, and Grades.

### **3. Normal Workload**

The 78 credit hours of study may be completed over three academic years of full-time study with a normal yearly workload as follows: Year 1: 26 credit hours; Year 2: 26 credit hours; Year 3: 27 credit hours.

## **Bachelor of Science (Nursing) Degree Programmes**

The challenges of the health care system have reached a technological and social level such that nurses have recognized the need for university level education in order to practice

within that system. The purpose of baccalaureate nursing education is to prepare professional nurses to provide research-based care to clients in a variety of settings. Baccalaureate nursing encompasses promotion of health, prevention of disease and intervention in health and illness problems. Nursing is an art and a science centering on nursing courses. It is complimented by required and support courses in biological sciences, social sciences and humanities. The four year basic degree programme is for students with no previous nursing knowledge and experience. Students who have a diploma in nursing (Post-RN students) are also admitted to the Bachelor of Science (Nursing) programme but have a shorter programme as described later.

### Programme Objectives

The graduate of this baccalaureate programme will be prepared to:

1. Use scientific knowledge in the application of the nursing process when caring for clients in different stages of health and illness.
2. Use therapeutic communication in the development of a professional helping relationship with clients.
3. Use critical thinking in nursing.
4. Serve as an advocate to protect the rights, diversity and worth of clients.
5. Use the process and products of research to enhance clinical practice.
6. Collaborate with others in the delivery of health care.
7. Demonstrate leadership in nursing and within the health care delivery system.
8. Use knowledge of the process of change within the political, social and health care systems in the practice of nursing.
9. Assume responsibility and accountability for learning and competency in her/his nursing practice.

All undergraduate degree programmes are coordinated by the Associate Director of Undergraduate Programmes.

## Bachelor of Science (Nursing) for Basic Students

The Bachelor of Science (Nursing) degree is a four year programme. Graduates are eligible to write examinations for membership in the Registered Nurses' Association of Nova Scotia.

### Immunization

Before commencing studies in first year, students must show proof of current immunization against: tetanus, diphtheria, polio, measles and rubella.

Immunization against Hepatitis B is recommended for all students and is available through Dalhousie Health Services at a cost of \$62 (based on 1993-94 cost).

Evidence of tuberculin testing (mantoux) must also be shown each September. TB testing can be done by the Public Health Nurse or is offered yearly by Dalhousie Health Services. This information must be sent to the Admissions Coordinator, School of Nursing. Students failing to provide this evidence will be withdrawn from clinical areas.

### CPR, (BCLS) & Basic First Aid Certification

All students must show proof of CPR and Basic First Aid certification before entering clinical in second year. This proof is to be sent to the Admissions Coordinator, School of Nursing. Taking a cardio-pulmonary resuscitation course and basic first-aid course are the student's responsibilities both in time and cost.

### Course of Study

The following is an outline of classes that are normally taken each year and includes in brackets the credit hours assigned to each class.

**First Year:** Chemistry 1430.06R, Anatomy 1010.03R, Physiology 1010.06R, Psychology 1000.06R, Sociology 1000.06R, Nursing 1010.03R.

**Second Year:** Microbiology 1100.03A, Statistics 1060.03A or B, N2010.03A, N2020.02A, N2200.03A, N2030.02B, N2040.02B, N2210.04B, N2220.06B and 9 credit hours of electives chosen from any Faculty. These electives are to be at the 2000 level or above. N2220.06B is a six week clinical nursing class usually starting toward the end of April.

**Third Year:** N3010.03A, N3020.03A, N3200.03A, N3210.04A or B, N3220.04A or B, N3030.03B, N3230.05B, N3240.03B, N3250.03B, Human Sexuality Workshop Part I (non-credit). N3240.03B and 3250.03B are clinical nursing classes of 3 weeks each that normally start towards the end of April.

**Fourth Year:** N4010.03B, N4020.01A, N4030.03A, N4200.04A, N4210.03A or B, N4220.03A or B, N4230.04B, one elective in nursing (3), and N4240.06B, Human Sexuality Workshop Part II (non-credit). N4240.06B is a 5 week clinical class normally starting toward the latter part of the winter term.

## Bachelor of Science (Nursing) for Registered Nurses

The Bachelor of Science (Nursing) for registered nurses consists of 78 credit hours of University study distributed as follows: required non-nursing classes, 33 credit hours; required nursing classes, 38 credit hours; electives, 9 credit hours. Students may complete the programme through either part-time or full-time study. The programme can be completed in two calendar years of full-time study provided resources allow required nursing classes to be offered during the summer session. Otherwise, students without transfer credits can complete the programme in two full-time and one part-time academic years (Sept. - April) of study. Part-time students who wish to change their status to full-time must write their request to the Associate Director of Undergraduate Programmes by March 1.

### Course of Study

With the help of an academic advisor, each student is able to map out an individual course of study. An individual course of study may be affected by the actual classes given in an academic year as well as in which semester (Fall, Winter, Spring, Summer) they are given. Certain classes may have pre-requisites as noted in the class descriptions. Part-time students are encouraged to complete most of the required non-nursing classes before starting nursing classes. N2230.04A and N2010.02A are pre-requisites for all nursing classes. Non-clinical nursing required or elective classes may be taken concurrently with N2230.04A by special permission of the class professor. Anatomy and Physiology are normally pre-, or co-requisites for N2230.04A. The course of study varies considerably when the student applies accepted transfer credits toward the degree programme. Transfer credit regulations are as outlined under the Academic Regulations section of the University Calendar.

The required non-nursing classes are (credit hours in brackets): Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R, Microbiology 1100.03A, Statistics 1080.03A or B. The nine credit hours of electives may be chosen from any Faculty and are to be at the 2000 level or above.

### Required Nursing Classes

NURS 2010.02A Helping Relationships and Nursing  
NURS 2230.04A Advanced Concepts and Skills of Nursing Practice  
NURS 3020.03A Teaching and Learning and Nursing  
NURS 3030.03B Nursing Research

NURS 3220.04A or B Family Nursing  
NURS 4010.03B Trends and Issues in Nursing  
NURS 4020.01A or B Advanced Skills in Helping Relationships and Interviewing  
NURS 4030.03A Leadership in Nursing Practice  
NURS 4200.04A Community Health Nursing: Theory and Practice I  
NURS 4230.04B Community Health Nursing: Theory and Practice II  
Human Sexuality Workshop  
Nursing Electives (5)

The 5 credit hours of nursing electives are chosen from:

NURS 2020.02A Growth and Development and Nursing  
NURS 2040.02B Nutrition and Nursing or  
NURS 4800.03B Interdisciplinary Course in Human Nutrition  
NURS 3010.02A Pathophysiology and Nursing  
NURS 3200.03A Nursing the Adult/Elderly I  
NURS 3210.04A or B Nursing Parents and Newborn  
NURS 3230.05B Nursing the Adult/Elderly II  
NURS 3250.03B Clinical Nursing I  
NURS 4210.03A or B Nursing the Child/Adolescent  
NURS 4220.03A or B Mental Health and Psychiatric Nursing

OR

Nursing and interdisciplinary electives as offered each year.

Please refer to specific class descriptions.

Post RN students are not required to take N1010.03C, N2030.02B, N2200.03A, N2210.04B, N2220.06B, N3240.03B, and N4240.06B.

## Class Descriptions

### Required Non-nursing classes

Class descriptions for Chemistry 1430.06R, Anatomy 1010.03R, Physiology 1010.06R, Psychology 1000.06R, Sociology 1000.06R, Microbiology 1100.03A, Statistics 1080.03A or B and potential electives can be found in the calendar under specific departments/faculties.

### Required Nursing Classes

NURS 1010.03R Introduction to Professional Nursing: Focuses on the development of professional nursing in the context of social and political climates with emphasis on nursing in Canada in the past, present and future. Major concepts and theories are introduced including the role of professional nursing.

Format: 3 lecture hours/week  
Prerequisite: None for Basic students

**NURS 2010.02A Helping Relationships and Nursing:** Introduces helping relationship theory involving the nurse and individual clients. The dynamics of therapeutic communication are addressed with an opportunity in a laboratory setting for the development of skills necessary to facilitate client exploration and understanding.

**Format:** 1 lecture and 2 laboratory hours/week

**Prerequisites:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R for Basic students; N2230.04A co- or pre-requisite for Post RN students. **THIS COURSE, PLUS N2230.04A, IS PRE-REQUISITE TO ALL OTHER REQUIRED NURSING COURSES FOR POST RNS.**

**NURS 2020.02A Growth and Development and Nursing:** Examines concepts and theories of normal growth and development of the individual from conception to old age. Roles and developmental stages are analyzed in regards to clients' attaining/maintaining an optimal level of health.

**Format:** 2 lecture hours/week

**Prerequisite:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R, or with permission of the professor for Basic students; none for Post RN students.

**NURS 2030.02B Pharmacology and Nursing:** Application of general principles of pharmacology to nursing practice. Content areas will include drug actions on body systems and drug actions in specific conditions, as well as potential side effects. Principles guiding the nurse in the administration of drugs are studied.

**Format:** 2 lecture hours/week or 1 lecture and 2 laboratory hours/week

**Prerequisites:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R, N2010.02A, N2020.02A, N2200.03A for Basic students.

**NURS 2040.02B Nutrition and Nursing:** Introduces the science of nutrition as it applies to nursing. Content is organized around nutritional needs during developmental stages and in situations of health and illness.

Environmental factors which influence clients' nutritional status are examined with emphasis on nursing interventions which promote an optimal level of health. Credit is not awarded for both NURS 2040.02 and NURS 4800.03.

**Format:** 2 lecture hours/week

**Prerequisites:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R, or with permission of the professor for Basic students; none for Post RN students.

**NURS 2200.03A Concepts and Skills of Nursing Practice I:** Focuses on the role of the nurse in helping the individual meet basic needs and attain/ maintain an optimal level of health. Nursing process is introduced and the assessment phase is covered in depth.

**Format:** 2 lecture and 2 laboratory hours/week

**Prerequisites:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R for Basic students.

**NURS 2210.04B Concepts and Skills of Nursing Practice II:** Focuses on the role of the nurse in helping the individual who is experiencing an altered ability to meet basic needs and attain/maintain an optimal level of health. Builds and extends directly on the content and theories discussed in N2200.03A. Assessment of diminished ability to meet basic needs caused by illness and/or hospitalization is also covered.

**Format:** 2 lecture and 4 laboratory hours/week or 2 lecture and 6 clinical hours/week

**Prerequisites:** N1010.03R, Anatomy 1010.03R, Physiology 1010.06R, Chemistry 1430.06R, Psychology 1000.06R, Sociology 1000.06R, N2010.02A, N2020.02A, N2200.03A for Basic students.

**NURS 2220.06B Clinical Nursing I (Summer Session):** A clinical nursing experience focusing on the care of the individual with a health problem, who has an altered ability to meet basic needs and attain/maintain an optimal level of health. Gives the students an opportunity to practice and consolidate concepts, theories and skills learned in previous classes.

**Format:** 40 clinical hours/week x 6 weeks

**Prerequisites:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, Microbiology 1100.03A for Basic students.

**NURS 2230.04A Advanced Concepts and Skills of Nursing Practice:** Focuses on the development and the role of nursing as a profession through an examination of nursing and other theories relevant to nursing practice. Laboratory and clinical experience provides opportunity to practice comprehensive health assessment skills and study the relationship between theory and practice.

**Format:** 2 lecture, 2 laboratory and 3 clinical hours/week

**Prerequisites:** Registration as a nurse and Anatomy 1010.03R and Physiology 1010.06R co- or pre-requisite, or with instructor's consent. THIS COURSE, PLUS N2010.02A, IS PRE-REQUISITE TO ALL OTHER REQUIRED NURSING COURSES FOR POST RNS.

**NURS 3010.02A Pathophysiology and Nursing:** Focuses on pathophysiological alterations from normal health. Manifestations of both acute and chronic illnesses are explored in terms of structural and functional changes from normal physiological functions.

**Format:** 2 lecture hours/week

**Prerequisite:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, N2220.06B, Microbiology 1100.03A, Statistics 1060.03A or B, or with permission of the professor for Basic students; N2230.04A, N2010.02A, or with the instructor's consent for Post RN students.

**NURS 3020.03A Teaching and Learning and Nursing:** Focuses on the role of the nurse as an educator. Principles and theories of teaching and learning are addressed to help clients acquire knowledge, skills and attitudes that enable them to attain/maintain an optimal level of health.

**Format:** 2 lecture hours/week

**Prerequisites:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, N2220.06B, Microbiology 1100.03A, Statistics 1060.03A or B or with permission of the professor for Basic students; N2230.04A, N2010.02A for Post RN students.

**NURS 3030.03B Nursing Research:** Focuses on the application of the research process to nursing. Content areas include the logic and thought processes basic to research, research methodology, measurement techniques, ethical and legal implications of nursing research and analysis of the growing body of research based nursing knowledge.

**Format:** 2 lecture and 2 tutorial hours/week.

**Prerequisite:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, N2220.06B, Microbiology 1100.03A, Statistics 1060.03A or B, or with permission of the professor for Basic students; N2230.04A, N2010.02A, Statistics 1060.03A or B, or with permission of the professor for Post RN students.

**NURS 3200.03A Nursing the Adult/Elderly with a Health Problem: Theory and Practice:**

Focuses on family-centred nursing management of adult and elderly clients with short-term acute health problems. Nursing and other relevant theories are applied to the nursing process in the care of individuals. Clinical experiences are mainly on short term surgical units.

**Format:** 1 lecture and 6 clinical hours/week

**Prerequisite:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, N2220.06B, Microbiology 1100.03A, Statistics 1060.03A or B for Basic students; N2230.04A, N2010.02A for Post RN students.

**NURS 3210.04A or B Nursing the Parents and Newborn: Theory and Practice:**

Examines the physiological, psychological and sociological determinants of the childbearing experience and the nurse's role with individuals and families in this phase of their development. Clinical experience involves the pre-natal, intra-partal and post-partal periods.

**Format:** 1 lecture and 6 clinical hours/week

**Prerequisites:** N2010.02A, N2020.02A, N2030.02B, N2040.02B, N2200.03A, N2210.04B, N2220.06B, Microbiology 1100.03A, Statistics 1060.03A or B for Basic students; N2230.04A; N2010.02A for Post RN students.

**NURS 3220.04A or B Family Nursing: Theory and Practice:** Students use the nursing process in the care of the family unit.



**For further information**

**The Registrar's Office**

Dalhousie University

Halifax, N.S. Canada B3H 4H6

Fax: 902-494-1630 or call: 902-494-2450