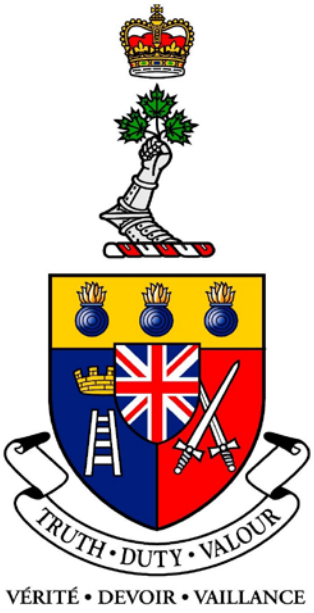
Défense nationale National Defence

Canada

Royal Military College of Canada



Undergraduate Studies Calendar

2016-2017

Note: If there is a divergence between the information in the “pdf version” of the calendar and, that in the “calendar web pages”, the information in the “calendar web pages” will prevail, since they are recognized as the official calendar.

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Important Dates and Deadlines

Note: The information in the calendar web pages is approved by Faculty Council and is recognized as the official information with regards to programme requirements, course descriptions and academic regulations.

2016	Event
Sep 6	Undergraduate Classes Start (Fall Term)
Sep 23	Obstacle Course
Sep 24-25	Reunion Weekend
Oct 10	Thanksgiving (statutory holiday)
Oct 11 - 21	Mid-term Exams
Nov 11	Remembrance Day (no classes)
Nov 18	Fall Convocation
Nov 30	Admissions Application Deadline for Winter Term - Distance Learning
Dec 02	End of Classes
Dec 5 - 16	Examinations
Dec 16	End of Fall Term
2017	Event
Jan 09	Undergraduate Classes Start (Winter Term)
Jan 14 - 15	Supplemental Exams
Feb 20 - 24	Reading Week
Mar 31	Admissions Application Deadline for Summer Term - Distance Learning
Apr 13	End of Classes
Apr 14	Good Friday (statutory holiday)
Apr 17	Easter Monday (statutory holiday)
Apr 18 - 29	Examinations
Apr 29	End of Winter Term
May 01	First Day of Classes - Distance Learning (Summer session)
May 08 - 09	Supplemental Exams (graduands)
May 09 - 11	Academic Tours (3rd yr engineers)
May 09 - 11	Professional Development Course (2nd yr engineers)
May 15 - 16	Supplemental Exams
May 18	Convocation
May 19	Commissioning Parade
Jul 31	Admissions Application Deadline for Fall Term - Distance Learning
Aug 08 - 12	Examinations - Distance Learning
Aug 12	End of Summer Term - Distance Learning

Important Notices

1. The course listings and academic programmes described in this Calendar represent Senate-approved requirements and electives for completion of degree requirements. Circumstances beyond the control of the College, such as severe budget shortfalls, may result in restrictions in the number and range of course and programme choices available to students as compared with those listed herein or in other College publications.
2. The College reserves the right to limit access to courses or programmes and, at its discretion, to withdraw particular programmes, options, or courses altogether. In such circumstances the College undertakes to the best of its ability to enable students registered in affected programmes to complete their degree requirements in a satisfactory manner.
3. Prospective students or new registrants are advised to consult the most current information available from the College and its various Faculties in printed or electronic form, as well as academic advisors for the programmes concerned, before making registration decisions or course/programme choices.
4. The Senate and the Board of Governors of the Royal Military College of Canada reserve the right to invoke changes in this Calendar, in either its printed or electronic forms, at any time without prior notice.
5. Officer Cadets at the Royal Military College of Canada must select a course of studies which is compatible with their element of the Canadian Forces and with the Military Officer Occupation selected. The Canadian Forces reserve the right to limit enrolment in any given course of studies.
6. Both men and women may apply for admission to the Royal Military College of Canada.
7. Applications are processed through Canadian Forces Recruiting Centres (1-800-856-8488). Applications for admission should be submitted as early as possible in the final year of high school. Transcripts of final marks are not required to initiate an application.
8. Additional information may be found on the Internet at Canadian Forces Recruiting.

RMC of Canada University Education

Introduction

The Royal Military College of Canada (RMC of Canada) is a national university for educating and developing leaders committed to serving Canada. To achieve this goal, the demands of an RMC of Canada education go beyond academic achievement.

For officer cadets of the Regular Officer Training Plan (ROTP) or the University Training Plan - Non-Commissioned Members (UTPNCM), the RMC of Canada degree consists of four interlocking components: Academics, Leadership, Athletics and Bilingualism, each of which is incorporated throughout the formal and informal elements of the RMC of Canada programme.

Long-standing co-operative ventures with Queen's have now been extended to undergraduate courses. Cadets at RMC of Canada and students at Queen's may now, subject to departmental approval, take undergraduate courses at the other institution and count these courses as credits towards their degrees. Normally, the choice of courses will be limited to third and fourth year courses.

For members of the Canadian Forces who undertake their undergraduate studies at RMC of Canada through correspondence, on site, at a distance, or at the RMC of Canada campus, the RMC of Canada degree provides them with the same fundamental philosophical foundation as the officer cadets who complete their studies through one of the subsidized education programmes.

For non-military students, in addition to benefiting from the philosophy governing the four interlocking components, an RMC of Canada education provides them with fundamental Canadian values and international values cherished by nations of the free world.

Role

The primary role of the Royal Military College of Canada is to educate and develop Canadians into leaders committed to serving the Canadian Armed Forces (CAF) and Canada.

Objectives

The objectives of the Royal Military College of Canada are:

1. To prepare and motivate Canadians for effective service as commissioned officers in the Canadian Armed Forces by:
    - providing a university education in both official languages in appropriate disciplines designed on a broad base to meet the unique needs of the Forces,
    - developing qualities of leadership,
    - developing a high standard of personal physical fitness, and
    - stimulating an awareness of the ethic of the military profession;
2. To improve in appropriate fields the educational background of students who are commissioned officers in the Canadian Armed Forces by providing undergraduate and post-graduate courses in both official languages; and
3. To foster and encourage faculty participation in research in order to sustain academic excellence. Research with a defence focus is encouraged.

The goal is to produce military leaders dedicated to serving Canada, who is motivated, well educated, ethical, bilingual and physically fit.

The Four Components of an RMC of Canada Education

Academics

The academics component fosters the critical intellectual skills required to understand the complexities of living in the 21st century. The academic programme emphasizes the practical applications of what has been learned to military settings and daily operational demands. All degree programmes offered at RMC of Canada are designed to provide a sound, balanced, liberal, scientific and military education.

Leadership

The demands of an officer in today's complex rapidly changing security environment are significant. Thus, the leadership component develops those personal skills and abilities that lead to success in most of life's endeavours. Leadership training provided by the RMC of Canada experience will help students, as they begin their studies at RMC of Canada and along with other experiences, prepare them to make difficult decisions under stressful conditions through deeper understanding of the factors affecting their role as a leader. The nature of military leadership and military operations necessitates an in-depth understanding of human behaviour. Therefore, studies in military psychology and leadership are part of the required academic curriculum. Particular emphasis is placed on the importance of personal integrity, ethical behaviour, and professional responsibility.

Athletics

Under the athletics component, RMC of Canada teaches students the importance of fitness and developing a healthy lifestyle as a lifelong endeavour. Striving for a higher level of physical fitness can inspire those around them and has been shown to improve one's quality of life and learning. Officer Cadets are required to take part in the physical education programme designed to achieve and maintain a high level of fitness and to learn the basic fundamentals in a wide variety of team and individual sports.

Bilingualism

The bilingualism component reflects Canada's cultural heritage. As representatives of this heritage, officers are expected to be fluent in both of Canada's official languages - English and French. Your responsibilities as an officer in the Canadian Armed Forces will require you to lead young Canadians that are primarily Anglophone or francophone. RMC of Canada has been training officers to communicate effectively in both French and English for well over 30 years. RMC of Canada helps make this learning process an interesting one with class time as well as integration into daily life at RMC of Canada.

Post Nominal:

Students who successfully complete the four interlocking components merit the “rmc "- post nominal.

Officers of Administration

Chancellor and President
The Minister of National Defence, The Honourable Harjit S. Sajjan, PC, OMM, MSM, CD, MP

Commandant and Vice Chancellor
Brigadier-General Sean G. Friday, OMM, MSM, CD

Principal
Dr. Harry J. Kowal, CD, PhD, MSAe, MA(SS), MDS, BEng, rmc, PEng, BGen (Ret'd)

The Board of Governors

The Board of Governors was established in 1997. Its role is to review and approve the strategic direction of the college, and to provide advice to the Minister of National Defence on all matters relating to the college as required.

Senate

The Senate was created by the Royal Military College of Canada Degrees Act, 1959, and is composed of the Chancellor and President, the Commandant, the Principal and Director of Studies, the Vice-Principal, the Deans of the academic faculties, the Director of Cadets, the Registrar, the Academic Director of RMC St-Jean, a Faculty representative and a Faculty Association representative.

Its function is to grant degrees and honorary degrees.

Faculty Council

The Faculty Council is composed of the Principal as Chair, the Registrar as Secretary, the Deans of faculties, the Heads or Acting Heads of the various departments, the Director of Cadets, and other members of the senior staff designated by the Chair.

Its function is to determine on all matters of an educational character including all courses of study, the library, and the calendar, to conduct examinations, to recommend to the Senate the candidates for degrees and diplomas, to award college medals, prizes and scholarships and generally to make such recommendations to the Commandant as may be deemed expedient for promoting the interests of the college.

Faculty Board

The Faculty Board is composed of the Principal as Chair, the Professors, the Associate Professors, the Assistant Professors, the Lecturers, the Chief Librarian, the Registrar, the Director of Administration, the Director of Cadets, the Officers of the Military Wing, all other members of the senior staff designated by the Chair, and students representing the student body invited by the Chair to attend.

The function of the Faculty Board is to deal with examination results of undergraduate students; to make recommendations to the Faculty Council on honours standing and academic failures; to exercise academic supervision of students; to make recommendations to the Commandant on Cadet Wing appointments; and to make recommendations to Faculty Council or the Commandant on any matter affecting the general interest of the college.

Office of the Registrar

Registrar
Karl Michaud

Associate Registrar (Undergraduate Studies)
Mrs. Naomi Greer-Ballance, BA

Associate Registrar (Graduate Studies)
Ms. Shelagh Corbett, BA

Associate Registrar (Admissions)
Mr. Rock Hau, CD, BA, MA

Explanation of Course Codes

Each course is identified by a six character code.

Note: *Credit for one-half of a full-year course may be granted and in such cases a seventh character will augment the course identification code. Addition of the digit "(1)" represents completion of the fall term portion of the course while the addition of the digit "(2)" denotes completion of the winter term portion.*

Code	Explanation
EEE	The first two letters indicate the Department or subject of the course; in this example it is Electrical Engineering. The third letter indicates the language in which the course is given, either E for English, as in the above example, or F for *Français* (French).
331	The three-digit course numbering indicates exactly which course in a subject area is referred to. The first digit indicates the year in which the course is normally offered. The second and third digits indicate the departmental course number.

Credit and Contact Hours (as used in conjunction with course descriptions)

Code	Explanation
Credit	The number of credits students will receive upon finishing the course; these credits can be either academic or military. Normally 1 credit is given for a "one term" course and 2 credits for a "full year" course.
Contact Hours (3-2-5)	The estimated number of hours per week, the course requires. The first number indicates the hours in the classroom. The second number indicates the hours of laboratory or practical work. The third number indicates the estimated hours of at-home study.

Identification of Course Codes

Code	Subject	Department Responsible
AEE	Aeronautical Engineering	Mechanical and Aerospace Engineering
BAE	Business Administration	Management and Economics
CEE	Civil Engineering	Civil Engineering
CCE	Chemistry and Chemical Engineering	Chemistry and Chemical Engineering
CSE	Computer Science	Math and Computer Science
ECE	Economics	Management and Economics
EEE	Electrical Engineering	Electrical and Computer Engineering
ENE	English Note 1	English
FRF	*Études francaises*	*Études francaises*
GEE	General Engineering	Faculty of Engineering
GOE	Geography	Political Science
HIE	History	History
MAE	Mathematics	Mathematics and Computer Science
MEE	Mechanical Engineering	Mechanical and Aerospace Engineering
MSE	Military and Strategic Studies	Military and Strategic Studies
PHE	Physics	Physics
POE	Political Science	Political Science
PSE	Psychology	Military Psychology and Leadership
SOE	Sociology	Military Psychology and Leadership
SLE	Second Language Note 1	Language Centre
SPE	Spanish Note 1	French Studies
ATH	Athletic Component	Athletic Department
PMT	Professional Military Training	Training Wing

Note 1
In the case of these subjects, the third letter of the code indicates the primary language of the majority of students taking the course.

Academic Regulations

Note: *In the case of a discrepancy between the English and French version of any regulation, Faculty Council will determine, in interpreting the regulation in question, which is the official version to be used.*

1. Degrees

1.1 The Senate may, for cause stated, deny a degree for any student.

1.2 In order to be granted a degree from the RMC of Canada, the candidate must meet all academic requirements, and be in good standing with the college. In the case of a candidate denied a degree for cause, Senate may consider the award of a suitable degree at a later date, upon presentation of evidence permitting the candidate's good standing at the RMC of Canada to be restored.

1.3 To receive a degree from the RMC of Canada students must take at least 50% of their required courses for their degree at the RMC of Canada and/or Collège militaire royal de St.-Jean.

2. Certificates and Diplomas

2.1 Certificates and diplomas are granted to students who have successfully completed the Programme of Studies leading to Certificates or Diplomas as specified in the appropriate Calendars and Brochures published by the RMC of Canada.

3. Honours Programmes of Study

3.1 To earn a Bachelor of Arts (Honours) degree within a discipline, a student must successfully complete the required courses set out in the applicable Honours Programme of Study, with at least 20 credits within the discipline, must maintain a minimum B average in the Honours courses in all 300 and 400 level courses in their Honours Programme of Study, and must attain at least a B- average in the 400 level courses.

3.2 To earn a Bachelor of Science (Honours) degree within a discipline, a student must successfully complete the required courses set out in the applicable Honours Programme of Study and must maintain a minimum B- average in all 300 and 400 level courses prescribed by the Faculty of Science.

3.3 To earn a Bachelor of Engineering degree within an approved engineering programme, a student must successfully complete all required courses set out within the applicable Programme of Study as prescribed by the Faculty of Engineering.

3.4 To earn a Bachelor of Military Arts and Science (Honours) degree, a student must successfully complete the required courses set out in the applicable Honours Programme of Study, with at least 20 credits in Military Studies, must maintain a minimum B average in the Honours courses in all 300 and 400 level courses in their Honours Programme of Study, must attain at least a B- average in the 400 level courses and must achieve at least a B in the Directed Research Project (MAS 400).

3.5 The Faculty Council may, for cause stated, remove a student from an Honours Programme of Study in Arts or Science at any time, even though the student may have obtained the standard required by these regulations.

4. Second Degrees

4.1 The holder of an Undergraduate Degree from the RMC of Canada or from another university may complete a second Undergraduate Degree at the RMC of Canada, subject to the agreement of the Faculty and/or departments involved and to the following restrictions:

a. The holder of an Honours degree from RMC of Canada or from another university may not apply to obtain from RMC of Canada a Major or a General degree in the same discipline;
b. the student may not apply to register into a Programme of Study leading to a degree which has the same name as the first undergraduate degree he/she has obtained, except that the student may apply to be admitted to an Honours Programme of Study, if the first degree obtained is a Major or a General degree or may apply to be admitted to a Major Programme of Study if the first degree obtained is a General degree;
c. the student has met the requirements for admission into the chosen Programme of Study, as determined by the Faculty and/or departments concerned.

4.2 To obtain a Second Degree, the holder of a first undergraduate degree, whether from the RMC of Canada or from another university, must complete at least half of the credits required by the chosen Programme of Study through the RMC of Canada and meet all the requirements of the chosen Programme of Study as specified in the RMC of Canada’s Undergraduate Calendar.

5. Upgraded Degrees

5.1 The holder of a General Degree from the RMC of Canada may apply to complete a Major or an Honours Programme at the RMC of Canada, subject to the agreement of the appropriate Dean involved, if she/he has met the requirements for admission into the chosen Programme of Study, as determined by the Faculties and/or departments concerned.

5.2 The holder of a Major Degree from the RMC of Canada may apply to complete an Honours Programme at the RMC of Canada, subject to the agreement of the Faculties and/or departments involved, if she/he has met the requirements for admission into the chosen Programme of Study, as determined by the Dean.

5.3 To obtain an Upgraded Degree, the holder of a General or Major Degree from the RMC of Canada must meet all the requirements of the chosen Major or Honours Programme of Study as specified in the RMC of Canada's Undergraduate Calendar, and they must surrender the degree that is being upgraded.

6. Changes in the Programme of Study

6.1 In the case of a transfer of registration in a Programme of Study between Faculties, the approval of the Dean and the Head of the Department or Programme Coordinator to which the student requests transfer is required.

6.2 The courses selected by any student may not be altered later than four weeks (28 days) after the beginning of the academic year or, in the case of single term courses, four weeks after the beginning of that term without the permission of the Dean of the Faculty in which the student is registered.

6.3 Normally a student will not be permitted to withdraw from a course after the 7th week (49th day) of the term. Courses dropped between the 4th and 7th week will be reflected as "Withdrawn / Abandonné" on the transcript, whereas after this period a mark will be assigned. In exceptional circumstances, the Dean may authorize a student to withdraw from a course at any time without academic penalty reflected on the transcript.

7. Course Completion

7.1 A university degree certifies that its holder has attained a measurable level of academic achievement as established by a recognized system of evaluation. Thus the performance of each student in each course must be evaluated by the instructor or instructors responsible for the course. Final grades are determined by students' performance on one or more of the following:

a. Assigned work: assignments, term papers, projects, oral presentations etc.;
b. Class participation which, in certain disciplines, may justify an attendance requirement;
c. Progress tests;
d. Laboratory tests and/or laboratory work;
e. Mid-term and/or final examinations; and/or
f. Level of written and/or oral expression.

7.2 The weight accorded to the various elements is at the discretion of the instructor or instructors responsible for the course. At the beginning of a course the instructor shall provide students with the evaluation scheme in writing, which includes proctored exams. The grading scheme cannot be altered without appropriate notice and normally should not be altered at all after seven weeks (49 days) into the term.

7.3 Students must normally complete all required course work prior to the last day of the term in which the course is offered. Students with incomplete work will normally receive a final grade based on work completed. Under exceptional circumstances, the Department Head may allow an incomplete grade to be assigned followed by the code "IN", provided that the student requests an incomplete grade and the instructor agrees to accept the outstanding work. (Prior to granting such a request, the Department Head may require a written appeal and/or medical certification or other documentation that demonstrates extenuating circumstances.) When the Department Head agrees to allow an incomplete grade to be awarded, the student will be advised in writing of the last acceptable date for receipt of late work.

7.4 If a revised mark has not been submitted before the end of the following term, the "IN" annotation will be automatically deleted from the transcript and the interim mark will stand as the final mark. (This one-term maximum may be extended when failure to complete course requirements is clearly due to exceptional circumstances (i.e., not simply workload demands). However, when it is unlikely that a student will be able to complete a course due to Canadian Armed Forces operational requirements, the student is encouraged to apply to withdraw without penalty).

8. Transcript Related Regulations

8.1 In addition to numeric and letter grades, the RMC of Canada uses the entries shown in Table 8-1 on the student's Transcript to reflect course status:

Table 8-1 Transcript Notations

Transcript Notation	Meaning
AC	Accepted (refers to thesis or project)
AE	Aegrotat credit
AU	Audit
CG	Credit Granted
CN	No Credit
EX	Extra Course (in excess of normal degree requirements)
EXE	Exempt (no credit given)
IN	Incomplete
IP	In Progress
TC	Transfer Credit
WD	Withdrawn
WDS	Withdrawn (military service commitment)

8.2 Aegrotat Standing: Aegrotat Standing in a course may be granted by Faculty Council to a student who has been unable to write the final examination, but who has received satisfactory term marks. Courses passed with Aegrotat Standing will be so annotated in the transcript and will not be included in the calculation of overall average.

8.3 Audit: A student must formally register to audit a course at the beginning of the term, subject to the permission of the instructor and the Department Head and will not normally be allowed to change to regular course status after registration deadlines have passed. The level of participation of auditing students will be determined by the instructor and will not normally include submission of assignments or writing exams. Audited courses will be annotated by the code "AU" on the transcript.

8.4 Credit Granted: Credits granted are annotated on the transcript with the code "CG". Marks for CG courses will not be included in overall average calculations

8.4.1 Challenge Exam: In conjunction with the respective faculty, Department Heads will determine which courses are appropriate for challenge, and in determining the appropriate method of evaluation. All challenge exams will be conducted in accordance with Academic Policy Directive 3: Standards for the Conduct of Undergraduate End-of-Term Examinations. Course credits earned through successful passing of a Challenge Examination will be annotated as "CG" (Credit Granted) on the transcript. A student cannot request a Challenge Exam, for a course in which they were unsuccessful, in lieu of repeating a course or a supplemental evaluation. This applies both to courses taken at the RMC of Canada or other institutions. Students must request and receive permission for a challenge exam through the appropriate Department Head before the start of each academic year; exceptions must be approved by the Principal. Once approved, students must register for the course through the Office of the Registrar. Students authorized to write a Challenge Exam are required to pay normal course fees for the course being challenged, as applicable. Students may not withdraw from a Challenge Exam once registered. The course fees for a challenged course are not refundable. Students will be assigned a course grade. Students who fail to complete the requirements for the Challenge Exam will be assigned a failing grade. A supplemental evaluation cannot be written for a failed Challenge Exam. A course cannot be challenged a second time.

8.5 Extra Course: The grades obtained in Extra Courses are counted in the student's term and cumulative averages, and when the Extra Course is within the field of study or discipline, the grade obtained in that course is taken into account with respect to the award of distinctions.

8.6 Exemption: An exemption does not earn academic credit, but will enable the student to replace the exempted course with another elective course in order to earn sufficient credits to satisfy degree requirements. The transcript is marked with the code "EXE".

8.7 Transfer Credit: Transfer credits may be granted for university courses that are assessed through the PLAR process as satisfying the RMC of Canada academic requirements, or as fulfilling the requirements for unallocated credits, provided that marks of C- or higher have been earned and an overall satisfactory academic record has been maintained. The minimum mark of C- is to be waived in cases where the RMC of Canada has entered into a Memorandum of Understanding with another university or a consortium of universities requiring the parties to reciprocally recognize the passing grade in each other's courses, under conditions stipulated in the Memorandum. A transfer credit for a university-level course taken at a Community College or CEGEP may also be granted provided the mark is satisfactory; normally a maximum of ten such credits may be granted at an appropriate level, depending on the program of study. Course requirements that have been satisfied through Transfer Credit are annotated on the transcript with the code TC.

8.8 Second Language Credits - ROTP/RETP/UTPNCM Students: ROTP/RETP/UTPNCM Students achieving the bilingual standard (BBB) on official language tests will be awarded an unallocated junior credit with a mark of 90 percent. For comprehension, writing, and speaking, students will be awarded an additional credit with a mark of 90% for each score indicating fluency or better (C or E). A maximum of four such credits will be awarded for a student's second official language. A further two credits may be awarded on the same basis for other languages, subject to formal testing, for a maximum of 6 second language credits. All BBB and above credits will normally be allocated to the third year in a four year *full-time* program. Credits achieved in fourth year will be applied to that year. Credits granted on this basis are annotated on the transcript with the course. Note: These credits do not count towards any degree. These credits do not count towards term averages, but they do count towards overall average.

8.9 Letter of Permission: The RMC of Canada students who wish to take courses at other institutions for credits towards their degree programme must obtain prior written permission in the form of a letter of permission. The course(s) so taken must satisfy a requirement identified in the student's programme plan. Failure to obtain permission prior to the course start date will result in the credits not being accepted. A course calendar description must be submitted with the written request, as well as a Request for a Letter of Permission. The amount of instructional hours should be clearly indicated.

8.10 Credits: Each course has been assigned a credit value, which is included in the Calendar description. Credits are used in determining the average and academic standing of a student. The actual credits assigned to a course are a function of the contact time.

9. Equivalency:

9.1 When a Mandatory Course or its equivalency, delivered by the RMC of Canada is failed for a second time, the student will be required to withdraw from his or her Programme of Study. Courses failed at another institution will not be counted as a first or second failure. See Academic Regulations 8.9, 18.1 and 18.2.

10. Final Examination

10.1 Final examinations will be held at dates and times specified in the examination timetables. Final examinations may be held outside the specified exam period only with prior approval of Faculty Council.

10.2 The instructor may refuse a student permission to write a final examination in a course if the requirements with regard to course work have not been met.

10.3 Under exceptional circumstances, including illness or deployment, a student may be granted, by the instructor or the Department Head concerned, permission to reschedule a final examination.

10.4 Final Standing is granted by the Senate upon recommendation from the Faculty Board and Faculty Council.

11. Academic Grades

11.1 Grades for all courses appear on transcripts as letter grades and per cent grades.

11.2 Gradation of Academic Distinctions used by the RMC of Canada is shown in Table 11-1.

Table 11-1 Conversion Table of Academic Standing

First Class Distinction

Letter Grade	Percentage Grade Relationship
A+	94-100
A	87-93
A-	80-86

Distinction

Letter Grade	Percentage Grade Relationship
B+	76-79
B	73-75
B-	70-72

Pass

Letter Grade	Percentage Grade Relationship
C+	66-69
C	63-65
C-	60-62
D+	56-59
D	53-55
D-	50-52

Failure

Letter Grade	Percentage Grade Relationship
E	40-49

Serious Failure

Letter Grade	Percentage Grade Relationship
F	0-39

12. Academic Distinctions

12.1 Repeated Courses - Determining Academic Averages for Academic Distinctions: When determining academic averages to be used for Academic Distinctions, any courses that were taken more than once will include only the mark for the most recent attempt.

12.2 Students graduating with a Bachelor of Arts (Honours) or a Bachelor of Science (Honours) who have attained at least an A- average in the 300 and 400 level honours courses will have their transcripts annotated *"First Class Distinction"* . Students graduating with a Bachelor of Arts (Honours) or a Bachelor of Science (Honours) who have attained at least a B- average in the 300 and 400 level honours courses will have their transcripts annotated *"with Distinction"* .

12.3 Students graduating with a Bachelor of Engineering who have attained at least an A- average in all 400 level courses will have their transcripts annotated *"First Class Distinction"* . Students graduating with a Bachelor of Engineering who have attained at least a B- average for all 400 level courses will have their transcripts annotated *"with Distinction"* .

12.4 Students graduating with a Bachelor of Military Arts and Science (Honours) who have attained at least an A- average in the 300 and 400 level honours courses and achieved at least a B in their Directed Research Project will have their transcripts annotated *"First Class Distinction"* . Students graduating with a Bachelor of Military Arts and Science (Honours) who have attained at least a B- average in the 300 and 400 level honours courses and achieved at least a B in their Directed Research Project will have their transcripts annotated *"with Distinction"* .

12.5 For all other undergraduate degrees, students who have attained at least an A- average for degree specific 300 and 400 level RMC of Canada courses, based on a minimum of five courses, will have their transcripts annotated *"First Class Distinction"* . Students who have attained at least a B- average in the degree specific 300 and 400 level RMC of Canada courses, based on a minimum of five courses, will have their transcripts annotated *"with Distinction".*

13. Not Assigned

14. Pass Standing

14.1 A student is on Pass Standing unless the student is placed on Warning, Probation or is required to Withdraw

15. Warning

15.1 A Full Time student shall be placed on Warning at the end of a term if the student fails one or more mandatory courses applicable to their programme of study, whose total credit value is less than two (2), provided the student's term average is greater than 50 percent.

15.2 A Full Time student will be removed from Warning when the student has successfully completed all previously failed Mandatory Courses.

15.3 A Part Time student shall be placed on Warning if:

a. The student has failed a Mandatory Course applicable to their programme of study whose total credit value is less than two (2), or
b. After taking courses in any given Programme of Study, the student has failed courses totalling more than four (4) credits.

15.4 A Part Time student must retake successfully the failed Mandatory Course or pass all subsequent courses taken totalling no less than eight (8) credits to be removed from Warning.

16. Probation

16.1 A Full Time student shall be placed on Probation at the end of a term if the student fails mandatory courses such that the cumulative total credit value of Mandatory Courses failed applicable to their programme of study, and which have not been successfully completed is greater than or equal to two (2), but less than or equal to four (4), provided the student's term average is greater than 50 percent.

16.2 A Full Time student will be removed from Probation and placed on Warning upon successful completion of a sufficient number of courses such that the total credit value of the courses that the student must retake is less than two (2).

16.3 A part time student shall be placed on Probation if:

a. The student was on Warning and fails any Mandatory Course; or
b. The student's cumulative average is less than 50 per cent but equal to or greater than 45 percent; or
c. The student has failed courses totalling more than eight (8) credits applicable to their programme of study.

16.4 A Part Time student must retake successfully all failed Mandatory Courses or pass all subsequent courses taken totalling no less than eight (8) credits to be removed from Probation.

17. Failed Term

17.1 A Full Time Student shall be declared "Failed Term" at the end of a term if:

a. the student fails Mandatory Courses such that the cumulative total credit value of Mandatory Courses failed applicable to their programme of study, and which have not been subsequently successfully completed is greater than four (4);
b. the student's average is less than 50 percent; or,
c. the student fails any Mandatory Course or Courses such that, due to prerequisite requirements, will be unable to register in the subsequent term in a normal course load as defined in Table D-1 or as determined by the department head.

17.2 Students who are in a Failed Term Status will not be required to maintain a normal course load as described in Table D-1 of the Academic Regulations. Students in a Failed Term Status may take only courses up to but not exceeding the normal course load as defined in Table D-1 .

17.3 In some cases, ROTP or UTPNCM students in "Failed Term" status will be unable to complete their programme within their period of subsidization. In these cases, a decision by the military chain of command will be required in order for the student to continue in the programme.

18. Withdrawal

18.1 Except when exceptional or extenuating circumstances are present, a Full Time student will be required to Withdraw from a Programme of Study if:

a. A Mandatory Course or its equivalency, delivered by the RMC of Canada is failed for a second time (it does not include exclusions, suitable substitute courses, or courses taken at another institution); or
b. The term average is less than 45 per cent; or
c. The student fails Mandatory Courses applicable to their programme of study totalling more than four (4) credits in any term; or
d. The student has failed courses applicable to their programme of study totalling more than eight (8) credits.
e. An ROTP or UTPNCM student fails a term having previously failed a term in the same programme.

18.2 Except when exceptional or extenuating circumstances are present, a Part Time student will be required to Withdraw from a Programme of Study if:

a. The student fails a course or its equivalency, delivered by the RMC of Canada that the student has previously failed (it does not include exclusions, suitable substitute courses, or courses taken at another institution); or
b. The student has a cumulative average, based on at least four (4) courses taken, of less than 45 per cent; or
c. The Student on Probation fails a Mandatory Course; or
d. The student has failed courses totalling more than twelve (12) credits applicable to their programme of study.

18.3 A student who is required to Withdraw from a Programme of Study may apply for admittance to a different Programme of Study. Permission of the appropriate Dean is required for admittance to a new Programme of Study.

18.4 The Senate of the Royal Military College of Canada may at any time require a student to withdraw from the University if his or her conduct, attendance, work or progress is deemed unsatisfactory.

19. Re-admittance

19.1 A student who has been required to Withdraw from a Programme of Study may apply to be re-admitted to the Programme of Study no sooner than 12 months after receipt of the notification requiring withdrawal.

19.2 A student who is re-admitted to and is subsequently required to Withdraw from a Programme of Study for a second time will not normally be permitted to apply for re-admittance.

20. Supplemental Evaluations

Important: *Revisions to Regulation 20 were approved by Faculty Council the 8 December 2016 and will take effect immediately.*

20.1 Supplemental Evaluations at the RMC of Canada will be held at dates and times specified in the Supplemental Evaluation timetables.

20.2 A student receiving a passing grade (as defined by the academic regulations) or higher on a Supplemental Evaluation will be granted a pass standing for the course for which the Supplemental Evaluation was conducted. Both the original mark and a PASS or FAIL notation for any Supplemental Evaluations will be shown on the student's transcript.

Note: *If a student passes the Supplemental Evaluation, then a grade of 50% will be used for the calculation of their average.*

20.3 Unless precluded by Faculty Council, a Full-time student will be granted the option of writing Supplemental Evaluations, provided that:

the student's mark in the course is less than 50% but greater than or equal to 40%; and

the student's overall Term Average is not less than 50%.

20.4 A Full-time student will not be permitted to write more than two (2) Supplemental Evaluations in any term; exceptions are at the discretion of the Dean.

20.5 No full-time student will be allowed to write more than four (4) Supplemental Evaluations during the student's entire period of undergraduate study at the RMC of Canada, which includes any RMC of Canada’s equivalent undergraduate courses taken at the Royal Military College Saint-Jean.

20.6 Part-time students are not permitted to write Supplemental Evaluations.

20.7 Supplemental Evaluations can take many forms, such as, but not limited to an exam, an essay, a lab report, an oral exam, some other assignment, or a combination of these formats, which will be determined by the instructor responsible for the course or course section. The form will be in accordance with the respective Dean’s discretion regarding commonality.

20.8 Supplemental Evaluations that address particular learning outcomes of a course or course section will be the same for all students that have failed to meet the same learning outcomes of that course or course section.

21. Language Used in Examinations and Course Work

21.1 A student may write examinations in either English or French, except that the examinations in language courses must be written in the language concerned.

21.2 With the exception of language courses, a student may write assignments or other course work in the student's first official language. However, the student must inform the instructor of the student's intention of handing in assignments and other course work written in the official language different from the one in which the course is given no later than seven days after the beginning of the term. If the instructor is unable to mark course work written in that language, the instructor must immediately inform the department responsible for the course of the student's request. The department shall make arrangements for the course work written in that language to be properly marked.

22. Complaints, Grievances, Appeals and Re-reads of Examinations

22.1 A student with a complaint or issue that is academic in nature should first communicate the concern to the involved instructor in an informal manner. This should be done as soon as possible after the student first becomes aware of the issue. The student must ensure that the instructor is aware of all of the facts that the student believes have a bearing on the issue, and which could affect the instructor's reconsideration of the issue, but which may not have been considered in the instructor's initial decision. The instructor will examine the issue again; reconsider the decision on the basis of the information that the student has provided, and will provide a response to the student as quickly as is practicable, and normally within seven (7) calendar days.

22.2 If the student is not satisfied with the instructor's decision, the student should take up the issue with the Chair of the Department or Programme of Study concerned in an informal manner. The student must ensure that the Chair of the Department or Programme of Study is made aware of all the relevant facts having a bearing on the issue. The Chair of the Department or of the Programme of Study concerned must provide a response to the student as quickly as is practicable, and normally within seven (7) calendar days.

22.3 If the student is not satisfied with the decision, a formal Appeal may be made to the Dean of the Faculty or Division responsible for the programme. This Appeal must be made in writing and submitted, through the appropriate Department Head or Programme Chair, as soon as practicable, but not later than twenty-one (21) calendar days after the student was informed of the decision of the Chair of the Department or Programme. The student should attach to the Appeal copies of all relevant documents and when copies are not available, provide clear references to other documents that the student feels are relevant. The responsible Dean will inform the student in writing of the decision with respect to the Appeal. Normally, within fourteen (14) calendar days of the date of receipt of the completed Appeal from the student.

22.4 If the student is not satisfied with the decision reached by the Dean, an Appeal may be made to Faculty Council. The student must submit the Appeal in writing, within twenty-one (21) calendar days of receiving the decision of the Dean. The student must submit the Appeal to Faculty Council through the Registrar, and should attach to the Appeal, copies of all relevant documents. When copies of documents are not available, the student must provide clear references to those documents that the student feels are relevant. Appeals to Faculty Council will normally be considered at the next scheduled meeting of Faculty Council, provided that the Registrar received the Appeal at least four (4) working days before the scheduled meeting of Faculty Council. The Registrar will inform the student in writing of the decision made by Faculty Council concerning the Appeal.

22.5 If the student is not satisfied with the decision of Faculty Council an Appeal may be made to the Senate. The student must submit the Appeal in writing within twenty-one 21 calendar days of receiving the decision of Faculty Council. The student must submit the Appeal in writing to the Senate through the Registrar, and should attach to the appeal copies of all relevant documents including a statement describing the basis of the appeal. Appeals will only be heard by Senate if they are based on new information or an abuse of process. Merely disagreeing with the decision of Faculty Council will not be considered a legitimate basis for an Appeal. Senate may decline to hear an Appeal if it finds that there is no legitimate basis for the appeal. Appeals to Senate will normally be heard at the next scheduled meeting of the Senate. The Registrar will notify the student in writing of the Senate’s decision concerning the Appeal within seven (7) calendar days of the decision being made. The decision of Senate is final and may not be appealed further.

22.6 If the student's complaint or grievance pertains to the marks awarded on a final exam and cannot be resolved in an informal manner, the student may make a formal request to have the exam re-evaluated. This request is to be made in writing to the Registrar. The Registrar will forward the request for re-read to the Head of the appropriate department, who will decide how the re-read will be conducted. The result of the final exam re-read will be used to replace the original exam’s mark and used in the determination of the student's final course grade. To ensure that such matters are addressed with due diligence, a request for re-read must normally be submitted not later than thirty (30) days after the student has been made aware of the result. A request for re-read will address only one exam, and normally will not be entertained for assignments, tests, or any other work that has been removed from the custody of the instructor after being marked and recorded.

22.7 A student wishing to make a complaint on an academic issue which is not related to a specific course has to take it directly to the person responsible, whether the Programme Chair, the Head of Department or the Dean. The complaint or grievance will then follow the process within the time periods as prescribed above.

22.8 Appeals related to Academic Sanctions imposed due to the application of Academic Regulation 23 must be appealed through the process described in Academic Regulation 23.

23. Academic Integrity

23.1 Integrity –When you do the right thing even though no one is watching. Integrity is essential to the academic enterprise and its foundations in the open, independent, and free exchange of ideas. The core values of integrity, both academic and otherwise include: honesty, fairness, respect, responsibility, and trust. Academic Integrity demands that all members of the RMC of Canada act in accordance with these values in the conduct of their academic work, and that they shall follow the rules and regulations concerning the legitimate and accepted conduct, practices and procedures of academic research and writing. Academic Integrity violations are defined as Cheating, Plagiarism or other violations of academic ethics. (It is important to note that, while the list below is comprehensive, it should not be considered exhaustive.)

Cheating includes:

a. An act or attempt to give, receive, share, or utilize unauthorized information or unauthorized assistance at any time for assignments, tests or examinations. Students are permitted to mentor or assist other students with assignments and laboratory reports, but, students will not permit other students to copy their work, nor will students copy other students' work, and they must acknowledge when they have received assistance from others;
b. Failure to follow rules on assignments, presentations, exercises, tests, or examinations as detailed by the respective professor or test/exam invigilator;
c. Unauthorized co-operation or collaboration;
d. Tampering with official documents, including electronic records;
e. Falsifying research, experimental data, or citations;
f. The inclusion of sources that were not used in the writing of the paper or report; and
g. The impersonation of a candidate at presentations, exercises, tests or an examination. This includes logging onto any electronic course management tool or program (e.g. Moodle, Black Board, etc.) using someone else's login and password.

Plagiarism includes:

a. Using the work of others and attempting to present it as original thought, prose or work. This includes failure to appropriately acknowledge a source, misrepresentation of cited work, and misuse of quotation marks or attribution;
b. Failure to acknowledge adequately collaboration or outside assistance and;
c. Copying.

Other violations of academic ethics include:

a. Not following ethical norms or guidelines in research;
b. Failure to acknowledge that work or any part thereof has been submitted for credit elsewhere;
c. Misleading or false statements regarding work completed; and
d. Knowingly aiding or abetting anyone in committing any form of an Academic Integrity violation.

23.2 All cases of suspected Academic Integrity violations must be reported to the Department Head responsible for the course in which the alleged Academic Integrity violation took place. The Department Head must in turn inform the appropriate Dean of the suspected Academic Integrity violation. All allegations of an Academic Integrity violation will be investigated. Investigations of alleged incidents of Academic Integrity violations shall be under the control of the Faculty Dean with jurisdiction over the course in which the infraction occurred. The Dean will decide who will be delegated to carry out the investigation. The results of all such investigations are reviewed at a regular meeting of the Academic Integrity Council. If the Academic Integrity Council determines that an Academic Integrity violation has taken place, the Academic Integrity Council may award one or more Academic Sanctions listed in Regulation 23.3. All cases involving expulsion will generate an automatic appeal to Senate. The Senate in accordance with Regulation 18.4 has the authority to require a student to withdraw. Faculty Council will be informed on a regular basis of any Academic Sanctions that are awarded. The findings with respect to Academic Integrity violations will be published in a public forum without names or other identifiers, such as student numbers on a periodic basis.

23.3 Academic Sanctions imposed upon students found guilty of an Academic Integrity violation will consist of one or more of:

a. Recorded Caution;
b. Reduction in mark for the work involved;
c. Reduction in mark of the course for which the work involved was submitted;
d. Suspension for a fixed period of time;
e. Annotation of Official Transcript and;
f. Expulsion.

When determining the appropriate Academic Sanction mitigating or aggravating circumstances may be considered.

In addition to the Sanctions described above, a student found guilty of an Academic Integrity violation may be required to re-submit any work that was deemed to constitute an Academic Integrity violation. If work is required to be re-submitted, the student will be informed in writing by the appropriate Department Head or Programme Chair within seven (7) calendar days of the decision being made of the nature of the required submitted work, the maximum mark it will be eligible to receive and the date by which it must be submitted. Work that is re-submitted may be awarded a reduced mark or zero. If a student fails to re-submit the required work to a satisfactory standard by the required date a mark of zero will be awarded for the course and the student will normally be deemed to be in a Failed Term Status. Academic sanctions imposed may also include exclusion from or suspension, cancellation, or forfeiture of any scholarships, bursaries, or awards with any academic component.

23.4 When it is determined that a member of the Canadian Armed Forces has committed an academic integrity violation(s), the Academic Integrity Council, through the Registrar, will notify the respective Commanding Officer (CO) of the findings and the sanction(s) imposed by the Academic Integrity Council. In any instance of an Academic Integrity violation by a Canadian Armed Forces member further administrative or disciplinary action may be taken, as deemed appropriate by the member's Commanding Officer.

23.5 Students who are found guilty of repeated or aggravated Academic Integrity and, as a consequence, are expelled from the RMC of Canada will not be considered for admission or readmission to any degree programme or course offered by or through the RMC of Canada. After a period of not less than five years from the date of expulsion, the Senate may, upon receipt of a written request, review an expelled student's case and consider an application for admission or re-admission.

23.6 All Academic Sanctions will become part of a student's permanent academic record. For serious cases of Academic Integrity violations, and upon specific direction by the Academic Integrity Council, a student's Official Transcript may be annotated so as to indicate that an Academic Integrity violation took place and that an Academic Sanction was awarded.

23.7 The RMC of Canada and its faculty members reserve the right to employ originality checking and plagiarism detection instruments or services to protect, preserve, and promote the academic integrity of the credits and degrees it grants. Students enrolled in a RMC of Canada course may, as part of the requirements to receive credit for that course, be required to submit their work to such originality checking and plagiarism detection instruments or services.

23.8 Students must be provided with the investigation report and any other documents or evidence that may be used in determining their culpability. In addition, they have a right to provide a written response to the investigation and any other evidence that may be used by the Academic Integrity Council in determining culpability. Students have the right to appeal any decision of an Academic Integrity violation or any sanction awarded as a result of a finding of an Academic Integrity violation. If the student is not satisfied with the decision of the Academic Integrity Council an appeal may be made to the Deans' Council. The final authority to hear any appeals arising from decisions made by the Academic Integrity Council will be Deans' Council, except for sanctions that involve expulsion; all cases involving expulsion will generate an automatic appeal to Senate. The student must submit the appeal in writing within twenty-one (21) calendar days of receiving the decision of the Academic Integrity Council. The student must submit the appeal in writing to the Deans' Council through the Registrar, and should attach to the appeal copies of all relevant documents including a statement describing the basis of the appeal. Appeals will only be heard by Deans' Council if they are based on new information or an abuse of process. Merely disagreeing with the decision of the Academic Integrity Council will not be considered a legitimate basis for an Appeal. Deans' Council may decline to hear an appeal if it finds that there is no legitimate basis for the appeal. Appeals to Deans' Council or Senate will normally be heard at the next scheduled meeting of Deans' Council or the Senate. Normally, appeals to Deans' Council or Senate will be on a paper basis only. At the request of the student, Deans' Council or Senate may agree to hear the appeal in *viva voce* but this is at the discretion of Deans' Council or Senate. The Registrar will notify the student in writing of Deans' Council's or the Senate's decision concerning the appeal within seven (7) calendar days of the decision being made. In cases not involving expulsion, the decision of Deans' Council is final and may not be appealed further. In cases involving a sanction of expulsion, the decision by Senate is final and may not be appealed further.

23.9 Academic Policy Directive No 1 – Academic Integrity amplifies this academic regulation, describes the process to be followed in greater detail, and provides sample documentation.

24. Full Time Undergraduate Students

24.1 Except for First Year, a full time student may, with the permission of the responsible department head, enrol in a maximum of one credit per term over the normal course load for the Programme of Study. Students wishing to enrol in more than one extra credit per term beyond the normal programme must first obtain permission of the responsible Dean. Minimum and maximum credits for full time status are presented in Table D-1 .

25. Part-Time Undergraduate Students

25.1 A Part-Time Student may take a maximum course load of 3 credits in any one term and must complete at least one course every two years to remain registered in a Programme of Study.

Table D-1 (minimum and maximum credits permitted by term)

Programme	Minimum number of credits	Normal Course Load	Maximum number of credits
Arts: 1st Year	3 per term | 8 per academic year	5 credits per term | 10 per academic year	6 per term
Arts (except Business Administration): 2nd, 3rd or 4th Year	3 per term | 8 per academic year	5 credits per term | 10 per academic year	6 per term
Business Administration: 2nd, 3rd or 4th Year	3 per term | 8 per academic year	Variable across Years	1 per term above the normal programme
Science: All Years	3 per term | 8 per academic year	5 credits per term | 10 per academic year	6 per term
Engineering: 1st Year	4 per term | 8 per academic year	6 credits per term | 12.5 per academic year	7 per term
Engineering: 2nd 3rd or 4th Year	4 per term | 8 per academic year	Variable across programmes and Years-	1 per term above the normal programme
BMASc: all Years	3 per term | 8 per academic year	5 credits per term | 10 per academic year	6 per term

Standing Regulations Applying to Students Prior to 1 September 2003

Note: *The Academic Regulations for the RMC of Canada's Undergraduate Programme were amended effective 1 September 2003. The following Academic Regulations were in effect prior to 1 September 2003 and continue to apply to students who graduated from the RMC of Canada under the ROTP, RETP and UTPNCM programmes until officially amended or rescinded.*

29. To be granted pass standing a cadet must:

a. achieve a satisfactory standard in Physical Education and in Military Training;
b. achieve a satisfactory standard in Second Language Training; and
c. obtain a favourable report in Officer-Like Qualities.

46. A cadet who, in the opinion of the staff, fails to develop the necessary officer-like qualities will, on the approval of the Commandant for such action, be required to withdraw.

Definitions

Academic Year:
For full-time students, the period from September to May. The academic year is divided into three terms: Fall Term, Winter Term, and Summer Term. For the purposes of determining academic standing the Summer term is not normally considered to make up the academic year.

Audit:
Courses that are taken without the purpose of earning academic credit. See Academic Regulation 8.3 .

Challenge Examination:
An examination to test the knowledge of candidates in the subject matter of a particular course. The purpose of the Challenge Exam is to establish a basis for the granting of credit for the course, without the normal requirements for attending the course and completing the usual course requirements. See Academic Regulation 8.4.1 .

Contact Hours: The estimated number of hours per week, the course requires. The first number indicates the hours in the classroom. The second number indicates the hours of laboratory or practical work. The third number indicates the estimated hours of at-home study.

Core Curriculum of the RMC of Canada:
Courses the RMC of Canada's students are required to take in order to prepare them to take on positions of leadership within the Canadian Armed Forces (CAF).

Corequisite:
A course which must be completed successfully before, or studied concurrently with, the course for which it is prescribed.

Course:
A unit of study designated by a code and number in the Academic Calendar.

Course Grade:
The grade assigned on completion of the course, based on assignments, practical work, examinations and/or other course requirements as determined by the course instructor.

Credit:
The equivalent, for all academic programmes, of a course consisting of about 39 hours of lectures, normally delivered in one term.

Credit Granted:
Credit granted based on challenge exams, through the appropriate Department, non-university courses, or other types of experience which are assessed through the Prior Learning Assessment and Recognition (PLAR) process as duplicating the RMC of Canada's academic requirements. See Academic Regulation 8.4 .

Discipline:
A field of study within a Programme of Study. A discipline will be either Major, Concentration, or Minor depending on the number of credits completed in the field of study.

Elective:
A course belonging to another discipline that a student may take to complete the minimum requirements of a Programme of Study or an optional course that is not required for a Programme of Study.

End of Term:
The end of term coincides with the end of the final exam period for that term.

Equivalency:
A course that has been reviewed by the faculty through PLAR and/or Syllabus Committee, as appropriate, and has been approved as covering at least 60% of the course content and all required key elements of the course to which it has been defined as equivalent. See Academic Regulation 9 .

Exception:
A course that has been reviewed by faculty, and approved to replace another course, based on exceptional circumstances.

Exclusion:
Two courses which are anti-requisites, meaning credit will not be granted for both courses. All equivalencies are exclusions while all exclusions are not necessarily equivalencies.

Exemption:
Granted when a student is not required to complete a Mandatory course within a Programme of Study because of prior exposure to related material. See Academic Regulation 8.6 .

Extra course:
A course which exceeds the requirements of the Programme of Study and which is taken only with the special permission of the Dean responsible for the programme in which the student is registered. See Academic Regulation 8.5 .

Failure of a Course:
A student is deemed to have failed a course if the student fails the normal requirements for a course and does not successfully pass the supplemental evaluation.

Full Time Undergraduate Students:
Those students registered in the minimum number of credits by term and academic year in accordance with Table D-1 for their Programme of Study once the deadline for course withdrawals has expired. See Academic Regulation 24 .

Good Standing:
Good standing implies that all a student's obligations to the College have been met. The requirements differ depending on the category of student. For example, the student must have paid all required fees, and must be of good character, such that the award of the degree requested does not impugn the values and reputation of the College.

Interest Only Student:
An Interest Only student is a student who is taking one or more courses at the RMC of Canada without being admitted to a programme of study or certificate.

Letter of Permission:
A letter signed by the Registrar that the RMC of Canada's students require in order to take courses at other institutions for credits towards their degree programme at the RMC of Canada. See Academic Regulation 8.9 .

Mandatory Course:
A specific course which a student must pass, or otherwise receive credit, in order to complete a Programme of Study.

Optional Courses:
Courses within a discipline that are not Mandatory Courses.

Part-Time Undergraduate Students:
Students who are registered in less than the minimum number of credits of the full year programme for their Programme of Study. See Academic Regulation 25 .

Pass:
A student is deemed to have passed a course if the student completes all requirements for that course to the satisfaction of the instructor.

Post Nominal:
Students who successfully complete the four interlocking components merit the " *rmc* " post nominal.

Prerequisite:
A course which must be successfully completed prior to commencing the course for which it is required.

Programme of Study:
The minimum set of courses required for the completion of a particular degree or certificate.

Suitable Substitute:
A course that has been reviewed by the faculty through PLAR and/or Syllabus Committee, as appropriate, and while it has not been approved as an equivalency, has been approved to replace a specific course to meet a given requirement in a degree or certificate. This is based on the common learning objectives shared by the required course and the suitable substitute. While both courses meet the requirement, because they are not equivalencies, both may be taken for credit, and either one may be applied as meeting the requirement and the other as an elective.

Supplemental Evaluation:
A Supplemental Evaluation assesses a student`s capability to fulfill the minimum learning outcomes of the course for students who have failed the course. See Academic Regulation 20 .

Term Average:
The student's weighted average calculated at the end of any academic term based on all courses completed in that term plus the marks of all full-year courses which are in progress at that point. Weighted averages are based on the number of credits.

Transfer Credits:
Credits for work done at an accredited post-secondary institution. See Academic Regulation 8.7 .

Visiting Students:
A visiting student is a student enrolled in a programme at another university who is authorized by that institution and by the RMC of Canada to take courses at the RMC of Canada.

Prizes and Awards

General Information

Officer cadets who are members of the Regular Officer Training Plan have their fees for the entire programme paid by the Department of National Defence and, in addition, are entitled to pay and allowances prescribed by the Department.

Scholarships and Prizes awarded may be retained under the Regular Officer Training Plan.

Scholarships and Bursaries

General Scholarship Fund

Administered by Faculty Council, the General Scholarship Fund permits the introduction of new scholarships, bursaries and prizes, or the augmentation of existing awards. The Fund is made possible through contributions in memory of Ex-Cadets No. 5804 S.G. Esdaile and No. 5522 T.A. Spruston; gift of the late Mrs. Lilian Grier in memory of Ex-Cadet No. 599 Colonel Leroy Fraser Grant; and also through the kind generosity of Bull HN Information Systems Ltd.; Pyrolysis Systems Incorporated; and of Emeritus Professor of Mechanical Engineering, the late Lieutenant-Colonel P.C. King.

The Leonard Foundation

Through the Leonard Foundation created by the late Lieutenant-Colonel Reuben Wells Leonard, RMC No. 87, financial awards are made available on the basis of need to provide assistance to students enrolled in undergraduate programmes. Preference in the selection of students for financial assistance is given to the sons and daughters of clergy, military personnel, school teachers, graduates of the Royal Military College of Canada, members of the Engineering Institute of Canada and members of the Mining and Metallurgical Institute of Canada. The amounts of the awards will vary depending on the applicant's financial situation, but on average will be $1250 and may be renewed on re-application.

Dominion Cadetships

A Dominion Cadetship may be granted by the Minister of National Defence to a cadet who, being a member of the Reserve Force enters the initial year at the Royal Military College of Canada.

1. The value of a Dominion Cadetship encompasses:
    a. the annual college fee for the First Year;
    b. the cost of single quarters and rations for the First and subsequent years; and
    c. the annual Recreation Club fee for the First and subsequent years.
2. Not more than fifteen Dominion Cadetships may be granted in a college year.
3. A candidate, to be eligible for a Dominion Cadetship, must meet the enrolment and academic standards for admission and be the child of a person who was killed, has died, or is severely incapacitated as a result of service in:
    a. the Canadian Forces, or
    b. the Canadian Merchant Marine, during hostilities.
4. Application for a Dominion Cadetship shall be made in writing, giving full particulars of the candidate's eligibility under subparagraph c. and shall normally be forwarded by the first day of March to a Canadian Forces Recruiting Centre or Detachment.
5. The final board of selection shall submit to the Minister of National Defence for approval a list of candidates recommended for Dominion Cadetships, in order of merit.
6. A Dominion Cadetship is forfeited on failure of an academic year.

Prizes and Awards

General Information

Awards in which studies, academic standing, or academic proficiency is a qualification normally require that the year must have been clearly passed at the first attempt without conditions and with at least Second Class standing. The following annual awards may be won by students who meet the requirements as specified by the donors or as determined by the Faculty Council and approved by the Commandant.

Definitions:

For the purposes of Prizes and Awards, a cadet is defined as a student enrolled under either the Regular Officer Training Plan (ROTP), the Reserve Entry Training Plan (RETP) or under the University Training Plan, Non-Commissioned Member (UTPNCM). "Student" includes "cadets" and officers enrolled under the Initial Baccalaureate Degree Programme (IBDP).

Fourth Year

The Sword of Honour

The Sword of Honour is awarded to the ROTP/RETP cadet of the Graduating Class who best combines high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Department of National Defence Award of Merit

The Department of National Defence Award of Merit is awarded to the graduating ROTP/RETP cadet attaining highest standards in each of the four components of the RMC of Canada programme. (Spring)

The Governor General's Silver Medal

The Governor General's Silver Medal is awarded to the student with the highest overall average in the Fourth Year of study at RMC of Canada, on completion of an Honours or Engineering degree programme with First Class Distinction, provided that a four-year programme of study has been completed and that an overall average of at least A- has been recorded in Third Year. (Spring)

The Sword of Distinction for Leadership

The Sword of Distinction for Leadership is awarded to the graduating ROTP/RETP cadet who displays outstanding leadership through attaining the highest Cadet appointment of Cadet Wing Commander (CWC) in their graduating year. (Spring)

The Victor van der Smissen-Ridout Memorial Award

The Victor van der Smissen-Ridout Memorial Award is awarded to the graduating ROTP/RETP cadet deemed to stand highest morally, intellectually, and physically at the Royal Military College of Canada (based on a vote by the cadets). (Spring)

The MacArthur Leadership Award

The MacArthur Leadership Award is awarded to the cadet who demonstrates outstanding leadership performance based on General Douglas MacArthur’s credo of Duty-Honour-Country and potential for future service in the profession of arms. (Spring)

The Generalissimo Jose-Maria Morelos Sabre of Honour

The Generalissimo Jose-Maria Morelos Sabre of Honour is awarded to the graduating ROTP/RETP cadet who has demonstrated outstanding dedication and leadership in the attainment of the highest standards in each of the four components of the RMC of Canada programme. The sword is donated annually by the United Mexican States Secretariat of National Defence. (Spring)

The Navy League of Canada Prize

The Navy League of Canada Prize is awarded to the best Sea Operations cadet (Maritime Surface and Sub-Surface or Maritime Engineering) in the graduating class, based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Royal Canadian Artillery Association Prize

The Royal Canadian Artillery Association Prize is awarded to the best Combat Arms cadet (Armoured, Artillery, Infantry, Engineer) in the graduating class, based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Air Force Association of Canada Award of Merit

The Air Force Association of Canada Award of Merit is awarded in alternate years (even) to the best Air Operations or Aerospace Controller graduating cadet, based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Air Cadet League of Canada Award of Merit

The Air Cadet League of Canada Award of Merit is awarded in alternate years (odd) to the best Air Operations or Aerospace Controller cadet in the graduating year, based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Commander Arturo Prat Leadership Award

The Commander Arturo Prat Leadership Award is awarded to the graduating naval cadet who has demonstrated outstanding leadership, moral values, performance, and potential for future service in the Profession of Arms. The award is sponsored by the Chilien Embassy. (Spring)

The UTPNCM Award of Merit

The UTPNCM Award of Merit is awarded to the graduating UTPNCM cadet attaining the highest standards of proficiency in the four components of the RMC of Canada programme. (Spring)

The Canadian Forces Engineering Prize

The Canadian Forces Engineering Prize is awarded to the best graduating cadet enrolled in the military occupations of Maritime Engineer, Combat Engineer, Signals, Electrical and Mechanical Engineer, Engineering Officer, Aerospace Engineer, Communications and Electronics Engineer, (Air), based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Military Support Award of Merit

The Military Support Award of Merit is awarded annually to the best cadet in the graduating class from the Logistics, Health Care Administration, Military Police Officer, or other military occupation of the Support Group, based on high standards of proficiency in each of the four components of the RMC of Canada programme. (Spring)

The Canadian Defence Academy Profession of Arms Award for Excellence in Military Professionalism (CDA)

The Canadian Defence Academy Profession of Arms Award for Excellence in Military Professionalism (CDA) is awarded to a Canadian Defence Academy student for demonstrating excellence in military professionalism, leadership and character, and who has consistently displayed the highest values of the Canadian Forces – Integrity, courage, academic achievement, fitness, loyalty, comradeship and commitment. (Spring)

The Gibson Medal - Graduating Year

The Gibson Medal – Graduating Year is presented in memory of 2569 Maj Desmond H. Gibson, ED and 805 Col The Honourable Colin W. Gibson, PC, MC, VD. It is presented to the top graduating student in the Faculty of Arts. (Spring)

The Stuart S. Barton Science Award

The Stuart S. Barton Science Award is awarded to the student who has maintained the highest overall academic average in the 4th year of an Honours Science programme, provided this average is above 80%. This award was sponsored by Mrs. Ruth Barton in memory of the late Dr. Barton, a distinguished member of the RMC Chemistry Department. (Spring)

The Professional Engineers of Ontario Gold Medal For Academic Achievement

The Professional Engineers of Ontario Gold Medal for Academic Achievement is awarded each year to the engineering student with the highest academic standing in the final year. (Spring)

The Leinster Shield

The Leinster Shield is awarded to the ROTP/RETP squadron amassing the most points in the Commandant's Competition, with events involving military, athletic and academic prowess. After each event, the squadron leading in the competition flies its pennant from a designated flagstaff and takes the right-of-the-line position on parade. At year's end, the winning squadron will take the right-of-the-line on the Commissioning Parade. The position of right-of-the-line is traditionally a place of honour, as this was the unit that lead the Army into battle. The Leinster Shield was originally inaugurated in 1892 by the 1st Battalion, Prince of Wales Leinster Regiment (Royal Canadians) for their inter-company challenge shield. The shield came to RMC of Canada in 1922 when the Leinster Plate was entrusted to Canada on the disbanding of the Regiment. The Class of 1933 refurbished the Shield for use in the Commandant's Competition. (Spring)

The J. Douglas Young Sword of Excellence

The J. Douglas Young Sword of Excellence is awarded in conjunction with the Leinster Shield on Graduation Parade to the Cadet Squadron Leader (CSL) of the Squadron winning the Commandant's Competition. The sword will be carried by the CSL of the Squadron until the next graduation parade. The fall and winter term CSL of the winning squadron will receive a commemorative plaque for personal retention. The College Number of the CSL's will be engraved on the scabbard to permit a continuing record. The J. Douglas Young Sword of Excellence was donated by the Class of 1933 in memory of their Classmate #2360 John Douglas Young, who was killed in action on D-Day, 6 June 1944. (Spring)

The Major General John Arthur Stewart Trophy

The Major General John Arthur Stewart Trophy is awarded to the top Military Engineer cadet in his or her graduating year whose occupation classification is Engineer (MOC 24) or Construction Engineer (MOC 46). Sponsored by the Canadian Military Engineer Association, it is based on high standards of proficiency in each of the four components of the RMC of Canada.

The Duncan Sayre MacInnes Memorial Scholarship

The Duncan Sayre MacInnes Memorial Scholarship is awarded to the graduating cadet who is considered the most deserving of those who accept a regular commission in the military occupation of Aerospace Control Officer by reason of academic standing, character, and proficiency in occupational training. (Spring)

The W.M. Carleton Monk Memorial Scholarship

The W.M. Carleton Monk Memorial Scholarship is awarded to the graduating Reservist (RETP) Fourth Year cadet with the highest marks in academic subjects, provided attendance at a university following graduation. (Spring)

The Squadron Leader McAlpine Cadet Trust Fund Award

The Squadron Leader McAlpine Cadet Trust Fund Award is awarded to the Graduating cadet in an Air Force cadet classification who obtains the highest academic marks. (Spring)

The Canadian Forces Military College Academic Awards for Graduating Students

The Canadian Forces Military College Academic Awards for Graduating Students is awarded annually in each of Honours Arts, Honours Science, and Engineering to the graduating UTPNCM cadet with Advanced Standing who, having First Class Distinction, stands highest of the graduating UTPNCMs in the course of study, provided that an overall average of Second Class Distinction without failures or conditions was maintained in the previous year. (Spring)

The Canadian Forces Military College Academic Award

The Canadian Forces Military College Academic Award is awarded annually to the UTPNCM cadet with Advanced Standing who stand highest among the Advanced Standing cadet, provided that the year has been clearly passed without condition and that an overall weighted average of A- or better, has been obtained in third Year of three-year (Pass) programme. (Spring)

The Harris-Bigelow Trophy

The Harris-Bigelow Trophy is awarded to the Fourth Year cadet who has displayed the best combination of academic and athletic ability throughout the entire course of study at RMC of Canada. This trophy was given for annual competition by the Class of 1932 in memory of their classmates, No. 2039 T.W.E. Harris and No. 2021 J.G. Bigelow. (Spring)

The Toronto Branch RMC of Canada Club Prize

The Toronto Branch RMC of Canada Club Prize is awarded to the Fourth Year ROTP/RETP cadet who obtains the highest combined marks in Drill and Physical Education during the entire course of study at RMC of Canada. (Spring)

Departmental Medals - Graduating Year

Departmental Medals - Graduating Year. A medal is awarded annually in each academic programme to the graduating student standing highest in the programme, providing an overall average of A- or better has been earned by the recipient. Recipients must have maintained a minimum overall average of B- or better without failures or conditions in the previous year of study. (Spring)

The Panet Cup

The Panet Cup is awarded to the graduating cadet who achieves the highest average score in all four years in the Spring RMC of Canada Physical Fitness Test. (Spring)

The Fort St-Jean Chapter Prize

The Fort St-Jean Chapter Prize is awarded to the graduating cadet with the most improved second language profile since entry into RMC of Canada while attaining a superior performance in the other components of the programme. (Spring)

The Padre W.A. Ferguson Shield of Duty

The Padre W.A. Ferguson Shield of Duty is awarded to the Officer Cadet who best exemplifies the qualities of civic duty that are the hallmark of an Ex-Cadet, through contributions to the College, the Club, and his/her community. (Spring)

The Robert Bradshaw Award

The Robert Bradshaw Award is awarded each year to the 4th year OCdt who has distinguished him/herself in the field of mentorship. (Spring)

The UTPNCM Drill and Physical Education Prize

The UTPNCM Drill and Physical Education Prize is awarded to the graduating UTPNCM cadet who has maintained, throughout the complete course of study, the highest standard in drill and physical education among those graduating. (Spring)

The Lieutenant-Colonel Leroy Fraser Grant Memorial Prize

The Lieutenant-Colonel Leroy Fraser Grant Memorial Prize is awarded in any year to the student of any year who, in open competition, submits the best original essay on an international topic other than Canada or the Commonwealth. (Spring/Fall)

The Class of '78 - Dr. Walter S. Avis UTPNCM Honour Shield

The Class of ‘78 - Dr. Walter S. Avis UTPNCM Honour Shield is presented annually to the UTPNCM graduate who has contributed most to the positive development of the UTPNCM squadron, during the entire time at RMC of Canada as determined by a secret ballot of the members of the UTPNCM squadron. (Spring)

The Jack C. Sargant memorial Scholarship

The Jack C. Sargant memorial Scholarship is awarded in any year annually to a varsity athlete who demonstrates combined proficiency in academic standing, sportsmanship, leadership, and athletic ability. (Spring/Fall)

The Doreen and John Windsor Award

The Doreen and John Windsor Award is awarded annually to the student in the final year of study in Honours History or Military and Strategic Studies programmes who demonstrated excellence in an area of Canadian or international history. (Spring)

The Society of Chemical Industry Award, Canadian Section

The Society of Chemical Industry Award, Canadian Section, is awarded to the graduating students who has the highest standing in the final year of the course in each of Chemical Engineering and Chemistry, provided that the overall average is at least A- and that the course of study has been completed in, at most, the normal number of years. (Spring)

The A.C. Leonard Award

The A.C. Leonard Award is awarded annually by the Department of Mechanical Engineering to the Fourth Year project group judged by the faculty to have presented the best project in MEE471/GMF471. (Spring)

The Chikhani Award

The Chikhani Award is awarded annually to the fourth year project group in electrical and computer engineering deemed to have the best project by the members of the Electrical and Computer Engineering Department. The prize is awarded in memory of Dr. Aziz Chikhani, PhD, PEng, former Dean of Engineering and Head of the Electrical and Computer Engineering Department. The winners receive the references required to prepare for the Practice of Professional Engineering exams. (Spring)

The W.C. Moffatt Aeronautical Engineering Award

The W.C. Moffatt Aeronautical Engineering Award is awarded to the student who contributed to a positive learning experience for his or her entire class not only through demonstrated academic excellence but also through sound leadership in the classroom and laboratories. The winner must have enhanced his or her intellectual achievements with maturity, creativity and a breadth of learning. The nominee is selected by a secret ballot of the students in the Aeronautical Engineering programme. The nominee is confirmed by the Mechanical and Aerospace Engineering Department faculty to have met the prize criteria. (Spring)

The J.F. Lott Award

The J.F. Lott Award is awarded annually by the Department of Civil Engineering to the student group judged to have presented the best Fourth Year design project. The award honours 06106 John Frederick Lott, twice a graduate from the Department. (Spring)

The R. Mann Award

The R. Mann Award is awarded annually by the Department of Chemistry and Chemical Engineering to the Fourth Year students judged by the faculty to have completed the best design project. (Spring)

The M. Evans Award

The M. Evans Award is awarded annually by the Department of Chemistry and Chemical Engineering to the Fourth Year student judged by the faculty to have completed the best chemistry senior project. (Spring)

The Mathematics Prize for Arts Students

The Mathematics Prize for Arts Students is awarded annually in any years by the Mathematics and Computer Science Department to the Arts student who achieves the highest standing in the courses of the department of Mathematics and Computer Science, provided that the year has been passed without conditions and a grade of at least A- has been obtained in one of the courses of the department. (Spring/Fall)

Third Year

Military Leadership Excellence Award in Third Year

The Military Leadership Excellence Award in Third Year is awarded to the ROTP/RETP cadet attaining the highest standards of proficiency in each of the four components in the Third Year of the RMC of Canada programme. (Fall)

Howard B. Ripstein Award of Excellence for Third Year

The Howard B. Ripstein Award of Excellence for Third Year is awarded to a cadet of each of the Navy, Army and Air Force elements who has completed the third year of undergraduate studies and has demonstrated excellence in all four components of the Royal Military College of Canada programme. (Fall)

The Naval Operations Sword

The Naval Operations Sword is awarded to the best overall naval operations cadet based on third year academic marks and overall performance in naval training during summer training periods. (Fall)

The Naval Engineering Sword

The Naval Engineering Sword is awarded to the best overall naval engineering cadet based on third year academic marks and overall performance in naval training during summer training periods. (Fall)

The Sea Logistics Sword

The Sea Logistics Sword is awarded to the best overall sea logistic cadet based on third year academic marks and overall performance in naval training during summer training periods. (Fall)

The Captain Matthew Dawe Memorial Sword

The Captain Matthew Dawe Memorial Sword is awarded to the most deserving Combat Arms Officer Cadet in Third Year. (Fall)

The Captain Nichola Goddard Memorial Sword

The Captain Nichola Goddard Memorial Sword is awarded to the most deserving Artillery Officer Cadet in Third Year. (Fall)

The Royal Military College of Canada Award for Academic Excellence in Third Year

The Royal Military College of Canada Award for Academic Excellence in Third Year is awarded annually to the student who has obtained the highest academic standing in the Third Year. (Fall)

The P.F. Fisher Memorial Trophy and Scholarship

The Dr. P.F. Fisher Memorial Trophy and Scholarship is awarded to the Third Year cadet considered most deserving by reason of academic standing and qualities of leadership and sportsmanship. (Fall)

The Frank R. Kossa Army, Navy and Air Force Veterans in Canada-United States Unit Memorial Scholarship (ANAVICUS)

The Frank R. Kossa Army, Navy and Air Force Veterans in Canada-United States Unit Memorial Scholarship (ANAVICUS) is awarded to the best cadet of Third Year on the basis of personal qualities, academic performance and leadership potential. (Fall)

The J.W. Brown Memorial Medal

The J.W. Brown Memorial Medal is awarded to the cadet who obtains the highest academic standing in the Third Year of an Arts programme. The medal is presented in memory of No. 7268 J.W. (Jim) Brown, a 1967 graduate in Commerce and President of the RMC Club of Canada in 1985/86. (Fall)

The Professional Engineers of Ontario Foundation for Education, Undergraduate Scholarship for Academic Achievement

The Professional Engineers of Ontario Foundation for Education, Undergraduate Scholarship for Academic Achievement provides an award to the undergraduate student in either Second or Third Year of an engineering programme who obtained the highest academic standing. (Fall)

The Professional Engineers of Ontario Foundation for Education, Undergraduate Scholarship for Non-Academic Achievement

The Professional Engineers of Ontario Foundation for Education, Undergraduate Scholarship for Non-Academic Achievement provides an award to an undergraduate student in either Second or Third Year of an engineering programme who exhibited exceptional role model qualities through participation in non-academic activities while maintaining above average marks. (Fall)

The UTPNCM Drill and Physical Education Departmental Prize

The UTPNCM Drill and Physical Education Departmental Prize is awarded to the UTPNCM cadet not in the graduating year who achieves the highest standard in drill and physical education in the year. (Third, Second or First Year) (Fall)

Programme Prizes

The Programme Prizes are awarded annually to the student standing highest in each academic programme in the Second and Third Year, providing the year has been passed without condition and an overall average of A- or above has been attained. (Fall)

The Canadian Forces Military College Academic Awards

The Canadian Forces Military College Academic Awards will be awarded annually to those UTPNCM cadets with Advanced Standing who stand highest among the Advanced Standing cadets in the years and programmes listed below, provided that the year has been clearly passed without condition and that an overall weighted average of A- or better has been obtained:

- second Year of a three-year (Pass) programme; and
- third Year of a four-year programme in each of Arts, Science, and Engineering. (Fall)

The Squadron Leader McAlpine Cadet Trust Fund Award

The Squadron Leader McAlpine Cadet Trust Fund Award is awarded to an Air Force cadet in the third year, with achievement in the bilingualism area. (Fall)

The Jack C. Sargant memorial Scholarship

The Jack C. Sargant memorial Scholarship is awarded annually to a varsity athlete who demonstrates combined proficiency in academic standing, sportsmanship, leadership, and athletic ability. (Third, Second or First Year) (Fall)

The Strong Challenge Shield

The Strong Challenge Shield is awarded to the cadet of the Third Year attaining the highest physical fitness score in the RMC of Canada Physical Fitness Test. (Fall)

The Chemical Institute of Canada Undergraduate Prize

The Chemical Institute of Canada Undergraduate Prize is awarded to the student who obtains the highest standing in each of Third Year Chemical Engineering and Chemistry. (Fall)

Second Year

The Military Leadership Excellence Award in Second Year

The Military Leadership Excellence Award in Second Year is awarded to the ROTP/RETP cadet attaining the highest standards of proficiency in each of the four components in the Second Year of the RMC of Canada programme. (Fall)

The Royal Military College of Canada Award for Academic Excellence in Second Year

The Royal Military College of Canada Award for Academic Excellence in Second Year is awarded annually to the student who has obtained the highest academic standing in the Second Year. (Fall)

The Class of 1942 Memorial Trophy

The Class of 1942 Memorial Trophy is awarded to the best all-round ROTP/RETP cadet of the Second Year in academic standing, leadership, and sportsmanship. (Fall)

The Royal Canadian Air Force Women's Division Scholarships (RCAF)

The Royal Canadian Air Force Women's Division Scholarship (RCAF) is awarded to cadets entering the Third Year of a four-year degree programme on the basis of high scholastic achievement and outstanding personal qualifications. One or more awards may be made annually. (Fall))

The Royal Canadian Air Force Women's Division Scholarships (RCAF)

The Royal Canadian Air Force Women's Division Scholarship (RCAF) is awarded to cadets entering the Third Year of a four-year degree programme on the basis of high scholastic achievement and outstanding personal qualifications. One or more awards may be made annually. (Fall)

The Squadron Leader McAlpine Cadet Trust Fund Award

The Squadron Leader McAlpine Cadet Trust Fund Award is awarded to an Air Force cadet in the second year, with achievement in the military area. (Fall)

Programme Prizes

Programme Prizes are awarded annually to the student standing highest in each academic programme in the Second and Third Year, providing the year has been passed without condition and an overall average of A- or above has been attained. (Fall)

The Grant Prize

The Grant Prize is awarded to the cadet in Second Year attaining the highest physical fitness score in the RMC of Canada Physical Fitness Test. (Fall)

The Corps of Guides Prize

The Corps of Guides Prize is awarded to the cadet who obtains the highest marks in Surveying and Terrain Analysis. (Fall)

First Year

The Military Leadership Excellence Award in First Year

The Military Leadership Excellence Award in First Year is awarded to the ROTP/RETP cadet attaining the highest standards of proficiency in each of the four components in the First Year of the RMC of Canada programme. (Fall)

The Royal Military College of Canada Award for Academic Excellence in First Year

The Royal Military College of Canada Award for Academic Excellence in First Year is awarded annually to the student who has obtained the highest academic standing in the First Year. (Fall)

The Howard B. Ripstein Award of Excellence for First Year

The Howard B. Ripstein Award of Excellence for First Year are awarded to a cadet of each of the Navy, Army, and Air Force elements who has completed the first year of undergraduate studies and summer training and has demonstrated excellence in all four components of the Royal Military College of Canada programme. (Fall)

The C. Raymond Grandy Memorial Scholarship

The C. Raymond Grandy Memorial Scholarship are awarded to the best cadet entering Second Year at RMC of Canada as determined by academic standing, leadership potential, and overall performance in the First Year. (Fall)

The Queen's University Challenge Shield

The Queen's University Challenge Shield is awarded to the best all-round ROTP/RETP cadet of the First Year in academic standing, leadership, and sportsmanship. (Fall)

The Squadron Leader McAlpine Cadet Trust Fund Award

The Squadron Leader McAlpine Cadet Trust Fund Award is awarded to an Air Force cadet in the first year, with achievement in the athletic area. (Fall)

Departmental Prizes

Departmental prizes are awarded annually to the students in First Year who have achieved the highest standing in the several courses of a department provided that the year has been passed without condition and at least A- has been obtained in one of the courses of the department concerned. (Fall)

The Fulton Award

The Fulton Award is awarded to the cadet in First Year attaining the highest physical fitness score in the RMC of Canada Physical Fitness Test. (Fall)

The English Prize for Engineering or Science Students

The English Prize for Engineering or Science Students is awarded annually by the English Department to the Science or Engineering student who achieves the highest standing in English 100, provided that the year has been passed without condition and at least A- has been achieved in English 100. (Fall)

Recruit

The Ontario Professional Engineers Foundation for Education Entrance Scholarships

The Ontario Professional Engineers Foundation for Education Entrance Scholarships provides two entrance awards to Grade 12 graduates entering an accredited RMC of Canada engineering programme. Based upon academic potential standing at admission, one of the awards is made to an eligible female student and one to an eligible male student. (Fall)

The Hope Medallion

The Hope Medallion is awarded to the recruit showing best potential of leadership during the First Year Orientation Program. (Fall)

The Captain John Bart Teamwork Prize

The Captain John Bart Teamwork Prize is awarded to the First Year team that wins the College’s Obstacle Course Competition. (Fall)

The Captain John Bart Leadership Award

The Captain John Bart Leadership Award is awarded to the best leader in each Squadron during the Obstacle Race. (Fall)

Undergraduate Academic Programmes

General Information

Introduction

All degree programmes are offered in English and in French. A student will normally register in academic courses given in the student's first official language. Students who have reached the functional level in their second language may register in courses in their second language and in courses taught in a bilingual format. The academic year is divided into three terms, the Fall Term, the Winter Term and the Summer term. The academic year for full-time students normally extends from late August until May.

Degrees and Programmes Offered

The Royal Military College of Canada offers academic programmes leading to the undergraduate degrees listed below. It should be noted that not all programmes are open to students under the ROTP entry plan.

Undergraduate Degree	Minimum credits required	Programmes Available
Bachelor of Arts (Honours) B.A. (Hons)	40	Business Administration English French Studies History Political Science Economics Military and Strategic Studies Psychology
Bachelor of Arts B.A.	40	Business Administration English French Studies History Political Science Economics Military and Strategic Studies Psychology
Bachelor of Arts (General) B.A. (Gen) Note 1	30	
Bachelor of Science (Honours) B.Sc. (Hons)	42	Chemistry Mathematics Computer Science Physics Space Science
Bachelor of Science B.Sc.	42	Chemistry Computer Science Mathematics Physics Space Science
Bachelor of Science (General) B.Sc. (Gen) Note 1	30	
Bachelor of Engineering B.Eng.	*Programme specific*	Aeronautical Engineering Chemical Engineering Civil Engineering Computer Engineering Electrical Engineering Mechanical Engineering
Bachelor of Military Arts and Science (Honours) B.M.A.Sc. (Hons) Note 2	40	Specialization in Military Studies
Bachelor of Military Arts and Science B.M.A.Sc. Note 2	30	

Note 1
The 30-credit general B.A. and general B.Sc. degrees are not open to ROTP students.

Note 2
The B.M.A.Sc.(Honours) and B.M.A.Sc. degrees are offered through the Division of Continuing Studies and are not open to ROTP students. For more information on the specific requirements of these degrees consult the Division of Continuing Studies Section.

College Core Curriculum

The Core Curriculum represents the minimum content in certain areas which are required content of all RMC of Canada degrees. However, all students need not pass exactly the same pattern of courses in order
The Core Curriculum contains within it two separate themes;

1. The first theme is the minimum standard for Mathematics (which also includes Logic and Information Technology) and Sciences (Chemistry or Biology and Physics).
2. The second theme is a basic requirement in the study of Canadian History, Language and Culture, Political Science, International Relations and Leadership and Ethics.

First Year

First Year may be completed in; Arts, Science, or Engineering. Students who complete the First Year Science or Engineering Programme may proceed in Engineering or in Science in subsequent years. They may also enter Second Year Arts but will be required to make up specific Arts courses from First Year.

Double Major

A student, who successfully completes the 16 credits required for each Major of two separate disciplines, will receive a Double Major. See your department for details.

Combined or Joint Programme

Some departments offer a Combined Major or a Joint Major. When the Combined Major or Joint Major is in conjunction with a Science Programme, the Science Programme takes precedence, and the core courses for Science Programmes must be followed. See your department for details.

Minor

In addition to the Honours or Major, students may also develop a Minor in one subject which is not an integral part of their Major. See your department for details.

Arts Degree Programmes

Note: *Students in the Arts will normally select a Major in their second year. Application for entry into Honours programmes will be made to the department and will normally be done during the third year. (or at the beginning of the third year in the case of Business Administration).*

Bachelor of Arts (Honours)

A Bachelor of Arts (Honours) degree will be awarded if the following conditions are completed:

- core courses for arts programmes;
- **20 programme specific credits** *(including any applicable core courses)* ;
- elective credits, as required, to meet the total programme credits.

Bachelor of Arts

A Bachelor of Arts degree will be awarded if the following conditions are completed:

- core courses for arts programmes;
- **16 programme specific credits** *(including any applicable core courses)* ;
- elective credits, as required, to meet the total programme credits.

Core Courses for Arts Programmes

The following is a list of courses required by all students enrolled in a Bachelor of Arts (Honours) or a Bachelor of Arts offered by the Faculty of Arts.

A total of 21 credits:

All of the following courses:

- ENE110: Introduction to Literary Studies and University Writing Skills (2 credits)
- ENE210: Reading the Contemporary World: 1900 to the Present (2 credits)
- HIE102: Canada (2 credits)
- HIE203: Introduction to Canadian Military History (1 credit) Note 3
- HIE271: Introduction to Military History and Thought (1 credit) Note 4
- PSE103: Introduction to Human Psychology (1 credit)
- PSE301: Organizational Behaviour and Leadership (1 credit)
- PSE401: Military Professionalism and Ethics (1 credit)
- POE116: Introduction to International Relations (1 credit)
- POE205: Canadian Politics and Society (1 credit)
- MAE103: Precalculus Mathematics (1 credit) Note 5
- MAE106: Discrete Mathematics with Probability (1 credit)
- MAE113: Calculus for the Liberal Arts (1 credit)
- 1 Physics Course (1 credit)
- 1 Chemistry or Biology Course (1 credit)
- 1 Information Technology: (1 credit) Note 6

Plus one (1) of the following two courses: Arts Programmes Note 7

- ECE103: Introduction to Microeconomics (1 credit)
- ECE104: Introduction to Macroeconomics (1 credit)

Plus one (1) of the following four courses:

- POE102: Introduction to Political Science (1 credit)
- PSE105: Social Psychology (1 credit)
- ECE103: Introduction to Microeconomics (1 credit)
- ECE104: Introduction to Macroeconomics (1 credit)

Note 3
Military Strategic Studies and History students will take HIE202 instead of HIE203.

Note 4
Military Strategic Studies and History students will take HIE270 instead of HIE271.

Note 5
All Arts students will be required to take this course or pass a Challenge Exam.

Note 6
Students can choose from the following courses: "CSE101: Introduction to Algorithms and Computing", "CSE260: Introduction to Computer Concepts", or "BAE220: Introduction to Information Technology"

Note 7
Students enrolled in Business Administration or Economics must take both ECE103 and ECE104.

Science Degree Programmes

Science Programmes

Note: *Students in the Science will normally select a Major in their second year. With the approval of the Dean of Science, students who complete second year Engineering may be permitted to enter any third year Science programme. With the approval of the Dean of Engineering, students who complete second year of a Science programme may be permitted to enter third year engineering with some additional courses.*

Bachelor of Science (Honours)

A Bachelor of Science (Honours) degree will be awarded if the following conditions are completed:

- core courses for science programmes:
- **20 programme specific credits** *(including the common core courses for the science programmes, if the course meets the programme requirement)* :
- A senior project (2 credits);
- elective credits, as required, to meet the total programme credits *(normally 50% from science or engineering, subject to department approval)* .

Normally a student must obtain a 70% average in first year to be eligible for entry into an Honours programme in second year. A student with a 70% average in second year may be eligible to enter the Bachelor of Science (Honours) in the third year. A student with an average of 70% in second and third years combined may be eligible to enter the Bachelor of Science (Honours) in the fourth year. *(SLT marks are not to be included in calculating the average)* .

A student must normally maintain a 70% average in the subsequent years of the programme of study or may be required to withdraw from the Bachelor of Science (Honours) and continue in a Bachelor of Science. A student who has been required to withdraw from the Bachelor of Science (Honours) may apply to the Dean for reinstatement after two academic terms.

Bachelor of Science

A Bachelor of Science will be awarded upon successful completion of:

- core courses for science programmes;
- **16 programme specific credits** *(including the common core courses for the science programmes, if the course meets the programme requirement):*
- elective credits, as required, to meet the total programme credits *(normally 50% from science or engineering, subject to department approval)* .

Core Courses for Science Programmes

The following, is a list of courses required by all students enrolled in a Bachelor of Science (Honours) or Bachelor of Science offered by the Faculty of Science.

A total of 18 credits:

- ENE100: Introduction to Literary Studies and University Writing Skills (2 credits)
- PSE103: Introduction to Human Psychology (1 credit)
- PSE301: Organizational Behaviour and Leadership (1 credit)
- PSE401: Military Professionalism and Ethics (1 credit)
- CCE101: Introductory Chemistry (2 credits) Note 8
- CSE101: Introduction to Algorithms and Computing (1 credit)
- MAE101: Introductory Calculus (2 credits)
- MAE129: Introduction to Algebra (1 credit)
- HIE203: Introduction to Canadian Military History (1 credit)
- HIE207: Canada (1 credit)
- HIE271: Introduction to Military History and Thought (1 credit) Note 9
- PHE104: General Physics (2 credit)
- POE116: Introduction to International Relations (1 credit) Note 10
- POE205: Canadian Civics and Society (1 credit)

Note 8
With the permission of the Dean of Science, "CCE240: Molecular and Cellular Biology" can be taken in lieu of CCE101(2)

Note 9
This course is taken in the third year.

Note 10
This course is taken in the fourth year.

Interdisciplinary Minor in Life Sciences

The Faculty of Science sponsors an interdisciplinary Minor in Life Sciences available to any candidate with the necessary prerequisites. The required courses include:

- CCE240; CCE241; CCE242; CCE244;
- one of CCE385 or CCE460;
- one credit in a statistics course offered by either the Faculty of Science or Faculty of Arts

Engineering Degree Programmes

Bachelor of Engineering

The Faculty of Engineering is responsible for the education of future officers for professional careers in engineering in the Canadian Armed Forces. Of primary concern is the development of professional competence in areas applicable to the military and society at large. The curriculum is a mixture of domain-specific engineering courses rounded out by knowledge-broadening courses in the humanities.

RMC of Canada offers six engineering programmes: Chemical, Civil, Computer, Electrical, Aeronautical and Mechanical Engineering. All programmes are offered in both English and French. All Engineering programmes are based on a common first year with specialization commencing in the second year of study. The successful solution to any engineering problem will inevitably involve the interaction of several subject areas. To give emphasis to this fact, the fourth year programme includes a realistic engineering project for which students must define the problem as well as find an appropriate engineering solution. The RMC of Canada Calendar should be consulted for further details pertaining to the specific curriculum for each of these engineering programmes.

Engineering programmes are a primary focus of this university, with approximately 40% of our graduates being engineers. All RMC of Canada programmes are accredited by the Canadian Engineering Accreditation Board (Canadian Council of Professional Engineers). These programmes are highly regarded due to their practical application to military problems and the low student to professor ratio. These unique characteristics, along with a commitment for excellence in education, assure successful candidates of an Engineering degree with a difference.

In addition to these accredited engineering programmes, the Faculty of Engineering is also responsible for the Army Technical Staff Officer Program (ATSOP) and the Army Technical Warrant Officer (ATWO) programmes in the department of Applied Military Science. This commitment provides continuing technical education and responsiveness to the Canadian Forces training needs.

Core Courses for Engineering Programmes

The following, is a list of courses required by all students enrolled in a Bachelor of Engineering offered by the Faculty of Engineering.

A total of 22.5 credits:

- ENE100: Introduction to Literary Studies and University Writing Skills (2 credits)
- PSE103: Introduction to Human Psychology (1 credit)
- PSE301: Organizational Behaviour and Leadership (1 credit)
- PSE401: Military Professionalism and Ethics (1 credit)
- CCE101: Introductory Chemistry (2 credits)
- CSE101: Introduction to Algorithms and Computing (1 credit)
- MAE101: Introductory Calculus (2 credits)
- MAE119: Linear Algebra for Engineers (1 credit)
- MAE209: Probability and Statistics (1credit)
- MAE226: Multivariable and Vector Calculus (1credit)
- MAE227: Differential Equations and Infinite Series (1credit)
- HIE203: Introduction to Canadian Military History (1 credit)
- HIE207: Canada (1 credit)
- HIE271: Introduction to Military History and Thought (1 credit)
- HIE289: The Impact of Science and Technology on Society and the Environment (0.5 credit)
- PHE104: General Physics (2 credits)
- POE205: Canadian Civics and Society (1 credit)
- GEE167: Engineering Graphics I (1 credit)
- GEE293: Managing Engineering Projects (1credit)

General Degree Programmes

Bachelor of Arts (General)

The Bachelor of Arts (General) is not open to students enrolled in the ROTP programme.

The Faculty of Arts offers a thirty (30) credit Bachelor of Arts (General). Of the 30 credits, at least 20 must be in Arts, at least 10 of the 20 credits in Arts must be at the senior level, and at least 15 must be RMC of Canada credits. Electives may include credits earned as per the RMC of Canada Table of Credit Granted.

Interested students have the option of applying to a Bachelor of Arts (General) without a chosen Concentration, or to a Bachelor of Arts (General) with a Minor (8 credits) or with a Concentration (12 credits). In the latter case, at least 12 credits must be in the chosen discipline (Business Administration, History, Psychology, English, French, Political Science or Economics); of those, at least six must be at the senior level; as well, at least six of the 12 credits in the chosen concentration must be earned through RMC of Canada.

Common Core Curriculum - Bachelor of Arts (General)

The Bachelor of Arts (General) with a Concentration incorporates, in much the same manner as the BMASc, a compulsory core. Of the 30 credits required, the following 11 credits are mandatory:

All of:

- BAE268: Introduction to Defence Resource Management (1 credit)
- PSE401: Military Professionalism and Ethics (1 credit) *(PSE402: Leadership and Ethics is an acceptable alternative in this programme)*

One of:

- POE205: Canadian Civics and Society (1 credit)
- POE116: Introduction to International Relations (1 credit)

One of:

- HIE271: Introduction to Military History and Thought (1 credit)
- HIE275: Survey of Technology and Warfare (1 credit)
- HIE475: Technology, Society and Warfare (1 credit)

A minimum of one (1) credit in Military History:

- HIE208: Canadian Military History: A Study of War and Military History, 1867 to the Present, (or another course in Military History, such as HIE205: Canadian Military History: New France to 1870 or HIE203: Introduction to Canadian Military History) (1 credit)

A minimum of one (1) credit in Canadian History:

- HIE207: Canada (1 credit), (or another course in Canadian History, such as HIE102: Canada (2 credits)

A minimum of one (1) credit in Military Psychology and Leadership:

- PSE103: Introduction to Human Psychology (1 credit) or Equivalent

A minimum of two (2) credits each in:

- English Literature (2 credits)
- Mathematics, Computer Science, Chemistry or Physics (2 credits)

The Bachelor of Arts (General) without a Concentration includes the 11 core credits listed above plus one of the following courses for a total of 12 mandatory credits: ECE103: Introduction to Microeconomics or ECE104: Introduction to Macroeconomics

The Bachelor of Arts (General) without a Concentration is offered to students who are interested in Arts courses, but who initially have no particular interest in a specific field of study in Arts. The student who has chosen this programme will always have the option later in the course of his/her studies to register in the Bachelor of Arts (General) with a Concentration.

The Bachelor of Arts (General) with a Concentration is offered to students who already have an interest in a given field of study in Arts. The Concentrations in Arts have been designed by the departments in the Faculty of Arts in such a way as to make it easy for a student who has completed the programme with distinction to upgrade his/her degree to an Honours degree with a view to pursuing studies at the graduate level.

Note that course offerings, via distance learning, for the Bachelor of Arts (General) with a Minor or a Concentration are limited at this time and completion of such a degree may require attendance at RMC of Canada or the completion of some courses at other universities.

Bachelor of Science (General)

The Bachelor of Science (General) is not open to students enrolled in the ROTP programme.

The Faculty Science offers a thirty (30) credit Bachelor of Science (General) degree with a chosen Minor in Science (Chemistry, Physics, Mathematics or Computer Science), or without a Minor. Of the 30 credits, at least 20 must be in Science, and at least 10 must be earned through RMC of Canada.

Of the 20 credits in Science, 8 are either those of the basic First Year Science Core Requirement of RMC of Canada (listed below) or equivalent. Of the remaining 12 Science credits, the requirements of a Minor as defined by the relevant department or by the Faculty of Science must be met if the student has opted to register in the Bachelor of Science (General) with a Minor. The student who has opted for the Bachelor of Science (General) without a Minor may take any Science course that counts towards a Science degree, provided the prerequisites for the courses are met and the following credits are completed:

Common Core Curriculum - Bachelor of Science (General)

The Bachelor of Science (General) incorporates a compulsory core of courses. Of the 30 credits required, the following 16 credits are mandatory:

First Year Science Core (8 credits):

- MAE101: Introduction to Calculus (2 credits)
- MAE129: Introduction to Algebra (1 credit)
- CSE101: Introduction to Algorithms and Computing (1 credit)
- PHE104: General Physics (2 credits)
- CCE101: Engineering Chemistry (2 credits)

All of:

- BAE268: Introduction to Defence Resource Management (1 credit)
- PSE401: Military Professionalism and Ethics (1 credit) *(PSE402: Leadership and Ethics is an acceptable alternative in this programme)*

One of:

- HIE271: Introduction to Military History and Thought (1 credit)
- HIE275: Survey of Technology, Society and Warfare (1 credit)
- HIE475: Technology, Society, and Warfare (1 credit)

One of:

- POE205: Canadian Politics and Society (1 credit)
- POE116: Introduction to International Relations) (1 credit)

A minimum of one (1) credit in Military History:

- HIE208: Canadian Military History: A Study of War and Military History, 1867 to the Present, (or another course in Military History, such as HIE205: Canadian Military History: New France to 1870) (1 credit)

A minimum of one (1) credit in Military Psychology and Leadership:

- PSE103: Introduction to Human Psychology (1 credit)

A minimum of two (2) credits in:

English Grammar and Literature (2 credits)

The Bachelor of Science (General) without a Minor is offered to students who have a general interest in science courses, but who initially have no particular interest in a specific field of study in Science. The student who has chosen this programme will always have the option later in the course of his/her studies to register in the Bachelor of Science (General) with a Minor or in any other university programme requiring basic science courses.

The Bachelor of Science (General) with a Minor is offered to students who already have an interest in a given field of study in Science. The Minors in Science have been designed by the departments in the Faculty of Science in such a way as to make it possible for a student who has completed the programme with distinction to upgrade the degree to an Honours degree with a view to pursuing studies at the graduate level.

Business Administration and Economics Undergraduate Programmes

Introduction

The primary purpose of the Management and Economics Department is to provide the Officer Cadets of the Royal Military College of Canada with the best possible university-level education in two major fields of the social sciences: Business Administration and Economics. This education must benefit first and foremost the students themselves and, as a direct consequence, the professional development of the future officers of the Canadian Forces. The quality of this education must be such that upon the completion of the undergraduate degree the doors of every graduate school will be opened to the best of these students.

Business Administration

The study of business administration involves a number of functional areas including accounting, information systems, finance, marketing, operations management and human resource management. These functional areas are developed from a number of basic disciplines. For example, marketing relies on the disciplines of microeconomics, statistics and psychology: finance and operations management rely on mathematics and statistics and human resource management relies on psychology and sociology. The practice of business administration does not take place in a vacuum. Understanding the environmental context and its relationship with a functional area is essential to the development of effective decisions, policies and strategies.

The Business Administration Programme will have a threefold thrust. The programme will provide the student with a basic understanding of certain core disciplines such as quantitative methods, economics and psychology. It will also provide the student with a basic understanding of each of the functional areas such as finance, accounting, human resources and marketing. Finally, it will include courses, which require integration of the functional areas. The overarching goal is to provide the student with a broad, well-grounded education in business administration.

Economics

Economics is the social science that studies how individuals, firms, and governments make choices on allocating scarce resources to satisfy unlimited wants. Economics is everywhere: from students choosing how much time to allocate to studying versus going to the gym or going out, to governments choosing how to allocate resources to education, health care, or security, all these decisions involve a choice of one or more alternatives given limited resources, such as time and/or money.

There are two main branches of economics; Microeconomics and Macroeconomics. Microeconomics studies the behaviour of individual decision makers such as firms and households. It deals with determination of prices and quantities in individual markets and with the relationship among markets. In contrast, macroeconomics is concerned with the behaviour of the economy as a whole, in particular, with factors such as unemployment, national income, economic growth, inflation and price levels.

Business Administration Programme Requirements

Students from First Year Arts, with at least a D average, may take either the B.A. Honours or B.A. in Business Administration starting in Second Year. The courses required for both the B.A. Honours and B.A. programmes are detailed below.

All 300/400 level courses in business administration are limited to students enrolled in the following programmes:

- B.A. Honours Business Administration / B.A. Business Administration
- All Joint Programmes with Business Administration
- Minor in Business Administration
- Concentration in Business Administration
- Certificate in Management with Applications in Defence
- Bachelor of Military Arts and Science

or with permission of the department.

B.A. Honours Business Administration

A 42 credit programme, including the core courses for arts programmes.

Mandatory Courses

BAE202: Financial Accounting
BAE208: Management Accounting
BAE220: Introduction to Information Technology Note 1
BAE238: Introduction to Strategic Management
BAE242: Quantitative Methods I
BAE262: Business Analysis and Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management
BAE402: Advanced Strategic Management
ECE206: Macroeconomic Theory and Policy I
ECE224: Microeconomics I
6 Business Administration credits at the 300/400 level Note 2

Elective

2 credits

B.A. Business Administration

A 40 credit programme, including the core courses for arts programmes.

Mandatory Courses

BAE202: Financial Accounting
BAE208: Management Accounting
BAE220: Introduction to Information Technology Note 1
BAE238: Introduction to Strategic Management
BAE242: Quantitative Methods I
BAE262: Business Analysis and Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management
BAE402: Advanced Strategic Management
ECE224: Microeconomics I
5 Business Administration credits at the 300/400 level Note 2

Elective

2 credits

Note 1
CSE101 or CSE260 may replace BAE220, with approval from the Programme Chair

Note 2
Students meeting the requirement may take "BAE490: Thesis" in lieu of 2 credits at the 300/400 level in Business Administration.

Programme Outlines for Business Administration

The following is an outline, by year, of a typical programme of study for a B.A. Honours Business Administration or a B.A. Business Administration that would cover required courses. Actual programmes of study may vary.

B.A. Honours Business Administration

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note 3 PSE103 ECE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 POE116 ECE104	ENE210 MAE106 Note 3 BAE202 BAE238 BAE262 ECE206	ENE210 (**cont'd**) HIE203 BAE208 BAE220 BAE242 ECE224
Semester total	**5 credits**	**5 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	BAE300 BAE314 BAE326 BAE330 BAE344	PSE301 HIE271 2 science credits Note 4 **Optional** Note 5 1 credit	POE205 **Optional** Note 5 3 credits **Elective** 1 credit	PSE401 BAE402 **Optional** Note 5 2 credits **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.A. Business Administration

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note 3 PSE103 ECE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 POE116 ECE104	ENE210 MAE106 Note 3 BAE202 BAE238 BAE262	ENE210 (**cont'd**) HIE203 BAE208 BAE220 BAE242 ECE224
Semester total	**5 credits**	**5 credits**	**5 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	BAE300 BAE314 BAE326 BAE330 BAE344	PSE301 HIE271 2 science credits Note 4 **Optional** Note 5 1 credit	POE205 **Optional** Note 5 3 credits **Elective** 1 credit	PSE401 BAE402 **Optional** Note 5 1 credits **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**4 credits**

Note 3

MAE106 can be taken in Year 1 if a student is not required to take MAE103.

Note 4

A credit in Physics is required. A credit in Chemistry or Biology is required.

Note 5

Optional courses must be chosen from 300/400 level Business Administration.

Concentration in Business Administration

Note: The Concentration in Business Administration is not open to ROTP cadets

30 credits must be completed and a credit may fulfill several requirements at the same time, ex: a course could be in Arts (including Business Administration), at the senior level and taken through RMC of Canada. The programme includes a compulsory core. Of the 30 credits required 11 credits are mandatory.

30 credits must be completed, and of these:

- At least 15 must be earned through RMC of Canada, (including six in the chosen discipline)
- At least 10 must be at the senior level
- At least 20 must be in Arts, (of which at least 12 must be in Business Administration)
- At least 5 of the 12 Business Administration credits must be at the senior level
- At least 6 of the 12 Business Administration credits must be earned through RMC of Canada

Note: *A credit may fulfil several requirements at the same time, ex: a course could be in Arts (including Business Administration), at the senior level and taken through RMC of Canada. The BA Programme includes a compulsory core.*

Mandatory College Courses

- HIE208: Canadian Military History: A study in War and Military History, 1867 to Present *(or another course in Military History, such as HIE205)*
- HIE275: Technology, Society and Warfare
- MAE106: Discrete Mathematics with Probability
- MAE113: Calculus for the Liberal Arts
- POE205: Canadian Politics and Society *(or POE116: Introduction to International Relations)*
- PSE123: Fundamentals of Human Psychology
- PSE401: Military Professionalism and Ethics *(PSE402: Leadership and Ethics, is an acceptable alternative in this programme)*
- At least 2 credits in English Literature and Grammar
- At least 1 credit in Canadian History

Business Administration Requirements

Students who select the Concentration in Business Administration are required to take the following courses or their equivalent from a recognized university.

BAE202: Financial Accounting I
BAE208: Management Accounting
BAE220: Introduction to Information Technology
BAE238: Introduction to Strategic Management *(BAE438: Strategic Management, is an acceptable alternative in this programme)*
BAE242: Quantitative Methods I
BAE268: Introduction to Defence Resource Management
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management
ECE103: Introduction to Microeconomics
ECE104: Introduction to Macroeconomics

Electives

7 additional credits in Arts, Science or Technology are also required

Minor in Business Administration

Note: The Minor is open to students from all faculties.

Mandatory Courses

BAE202: Financial Accounting I
BAE238: Introduction to Strategic Management
BAE242: Quantitative Methods (or equivalent)

Optional Courses

5 of the following Business Administration courses:
BAE208: Management Accounting I
BAE220: Introduction to Information Technology
BAE262: Business Analysis and Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resource Management
BAE330: Organizational Theory
BAE344: Operations Management

Economics Programme Requirements

Students successfully completing their first year in Arts are eligible for entry into the programme leading to a B.A. Honours Economics or a B.A. Economics. The first year Economics courses are part of the core compulsory courses and will count toward the degree requirements noted below. In consultation with the Department Head, students will select courses each year which fulfil the degree requirements that are best suited to students' interests.

B.A. Honours Economics

A 40 credit programme, including the core courses for arts programmes, with a minimum of 20 credits in Economics.

Mandatory Courses

ECE103: Introduction to Microeconomics
ECE104: Introduction to Macroeconomics
ECE206: Macroeconomic Theory and Policy I
ECE224: Microeconomics I
ECE242: Introduction to Statistics
ECE256: Modelling in Economics
ECE308: Macroeconomic Theory and Policy II
ECE326: Microeconomics II
ECE342: Introduction to Econometrics
ECE424: The Economics of Defence **or** ECE428: Economics of National Security
ECE442: Applied Econometrics
ECE454: Topics in Microeconomic Analysis
ECE456: Topics in Macroeconomic Analysis
ECE492: Economics Seminar

Optional Courses

Minimum of 6 credits from the following
ECE300: Money; Financial Institutions and Markets
ECE312: The Development of Economic Ideas
ECE316: Canadian Economic History
ECE318: International Economic Problems
ECE320: Industrial Organization
ECE336: International Financial Management
ECE411: Public Finance
ECE417: International Economics
ECE444: Economics of the Environment
ECE448: Cost Benefit Analysis
ECE490: Directed Readings in Economics

Or any credits from the following, with the approval of the Programme Chair:
BAE300: Finance
BAE400: Advanced Finance
BAE436: Public Financial Management
POE332: Public Administration in Canada

Note: *Any other course approved by the Programme Chair.*

B.A. Economics

A 40 credit programme, including the core courses for arts programmes , with a minimum of 16 credits in Economics.

Mandatory Courses

ECE103: Introduction to Microeconomics
ECE104: Introduction to Macroeconomics
ECE206: Macroeconomic Theory and Policy I
ECE224: Microeconomics I
ECE242: Introduction to Statistics
ECE256: Modelling in Economics
ECE308: Macroeconomic Theory and Policy II **or** ECE326: Microeconomics II Note 8
ECE342: Introduction to Econometrics
ECE424: The Economics of Defence **or** ECE428: Economics of National Security Note 8
ECE454: Topics in Microeconomic Analysis **or** ECE456: Topics in Macroeconomic Analysis Note 8
ECE492: Economics Seminar

Optional Courses

Minimum of 5 credits from the following
ECE300: Money; Financial Institutions and Markets
ECE312: The Development of Economic Ideas
ECE316: Canadian Economic History
ECE318: International Economic Problems
ECE320: Industrial Organization
ECE336: International Financial Management
ECE411: Public Finance
ECE417: International Economics
ECE442: Applied Econometrics
ECE444: Economics of the Environment
ECE448: Cost Benefit Analysis
ECE490: Directed Readings in Economics

Or any credits from the following, with the approval of the Programme Chair:

BAE300: Finance
BAE400: Advanced Finance
BAE436: Public Financial Management
POE332: Public Administration in Canada

Note: *Any other course approved by the Programme Chair.*

Programme Outline for Economics

The following is an outline, by year, of a typical programme of study for a B.A. Honours Economics or a B.A. Economics that would cover required courses. Actual programmes of study may vary.

B.A. Honours Economics

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note 6 PSE103 ECE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 POE116 ECE104	ENE210 MAE106 Note 6 ECE206 ECE256 **Elective** 1 credit	ENE210 (**cont'd**) HIE203 ECE224 ECE242 **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 ECE342 1 science credit Note 7 **Optional** Note 9 2 credits	HIE271 ECE308 ECE326 1 science credit Note 7 **Optional** Note 9 1 credit	POE205 ECE442 ECE454 ECE456 **Optional** Note 9 2 credits	PSE401 ECE424 **or** ECE428 ECE492 **Optional** Note 9 1 credit **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.A. Economics

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note 6 PSE103 ECE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 POE116 ECE104	ENE210 MAE106 Note 6 ECE206 ECE256 **Elective** 1 credit	ENE210 (**cont'd**) HIE203 ECE224 ECE242 **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 ECE342 1 science credit Note 7 **Optional** Note 9 1 credit **Elective** 1 credit	HIE271 ECE308 **or** ECE326 Note 8 1 science credit Note 7 **Optional** Note 9 1 credit **Elective** 1 credit	POE205 ECE454 or ECE456 Note 8 ECE442 **Optional** Note 9 2 credit **Elective** 1 credit	PSE401 ECE424 **or** ECE428 Note 8 ECE492 **Optional** Note 9 1 credit **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Note 6
MAE106 can be taken in first year if a student is not required to take MAE103. (Note: If a student is not required to take MAE103, another elective shall be taken instead).

Note 7
The core science requirement is: 1 credit in Chemistry or Biology and 1 credit in Physics.

Note 8
Students enrolled in a B.A. Economics may take both; (ECE308 and ECE326), (ECE424 and ECE428), (ECE454 and ECE456). Students taking both courses will have one applied to the programme as a Mandatory course and the other as an Optional course.

Note 9
The B.A. Honours Economics requires a minimum of six credits and the B.A. Economics requires a minimum of five credits chosen from the following: ECE300, ECE312, ECE316, ECE318, ECE320, ECE336, ECE411, ECE417, ECE442, ECE444, ECE448, ECE490 **or** the following, with the approval of the Programme Chair: BAE300, BAE400, BAE436, POE332.

Minor in Economics

Note: All Arts students may take a Minor in Economics. The requirements for the Minor are 8 courses in the discipline. The First Year courses in Economics can count toward the Minor. Students choosing to Minor in Economics must maintain a minimum of a B- average in their three best courses of the Minor.

Mandatory Courses:

ECE103: Introduction to Microeconomics
ECE104: Introduction to Macroeconomics
ECE206: Macroeconomic Theory and Policy I
ECE224: Microeconomics I
ECE242: Introduction to Statistics
ECE308: Macroeconomic Theory and Policy II **or** ECE326: Microeconomics II
2 credits in Economics at the 300-400 level.

Business Administration and Economics Degree or Economics and Business Administration Degree

Students have the choice of a primary focus in Business Administration (Business Administration & Economics) or a primary focus in Economics (Economics & Business Administration). In addition, students have the choice between a B.A Honours (22 credits) and a B.A. (20 credits).

Business Administration and Economics or Economics and Business Administration Common Core (17 credits)

BAE202: Financial Accounting
BAE220: Introduction to Information Technology
BAE238: Introduction to Strategic Management
BAE262: Business Analysis & Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management
ECE206: Macroeconomic Theory and Policy I
ECE224: Microeconomics I
ECE256: Modelling in Economics
ECE308: Macroeconomics Theory and Policy II
ECE326: Microeconomics II
ECE454: Topics in Microeconomic Analysis
ECE456: Topics in Macroeconomic Analysis
ECE492: Economics Seminar

B.A. Honours Business Administration and Economics

BAE208: Managerial Accounting
BAE242: Quantitative Methods I
BAE402: Advanced Strategic Management
1 optional Business Administration credit at the 300/400 level.
1 optional Economics credit at the 300/400 level.

B.A. Business Administration and Economics

BAE208: Managerial Accounting
BAE242: Quantitative Methods I
BAE402: Advanced Strategic Management

B.A. Honours Economics and Business Administration

ECE242: Introduction to Statistics
ECE342: Introduction to Econometrics
2 optional Economics credits at the 300/400 level.
1 optional Business Administration credit at the 300/400 level.

B.A. Economics and Business Administration

ECE242: Introduction to Statistics
ECE342: Introduction to Econometrics
1 optional Economics credit at the 300/400 level.

Joint Business Administration and Psychology Degree

The B.A. Honours Business Administration and Psychology is 42 credits, including the core courses for arts programmes Note 10

The B.A. Business Administration and Psychology is 40 credits, including the core courses for arts programmes Note 10

Business Administration Requirements

BAE202: Financial Accounting
BAE208: Management Accounting
BAE220: Information Technology Note 11
BAE238: Introduction to Strategic Management
BAE242: Quantitative Methods I
BAE262: Business Analysis and Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management
BAE402: Advanced Strategic Management
1 Business Administration credits at the 300/400 level Note 12

Psychology Requirements

PSE211: Research Methodology in Psychology
PSE236: Cognition and Learning
PSE240: Personality
PSE312: Applied Military Psychology
PSE346: Persuasion and Influence **or** PSE328: Group Dynamics
PSE370: Recruitment and Selection
PSE430: Stress **or** PSE450: Advanced Social Psychology
PSE454: Advanced Leadership
1 Psychology credit at the 300/400 level Note 12

Note 10
Within the Common Arts Core ECE103 and PSE105 will be preferred

Note 11
BAE220 counts as the Information Technology credit required in the core courses for arts programmes.

Note 12
Only required for the B.A. Honours Business Administration & Psychology.

Certificate in Management with Applications to Defence

Note: This certificate is intended to allow individuals to gain a basic understanding of the defence management field.

The topics cover the basics of management theory across multiple disciplines. In addition, the Certificate can be applied to the General BA and BMASc degrees. The equivalent of 10 one-credit courses is required for completion of the Certificate.

Core courses or their equivalent (10 credits):

BAE202: Financial Accounting
BAE208: Managerial Accounting
BAE220: Introduction to Information Technology
BAE238: Introduction to Strategic Management
BAE242: Quantitative Methods I
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management

Business Administration and Economics Courses

Courses 100-199

BAE101 Introduction to Defence Management and Decision Making

Providing a broad introduction to management - including its principles and practices - in a Defence setting, this course identifies the mechanisms affecting the management of military and civilian personnel at the institutional level (i.e., within both the CAF and DND at large), and covers topics in organization, roles and responsibilities, resources and capabilities, operational activities, and business planning. The course also provides an overview about the role of the individual manager and the associated principal tasks of planning, organizing, leading, decision-making, and controlling in a variety of dynamic circumstances.

Note(s): Only offered through Distance Education .
Exclusion(s): BAE268
Contact Hours: 0 - 0 - 9
Credit(s): 1

ECE103 Introduction to Microeconomics

This course is designed as an introduction to the fundamental building blocks of microeconomic analysis. Choices made by consumers and producers are shown to give rise to demand and supply. The role of the price system providing information and incentives is discussed. Various topics, particularly price controls and taxation, are used to motivate the analysis of demand and supply as well as the need to measure changes in demand and supply. This course will enable students to develop their own thinking on contemporary microeconomic problems in addition to offering them the necessary tools to understand the economic phenomena that characterize everyday life.

Note(s): Also offered through Distance Education . Core Course for students of the First Year taking Arts.
Exclusion(s): ECE102
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

ECE104 Introduction to Macroeconomics

This course provides an introduction to the fundamentals of macroeconomic analysis. Key macroeconomic variables such as GDP, unemployment, inflation, interest rates and trade flows are discussed in detail, and models of aggregate expenditure and aggregate demand and supply are used to analyze fluctuations and growth trends in economic activity. The course also provides an in-depth exploration of the effects of fiscal policy and monetary policy on economic aggregates.

Note(s): Also offered through Distance Education . Core Course for students of the First Year taking Arts.
Exclusion(s): ECE102
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

Courses 200-299

BAE202 Financial Accounting I

This course provides an introduction to the principles, practice and process of financial accounting. The student is introduced to the theory and mechanics of financial accounting with an emphasis on the presentation and development of accounting as an information system. Major topic areas include accounting theory, the processing of accounting data, accounting for assets, liabilities, owner's equity and the preparation and interpretation of financial statements.

Note(s): Also offered through Distance Education .
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

BAE208 Managerial Accounting

This course introduces students to the fundamentals of management accounting within the organization. The early part of the course examines basic terms, concepts and systems of management accounting before moving on to more specific topics such as activity based costing, budgeting, variance analysis, and cost allocation. The course emphasizes the use of accounting information for planning and control within the organization and the appropriate use of accounting information for other types of decision-making such as pricing and product profitability decisions. The role of management accounting in systems supporting quality programmes and just in time delivery is considered. Other types of decision-making using accounting information such as capital budgeting and transfer pricing are examined as time permits. Consideration will be given to the behavioural and motivational impact of various management accounting systems.

Note(s): Also offered through Distance Education .
Prerequisite(s): BAE202, or equivalent.
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

BAE220 Introduction to Information Technology

This course is intended for students who will use Information Technology (IT) in the workplace. It is not intended for computer or systems professionals. The course will provide students with an introduction to the fundamentals of IT and its applications in an organizational setting. Students will be expected to have basic computer skills such as the ability to use a modern integrated office software package. Students who lack these skills will be required to take part in a skills lab. Topics include: Computer Hardware, Computer Software, Networking, Data Management, Uses of IT in Organizations, Development of Information Systems, Ethics and Information Technology.

Note(s): Also offered through Distance Education . For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

BAE238 Introduction to Strategic Management

The course focuses on introducing the principals of general management of the business organizations. Definitions, frameworks and conceptual models are presented to provide basic principles for strategy formulation, implementation, execution, leadership and control. Topics include, but are not limited to, competitive forces and value chain analysis, strategic intent, core competencies, corporate social responsibility, strategic and organizational performance, internal and external analysis, and management of change. Particular attention is given to strategic management in the military context of defence and security.

Note(s): Also offered through Distance Education .
Exclusion(s): BAE438
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

BAE242 Quantitative Methods I

This course introduces students to the application of probabilistic and statistical techniques to business problems. Major topics include probability theory, estimation, confidence intervals and inference, all in the context of business problems.

Note(s): Also offered through Distance Education .
Exclusion(s): ECE242 and PSE213
Semester: May be offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

BAE262 Business Analysis and Reporting

This course is an introduction to business problem solving and communication. Qualitative and quantitative approaches to business research, decision making and problem solving are reviewed and the limitations to each approach considered. Reading and case study analysis are used to develop critical thinking. Written and oral presentation of ideas is emphasized.

Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1 - 6
Credit(s): 1

BAE268 Introduction to Defence Resource Management

This course provides a broad introduction to defence resource management, including its principles and practices. This course identifies the mechanisms affecting the management of military and civilian personnel at the institutional level, and covers topics in organization, roles and responsibilities, resources and capabilities, operational activities, and business planning. The course integrates analytical concepts, principles, methods, and techniques drawn from the disciplines of management and economics, and applies them to decisions involving the allocation of financial, logistic and human resources.

Note(s): Only offered through Distance Education .
Exclusion(s): BAE101
Semester: Usually offered in the Winter Term
Contact Hours: 0 - 0 - 6
Credit(s): 1

ECE206 Macroeconomic Theory and Policy I

This is an intermediate course in macroeconomics with a focus on constructing and understanding macroeconomic models. The topics covered include long-run economic growth and short-run business cycle fluctuations, as well as fiscal and monetary policy. The questions of concern will include why are some countries rich and others hopelessly poor. What are the sources of economics booms and recessions? Why is there unemployment? What are the sources of inflation? And, how do government policies affect output, inflation and unemployment?

Prerequisite(s): ECE103 and ECE104
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE224 Microeconomics I

This is an intermediate course in microeconomic theory. The first half of the course focuses on consumer choice theory, with an examination of utility maximizations problems, derivation of consumer demand functions and analysis of the effects of price and income changes.

Prerequisite(s): ECE103
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE242 Introduction to Statistics

This is an introductory course in statistics designed for students in Economics and Business Administration. Topics include statistical inference, probability, statistical testing and confidence intervals as well as sampling and sampling distribution. Problem solving is emphasized using hypothesis testing and confidence intervals on means, proportions and differences. Estimation of sample statistics is also analyzed.

Prerequisite(s): MAE113
Exclusions(s): BAE242 and PSE213
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE256 Modelling in Economics

This course introduces students to models used in economics and other quantitative courses. Analyses of consumer and producer optima, as well as market equilibrium under different market forms are introduced. Comparative statics and dynamics as well as empirical testing methodologies used in microeconomic and macroeconomic problems are studied. Further applications of these models can be found in such diverse applied fields such as public finance, environmental economics, monetary economics, finance, international economics, industrial organization, defence and security economics, and cost-benefit analysis. This introductory course helps students understand models used in teaching both economics and management courses.

Prerequisite(s): MAE113
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 300-399

BAE300 Finance

This course introduces the students to principles of financial decision-making. Topics include the theory of present value and interest, risk, capital markets, and valuation, and decision-making within the firm including the financing decision, and capital budgeting. The emphasis is on the application of the principles to solve business, military and administrative problems.

Prerequisite(s): BAE202 and BAE242.
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE302 Financial Accounting II

This course provides a continued examination of the principles, practice and process of financial accounting. The students continue their introduction to the theory and mechanics of financial accounting with an emphasis on the presentation and development of accounting as an information system. Major topic areas include accounting theory, the processing of accounting data, accounting for assets, liabilities, owner's equity and the preparation and interpretation of financial statements. Time permitting; the accounts of the federal government will also be introduced.

Prerequisite(s): BAE202
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE310 Audit

This course aims to provide students with a foundational understanding of contemporary auditing concepts, techniques, and other assurance services. Students will also learn about the evaluation of internal audit, management audit, and "value-for-money" audit procedures used in the public sector.

Prerequisite(s): BAE202 and BAE208
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE314 Marketing Fundamentals

This course provides an introduction to the fundamentals of Marketing within a business organization. The course will begin with an examination of consumer and business-to-business markets, before moving on to the major components of competitive marketing strategy, namely product/service development, pricing, distribution and promotion. The course will provide a foundation for future work in this area. No prerequisites are required although knowledge of differential calculus or microeconomics is helpful.

Note(s) : Also offered through Distance Education
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

BAE326 Human Resources Management

The basic purpose of every human resource system is to acquire, develop and maintain the right kinds and numbers of people necessary to achieve organizational objectives. Taking a general systems approach this course examines the major human resource management (HRM) functions and their impact on organizational effectiveness. Representative topics include demographics and personnel supply; human rights legislation and employment equity; human resource planning; recruiting and selection; training and development; and compensation and benefits.

Note(s) : Also offered through Distance Education
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

BAE330 Organizational Theory

This course examines organizational theories, structures and processes. Organizational theories to be examined include classical management theory, contingency theory, open systems theories, theories based on technological imperatives and theories of bureaucracy. Emphasis will be placed on issues relating to process including organizational change, politics, power and control in organizations, organizational legitimacy and organizational design.

Note(s): Also offered through Distance Education
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

BAE336 International Financial Management

This course focuses on international financial management and international economics. The objective of the course is to develop the student's ability to understand and analyze the major problems of economics and financial decisions in an international context. Specifically, the course covers the following aspects: Foreign exchange markets, exchange rate determination, international money and capital markets, currency futures, options, and swaps, corporate exposure management, Managing Foreign Exchange Risk in the Department of National Defence, international capital budgeting and investing.

Prerequisite(s): ECE206, ECE242 or BAE242
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE342 Quantitative Methods II

This course continues the study of the disciplines of operations research and management science and their application to business, military and administrative problems. Topics include linear programming, integer programming, networks and computer simulation. As is the case in the prerequisite course, emphasis is on application and each topic is introduced and motivated by a specific management issue or problem.

Prerequisite(s): BAE242
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE344 Operations Management

This course presents a qualitative overview and introduces quantitative methods used in planning and managing operations in the service and production sector of the economy. Topics include: design, process selection, capacity planning, project control, quality control, response to customer, cost/benefit analysis, facility layout, inventory and, supply chain management.

Note(s) : Also offered through Distance Education
Prerequisite(s): BAE242
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

ECE300 Money, Financial Institutions and Markets

This is an undergraduate focusing on the study of financial markets and institutions, including in particular the study of money and banking. This course examines money supply determinants, Canadian financial markets (the money market, the stock market, bond markets and the foreign exchange market) and the operations of financial institutions that participate in these markets. The primary objective of the course is to help students obtain a better understanding of the role of the central bank, the instruments of monetary policy and the mechanism of transmission and how monetary policy can stabilize short term economic fluctuations.

Prerequisite(s): (ECE103 and ECE104) or (ECE104 and ECE206) or with the permission of the Department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE308 Macroeconomic Analysis: Theory and Policy II

This course presents an in-depth analysis of various elements of macroeconomic theory. Topics covered include aggregate consumption and investment behaviour, labour markets, inflation and price and wage rigidities. The New Keynesian and New Classical Real Business Cycle models are examined and policy implications are studied. The course will also focus on open economy issues surrounding capital flows, exchange rate movements and trade.

Prerequisite(s): ECE206
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE312 The Development of Economic Ideas

This course is intended to broaden the view of students who have studied intermediate theory. The ideas of Smith and Ricardo and the Marginalist School will start the course. Potential topics include Marxian economics, institutional economics and social planning.

Prerequisite(s): ECE206 and ECE224 or with the permission of the Department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE320 Industrial Organization

Industrial Organization examines imperfectly competitive markets, their structure and the behaviour of firms in these markets. Topics covered include monopoly, oligopoly and monopolistic competition, price and quantity discrimination, product differentiation, strategic entry, industry concentration and the firm's boundary, horizontal and vertical integration problems, research and development, advertising, regulation and anti-trust economics.

Prerequisite(s): ECE224
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE326 Microeconomics II

This course extends the microeconomic analysis introduced in ECE224. The first part of the course covers the imperfectly competitive markets, i.e. monopoly, oligopoly and monopolistic competition, and the related topics in price discrimination and strategic entry. The second part includes the analysis of factor markets. The third part covers externalities, public goods and club goods. The fourth and final part covers the economics of information, starting with decision-making under uncertainty and then analyzing adverse selection and moral hazard problems.

Prerequisite(s): ECE224
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE330 Labour Economics

This course provides an analysis of various aspects connected to the operation of labour markets, including labour demand and supply determinants, the economics of human capital, wage determination, unemployment and the economics of unions.

Prerequisite(s): ECE206 and ECE224
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE336 International Financial Management

This course focuses on international financial management and international economics. The objective of the course is to develop the student's ability to understand and analyze the major problems of economics and financial decisions in an international context. Specifically, the course covers the following aspects: Foreign exchange markets, exchange rate determination, international money and capital markets, currency futures, options, and swaps, corporate exposure management, Managing Foreign Exchange Risk in the Department of National Defence, international capital budgeting and investing.

Prerequisite(s): ECE206 and (ECE242 or BAE242)
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE342 Introduction to Econometrics

This course follows ECE242. The course is an introduction to econometrics and statistical methods testing the validity of the economic theories. Statistical analysis focuses on simple regression methods as well as autocorrelation, Hetroscedasticity, Multicollenearity and other problems. Econometric software will be introduced for the collection of data as well as data analysis. Students will be given the opportunity to conduct a small project which will include model specification, data collection, examination, display, and model analysis.

Prerequisite(s): ECE242 or BAE242
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

BAE400 Advanced Finance

This course provides a framework for formulating and considering financial decisions that affect the long term performance and value of an enterprise. The course further develops areas of finance covered in the introductory finance course and introduces and develops new topics essential to advanced study in finance. The course covers such topics as raising capital, capital budgeting , interaction of financing and investment decisions, options in corporate finance, capital structure choices, distribution policy, and corporate governance. Cases are used to promote discussion of the application of financial principles to realistic business scenarios.

Prerequisite(s): BAE300
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE402 Advanced Strategic Management

Based on learning from "BAE238: Introduction to Strategic Management" this course is intended to pull together material from the various Business Administration courses and illustrates the complex overlap that exists between areas in applied situations. In the examination of corporate strategy the focus will be on the application of theories, concepts and analytical techniques developed in other courses, to a variety of case problems and situations. The students will also be required to work on a major management project involving the development of a comprehensive business plan, its implementation and control.

Prerequisite(s): BAE202, BAE208, BAE220, BAE238, BAE242, BAE262, BAE300, BAE314, BAE326, BAE330, BAE344
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE406 Management of Technology

The aim of this course is to help students develop a strong conceptual foundation for managing technology. It introduces concepts and frameworks for analyzing how organizations can create, develop, commercialize, diffuse and capture value from high technology-based products and services. It studies how organizations manage the technological change process (marketing, R&D, engineering, and manufacturing) in new organizational forms. Topics covered include: 1) technological change and how it affects competition between new and existing organizations, 2) strategies for organizations competing in high-technology industries, 3) management of innovation within a corporation, 4) management of innovation across organization boundaries (strategic alliances, entrepreneurship, venture capital), 5) technology commercialization, and 6) protection of an invention that might someday be commercialized.

Prerequisite(s): BAE220
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE408 Management Control Systems

Management control focuses on the process of assuring that the resources of the organization are used effectively and efficiently in the accomplishment of its objectives. This course deals with the design and implementation of accounting and non-accounting related controls from a managerial perspective. Using case analysis, the course focuses on the broad aspects of management control.

Prerequisite(s): BAE208
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE410 Information Systems

The objectives of this course are to provide a solid managerial perspective in the concepts essential to: 1) analyse and understand the capabilities and limitations of information technology so one can be an effective user of computers; 2) analyse, design, develop, implement and use MIS in organizations. Subjects covered include: role of information technology in organizations; strategic role of information systems in organizations; concepts, tools and techniques for systems development; managing information systems implementation; managing information system resources, Decision Support Systems; and managing International Information Systems.

Prerequisite(s): BAE220
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE412 e-Business

E-Business has become a key enabler for business transformation through the use of Electronic Service Delivery (ESD) in both the public and private sectors. This course covers the essential elements necessary for planning and implementing successful ESD initiatives and strategies. It examines what has fundamentally changed for business and government with the advent of the World Wide Web (WWW) technologies on the Internet and looks at their impact on marketing, emergence of new business models, and the nature of business transactions with customers and between business entities. The course also provides an introduction to the technical dimension of planning and building ESD infrastructure such as security, electronic payment systems and supply chain integration. A balanced approach is taken in addressing issues from both the private sector and government ESD planner's perspectives.

Prerequisite(s): BAE220
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE416 Quantitative Analysis

This course will examine both advanced deterministic and probabilistic methods of decision analysis and problem solving in management and economics areas. The course will be targeted at several methods of mixed integer and integer programming, decision and risk analysis, multi-criteria decision problems, simulation, forecasting, calculus of variations and optimal control, Markov Chains and Dynamic Programming. That is, both descriptive and prescriptive methods will be used and where possible, examples from the civilian world, DND or the CAF will be used to motivate the discussion, formulate problems and come to solutions.

Prerequisite(s): (BAE242 or ECE242) and BAE342
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE418 Intermediate Marketing

This course builds on the marketing basics by showing how marketing strategy is directly influenced by a firm's competitiveness and other macro-environmental factors. In addition, this course emphasizes the importance of customer orientation and strategic market planning, as well as introduces the subject of global marketing. The course will examine how all the elements of the marketing mix can be utilized to best achieve the firm's goals as well as the selection of target markets. The course will also examine how to respond to changes in the firm's environment.

Prerequisite(s): BAE314
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE420 Business Law

A basic introduction to the Canadian legal system with a focus on the areas of law of particular relevance to business. The course will briefly discuss the court system and civil procedure. Greater emphasis will be placed on the law of tort and contract.

Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE422 Business Ethics

This course provides students with the opportunity to examine and analyze ethical issues arising in contemporary business life. Ethical concerns and dilemmas within all the functional areas of business are considered. The course considers structural issues such as the nature of capitalism and the structure of the corporation before examining the responsibilities of a business enterprise to those people who work within it, and to consumers and society at large. Topics include: the capitalist system, the corporation, responsibilities toward employees, employee responsibilities toward their organization, obligations toward consumers, businesses and the environment, and honesty and integrity in business.

Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE426 Labour Relations

This course examines the basic issues in labour relations such as union certification and negotiation and administration of collective agreements. Other selected topics in labour relations and employee relations will also be covered.

Prerequisite(s): BAE326
Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE434 Managerial Challenges in Organizational Behaviour

This course aims to give students the opportunity to apply the knowledge they have acquired in introductory courses in Organizational Behaviour and Organizational Theory. The course focuses on analyzing managerial challenges through case studies, introspection, and active learning techniques. Contemporary management challenges guide the selection of topics included in the course.

Prerequisite(s): BAE330 and PSE301
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE436 Public Financial Management

This course aims at developing student capabilities in the analysis of financial operations and the management of the public sector at all level of governments. The course covers the principles of finance, economics, accounting and fiscal administration that are relevant to the understanding of financial functions and financial management in the public sector.

Prerequisite(s): BAE202, BAE300 and ECE224
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE438 Strategic Management

The course focuses on the overall general management of the business organizations. Definitions, Frameworks and conceptual models are presented to provide basic principles for strategy formulation, implementation, execution and control. Topics include competitive forces and value chain analysis, strategic intent, core competencies, intellectual resources, strategic and organizational design fit, networks, alliances and partnerships, and management of change. Short case studies related to a variety of organizations types of differing sectors (public and private) and size are used to help students analyze business environment and conditions and provide an enhanced understanding of strategic management approach for the organization. Particular attention is given to strategic management in the military context of defence (DND organizations).

Prerequisite(s): BAE202; BAE208; BAE220; BAE300; BAE314; BAE326; BAE344; and BAE330
Exclusion(s): BAE238
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE440 International Management

This course will focus upon the opportunities and threats with which a firm must contend to become globally competitive and to be able to effectively operate within an international setting. A particular emphasis will be placed on multinational corporations, that is, companies that have significant interests across nations. Course topics include consideration of: the international macro-environment, including its economic, political, legal, technological and social elements; the role of culture, including the challenges faced when managing, motivating and leading persons across a variety of cultures; and international strategic management, including strategic planning, organizing international operations and decision-making in an international context.

Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE442 Project Management

This course examines approaches to the management of major projects within and between organizations. Topics covered include, but are not limited to, requirement definition, project selection, organization, planning, scheduling, budgeting control and termination. Skills necessary for successful project management such as the ability to negotiate and the ability to identify and manage risk are also considered.

Prerequisite(s): BAE242
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE444 Supply Chain Management

Supply-chain management (SCM) is a system that helps manage the entire flow of information, materials, services and financials from raw materials suppliers through factories and warehouses, retailers to the end-customer (end-user). SCM stresses particularly processes and integration. Globalization and the rapid development of electronic business have heightened the strategic importance of supply chain management. The course develops a solid grounding, and includes strategies for customer service, inventory management, integrated processes and virtual integration, information sharing and the management of the bullwhip effect phenomena, matching supply and demand and managing uncertainties, business logistics outsourcing, supply chain network design and postponement, managing partnerships and how to create value through global networks.

Prerequisite(s): BAE344
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE446 Operations Planning

This course will examine advanced techniques and the thought processes with respect to Operations Management. The course will examine Reliability and Maintainability, Learning Curves, Aggregate Operations Planning, one off Operations Planning, advanced Inventory Control, Job and Staff Scheduling, Process Control and Project Management. Where possible, the course will examine these issues for both profit oriented firms as well as not for profit organizations such as DND.

Prerequisite(s): BAE344
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE448 Selected Readings in Management

This course allows students to explore an area of management that they are particularly interested in. This course can only be undertaken if a faculty member agrees to participate. Instructor participation will include providing/approving course readings, meeting with the student periodically to discuss these readings, developing a set of deliverables and providing appropriate assessment.

Note(s): Permission of head and support of sponsoring faculty member required
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE450 Advanced Topics in Management

This course examines topics from a number of management areas. The course will provide the student who has completed the more basic courses with exposure to more complex issues in areas such as accounting, marketing, production, quantitative methods and human resources management. In addition, the course examines areas of management the student has not previously been exposed to such as international business and logistics. Coverage of topics will be on a selective basis.

Semester: Usually Offered in the Fall & Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE452 Business Policy

This course is intended to pull together material from the various Business Administration courses and illustrates the complex overlap that exists between areas in applied situations. In the examination of corporate strategy the focus will be on the application of theories, concepts and analytical techniques developed in other courses, to a variety of case problems and situations. The course examines how the internal resources of the firm, the organization of the firm and the environment of the firm, all influence the strategic choices that the firm makes. Over the two terms of the course students will also be required to work on a major project involving the development of a comprehensive business plan, for presentation to faculty and invited guests.

Prerequisite(s): BAE202, BAE208, BAE220, BAE242, BAE314, BAE326, BAE344
Contact Hours: 3 - 0 - 6
Credit(s): 2

BAE454 Seminar in Entrepreneurship

This advanced seminar course is designed for business students who wish to learn about entrepreneurship and its role in bringing new business models, new products and services into the market. The course surveys the entrepreneurial process, including starting, operating and ending an entrepreneurial venture. Topics include entrepreneurship, new venture creation, business planning, entrepreneurial economics, financial projections, capitalization and debt, legal and taxation issues, franchising, marketing, technology, leadership in an entrepreneurial enterprise, and business expansion. Upon completion, students should understand a wide range of entrepreneurship concepts, and gain sufficient knowledge in the course to initiate their own business venture.

Prerequisite(s): BAE208, BAE314, BAE300, BAE330
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE460 Consumer Behaviour

Consumer behaviour is about how people select, purchase, use or dispose of goods, services, ideas or experiences to satisfy their needs and wants. The study of consumer behaviour is rooted in market research and how it informs marketers on how to reach and influence consumers. The course begins with the study of individual processes that influence consumers, such as perception, learning, motivation and personality. Next, decision-making theories and practices are studied and analyzed. This is followed by in-depth discussions and analyses about group and cultural influences. Specific modules on service marketing and consumer behaviour research are included. The course challenges students to apply different conceptual lenses and adopt a rigorous critical stance by considering various perspectives to consumer behaviour theory and application.

Prerequisite(s): BAE314
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE462 Brand Strategy

In this course, students will be exposed to different brand concepts and principles underlying the creation and development of the brand over time. We will address issues of recovery, repositioning, brand extension, architectural scenario and the orchestration of brands in the portfolio. Through several examples, the course will also address the identity and culture of brand concept of internal and external branding. The student will become familiar with the assessment of the value of trademark through a review of the strengths and weaknesses of the various measurement models used in industry and in the literature. In the context of globalization this course also aims to present the different branding strategies: global brands, "global" and local. The student will learn to identify the factors that favour the emergence of global brands.

Prerequisite(s): BAE314
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE464 Management of Organizational Change

The effective management of change is a constant challenge for today's organizations. These organizations, both in the private and public sectors, face complex competitive, regulatory, technological, and cultural environments that demand adaptation. The process of managing change is complex and dynamic affecting all aspects of organizational life. Change can impact organizational goals, strategy, structure, processes, and culture. Organizational participants can find change impacts motivational and reward systems, career opportunities and in some cases their basic relationship with the organization. Organizational power and politics cloud and encumber the change process and the way participants understand the process. This course examines conceptual frameworks for leading and managing change and recognizing and dealing with the issues that arise in achieving effective change.

Prerequisite(s): BAE330
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE466 Management of Health and Safety at Work

The high costs of work accidents and occupational health problems constitute a major concern for managers. In addition to the contributions made to regulatory bodies for compensation, workplace accidents generate many hidden costs for organisations, such as material losses and reduced production levels, among others. Employers are generally concerned with any level of accidents and work-related illnesses that result in significant work interruptions and slowdowns, and which often curtails the availability of personnel often indispensable to the effective functioning of the organisation. Thus, workplace health and accident prevention have become priorities for organisations. This course aims to familiarise the student with the effective management of workplace health and safety. It will introduce students to fundamental concepts and issues in workplace health and safety, to work-related dangers and risks, and will focus on an integrated approach to managing workplace health and safety.

Prerequisite(s): BAE326
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE468 Training and Development

This course examines the theory and practice of the training and development function of human resources management in work organizations. Students will learn how to assess needs, set learning objectives, design learning activities, and evaluate program effectiveness through hands-on experience. Related topics include: learning theory, budgeting, alternatives to training, staffing and societal issues, and training. Specific attention will be paid to training and professional development in the CAF because of the unique needs of the military related to their requirement to develop all of their senior personnel internally.

Prerequisite(s): BAE326
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

BAE490 Thesis

This two-term course is available only to students of Business Administration who have an average of at least A- in 3rd year Business Administration courses. Students who take the course may substitute it in place of *(BAE440 and BAE450)* two business electives. Before enrolling in the course a student must obtain the approval of a professor in the Department of Business Administration who will supervise the thesis. The topic of the thesis will be mutually agreed upon by the student and the professor and should be in one of the areas covered in one or more of the Business Administration core courses. The thesis topic should not be directly related to the major project of the course BAE438: Strategic Management .

Prerequisite(s): Permission from the Head of the Department.
Contact Hours: 3 - 0 - 6
Credit(s): 2

ECE411 Public Finance

This course examines the role of the state in the allocation of resources in a mixed economy. First, market failures such as public goods, externalities and optimal income distribution are analyzed as motivating state intervention. Second, taxation issues are examined, from efficiency and equity of taxation to particular forms such as income, consumption, corporate, wealth and property, and lump-sum taxes. Third, cost-benefit analysis is introduced and state expenditures are analyzed, from transfers to programs such as education, health care, security and infrastructure. Finaloy, fiscal federalism is analyzed.

Prerequisite(s): ECE224
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE417 International Economics

The first part of this course emphasizes International Trade. Topics studied include the classical theory of international trade, the theory and practice of tariffs and non-tariff barriers to trade, the theory and practice of economic integration, and the effect of trade on economic growth and vice versa. The second part of this course deals with International Finance. Topics studied include the balance of payments, foreign exchange markets, macroeconomic policy in an open economy, and the international monetary system.

Prerequisite(s): ECE206 or ECE224
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE424 Economics of Defence

This course in security covers the economics of the defense force. First, as part of the defensive demand process, public choice analysis and alliance issues are introduced in order to understand budget-making. Then, for a detailed understanding of demand, defense force components such as traditional services and expeditionary or tasks forces and the optimal composition of force units in terms of personnel versus equipment are examined. Finally, the supply side analysis includes procurement with all five phases (research and development, acquisition, production and service contracts, and disposal), defense industrial base, personnel (recruitment and retention) and leadership.

Prerequisite(s): ECE206 and ECE224 or with the permission of the Department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE428 Economics of National Security

This course covers the economics of non-defence force security issues. The economic analysis of national security clarifies the resources allocated towards state policies and agencies for national security. First, general demand for security is developed from first principles of security as complement to all goods and services, and additionally motivated by risk-aversion. Then, specific demands considered include domestic security needs such as policing, immigration, drug enforcement, public health protection, anti-terrorist readiness and an understanding of terrorism whereas regional and global security issues include peace support operations, resource security and epidemics. Finally, the supply side analysis includes intelligence and enforcement provision such as public health agencies, police forces, border and immigration services, cyberspace and infrastructure protection and legislative action.

Prerequisite(s): ECE206 or ECE224
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE442 Applied Econometrics

This course provides a review of basic econometric methods with an emphasis on application to real world problems. Additional econometric techniques will also be introduced, such as instrumental variable regression, estimation with binary data and panel data estimation.

Prerequisite(s): ECE342
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE444 Economics of the Environment

Operational decisions, whether by the private sector or the public sector, are increasingly becoming dependent upon the satisfaction of a number of environmental concerns. This course is an introduction to the major elements of environmental analysis and policy instruments used by the public sector. Topics include the notions of dynamic efficiency and sustainability, property rights and externalities, environmental legislation, measures of costs and benefits, and pollution controls.

Prerequisite(s): ECE103 and ECE104
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE448 Cost-Benefit Analysis

Two central issues in any cost-benefit problem are the appropriate measures of costs and benefits to use, and the identification of all costs and benefits. This course discusses a number of theoretical issues in cost benefit analysis including risk and the appropriate discount rate. The specificity of each cost benefit study as well as the general principles of analysis are reinforced by studying numerous examples of cost benefit analysis. Cost effectiveness analysis is also considered and its use in the examination of command and control policies is studied.

Prerequisite(s): ECE224
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE454 Topics in Microeconomic Analysis

This course covers selected topics in microeconomics and the selection varies depending on the instructor. Topics may include consumer choice (utility-expenditure duality, uncertainty, intertemporal choice), the theory of the firm (profit-cost duality, market structures, boundaries of the firm), game theory (cooperative, non-cooperative, evolutionary, behavioural), economics of information, welfare economics, public choice and political economy.

Prerequisite(s): ECE326
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE456 Topics in Macroeconomic Analysis

This course examines both short-term economic fluctuations and long-term economic growth using a variety of advanced macroeconomic tools such as a generalized algebraic ISLM model, infinite horizon and overlapping generations models and endogenous growth models. In working with these tools students will be introduced to dynamic analysis and other more advanced mathematical techniques that underlie more sophisticated macroeconomic analysis. This course will also give students the opportunity to learn about frontier research being done on key questions of economic growth, development and technological change.

Prerequisite(s): ECE308
Contact Hours: 3 - 0 - 6
Credit(s): 1

ECE490 Directed Readings in Economics

Prerequisite(s): Permission of the Head of the Department.
Contact Hours: 1 - 0 - 9
Credit(s): 2

ECE492 Economics Seminar

This seminar course requires each student to undertake research paper on an approved subject. Students will prepare and present a project proposal, will present their final papers, and will comment and critique work presented by their peers.

Prerequisite(s): ECE308 or ECE326
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

English Undergraduate Programme

Introduction

Objectives

The primary purpose of the English Studies programme at RMC of Canada is to provide a university-level education to officer cadets as one of the essential elements of their professional development. In meeting that responsibility, the programme is designed to foster both the general intellectual development achieved through university education and the particular skills and insights derived from the study of literary culture and language. At all levels of instruction, the courses offered by the department have three basic objectives:

to develop clarity, precision, and maturity in spoken and written communication;
to focus attention on the importance of cultural and social values in developing an understanding of the forces that have shaped civilization and that are shaping the contemporary world; and
to develop a flexible intellectual capacity centred around thinking skills and problem-solving abilities which can be applied to a wide range of professional responsibilities where individuals must take action in the face of concrete human problems.

Communication Skills

In English Studies, particular emphasis is placed on refining writing and verbal skills in the first and second-year courses, but that emphasis continues in senior courses, especially for those cadets enrolled in the English (Honours) or Major in English streams of the humanities degree programme. At the same time, analytical study of complex literary works develops the other half of communication: the ability to listen carefully and to understand in detail what another person is attempting to communicate. Together, the development of writing and reading skills heighten awareness both of the potential and of the limitations of verbal communication.

Perceptive Insight

The study of literature offers valuable insights into the cultural and social values of a people or a particular group, and acknowledges that these values represent (and have always represented) powerful driving forces shaping the development of any given society, whether it be our own or that of others. At all levels of instruction, English Studies attempt to demonstrate that the influence of social and cultural forces is as important as the role of political, economic, historical and strategic realities in understanding the historical development of societies and the complex nature of the contemporary world.

Intellectual Development

English Studies share with other disciplines a concern for developing traditional patterns of logical analysis and evaluation. However, because of the nature of creative literature, the English programme is also conscious of the value of developing non-linear forms of thought, intuition, imagination, and emotive perception. Such skills are particularly valuable in understanding and dealing with human problems. Creative literature is almost always about understanding a concrete human situation in depth, and the effort to find a creative solution to the problems raised. Studying and analyzing such problems develop a flexible and responsive intelligence, one well suited to the demands of leadership responsibilities.

Programme Structure

First Year

These courses are taken by all first-year students and are designed to refine basic writing and reading skills as well as to introduce cadets to the range of English literature, which forms an important part of their general cultural heritage.

Second Year

ENE210: Reading the Contemporary World: 1900 to the Present provides more specific literary and intellectual foundations for advanced studies and is mandatory for all students in Arts. The course explores significant aspects of modern thought and cultural issues in order to provide a broad foundation for students entering any humanities, Social Sciences, or Business Administration programme. An important element of ENE210 is instruction in writing skills.

Third and Fourth Years

In their third and fourth years, students enrolled in an English (Honours), Major in English, Concentration in English or Minor in English can take courses at both the 300 and the 400 level. Students are urged to plan ahead and to discuss their whole programme with the department head when they apply to enter the English degree programme.

English Programme Course Groupings

Group A: Medieval and Early Modern Literature

ENE303: Studies in English Renaissance Literature
ENE305: Studies in English Renaissance Literature II
ENE317: Studies in Medieval English Literature I
ENE319: Studies in Medieval English Literature II
ENE427: Studies in Shakespeare I
ENE429: Studies in Shakespeare II

Group B: 18th and 19th century

ENE307: British Literature during the Romantic Period
ENE309: British Literature of the Victorian Period
ENE312: Cross-currents in French and English Literature (1850–1900)
ENE320: Eighteenth-Century Satire
ENE322: Eighteenth-Century Fiction
ENE371: Science and Literature in the Nineteenth Century
ENE389: The Influence of English Literature in Enlightenment France

Group C: Canadian/American/World

ENE226: Foundations of Western Literature: Greek and Roman Classics and the Bible
ENE331: World Literature I
ENE333: World Literature II
ENE351: Canadian Literature: Beginnings to the 1960s
ENE353: Canadian Literature: 1960s to the Present
ENE356: Bridging the Two Solitudes: French and English Canadian Literature
ENE358: French-Canadian Literature in Translation
ENE361: American Literature: The Puritans to the Transcendentalists
ENE363: American Literature: The American Dream, Race, Gender, War

Group D: Critical Approaches

ENE228: Critical Approaches to Literature and Culture
ENE403: Gender and Literature I
ENE405: Gender and Literature II
ENE413: Literature, Culture, and Ecology
ENE415: Literature, Culture, and Evolution
ENE421: Literary Theory I: Postcolonialism, Race, and Ethnicity
ENE423: Literary Theory II: Gender, Sex, and Sexuality
ENE484: Post-Colonial Literature

Programme Requirements

General Information

Students normally apply for entry into the English degree programme in their second year.

In addition to ENE210, students are encouraged to take at least six other English credits in their second year in order to create greater flexibility in course selection in third and fourth years.

The programme of study for English consists of a set of courses required by the department, in addition to the core curriculum for a Bachelor of Arts. The department offers a number of courses that are required as part of the core curriculum. In many instances, these courses can also be counted toward requirements for English (Honours), Major in English, Concentration in English, or Minor in English.

English (Honours)

Students apply for entry into the English (Honours) during their third year.

Academic Regulation 3.1: *"To earn an Honours Bachelor of Arts degree within a discipline, a student must successfully complete the required courses set out in the applicable Honours Programme of Study, with at least 20 credits within the discipline, must maintain a minimum B average in the Honours courses in all 300 and 400 level courses in their Honours Programme of Study, and must obtain at least a B- average in the 400-level courses."*

The English (Honours) is a 40 credit programme, including the core courses for arts programmes , and the English requirements listed below:

Students must successfully complete the following courses: (a minimum of 20 English credits):

Mandatory Courses

ENE110: Introduction to Literary Studies and University Writing Skills (2 credits)

ENE210: Reading the Contemporary World: 1900 to the Present (2 credits)

ENE492: Seminar in Advanced Professional Skills (1 credit)

Optional Courses

2 credits from Group A: Medieval and Early Modern Literature

2 credits from Group B: 18th and 19th century Note 1

2 credits from Group C: Canadian/American/World Note 2

1 credit from Group D: Critical Approaches

8 Optional Credits in English at the 300 or 400 level

Note 1
Each of these courses must be from different periods (i.e. one cannot take two Victorian courses as fulfillment of the requirement).

Note 2
Each of these courses must be from different geographic categories (i.e. one cannot take two American courses as fulfillment of the requirement).

Major in English

The Major in English is a 40 credit programme, including the core courses for arts programmes , and the English requirements listed below:

Students must successfully complete the following courses: (a minimum of 16 English credits)

Mandatory Courses

ENE110: Introduction to Literary Studies and University Writing Skills (2 credits)

ENE210: Reading the Contemporary World: 1900 to the Present (2 credits)

Optional Courses

1 credit from Group A: Medieval and Early Modern Literature

1 credit from Group B: 18th and 19th century

1 credit from Group C: Canadian/American/World

1 credit from Group D: Critical Approaches

8 Optional Credits in English at the 300 or 400 level

Programme Outline Tables

These tables represent an example the typical course load for a student enrolled in the Bachelor of Arts (Honours) or the Bachelor of Arts in English.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 PSE103 MAE103 Note 1 POE116	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 **Optional** Note 2 1 credit **Optional** Note 3 1 credit	ENE210 MAE106 Note 1 **English** Note 5 2 credits **Elective** 1 credit	ENE210 (**cont'd**) HIE203 **Science** Note 4 1 credit **English** Note 5 2 credits
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 **Science** Note 4 1 credit **English** Note 5 Hon x 3 credits Major x 2 credits **Elective** Major x 1 credit	HIE271 **English** Note 5 Hon x 3 credits Major x 2 credits **Elective** Hon x 1 credit Major x 2 credit	POE205 **English** Note 5 Hon x 3 credits Major x 2 credits **Elective** Hon x 1 credit Major x 2 credits	PSE401 **Science** Note 4 1 credit ENE492 Note 6 **English** Note 5 Hon x 2 credits Major x 2 credits **Elective** Major x 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Notes for Outline

Note 1
MAE106 can be taken in Year 1 if a student is not required to take MAE103.

Note 2
One of the following: ECE103 or ECE104.

Note 3
One of the following: ECE103, ECE104, POE102 or PSE105.

Note 4

- Credits required for the Science core requirement are: one credit in Chemistry or Biology, 1 credit Physics and; 1 credit in information technology from the following courses:
  CSE101: *Introduction to Algorithms and Computing*, ***CSE260:*** *Introduction to Computer Concepts*
  BAE220: *Introduction to Information Technology*, ***BAE410:*** *Information Systems*

Note 5
The English programme credits must be chosen from Group A , Group B , Group C or Group D in accordance with the requirements of the programme. The remaining programme credits must be at the 300 or 400 level.

Note 6
This course is only a requirement for the English (Honours) programme.

Concentration in English

Note: The Concentration in English is not open to ROTP students.

The following list identifies English courses required for the completion of a 12-credit Concentration in English.

Students pursuing a Concentration in English must complete the following within their 30-credit degree:

- at least 12 credits in English Language and Literature
- at least six of these credits at the senior level
- at least six of these credits through RMC of Canada

Certain courses are required:

- ENE101 and ENE102 or equivalent 2-credit first-year Language and Literature course
- ENE202 or ENE203 or equivalent 1-credit second-year Language and Literature course
- RMC of Canada English offers the following courses by distance toward the Concentration:
- ENE101: Introduction to Literary Studies: Fiction (1 credit)
- ENE102: Introduction to Literary Studies: Poetry and Drama (1 credit)
- ENE150: University Writing Skills (1 credit)
- ENE202: Cross-Currents of 20th-Century Literature: Modernism (1 credit)
- ENE203: Cross-Currents of 20th-Century Literature: Post-Modernism (1 credit)
- ENE309: British Literature of the Victorian Period (1 credit)
- ENE358: French-Canadian Literature in Translation (1 credit)
- ENE403: Gender and Literature (1 credit)
- ENE426: Directed Research Project (2 credits)

Minor in English

A Minor in English requires eight credits.

Students must successfully complete the following courses:

- 8 credits in English at any level

English Courses

Courses 100-199

ENE100 Introduction to Literary Studies and University Writing Skills

This course provides an introduction to literary studies through a range of critical approaches, national perspectives, historical contexts, literary genres, and critical terms. Students will compose persuasive arguments that demonstrate close reading skills, logical reasoning, and a competence in writing at the university level.

Texts as assigned by instructors.

Note(s): Mandatory for all first-year Anglophone students in the Science or Engineering entry programme.
Exclusion(s): ENE101, ENE102, ENE110
Semester: Offered every year
Contact Hours: 3 - 0 - 6
Credit(s): 2

ENE101 Introduction to Literary Studies: Fiction

This course is divided between the study of literature - primarily through reading works of short fiction - and exercises and assignments that develop grammar and composition skills. The Course Reader comprises a selection of largely modern short stories by Canadian, American, and British writers, and is supplemented by a Canadian war novel. The course does not attempt an historical or chronological overview of modern short fiction; rather, the works of fiction have been grouped around common themes that explore the human condition as well as address concerns particular to military culture. General characteristics of fiction and effective strategies for reading and understanding literature are presented in the course notes. Grammar and writing skills are developed through auto-instructional methods that provide ample illustration and practice for each principle. Course work consists of required readings and grammar/writing lessons, four essay assignments, and a final exam.

Note(s): Only offered through Distance Education .
Exclusion(s): ENE100, ENE110
Semester: Usually offered in the Fall, every year.
Contact Hours: 0 - 0 - 9
Credit(s): 1

ENE102 Introduction to Literary Studies: Poetry and Drama

This course introduces students to poetry and drama using examples of the genres from Shakespeare to the twenty-first century. The course begins by identifying and discussing the major features of poetic language through lyric poems that are notable for their distinctive speaking voice. The course then examines the different forms of poetry with particular focus on lyric and narrative poetry that address complex human situations. In the second part of the course, students will study two plays. Topics for consideration include dramatic structure, characterization, and thematic development. Course work consists of three essay assignments (two on poetry and one on drama), online discussion postings, and a final exam.

Note(s): Only offered through Distance Education . No prerequisite is required, but students are encouraged to first complete ENE101 or its equivalent.
Exclusion(s): ENE100, ENE110
Semester: Usually offered in the Winter, every year
Contact Hours: 0 - 0 - 9
Credit(s): 1

ENE110 Introduction to Literary Studies and University Writing Skills

This course provides an introduction to literary studies through a range of critical approaches, national perspectives, historical contexts, literary genres, and critical terms. Students will compose persuasive arguments that demonstrate close reading skills, logical reasoning, and a competence in writing at the university level.

Texts as assigned by instructors.

Note(s): Mandatory for all first year Anglophone students in the Arts programme.
Exclusion(s): ENE100, ENE101, ENE102
Semester: Offered every year
Contact Hours: 3 - 0 - 6
Credit(s): 2

ENE150 University Writing Skills

This course is aimed at the student who is competent with basic English grammar and written expression, but desires to develop and hone critical thinking and writing skills. Instructional materials address a broad number of forms and methods used in academic and non-academic writing. Topics range from matters of prewriting practices and the writing process, to aspects of sentence structure and argument, and the elements of style. Through analysis of sample essays and excerpts, students will learn how to move from topic to technique - to apply effective writing and organizational strategies that distinguish good writing wherever it is found.

Note(s): Only offered through Distance Education . This course may count as a Military Arts credit within the BMASc programme.
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 200-299

ENE202 Cross-Currents of Thought in 20th-Century Literature: Modernism

This course introduces students to the major literary and cultural trends of the first half of the twentieth century. Through a selection of British, Canadian, American, and German literature, students will study the styles and themes of literary modernism in poetry, novels, short stories, and one play. The course studies the literature of the Great War, including the English war poets Wilfred Owen and Siegfried Sassoon and the German novel All Quiet on the Western Front. Students will also encounter such important modern poets as Thomas Hardy, W. B. Yeats, Ezra Pound, H. D., and T. S. Eliot. Students will learn why the short story is a particularly twentieth-century genre and how its innovations apply to the techniques of the modernist novel through discussions of Virginia Woolf's Mrs. Dalloway. More generally, the course provides both a regional and a planetary perspective on humanity, allowing us to consider variations in national and personal definitions of such themes as heroism, utopia/dystopia, issues of gender and sexuality, social and individual responsibility, and freedom. Students will be required to write several short response papers and one major essay. Although this is a distance course, it is also a discussion-intensive course, and all students are required to contribute frequently to the online discussion forum.

Note(s): Only offered through Distance Education . This course may count as a Military Arts credit within the BMASc programme.
Prerequisite(s): ENE100 or ENE110 or (ENE101 and ENE102) or equivalent.
Exclusion(s): ENE210
Semester: Usually offered in the Fall, alternate years
Contact Hours: 0 - 0 - 9
Credit(s): 1

ENE203 Cross-Currents of Thought in 20th-Century Literature: Postmodernism

This online course examines literature in English from the years following the Second World War to the present. It considers such authors as Michael Ondaatje, Nadine Gordimer, Chinua Achebe, Angela Carter, Kath Walker, Margaret Atwood, and Hanif Kureishi. The course examines how international writers have met the challenges of our increasingly diverse, technological, postcolonial, and globalized world, a world in which identities have become unstable and borders of all kinds have become fluid. Students will contribute to online discussion, write five short formal response papers, complete one formal essay, and write a final exam.

Note(s): Only offered through Distance Education . Although it is preferred that students have taken ENE202 before enrolling in ENE203, it is not required.
Prerequisite(s): ENE100 or ENE110 or (ENE101 and ENE102) (or equivalent).
Exclusion(s): ENE210
Semester: Usually offered in the Fall, alternate years
Contact Hours: 0 - 0 - 9
Credit(s): 1

ENE210 Reading the Contemporary World: 1900 to the Present

This course develops students' cultural literacy in a global context through critical examinations of modern and contemporary texts. Students will apply critical and cultural theories to a range of texts and topics that address questions concerning global cultures in the 20th and 21st centuries. Students will also apply research methods to the composition of argumentative essays.

Note(s): This course is required for all second-year students in an Arts programme.
Prerequisite(s): ENE100 or ENE110 (or equivalent).
Exclusion(s): ENE202, ENE203
Semester: Offered every year
Contact Hours: 3 - 0 - 6
Credit(s): 2

ENE226 Foundations of Western Literature: Greek and Roman Classics and the Bible

This course is an introduction to the cultural, ethnic, and literary histories that have informed the production of English Literature, and of much Western culture, for the past four millennia. Students will examine how Greek, Roman, and Judeo-Christian texts reflect the values of the periods in which they were written, and why they are important today.

Corequisite(s): ENE210 (or equivalent)
Semester: Usually offered in the Fall, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE228 Critical Approaches to Literature and Culture

This course introduces key theoretical and practical questions which arise in the study of literature and contemporary culture such as "Why study literature?" "What constitutes 'great' literature?" "What aspects of culture--such as movies, TV shows, advertising, news media, or music--can be read as 'texts'?" Students will learn how to apply these theories in commenting on literature. Emphasis will also be placed on effective essay writing.

Corequisite(s): ENE210 (or equivalent)
Semester: Usually offered in the Winter, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 300-399

ENE303 Studies in English Renaissance Literature I

This course presents English literature from about 1550 to the beginning of the seventeenth century, an era often referred to as "the golden age of English literature." The intention of the course is to provide an appreciation of the intellectual, cultural, and social milieu of the Renaissance. Students will enrich their knowledge about European and English Renaissance art, architecture, music, exploration, science, political figures, and religious movements.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years..
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE305 Studies in English Renaissance Literature II

This course continues the study of English literature in the Renaissance and focuses on the time period from about 1600 to 1660, the continuation of the era often referred to as "the golden age of English literature." The intention of this course is to provide an appreciation of the intellectual, cultural, and social milieu of the Renaissance. The study of seventeenth-century literature will include a detailed examination of Milton's magnificent Paradise Lost, the finest epic in English literature, and the examination of selected metaphysical poets such as John Donne, who revolted against the conventions of earlier Renaissance poets.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE307 British Literature during the Romantic Period

The backbone of this course is the study of the work of the six great British Romantic poets: Blake, Wordsworth, Coleridge, Shelley, Keats, and Byron. Careful attention will be paid to the short lyric poems, and we will read parts of the longer narrative poems. Students will be encouraged to explore the common ideas which emerge in these poets' work and the differing ideas of "Romanticism" which are present. The prose of some of these authors will also be examined. Finally, the course will include the study of two novels, by Jane Austen and Mary Shelley.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE309 British Literature of the Victorian Period

This course looks at British literature from 1837 to 1901, the period encompassing Queen Victoria's reign. Examining various types of literature – essays, poetry, novels, and plays – this course will treat texts as both products and producers of culture, looking at them within their historical and social contexts and considering how they might support or undermine the world in which they were created.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

ENE311 British Literature: 1890s to 1945

In this course, students will study selected poems, short stories, novels and plays of representative modern British writers - Hardy, Housman, Kipling, Conrad, Yeats, Shaw, Owen, Forster, Woolf, Lawrence, Joyce, Eliot, Auden, Thomas, Reed, Huxley, Orwell - and assess how they have grappled with a variety of themes: the pros and cons of empire-building, the evils of colonialism, the pain of exile, the anguish of alienation, the quest for identity, the struggle for freedom, the lust for money and power, the love for life and God. Students will be expected to scrutinize the writers and their works historically and critically.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE312 Crosscurrents in French and English Literature (1850-1900)

This course, offered jointly as a “dialogue course” between the English Department and the French Department, will be team-taught by a professor from each department. The course will therefore include classes in English, alternating with classes in French, will familiarize students, through analyses of representative texts in French and English, with important aesthetic concepts of the second half of the 19th century, enabling them to trace connections and divergences between the two cultures. At the end of the course, students will not only be able to describe the interactions between the writers of the two worlds, but also to apprehend the differences in the understanding of aesthetic movements on either side of the Channel.

Prerequisite(s): Students are permitted entry into this course only if they have attained a ‘C’ in the second language Reading Comprehension examination or equivalent. This course is designed for students in the third or fourth years in Arts (or at the discretion of the Departments of English and French Studies).
Corequisite(s): ENE210 or equivalent.
Semester: One of the three bilingual courses will generally be offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE313 Postmodern British Literature

In this course, students will study selected poems, short stories, novels and plays of representative post-modern British writers - Greene, Burgess, le Carré, Pinter, Stoppard, Larkin, Gordimer, Hughes, Heaney, Walcott - and assess how they struggle and come to terms with various socio-political events and issues: the loss of empire, the Cold War, the emergence of a new "world order," the imminence of dystopia, the exploration of space, the advance of science and technology. Students will be expected to scrutinize the writers and their works historically and critically.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE317 Studies in Medieval English Literature I

This course is designed to introduce students to the early literature of England before 1500, commonly called Old and Middle English literature. The course begins with an outline history of the development of the English language from Old and Middle English to the modern period. Students will then read the heroic epic *Beowulf* , a great warrior adventure story, followed by such works as the "Battle of Maldon," "The Wanderer," "The Seafarer," *Sir Gawain and the Green Knight* , and Sir Thomas Malory's *Morte Darthur* . Students in this course will learn that English Medieval literature remains highly readable, entertaining, and relevant to today's concerns.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE319 Studies in Medieval English Literature II

In this course, which deals with Old and Middle English literature, students will study a variety of early English literary works written between 650 and 1500. They will be introduced to the earliest extant poetry in the English language from the seventh century to the tenth century. Students will be introduced to genres as diverse as chronicles and courtly romances, lyrics, ballads, religious allegory, animal moral fables, Biblical and moral drama. Great universal works such as the moral drama *Everyman* are still popular on the stage today. Students will study in detail the *Canterbury Tales* of Geoffrey Chaucer, who is still recognized as one of the greatest storytellers in the English language.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE320 Eighteenth-Century Satire

This course examines poetry and prose satire at a time when these genres dominated an exploding print culture. In the Age of Reason, also known as the Enlightenment, “wit” was a serious kind of play with the power to build up, and the power to tear down—individuals, regimes, and systems. Students will analyze satiric poetry, essays and plays in order to identify such central concerns of the period as the idea of a rational universe, the threat of disorder, competing voices, and social mobility.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall Term, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE322 Eighteenth-Century Fiction

This course is a critical discussion of novels in an age that witnessed long prose narratives take hold of the press and of the popular imagination. Students will read and compare a variety of texts that may include travel, epistolary, satiric, and sentimental in order to evaluate the evolution of what has become the most popular genre in our own time. Problems of voice, point of view, and the novel's love-hate relationship with itself will contribute to the students' ability to interrogate such issues as class, gender and nationalism in the early novel.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter Term alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE331 World Literature I

Through an examination of novels, short stories, and poetry from Africa, South America, and the Caribbean, complemented by recent films, this course will introduce students to some of the major writers of the "new literatures in English." Such artists invite us to consider how we encounter, explore and engage other countries and cultures, how we respond to foreign values and perspectives, how we meet new and unexpected challenges and unusual circumstances. Attention will be given to historical, social and cultural contexts as well as to appreciating the works within their own emerging traditions and within the parent tradition of English literature.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE333 World Literature II

Through a survey of novels, short stories and poetry from Afghanistan, Iran, Australia, New Zealand, India and the Himalayas, complemented by recent films, students will familiarize themselves with outstanding writers of the "new literatures in English." Class discussion will focus on such themes as human relationships in the rapidly changing contemporary world, heroism, leadership, terrorism, fundamentalism, spirituality, "the good life," racial and gender issues, environmental stewardship, and the link between a nation's character and its landscape.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE351 Canadian Literature: Beginnings to the 1960s

Through a survey of English-Canadian fiction and poetry from the beginnings to the 1960s, including aboriginal artists, this course attempts to identify shared perspectives, attitudes, ideas, and techniques characteristic of our own distinctive literature. The writers and filmmakers under study invite us to reflect on who we are, where we came from and where we are going, as well as on the relationship between the nation's character and its landscape. We survey both the blessings and the challenges posed by the diversity of our rich multicultural mosaic.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE353 Canadian Literature: 1960s to the Present

Through a survey of English-Canadian fiction and poetry from the 1960s to the present, complemented by recent films, this course endeavours to identify shared perspectives, attitudes, ideas and techniques characteristic of our unique literature. While designated as the complement to ENE351, it is helpful but not necessary to take both courses. Throughout this course and ENE351, we see our artists engaged in what Northrop Frye describes as closing the gap between an immigrant mentality at odds with this land and an aboriginal sensibility attuned to it.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE356 Bridging the Two Solitudes: French and English Canadian Literature

This course is to be offered conjointly by the Department of French Studies and the Department of English; it is to be team-taught by two professors, one from each of the departments. It will focus on comparisons of important aesthetic and cultural movements.

Through analyses of representative texts in French Canadian and English Canadian literature, this course will familiarize students with important aesthetic concepts in each of what Hugh MacLennan famously labelled “the two solitudes,” enabling students to trace connections and divergences between the two cultures. Specific texts and topics will change year to year but may include canonical writers (such as Roy, Yves Thériault, Margaret Atwood, Leonard Cohen), and topics such as nationalism, war, economics, religion, gender, and narrative form.

Prerequisite(s): Students are permitted entry into this course only if they have attained a ‘C’ in the second language Reading Comprehension examination or equivalent. This course is designed for students in the third or fourth years in Arts (or at the discretion of the Departments of English and French Studies).
Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE358 French-Canadian Literature in Translation

Through a detailed study of French-Canadian texts translated into English, this course focuses on French-Canadian culture and its literature. Students will read, for example, a nineteenth-century novel, a contemporary play, and French-Canadian literature from outside Quebec in order to gain an understanding of the unique nature of the literature of French Canada.

Corequisite(s): ENE202 or ENE203 or equivalent.
Semester: Usually offered in the Winter, alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE361 American Literature: The Puritans to the Transcendentalists

Through the study of American literature and writings from the early colonial period to the late 19th century, this course introduces the student to the "idea" of America and to American ideals, from the Puritans' "city on a hill" to the cosmic consciousness of the Transcendentalists. Students will engage with a diverse range of texts that include journal writing, social histories, sermons, speeches, essays, and autobiography, along with representative works of fiction and poetry. A complement to ENE363, the course traces two predominant themes in American literature: Puritanism and primitivism.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE363 American Literature: The American Dream, Race, Gender, War

This course focuses on 20th-century American literature, particularly the short story, poetry, and drama, as well as popular culture: music (from blues & folk to rock & rap) and film. Through lectures, seminars and readings, students will examine the diverse definitions and staying power of the American Dream, themes of gender and racial identity (from slavery to presidency), and the legacy of Puritanism. Two compelling narratives by serving soldiers in the Vietnam and Iraq wars explore the meaning of war and the nature of war stories.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE371 Science and Literature in the Nineteenth Century

This course looks at the interactions between literature and science from a cultural, historical, and literary perspective. Since it gained its first popular foothold in the early nineteenth century, science and its methods have come to dominate the Western collective consciousness, determining in many ways how we interpret – and how we express – our reality. This preoccupation with science and discovery can be found throughout literature, both as celebration and as critique. Focusing on science's rise in popular culture, and looking at texts ranging from poetry, fiction, essays, and drama to influential scientific narratives of the period, the course may include discussions of exploration and travel writing, representations of science and scientists in literature, cultural influences of and on scientific discoveries, and the complex intersections between nineteenth-century scientific advancement and literary production.

Note(s): Also offered through Distance Education .
Corequisite(s): ENE210 or equivalent or permission of the instructor.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE375 Literature and Spirituality

At the heart of both literature and spirituality, we find the same mysteries and questions: Who am I? Why am I here? What's it all about? This course invites you on an exploration of how the world's literatures and the diverse wisdom teachings and religious traditions through the ages speak to the spiritual within our human condition. Along with exploring a variety of foundational beliefs and expressions of spiritualties East and/or West, this course will examine the spiritual dimension in sacred and secular literature, and the challenges occasioned by the representation and interpretation of literary encounters of a spiritual kind.

Note(s): Also offered through Distance Education .
Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

ENE381 Major Women Writers to 1900

This course offers students an opportunity to read both widely and deeply the works of early women writers. Works will be studied within their historical contexts as well as with a consideration of the history of women as authors in manuscript, coterie publication, and finally print. There is a significant difference between publishing for fame and publishing for the evolving literary marketplace of the period. These authors were from different backgrounds, writing in different genres (including poetry, drama, essay and novel) and on a wide variety of subjects. Their concerns included, as might ours, examinations of the tension between religion and reason, misogyny and the subjection of women, issues of class in a highly stratified society and debates that address the subjection of other peoples through colonization and slavery.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE383 Major Women Writers: 1900 to the Present

The focus of this course is twentieth- and twenty-first century literature by women. Students will have the opportunity to read and learn about women in the era that created feminism, and trace that evolution to their own lifetime. Common ground among the authors will be identified, but so too will divergence and dispute among women who do not, after all, make up one unified community. Further, by considering the recent past and the contemporary world through the writings of women of many nationalities (including Canadian, Indian, West-Indian, Japanese, Welsh, and others) in poetry, essays, short and long fiction, this course is a gathering place for diversity of voice, and of choice.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE385 Introduction to Children's Literature

This course conducts a critical/historical survey of literary works in English composed for, or appropriated by, children. Selections may vary annually but each year will include both classic and less familiar texts. The chronological organization will highlight the historical context of the text and enable students to trace shifting ideas about the child and childhood. Formal literary analysis will be complemented by a variety of critical approaches that will enable the class to explore relevant theoretical issues and to comprehend the cultural and ideological work being done by specific texts.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE387 Contemporary Children's Literature

This course examines contemporary literary works in English composed for, or appropriated by, children. Selections may vary annually but each year will include both classic and less familiar texts. The focus of contemporary children's literature in a particular year might be thematic, such as coming-of-age narratives, childhood and war, or the journey, or generic, such as fantasy or young adult fiction. Formal literary analysis will be complemented by a variety of critical approaches that will enable the class to explore relevant theoretical issues and to comprehend the cultural and ideological work being done by specific texts.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE389 The Influence of English Literature in France in the Enlightenment

This course, offered jointly as a "dialogue course" between the English Department and the French Department, will be team-taught by a professor from each department. The course will therefore include classes in English, alternating with classes in French concerning the influence of the English novels (by such authors as Daniel Defoe, Samuel Richardson, Henry Fielding, Laurence Sterne, Jane Austen) on literature of the French Enlightenment, including their reception, their translation, and their adaptation, in a study of how the novels under consideration are invested with new meanings through translation. The student will come to recognize that translation functioned as a compromise between the two cultures rather than conforming to today's convention of linguistic and semantic equivalence.

Note(s): This course is designed for students in the third or fourth years in Arts (or at the discretion of the Departments of English and French Studies).
Prerequisite(s): Students are permitted entry into this course only if they have attained a 'C' in the second language Reading Comprehension examination or equivalent.
Semester: One of the three bilingual courses will generally be offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE390 Creative Writing

This course introduces students to writing creatively in a number of genres, including poetry, short fiction, and creative non-fiction. Students will have the chance to explore and develop their skills by analyzing such elements as prosody, theme, characterization, plot, dialogue, setting, point of view, openings, and endings. Research into the process of creative writing will inform weekly writing assignments. Students will submit a finished portfolio of original, workshopped, and edited work at the end of the course.

Corequisite(s): ENE210
Semester: Usually offered in the Winter every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

ENE403 Gender and Literature I

This course aims to introduce students to the various ways literature reflects, constructs, reinforces, and challenges gender roles. The course will explore masculinity and femininity, suggesting that they are always socially constructed and historically specific by examining literature from the Middle Ages to the present. In order to do so, students will explore several different feminist approaches to literature and culture. Ultimately, the course will show that understanding gender as socially constructed rather than biologically given is empowering for society as a whole.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

ENE405 Gender and Literature II

This course examines the various ways in which literature reflects, constructs, reinforces, and challenges gender roles. The course will explore "masculinity" and "femininity," suggesting that they are always socially constructed and historically specific. Students will examine the degree to which gender is an organizing principle in the daily life of Western civilization, looking first at how the gendered body is politicized in specific literary works (prose, poetry, drama) and films. They will then investigate how class and race have the potential to disrupt gender as a primary category of analysis. And, finally, they will discuss the challenges to gender analysis raised by the figure of the transgendered person.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE413 Literature, Culture, and Ecology

This course introduces students to the emerging field of “ecocriticism,” a body of ecologically-oriented literary and cultural scholarship that explores nature both as a cultural construct and as a real, tangible entity on which humanity--and the more than 30 million other species on the planet with whom we are interconnected--depends for survival. Like feminism, postcolonialism, or queer studies, ecocriticism is at its core sociopolitical and global; as such, the course will consider international and often conflicting perspectives on nature and human responsibility by engaging with a diverse range of literary and cultural genres (drama, poetry, narrative, film, news, internet, social media, and electronic gaming) from around the world. Finally, students may assess Western military perceptions of space and place to determine how they influence our understanding of foreign peoples and cultures during overseas deployments.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE415 Literature, Culture, and Evolution

This course investigates how literature specifically, and art and culture more broadly, emerge from evolutionary strategies designed to maximize our adaptive fitness as a species. Students will explore the relationship between biological and environmental influences on the production and consumption of literature, other arts, and the cultural milieu in which they are produced. They will also assess how and why what literary Darwinist Ellen Dissanyake calls “homo aestheticus” relies strongly on art for such diverse evolutionary purposes as transmitting information, strategizing for future events, maintaining kinship and other social networks, selecting mates, sexual reproduction, and developing cognitive capabilities that serve us in other domains. Art and literature, the course will reveal, are much more than accidental by-products of evolution: they are, like the imagination on which they depend, central to our survival.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE421 Literary Theory I: Postcolonialism, Race, and Ethnicity

This course offers an advanced introduction to the key concepts and questions of postcolonial theory and related theories of race and ethnicity. This course will survey some of the major texts of these theories, as well as their historical, social, political, and philosophical backgrounds, in order to assess their value for understanding our own relation to and perception of those who are “other” to us. Central to this investigation will be an examination of how categories of racial, ethnic, and cultural difference are constructed, maintained, and contested in literature and culture.

Prerequisite(s): ENE210 and ENE228 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE423 Literary Theory II: Gender, Sex, and Sexuality

This course offers an advanced introduction to contemporary theories of gender, sex, and sexuality. This course will survey some of the major texts of these theories, as well as their historical, social, political, and philosophical backgrounds, in order to explore the different ways in which categories of gender, sex, and sexuality have been defined and disrupted, problematized and pluralized by competing thinkers and writers.

Prerequisite(s): ENE210 and ENE228 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE426 Advanced Directed Study

This course is offered under special circumstances and at the discretion of the Department Head where a student with high standing in earlier English courses wishes to pursue a specific topic in some depth. The course is normally conducted on a tutorial basis and usually includes a considerable amount of written work.

Note(s): For students in Fourth Year Honours English at the discretion of the Department Head. With the approval of the Department Head, this course may count as a Military Arts credit within the BMASc programme.
Corequisite(s): ENE210 or equivalent.
Contact Hours: 0 - 0 - 6
Credit(s): 2

ENE427 Studies in Shakespeare I

This course will focus entirely on the dramas of William Shakespeare. The course will centre on the plays from Shakespeare's early career to mid-career. Students will study plays from the genres of tragedy, comedy, history, and Roman plays, within the context of a variety of critical approaches. A study of these plays will reveal the remarkable artistry of this great Elizabethan who is still recognized after 400 years as the world's finest dramatist.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE429 Studies in Shakespeare II

This course continues the study of the dramas of William Shakespeare. The course will centre on the plays from Shakespeare's mid-career to late career. Students will study plays from the genres of comedy, tragedy, and romance within the context of a variety of critical approaches. The course will also draw attention to Shakespeare in performance and the Shakespearean theatrical conventions within which these plays were performed.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE442 English Dramatic Forms

In this study of dramatic literature from medieval to modern times, students will examine a rich diversity of dramatic forms. The course will begin with an introduction to classical drama and its sustained influence on English literature and then proceed to a study of medieval religious allegorical drama, Renaissance tragedy, Renaissance satiric comedy, Restoration and eighteenth-century comedies of manners, nineteenth-century comedy, modern discussion drama, tragicomedy, and musical drama.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE444 Twentieth-Century Dramatic Literature

In this course, which focuses on dramatic literature of the twentieth century, students will be introduced to a wide variety of modern dramas by pre-eminent playwrights from North America, Britain, Europe, and Africa. These writers have challenged traditional approaches to drama to invent new dramatic styles such as realism, naturalism, poetic drama, symbolism, expressionism, the epic theatre, the theatre of the absurd, and surrealism. The modern theatre has its great definitive scenes which sum up man as he has come to sense himself in the modern world: his most fundamental hopes and fears, his understanding of the shape and currents of the world, and his intuition of his stance in relation to that world.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE449 Literary Journalism

This course studies various works of literary journalism, which combine the craft of in-depth reporting with the art of writing, or “making facts dance,” as Kevin Kerrane describes the genre. In order to understand the characteristics of literary journalism, students will critically assess newspaper and magazine articles, reviews and books, as well as online material. Writing assignments in the course will put the principles of literary journalism into practice.

Corequisite(s): ENE210 or equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE450 The News Media and the Military

The course examines the relationship between the news media and the military within the broader context of the pervasive presence of mass media of communication in the political and cultural realms. A critical personal inventory of the students' habits as mass media consumers forms the basis for the course and for each class. The course studies the rhetoric of mass media communication from Plato to today before shifting focus to an investigation of the newsroom, the business and marketing pressures affecting its operation, and the constitutional and legal rights and responsibilities related to freedom of the press. Students will survey and examine in detail examples and case studies of the evolving relationship between the news media and the military in Canada and elsewhere. The aim of this course is to enable students to critically analyze various print and electronic news products, including their modes and styles of presentation, and to evaluate their relationship to the military.

Corequisite(s): ENE210 or equivalent.
Semester: Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE451 War Literature I

This course surveys and examines war literature from its origins in the Greek classical period to the First World War. *The Iliad, Beowulf* and Shakespeare's *Henry V* will be studied as foundational texts that establish the concepts of the hero and the *comitatus* , the roles of religion and fate, and the characteristics of the war story. The works of the First World War trench poets, the memoirs of Graves and Brittain, and Hemingway's fiction will focus analysis on how the unforgettable experience of war becomes realized in various literary forms.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE453 War Literature II

This course surveys and examines war literature from the Second World War to the present. The course begins by studying how the unforgettable experience of Second World War combatants is represented in fiction, memoir and poetry. The Canadian novel *Execution* is used as the focal point of this critical analysis. The stories of non-combatants and civilians, including a survivor of the Holocaust, extend the range of wartime experience beyond the combat veteran. Study of post-war texts focuses on the Cold War and Vietnam. The course concludes with an examination of the writings of Canadians about UN missions and the war in Afghanistan.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, every year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE470 Topics in English Literature

Seminars offered by faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Corequisite(s): ENE210 or equivalent
Semester: Offered at the discretion of the department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE471 Topics in English Literature

Seminars offered by faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Corequisite(s): ENE210 or equivalent
Semester: Offered at the discretion of the department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE472 Topics in English Literature

Seminars offered by faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Corequisite(s): ENE210 or equivalent
Semester: Offered at the discretion of the department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE473 Topics in English Literature

Seminars offered by faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Corequisite(s): ENE210 or equivalent
Semester: Offered at the discretion of the department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE474 Chosen Topics in Literary Studies

This course is designed so that professors in the Department of English will be able to share with the students the results of their research in a particular area of literary studies that does not form part of the regular Honours or Major stream. Topics will vary with the interests and research of the faculty.

Corequisite(s): ENE210 or equivalent.
Semester: Offered at the discretion of the Department.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE484 Post-Colonial Literature

In this course, students will have an opportunity to examine selected modern literary works from Africa, South Asia and the West Indies, as well as to assess how writers in those societies have depicted the throes of revolution, the pain of exile, the struggle for freedom, the waning of colonialism, the anguish of alienation, and the quest for identity. Students will be encouraged to approach the writers and their works historically and critically.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Fall, alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE485 Utopian and Dystopian Literature

This course will focus on the ideal of a perfect society that has dominated the human imagination ever since the days of Plato. Students will study the utopian and dystopian ideas in the works of Plato, More, Shakespeare, Swift, Shelley, Stevenson, Wells, Huxley, Burgess and Atwood. They will be encouraged to explore the following themes among others: Plato's Myth of the Cave, the philosopher king, imperfect societies, the idea of utopia, utopia perverted into dystopia, tyranny and dictatorship, hubris and nemesis, religion versus science, the abuse of science, individuality and freedom, power and the state.

Corequisite(s): ENE210 or equivalent.
Semester: Offered in alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE486 The Tale of Mystery and Imagination

This course offers a critical and analytical approach to one of the most popular forms of literature in the nineteenth and twentieth centuries. Students will encounter many variations of what Poe called the tale of ratiocination, as well as the tale of mystery and imagination. They will study the works of well-known writers such as Arthur Conan Doyle, Wilkie Collins, G.K. Chesterton, Agatha Christie, Robert Louis Stevenson, Dashiell Hammet, Raymond Chandler, John le Carré and Simon Winchester. Students will be expected not only to read extensively but also to analyse and critically evaluate what they read. They will be encouraged to engage in creative writing.

Corequisite(s): ENE210 or equivalent.
Semester: Usually offered in the Winter, alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 1

ENE492 Seminar in Advanced Professional Skills

This course is available only to Honours students of English. It is a specialized study of advanced professional skills related to the discipline. At the end of the course, the student will be able to demonstrate a range of advanced skills selected from but not limited to the following: skills in research, writing, editing, public presentation, grant and proposal writing, and colloquium organization. The course may take a variety of forms, from a series of guest speakers to a focused exploration of a current research topic, or a combination of both.

Semester: Usually offered in the Winter, every year
Note(s): Compulsory for all students in Fourth Year Honours English
Contact Hours: 3 - 0 - 3
Credit(s): 1

French Studies Undergraduate Programme

Introduction

The Department of French Studies offers a programme that focuses on French literature in the francophone world and other aspects of French studies such as civilization and language (linguistics and stylistics). The department offers Honours and a Major. In order to be admitted to these programmes, students must have taken *FRF152: Cours de composition et d'introduction aux études littéraires I,* and *FRF262: Cours de composition et d'introduction aux études littéraires II,* or equivalent courses. French is the only working language within the department. Most courses may be taken by all students possessing the required knowledge and ability. The final decision on eligibility will be made by the course instructor, with the approval of the Department Head.

Programme Objectives

The French Studies programme is intended to provide students with a university education, promote their intellectual development and give them the knowledge and abilities that can be gained through the study of literature and language.

The courses offered by the department have four main objectives:

- to teach students how to express themselves clearly and accurately, orally and in writing, and how to discuss various subjects rigorously and at length;
- to make students aware of interference from the second language;
- to draw students' attention to the importance of cultural and social values in the evolution of civilization and the contemporary world, particularly the French-speaking world; and
- to develop students' intellectual faculties, especially the ability to think and to analyze. These skills are often required in the exercise of their profession, particularly in the areas of human relationships and problems.

Ability to communicate:

While the mastering of oral and written communication is emphasized in the 100 and 200-level courses, these skills are also stressed in the 300 and 400 level courses, particularly for students doing Honours or a Major.

The analytical study of literary works helps to assess situations with a critical mind. The analysis of literary texts is useful in developing a critical mind; knowledge of critical and analytical methods leads to a better appreciation of language's potential and limitations.

Perceptual development:

Literary studies enable students to fully understand and appreciate the cultural and social values of a people or community and help them to recognize the forces that shape the evolution of a society. The French Studies programme demonstrates, at all levels, that the influence of cultural and social forces is as important as the influence of political, economic, strategic and historical realities in understanding the past evolution of societies and the complex nature of the contemporary world.

Intellectual development:

French studies, like studies in other disciplines, enable students to acquire the methods involved in logical analysis and evaluation. However, because of the very nature of literature, French studies also help to promote less Cartesian forms of thinking, such as intuition, imagination and a sense of aesthetics. These kinds of thinking are particularly useful for resolving human problems.

A literary work generally deals with human problems and the measures taken to resolve them. These problems require intellectual flexibility and an ability to analyze. Such abilities are extremely useful for people in management and other positions of responsibility.

Programme Structure

100-Level Courses

Courses designed to improve the student's composition, style and understanding of French literature in general and French-Canadian literature in particular.

200-Level Courses

Courses designed to perfect the student's style and to teach an appreciation of the most important French literary works of the 19th and 20th centuries. These courses can also serve as a foundation for future studies in the humanities, social sciences or administration.

300 & 400-Level Courses

Courses designed mainly for students completing Honours or a Major in French Studies. These courses may also be taken by students enrolled in other programmes.

The courses cover two main areas:

- literature, and
- linguistics
- There are three categories of literature courses:
- French literature,
- French-Canadian literature, and
- literature by French-speaking authors from other cultures.

Most of the courses offered are given every two years. It is highly recommended that students choose their courses in advance, seek advice from the professors in the Department and discuss their choices with the Department administration.

B.A. Honours in French Studies

To earn an Honours Arts degree the student must:

- successfully complete the 40 credits as set out in the programme of study, including the core courses for arts programmes
- successfully complete the courses specified in the Honours programme, at least 20 credits in the discipline,
- maintain a minimum B average in all 300 and 400 level courses in their Honours programme
- attain at least a B- average in the 400 level courses.

The B.A. Honours French Studies requires completion of 40 credits, with at least 20 credits in the French Studies in accordance with the following:

I. Mandatory Courses

FRF152: *Cours de composition et d'introduction aux études littéraires* I (2 credits)
FRF262: *Cours de composition et d'introduction aux études littéraires* II (2 credits)
FRF344: *Stylistique française* I (1 credit)
FRF346: *Stylistique française* II (1 credit)
FRF347: *Théories littéraires* (1 credit)

II. Mandatory selection of at least one course from each of the five following sections:

Section A – *De l'Antiquité à la Renaissance*

FRF372 : *Théâtre médiéval et classique*
FRF376 : *La littérature française du Moyen Âge* I
FRF378 : *La littérature française du Moyen Âge* II
FRF379 : *Art oratoire*
FRF381 : *Les moralistes du XVIe siècle*
FRF440 : *Vie et mort des grands héros de l'Antiquité*

Section B – *Du Grand Siècle aux Lumières*

FRF367 : *Poésie française du Moyen Âge à la Révolution*
FRF373 : *Théâtre post classique*
FRF383 : *Les moralistes française du XVIIe siècle*
FRF386 : *La littérature française du siècle des lumières* I
FRF388 : *La littérature française du siècle des lumières* II
FRF420 : *Roman épistolaire*
FRF460 : *L'écriture au féminin sous l'Ancien Régime*

Section C – *Modernité(s)*

FRF331 : *Expression de la guerre dans la littérature française*
FRF335 : *Récits de militaires et d'explorateurs en Afrique de Napoléon à la Première Guerre mondiale*
FRF353 : *Roman français du XIXe siècle*
FRF355 : *Roman français du XXe siècle*
FRF369 : *Poésie d'expression française depuis la Révolution*
FRF375 : *Théâtre français du XXe siècle*
FRF428 : *L'essai au XXIe siècle : crise, terreur, paranoïa et sécurité intérieure*
FRF474 : *Littérature française de 1945 à 1980*
FRF476 : *Littérature française de 1980 à aujourd'hui*

Section D – *de Jacques Cartier à la Révolution tranquille*

FRF333 : *Expression de la guerre dans la littérature canadienne-française*
FRF356 : *Rapprocher les deux solitudes : les littératures du Canada anglais et du Canada français*
FRF453 : *Le roman canadien-français avant la Révolution tranquille*
FRF466 : *Poésie canadienne française* I
FRF470 : *Théâtre canadien français* I
FRF483 : *Civilisation canadienne-française avant le XX e siècle*

Section E – *Modernité franco-canadienne*

FRF334 : *Figure du sportif-guerrier dans la littérature québécoise*
FRF455 : *Le roman canadien-français depuis la Révolution tranquille*
FRF468 : *Poésie canadienne-française* II
FRF472 : *Théâtre canadien français II*
FRF485 : *Civilisation canadienne-française de 1900 à nos jours*
FRF493 : *Littérature canadienne-française hors Québec*

III. At least five courses from the following section:

FRF312 : *Regards croisés sur les littératures française et britannique* (1850 -1900)
FRF324 : *Littérature francophone subsaharienne des Indépendances aujourd'hui*
FRF326 : *Littérature francophone du Maghreb et du Moyen-Orient, de la colonisation à nos jours*
FRF337 : *Caractéristiques linguistiques du français québécois*
FRF339 : *Variété du français québécois*
FRF342 : *Grammaire et rédaction avancées*
FRF348 : *Approche historique et linguistique de la langue française* I
FRF350 : *Approche historique et linguistique de la langue française* II
FRF389 : *De l'influence de la littérature anglaise en France à l'époque des Lumières*
FRF413 : *Littérature européenne en traduction*
FRF415 : *Littératures non-européennes en traduction*
FRF422 : *Littérature de voyage*
FRF426 : *Études dirigés avancées*
FRF430 : *Échec des utopies dans la littérature française depuis la fin de la guerre froide*
FRF432 : *Surréalisme*
FRF434 : *Témoigner*
FRF436 : *Absurde*
FRF438 : *Rétrospective sur un auteur*
FRF443 : *La rhétorique antique*
FRF444 : *La rhétorique moderne*
FRF478 : *Liens entre la littérature française et les arts (arts plastiques et musique)*
FRF495 : *Francophonie dans le monde*

IV. The three remaining credits can be chosen from any of the five sections (A, B, C, D, E) or from category III.

V. At least two courses in different genres (e.g. ex: *poésie, essai, théâtre, roman)* must have been followed for the baccalaureate.

B.A. French Studies

To earn a Bachelor of Arts degree within a discipline, a student must:

- successfully complete the 40-credit Bachelor of Arts degree programme, including the core courses for arts programmes
- successfully complete the required courses set out in the applicable Programme of Study, with at least 16 credits within the discipline,

The Major in French Studies requires completion of at least 16 credits selected from the offerings of the French Studies Department in accordance with the progressions described in Category I. and II. Except for category III; at least 3 credits from this section.

The remaining credit can be chosen from any of the five sections (A, B, C, D, E) or from category III.

Minor in French Studies

For a minor in French studies, you need 8 credits in the discipline.

Programme Outline Tables

The programme outline tables are an example the typical course load of a student enrolled in a French Studies (Honours) or a Major in French Studies. The course numbers which are in *"italic"* are part of the core curriculum for arts programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	FRF152 PSF103 HIF102 MAF103 Note 1 POF116	FRF152 (**cont'd**) 1 optional credit Note 2 HIF102 (**cont'd**) MAF113 1 optional credit Note 3	FRF262 MAF106 Note 1 **French studies** 3 credits	FRF262 (**cont'd**) HIF203 **French studies** 3 credits
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSF301 1 science credit Note 4 FRF344 **French studies** 1 credit **Elective** 1 credit	HIF271 1 science credit Note 4 FRF346 **French studies** Honours x 2 credits **Elective** Major x 2 credits	POF205 FRF347 **French studies** Honours x 2 credits Major x 1 credit **Elective** Honours x 1 credit Major x 2 credits	PSF401 1 science credit Note 4 **French studies** Honours x 2 credits Major x 1credit **Elective** Honours x 1 credit Major x 2 credits
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Notes

Note 1
MAF106 can be taken in Year 1 if a student is not required to take MAF103.

Note 2
One of the following: ECF103 or ECF104.

Note 3
One of the following: ECF103, ECF104, POF102 or PSF105.

Note 4
Credits required for the Science core requirement are:

- 1 credit in Chemistry or Biology
- 1 credit in Physics, and
- 1 credit in Information Technology from the following courses:
  - INF101 : *Introduction aux algorithmes et à la programmation*
  - INF260 : *Introduction aux concepts informatiques*
  - AAF220 : *Introduction à la technologie de l'information*
  - AAF410 : *Système d'information*

French Studies Courses

Courses 100-199

FRF150 *Communication écrite*

This course is an introduction to written communication in French. In addition to increasing students' ability to recognize and employ good writing techniques, it aims to familiarize students with various types of writing (resume, critical review, essay) and to explore strategies that facilitate writing across disciplines and genres.

Note(s): Only offered through Distance Education . Students with pronounced problems in basic grammar and sentence structure are encouraged first to complete DEF050: *Français correctif,* a self-paced course that is non-credit.
Contact Hours: 0 - 0 - 9
Credit(s): 1

FRF151 *Cours de composition et d'introduction aux études littéraires*

This course is divided into two parts. The first part examines grammar and writing; its goal is to develop the students' written French and their ability to present their ideas using a methodology-skills that will serve them well for all of the written work they will have to produce during their time at university. The second part of the course focuses on literature. Through the study of various literary works, a variety of literary genres from different centuries will be examined, providing students with a rich overview of French-Canadian literature during the first semester and of Francophone literature from outside Canada during the second semester. At the end of the year, students will have developed their ability to analyze, will recognize the characteristics of each of the literary genres taught, and will establish meaningful links between the literary works, and between literature and society.

Note(s): Compulsory for students in their first year in Science or Engineering. Offered annually.
Contact Hours: 4 - 0 - 6
Credit(s): 2

FRF152 *Cours de composition et d'introduction aux études littéraires I*

This course is divided into two parts. The first part examines grammar and writing; its goal is to develop the students' written French and their ability to present their ideas using a methodology-skills that will serve them well for all of the written work they will have to produce during their time at university. The second part of the course focuses on literature. Through the study of various literary works, a variety of literary genres from different centuries will be examined, providing students with a rich overview of French-Canadian literature during the first semester and of Francophone literature from outside Canada during the second semester. At the end of the year, students will have developed their ability to analyze, will recognize the characteristics of each of the literary genres taught, and will establish meaningful links between the literary works, and between literature and society.

Note(s): Compulsory course students in their first year in Arts. Offered annually.
Contact Hours: 4 - 0 - 6
Credit(s): 2

FRF160 *Composition et introduction à la littérature canadienne-française I*

This course introduces students to French-Canadian literature through certain texts that are typical of the following literary genres: drama, the novel, and the story/legend. French-Canadian texts are examined with special emphasis on their socio-historical background, character development, and themes. The course also aims at developing students' analytical minds, and at improving their writing skills and knowledge of grammar through production of written work.

Note(s): Only offered through Distance Education . This is a Web-based course and is offered in French only. Offered annually.
Prerequisite(s): FRF150 or equivalent
Contact Hours: 0 - 0 - 9
Credit(s): 1

FRF161 *Cours de composition et d'introduction à la littérature française I*

This course introduces students to canonical texts in French literature. French literary works of various eras are studied; examined works will be mostly prose (novels, short stories, tales). Through a series of written assignments, the course will also increase students' skills in the organization and production of university-level written work.

Note(s): Only offered through Distance Education . This course is offered in French only.
Prerequisite(s): FRF160 or equivalent
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 200-299

FRF262 *Cours de composition et d'introduction aux études littéraires - II*

This one-year course is divided into two semesters. The first semester is dedicated to Francophone literature from outside Canada since the 16th century, and the second semester focuses on French-Canadian literature from the 20th century. For both semesters, literary works of various genres (narrative, poetry, drama, etc.) belonging to different cultural movements will be analyzed. The course situates the literary works in the historic period they were written in and that influenced them, and in the history of ideas that accompanies the development of literature and society. At the end of the year, students will know the important phases that led to cultural modernity, and will be able to connect these phases to historical and social factors or to philosophical notions. In addition, they will have honed their ability to analyze, write essays and conduct bibliographical research-highly useful skills that will serve them well for the rest of their university career.

Note(s): All students must successfully complete FRF262 or its equivalent before taking a 300 or 400-level course; however, if they obtain the approval of the Department Head, they may take FRF262 and a 300 or 400-level course concurrently. Offered annually.
Prerequisite(s): FRF152 or equivalent. Students from RMC St-Jean must pass the Quebec government's French proficiency test, the 103 course and the GFA course; once they have successfully completed these prerequisites, they can take FRF262, otherwise they must retake FRF151/FRF152.
Contact Hours: 3 - 0 - 6
Credit(s): 2

FRF264 *Cours de composition et d'introduction à la littérature canadienne-française II*

This course is a study of advanced writing techniques (explanatory essay) and an introduction to French Canadian literary movements and writers of the twentieth century. The aim of the course is to enable students, through their readings, to improve their analytical skills and to explore important Quebec and French Canadian literary works and movements, especially from a sociohistorical point of view.

Note(s): Only offered through Distance Education . This course is offered in French only.
Prerequisite(s): (FRF160 and FRF161) or FRF151 or FRF152
Contact Hours: 0 - 0 - 9
Credit(s): 1

FRF265 *Cours de composition et d'introduction à la littérature canadienne-française II*

This course is a study of advanced writing techniques (explanatory essay) and an introduction to French literary movements and writers of the nineteenth and twentieth centuries. The aim of the course is to enable students, through their readings, to improve their analytical skills and to explore important French literary works and movements, especially from a sociohistorical point of view.

Note(s): Only offered through Distance Education . FRF264 + FRF265 are the equivalent of FRF262.
Prerequisite(s): FRF264
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 300-399

FRF312 *Regards croisés sur les littératures française et britannique (1850 -1900)*

Characteristics: This course is to be offered conjointly by the Department of French Studies and the Department of English; it is to be team-taught by two professors, one from each of the departments. It will focus on comparisons of important aesthetic and cultural movements.

Through analyses of representative texts in French and English, this course will familiarize students with important aesthetic concepts of the second half of the 19th Century, enabling them to trace connections and divergences between the two cultures. At the end of the course, the students will not only be able to describe the interactions between the writers of the two worlds, but also to apprehend the differences in the understanding of aesthetic movements on either side of the Channel.

Note(s): This course is designed for students in their third or fourth year of study in Arts (or at the discretion of the Departments of English and French Studies).
Prerequisite(s): Please note also that it is strongly recommended that students enrolling in this course have attained at least a 'C' in the second language **Reading Comprehension examination** .
Semester: Normally offered in Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF324 *La littérature francophone subsaharienne des In dépendances à aujourd'hui*

This course aims, through textual analysis and lectures, to provide the student with a deeper knowledge of the francophone literature of the sub-Saharan, especially that which deals with problems of post-colonial society. Through readings dealing with violence (Beti), dictators (Kourouma), child soldiers, the Rwandan genocide (Monénembo), immigration (Diome), etc., the student will acquire a better understanding of the stakes and mentality of certain areas of sub-Saharan francophone Africa. At the end of the course, the student will understand those forces which motivated various independence movements and the difficulties that resulted. The student will also acquire the basic tools which will allow him to reflect upon tribal wars, ethnic conflicts and genocide. He will also become familiar with literary representations of sub-Saharan francophone Africa. Finally, the student will be made aware of what literature can teach us about the limitations of the westernization of customs and mores and its unexpected consequences.

Note(s): Offered in alternate years. This course is intended for students in their third or fourth year of study.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF326 *La littérature francophone du Maghreb et du Moyen-Orient, de la colonisation à nos jours*

The objective of this course is to introduce the student to francophone literature of the Maghreb and of the Middle East through the study of their most representative works. This course will also allow the student to discover la francophonie arabe in general. The course will be divided into three parts: the first part will be devoted to writers of the colonial period; the second to texts written after the wars of independence; and the third to contemporary works. At the end of this course, the student will have gained a certain understanding of the uneasiness of certain intellectuals who employ the language of the colonizer while at the same time calling for independence. The student will also come to understand how such literature forces the writer to become *un écrivain engagé* , and how it of necessity turns into a vehicle for struggle, protest and demands for autonomy. The student will note the self-imposed role of the author as a righter of wrongs, specifically of the stereotyped Western vision of the history and society of the Middle East and of the Maghreb. He will also note the transformation of this literature from its roots in Arabic/Muslim communities to one which today is called upon to deal with current hot topics, such as the rise of fanaticism and the identity crises connected to immigration. Finally, the student will learn to recognize the literary and linguistic specificities of the works studied, all the while acknowledging them as products of the fusion of divergent cultures.

Note(s): Offered in alternate years. This course is intended for students in their third or fourth year of study.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF331 *L'expression de la guerre dans la littérature française*

This course examines the portrayal of war and military life in French literature from the Middle Ages to the present as well as the works that had a determining influence on this literature. The works covered in the course include novels, short stories, memoirs and poems. Students will be required to participate in discussions, write an essay, give an oral presentation, etc.

Note(s): This course is intended for students in the their second third or fourth year of study.
Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF333 *L'expression de la guerre dans la littérature canadienne-française*

The course examines the portrayal of war and military life in French-Canadian literature, from the founding of New France to the present day. Emphasis is placed on the 20th century, especially the two world wars. The works covered in the course include novels, short stories, plays, memoirs and poetry. Students will be required to take part in seminar discussions, write a dissertation and make an oral presentation.

Note(s): This course is intended for students in the their second third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF334 *La figure du sportif-guerrier dans la littérature québécoise*

Using works by civilization sociologist Norbert Elias and sociocriticism, this course explores the methods through which the advent of sport in Quebec culture contributed to the symbolic transfer of violence (war, state, economic, identity) into the world of sport. By re-examining Quebec literature (poetry, novel, theatre, song) with a focus on sport heroes (e.g., Jos Montferrand, Maurice Richard and fictitious heroes), their motives and their social recognition, students will learn how literature is a space for conflict, negotiation and mediation, as exemplified through the world of sport. By analyzing the figure of the athlete-warrior in Quebec literature, students will be able at the end of the course to identify the means through which conflicts of identity and social tensions are resolved through sport.

Note(s): Generally offered every two years.
Prerequisite(s): FRF151 or FRF152 or the equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF335 *Récits de militaires et d'explorateurs en Afrique de Napoléon à la Première Guerre mondiale*

This course aims, through text analysis and lectures, to give students an in-depth knowledge of travel stories, war stories and memoirs that give accounts of the exploration of Africa from the Napoleonic era to World War I. Through reading works (essays, newspapers, treatises, memoirs) written by both military personnel and explorers, students will understand the ways in which the exploration of Africa and the mores of its various peoples were talked about. The writings of Caillié, Douville, Faidherbe, Binger, Gallieni, Brazza, Blanc and Foureau will be studied and compared to those of other explorers such as Barth, Nachtigal, Livingstone and Stanley. At the end of the course, students will have acquired a solid knowledge of the poetics specific to the exploration narrative and will be more skilled at analyzing written works in which authors attempt to describe cultures that are different from their own.

Note(s): Usually offered every other year. This course is intended for students in the their second third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF337 *Caractèristiques linguistiques du français québécois*

This course examines, mainly from a synchronic perspective, the linguistic characteristics of modern-day Quebec French. More specifically, students will be introduced to the phonetic, morphological, syntactical and lexical particularities that distinguish Quebec French from standard French. Part of the course will be dedicated to different forms of Anglicization in each of the linguistic disciplines. At the end of the course, students will be able to assess the various differences between the Quebec variety of French and standard French and better understand how their language works.

Note(s): Generally offered every two years.
Prerequisite(s): FRF340
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF339 *Variété du français québécois*

This course examines the characteristics of spoken French in Quebec by analyzing the underlying historical, political, economic and social contexts. Students will be introduced to joual and its influence on literature and everyday language. More specifically, they will evaluate the impact of anglicisms on Quebec French, the importance of establishing standards different from those of French in France, and the usefulness of descriptive dictionaries as distinct from conventional dictionaries. At the end of the course, students will be able to identify and determine the factors that have contributed to the development of the Quebec variety of French.

Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF342 *Grammaire et rédaction avancées*

This course is for students who wish to improve their knowledge of the French language, both written and oral, in order to speak with accuracy and rigor in academic writings and in military contexts. In this course, students acquire grammatical and linguistic knowledge that will enable them to better control of the French grammar and its many difficulties as well as the current consensual metalanguage. Traditional grammar describes uses and defines rules that we must appropriate to be able to communicate clearly in written and oral languages in a military environment or otherwise. The spoken verb and hinges occupy a prominent place in the grammatical learning courses. The student will receive advice on sentence acceptability notions and on relief and phrasal structure in academic or military writing strategies.

Note(s): This course is intended for students in the their second third or fourth year of study.
Corequisite(s): FRF262 or equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF344 *Stylistique française I*

This course primarily aims to improve students' discursive competency in writing through a variety of writing exercises and to give them the necessary knowledge to express their ideas clearly and accurately in different stylistic works using a precise and rich vocabulary. Students will learn to recognize and, where possible, appropriately use the most striking stylistic devices in the French language, which can be found in a wide range of documents such as newspaper articles, film reviews, literary works and even technical texts. The primary goal of the writing exercises is to teach students to adopt the style best suited to the function of the documents they produce.

Note(s): Compulsory for all students who take the French Studies programme. This course is intended for students in the their second third or fourth year of study.
Corequisite(s): FRF262 or equivalent.
Semester: Usually offered every Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF346 *Stylistique française II*

This course aims to give structure to what the students learned in level I about grammar and style and to put the students' syntactical skills into practice through a variety of literary writing exercises. The works of authors from the 19th and 20th centuries will be analyzed, particularly short stories. During this course, students will learn to recognize and apply the various registers while striving to polish the various stylistic and lexical nuances of French.

Note(s): Compulsory for all students who take the French Studies programme. This course is intended for students in the their second third or fourth year of study.
Corequisite(s): FRF262 or equivalent.
Semester: Usually offered every Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF347 *Théories littéraires*

The course aims, by the introduction to representative theoretical texts, not only at familiarizing the students with the important literary theories, but also at teaching them to choose the approach which suits best in a given work and in their own reading of a corpus. At the conclusion of this course, the student will understand, on one hand, that no theory is absolute and, on the other hand, that each allows to understand and to analyze the literary work according to a specific but not exclusive angle. This way, he can use the learnt methodological approaches during all his studies. The course will be divided into sequences, from two to three weeks, among which each will be dedicated to a particular theoretical approach in order to present its development and its current applications (structuralism, literary psychoanalysis, sociocriticism, narratology, deconstruction, theory of the reception, feminist theory, cultural and postcolonial studies, etc.)

Note(s): It is strongly recommended to take this course during your second or third year in programme.
Prerequisite(s): FRF151 or FRF152 or the equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF348 *Approche historique et linguistique de la langue française I*

This course introduces students to the major language classifications and goes on to explore the origins of French, particularly French in Canada. With the aid of the major 20th-century linguistic theories (structuralism, functionalism, generative grammar), students will become familiar with the terminology of descriptive linguistics and contemporary French grammar and will go on to concretely examine the foundations of the articulatory phonetic system of French.

Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF350 *Approche historique et linguistique de la lange française II*

This course is a theoretical and practical exploration of the major fields of modern linguistics: derivational and inflectional morphology, semantics, lexicography and syntax. Students will apply the knowledge they acquire to identify and analyze neologisms in everyday language in France and Quebec.

Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF353 *Roman français du XIXe siècle*

The objective of this course is to present the origins of the French novel and how it flourished during the 19th century. Through reading and interpreting the most representative works as well as lesser-known titles, students will gain in-depth knowledge of the genre, supported by various theories and poetics. Students will be able to give a precise definition of "novel" and describe the development of the trends and types of novels in the 19th century: Romanticism, realism, naturalism, decadence and *fantastique* . The course will also enable students to understand why, after a period of fame for its realism and naturalism, the novel would experience a crisis in the late 19th century and the early 20th century.

Note(s): This course is intended for students in the their second third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF355 *Roman français du XXe siècle*

This course is a study of the important phases that shaped the development of the novel in France in the 20th century through the study of a number of representative works. All of these works are striking in many respects, and they will be examined in relation to the art and thinking associated with each period; therefore, relevant cultural movements will be studied. Some of the topics that may be covered are the mise en abyme technique, which appeared in novels at the turn of the century; surrealism, which flourished during the interwar period; the notion of engagement, which took shape with World War II; existentialism; the *Nouveau Roman* , which developed in the 1950s and 1960s; contemporary novels written by women; and migrant literature.

Note(s): This course is intended for students in the their second third or fourth year of study.
Semester: Usually offered every other year in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF356 *Rapprocher les deux solitudes: les littératures du Canada anglais et du Canada français*

Characteristics: This course is to be offered conjointly by the Department of French Studies and the Department of English; it is to be team-taught by two professors, one from each of the departments. It will focus on comparisons of important aesthetic and cultural movements.

Through analyses of representative texts in French Canadian and English Canadian literature, this course will familiarize students with important aesthetic concepts in each of what Hugh LacLennen famously labelled "the two solitudes," enabling students to trace connections and divergences between the two cultures. Specific texts and topics will change year to year but may include canonical writers (such as Roy, Yves Thériault, Margaret Atwood, Leonard Cohen), and topics such as nationalism, war, economics, religion, gender, and narrative form.

Note(s): This course is designed for students in the their third or fourth year of study in Arts (or at the discretion of the Departments of English and French Studies).
Prerequisite(s): Please note also that students are permitted entry into this course only if they have attained a 'C' in the second language Reading Comprehension examination or equivalent.
Semester: Normally offered in Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF360 *Composition sur des sujets d'intérêt public I*

This course is designed to improve students' writing skills on topics in public administration. Students will work to master different writing strategies adapted to the purpose of the text and the intended readers. Specifically, they will produce argumentative, narrative and descriptive texts about important issues. They will also have the opportunity to develop their techniques for summarizing and synthesizing texts. All practical writing exercises will be supported by pre-class reading of at least one assigned text. Required readings will be drawn from a variety of fields to illustrate the social discourse the students must engage with: legislation, newspaper articles, literary works, and texts in disciplines such as political science, sociology, psychology and economics.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF362 *Composition sur des sujets d'intérêt public II*

This course is designed to improve students' writing skills on topics in public administration. Students will work to master different writing strategies adapted to the purpose of the text and the intended readers. Specifically, they will produce argumentative, narrative and descriptive texts about important issues. They will also have the opportunity to develop their techniques for summarizing and synthesizing texts. All practical writing exercises will be supported by pre-class reading of at least one assigned text. Required readings will be drawn from a variety of fields to illustrate the social discourse the students must engage with: legislation, newspaper articles, literary works, and texts in disciplines such as political science, sociology, psychology and economics.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF367 *Poésie française du Moyen Âge à la Révolution*

This course is a study of French poetry from the Middle Ages to the French Revolution. We will examine the various movements that occurred over this long period -particularly the Pléiade, baroque and classicism and classicism -by situating the poetic works in their cultural context. Several literary beacons (such as Villon and Ronsard) will be studied in depth, but a number of other poets will also be looked at, and a variety of genres, registers and contents will be broached. A number of aspects will be emphasized-stylistic, prosodic, lexical, thematic, etc.-as well as their interrelation. Students will learn theory (linguistics, versification, etc.) and will learn to identify certain rhetorical techniques. While analyzing poetic works, sometimes comparatively, students will develop an aesthetic reflection on the nature of poetry by examining the understanding of not only the critics, but of the poets themselves.

Prerequisite(s): FRF151, FRF152 or equivalent.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF369 *Poésie d'expression française depuis la Révolution*

This course is a study of French poetry and other Francophone poetry from the French Revolution to the present. We will examine the 19th century, particularly romanticism, Baudelaire and symbolism; the Belle Époque, as the late 19th century and the early 20th century is called; the *Esprit nouveau* , which took shape with World War I; Dadaism and surrealism, which flourished in the interwar period; socially engaged poetry, which took shape with World War II; the voices of the French-speaking world, which resonated with many in the second half of the 20th century; and poetic songs, which have abounded in recent decades. Throughout this rich journey, links will be made with the visual arts: painting, sculpture and artistic photography.

Note(s): This course is intended for students in their second, third or fourth year of study.
Prerequisite(s): FRF151, FRF152 or equivalent.
Semester: Usually offered every other year in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF372 *Théâtre médiéval et classique*

This course will study medieval theatre, including farces and mystery, miracle and morality plays, French Renaissance theatre and classical theatre.

Cultural trips will be obligatory if circumstances and financial resources allow.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF373 *Théâtre post-classique*

This course will study post-classical drama in France. At the end of the term, students will be able to identify the different esthetically and ideological trends in French dramatic literature of the XVIII th and XIX th centuries.

Cultural trips will be obligatory if circumstances and financial resources allow.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF375 *Théâtre du XXe siècle*

This course attempts to identify what it is that determines modernity in theatre, by examining a few texts--mostly dramatic, but some theoretical--that have marked the 20th century. At the end of the course, the student will know the major movements in theatrical aesthetics and make connections between dramatic, structural and thematic issues.

Cultural trips will be obligatory if circumstances and financial resources allow.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF376 *La littérature française du Moyen Âge I*

After a presentation of a number of sociohistoric elements and an overview of the birth of the French language, this course will examine French medieval literature from its origins (the Oaths of Strasbourg) up to the 13th century, dealing with the epic form (the Song of Roland), the novel of courtly love and knightly honour (Knights of the Round Table, the Story of the Grail), the fabliau and the chantefable (Aucassin and Nicolette). A study of various aspects of medieval life (society, pastimes, clothing, food, war, etc.) will complement the material.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF378 *La littérature française du Moyen Âge II*

This course follows FRF376 and addresses French literature of the 13th, 14th and 15th centuries. More specifically, we will be studying the inception of theatre as a literary form (religious plays, works of Adam de la Halle, *Farce de ma être* Pathelin), various forms of lyrical poetry (*chanson de toile* , jeu-parti, etc.), and important longer works such as *Le roman de Renart* and *Le roman de la rose* . The end of the Middle Ages brings us to the work of the man considered to be the first modern French poet: François Villon.

Note(s): This course is intended for students in their second, third or fourth year of study.
Prerequisite(s): FRF376
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF379 *L'Art oratoire*

Through the analysis of texts, lectures, presentations and oratory performances, the course aims to offer students a theoretical and practical knowledge of various approaches and methodologies in the preparation and drafting of oral discourse. By reading treatises on oratory art, the students will learn the usual techniques that allow the oral transmission of thought in a convincingly natural and spontaneous manner. We will start from Antiquity, where the foundation of oratory art is found, then move to the study of different manuals of classical and modern oratory in order to familiarize the students with the great theories of the art of public speaking. At the end of the course, students will have acquired precise knowledge of the history of oratory art and of the means to better express themselves in public.

Semester: Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF381 *Les Moralistes français du XVIe siècle*

The aim of this course is to offer students a thorough knowledge of non-fictional prose of the 16th century from the Italian Wars to the Edict of Nantes through a combination of textual analysis and lectures. The main focus of this course, the Literature of Ideas, will be approached from different angles, focusing on understanding the different religious, literary, and philosophical principles to enable a better insight into the interactions of the perspectives of the time. Through close reading of diverse texts, students will understand the consequences of European Renaissance, the arguments typical to Protestantism, and the significance of the issues in the civil wars that devastated France during the second half of the century. At the end of the course, the student will have an understanding of the genres of the period (utopian fiction, the pamphlet, and the essay) and of other types of argumentation that are characteristic of this period of troubles and radical political transformations.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF383 *Les Moralistes français du XVIIe siècle*

The aim of this course is to give the students a thorough knowledge of French Literature of the 17th century. Through the reading and analysis of different texts that are on the margins of the traditional corpus of theater and poetry, the student will come to understand the consequences of the Wars of Religion and of the Edict of Nantes, the character of the numerous superstitions and occult beliefs that were very common during these times, the development of new philosophical principles, the modification of characteristic Christian beliefs, the impact of the concept of the *honnéte homme* on the idea of decorum, and the arguments that justified and then supported the establishment of Absolutism. At the end of this course, students will have acquired a better understanding of the issues that concern French literature between the assassination of Henri IV and the War of the Spanish Succession. They will have gain knowledge of the philosophy, maxims, fables, memoirs, and tales of the time, as well as an understanding of the characteristics of the types of discourse produced during the century of Louis XIV.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF386 *La littérature française du siècle des lumières I*

The aim of this course is to allow students to acquire an excellent understanding of the Literature of the Enlightenment. A series of lectures combined with textual analysis will help the students to gain insight and then deepen their understanding of historical concepts linked to the intellectual perspective of the Old Regime (Fénelon, Saint-Simon), as well as those linked to the protests of the authors of the Enlightenment (republic, anticlericalism, equality, etc.). Eighteenth century literature will be analyzed as a vehicle of ideologies that rest on a new philosophical conception in which human beings have become the foundation of knowledge (Montesquieu, Rousseau, Voltaire). During the semester, the student will acquire the aptitudes that will allow him to recognize and understand the thinking that led to the 1789 French Revolution. At the end of the course, students will understand the great axis on which the philosophy of Enlightenment is built: rejection of all values linked to the Old Regime, ambiguous return to the modes of thinking associated with classical antiquity (Montesquieu, Marmontel), belief in a natural religion (Rousseau, Mercier), and faith in the future as well as in progress (Turgot, Condorcet).

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF388 *La littérature française du siècle des lumières II*

The aim of this course is to analyze the periods preceding and subsequent to the French Revolution. Lectures combined with textual analyses and oral presentations will help deepen the knowledge of the factors that motivated the Revolution and of the changes in thinking that accompanied it. The discourses of the Encyclopedists (Diderot, d'Alembert) will be analyzed, as well as the licentious discourses of Diderot, Casanova, and Laclos. The course will also examine the views expressed against the practice of torture, on the appearance of the *guillotine* (Dr Guillotin and Beccaria), on the legalization of divorce (Brissot de Warville), on the cult of reason (Danton) and on the cult of the Supreme Being (Robespierre). It will also consider the views promulgated by the Catholic reactionaries (Joseph de Maistre, Chateaubriand and Vicomte de Bonald), that began to be published after Thermidor. During the semester, students will acquire the ability to recognize and understand different revolutionary and post-revolutionary attitudes.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF389 *De l'influence de la littérature anglaise en France à l'époque des Lumières*

This course, offered jointly as a "dialogue course" between the English Department and the French Department, will be team-taught by a professor from each department. The course will therefore include classes in English, alternating with classes in French concerning the influence of the English novels (by such authors as Daniel Defoe, Samuel Richardson, Henry Fielding, Laurence Sterne, Jane Austen) on literature of the French Enlightenment, including their reception, their translation, and their adaptation, in a study of how the novels under consideration are invested with new meanings through translation. The student will come to recognize that translation functioned as a compromise between the two cultures rather than conforming to today's convention of linguistic and semantic equivalence.

Notes(s):
This course is designed for students in the their third or fourth year of study in Arts (or at the discretion of the Departments of English and French Studies). One of the three bilingual courses will generally be offered every other year.

Prerequisite(s): Students are permitted entry into this course only if they have attained a 'C' in the second language Reading Comprehension examination or equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

FRF413 *Littérature européenne en traduction*

This course examines European literature in translation by studying important works, literary movements, and large themes. While putting emphasis on the diversity of the literature in Europe (Spain, England, Italy, Russia, Germany, etc.), this course will show that definitions of literature and national literature are determined by the social status of the intellectual, of the literary critic and of literature within society. The course will study novels, poetry and drama from Europe, from a selection determined by the teacher, either on a national or on a transnational comparative scale. An important aspect of this course is to determine the place of the masterworks in the evolution of world literature. At the end of the course, students will be able to compare texts from other literary contexts, gain new perspectives in literary history, and explore literature through the lens of literary canons, genres, themes, and forms.

Note(s): Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF414 *Théâtre européen en traduction*

This course studies European theatrical plays in French translation, with particular— but not exclusive—attention to the canons that marked Western theatre. It may then look at the Greek tragedies of Antiquity, the Elizabethan period and the Spanish Golden Age of the Baroque repertoire, as well as creators of the 20th century like the Italian Luigi Pirandello and the German Bertolt Brecht, who were imitated by others. By the end of the course, students will know the seminal works in the history of theatre and their influence on the contemporary dramatic art that continually draws upon them.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF415 *Littératures non-européennes en traduction*

The objective of this course is to introduce students to the study of non-European literature. Texts will be examined in their French translation. By studying important works, significant literary movements, and large themes, the course will analyze how national literatures are built and how literature is used in context outside the French-speaking literature. While stressing the diversity of literature (Americas, Africa, Asia, Oceania), this course will evaluate emerging literature in their relationship with the European canon. The course may study one region in particular or may elaborate a comparative study of two (or more) regions. At the end of the course, students will be able to understand masterworks originating from another language (English, Spanish, Portuguese, Arabic, etc.), to compare these works to the traditions of French-speaking literatures, to gain new perspectives in literary history, and to see the relative universality of canons, genres, themes, and literary forms.

Note(s): Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF420 *Le roman épistolaire*

The course provides students an in depth knowledge of the epistolary novel at the end of the 17th century and during the Enlightenment through the study of its most representative works. The French novel underwent an important change in 1669 with the publication of Guilleragues' novel, *Lettres d'une religieuse portugaise,* comprised entirely of letters. This new narrative device, which became increasingly popular among novelists, legitimized the expression of love by concealing the identity of the author behind that of the letter writer, giving the impression of an actual eyewitness account. This course aims to define the epistolary novel, to analyse the issues inherent to the letter form novel, as well as to study major works of this genre, including *Lettres de la marquise de M*** au comte de R****** (1732) by Crébillon *fils* , *Lettres de Fanni Butlerd* (1757) by Marie-Jeanne Riccoboni, *Julie ou La Nouvelle Héloïse* (1761) by Jean-Jacques Rousseau, *Caliste ou Lettres écrites de Lausanne* (1788) by Isabelle de Charriére and *Les Liaisons dangereuses* (1782) by Choderlos de Laclos.

Prerequisite(s): FRF151, FRF152 or equivalent.
Semester: Usually offered every other year, in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF422 *Littérature de voyage*

The objective of this course is to introduce students to two similar literary genres: the travelogue and the travel novel. Since the age of the Great Discoveries, the travelogue gave rise to increasing interest in France. While Paul Le Jeune and Jean de Brébeuf gave a written account of their travels to America, Jean Chardin and Jean-Baptiste Tavernier renewed the way in which the East was perceived. Anchored in reality, the travelogue, which claimed to be objective and transparent, served a double role: to portray the truth and to teach through description. The travelogue became a useful means to fight the accusations of improbability and puerility which weighed down the novel as a genre. This course seeks to define and describe travel literature, to analyse its issues, as well as to study major works of the period including travelogues such as *Le Grand Voyage du pays des Hurons* (1632) by Gabriel Sagard and *Le Voyage autour du monde* (1766-1769) by Bougainville, as well as travel novels including *Espion turc* (1694) by Giovanni Paolo Marana, *Lettres persanes* (1721) by Montesquieu, *Lettres moscovites* (1736) by Francesco Locatelli and *Lettres d'une Péruvienne* (1747) by Françoise de Graffigny.

Prerequisite(s): FRF151, FRF152 or equivalent.
Note(s): Normally offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF424 *La paralittérature*

This course introduces students to a considered analysis of a number of literary genres considered to be on the fringe of the canonical work officially recognized by the literary institution. From fantasy writing to fanfiction, by way of science fiction, the romance novel, erotic literature, the detective novel, spy novel, horror novel, adventure novel and comic strips, students will learn to identify the main literary characteristics of these “sub-genres.” They will also be able to diachronically analyze their sociological role and place in popular culture.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF426 *Études dirigées avancées*

This two-semester course is intended for fourth-year students doing an honours degree in French who obtained an average of A- or higher in their French Department courses in their third year. Before registering in this course, students must find a professor to guide them during both semesters, and they must receive the approval of the Department Head. This course is given in the form of guided readings. Students must produce either a significant quantity of written work or a single written piece of a substantial length on a specific theme. Students will develop their critical thinking skills and will use a number of theoretical works published in their area of research.

Note(s): Usually offered annually. This course must be approved by the department head.
Contact Hours: 3 - 0 - 6
Credit(s): 2

FRF428 *L'Essai au XXIe siècle : crise, terreur, paranoïa et sécurité intérieure*

This course aims to impart to the student, by means of textual analyses and lectures, a greater knowledge of diverse currents that characterise the francophone essay since the beginning of the 21st century. Through readings of different essays and studies of the specific poetics of this literary genre, the student will become familiar with the ways in which the 21st century essay breaks today's world down into themes. The student will also gain greater awareness of society's profound transformations, its crises, its innovations and its catastrophes, which all contribute to the creation of a new apocalyptic "imaginaire", which can be defined by the loss of stable points of reference. Readings of various essays will allow us to study sequentially the discursive construction of new internal threats, different conspiracy theories, the topic of crisis as a way of interpreting the world, rhetorical anxiety-provoking situations and the stylisation of paranoia (Hofstadter). By the end of the course, the student will have acquired a thorough knowledge of the poetics of this genre as well as an enhanced ability to pinpoint and analyse recurrent themes by which the modern essay strives to make sense out of the 21st century.

Note(s): Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF430 *L'Échec des utopies dans la littérature française depuis la fin de la guerre froide*

This course will examine how the issue of failed utopias is manifested in contemporary French literature since the end of the Cold War through the analysis of representative works. On the one hand, it will put into perspective the recent production by placing it in the history of utopian literary genre and its derivations dystopian. On the other hand, we seek to realize specific strategies implemented today by the writers to question the utopian, through various methods such as the registration referential in history, the fantastic storytelling or the use of science fiction. At the end of the course, students will have grasped the way in which literature can be an experiment of possibilities and thus reveal the potentialities contemporary.

Prerequisite(s): FRF151, FRF152 or equivalent.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF432 *Le surréalisme*

This course examines surrealism, the most significant cultural movement of the 20th century. It starts with a review of the 19th-century writers who were the forerunners of the movement and the dada phenomenon, where it all started. It then examines the founding works of André Breton and the key concepts found therein, but also the work of authors including Reverdy, Éluard and Desnos. In addition to looking at different literary genres, students will focus their attention on the visual arts-particularly photography, painting and sculpture-and on contemporary expressions of surrealism that can be found in advertising, film, etc. At the end of the course, students will have a strong understanding of the period during which surrealism flourished most strongly, the interwar period, as well as the movement's forerunners in the previous century and its many descendants today.

Note(s): Usually offered every other year. This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF434 *Témoigner*

This course aims, through lectures and text analysis, to study the poetics and aesthetics of testimony, from Jean Norton Cru (*Témoins* [witnesses], 1929) to the present, more specifically war testimony, workers' testimony, journalistic testimony and autoethnographic testimony. This course aims to give students in-depth knowledge of the art of testimony (narrative techniques, the work of memory, striving for coherence, effects of reality) and a better understanding of the polarity of opinions expressed in often contradictory testimonies regarding similar experiences. Students will grasp the issues that the various testimonies reveal and, through analyzing the tensions inherent in any recounted experience, gain a better understanding of the significance and the scope of testimonies.

Note(s): Also offered through Distance Education . Usually offered every other year. This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF436 *L'Absurde*

This course will begin by examining the philosophical roots of the notion of "absurd" as they were expressed in the 19th century, such as Kierkegaard's "despair," and as they developed in the 20thcentury, such as Heidegger's "anxiety." But the main focus will be on the ways in which the notion was expressed by 20th-century writers. The works of Sartre and Camus will be of primary importance, in the three major literary genres they used: essays, stories and theatre. We will also examine the aesthetic change of direction that the absurd took after World War II, with the theatre of derision. At the end of the course, students will be able to identify the absurd in theoretical and fictional works and will be familiar with the different forms it has taken over time.

Note(s): Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF438 *Rétrospective sur un auteur*

This course proposes to study various facets of the work of a single author, in the context of his/her time-frame. The choice of the author will depend upon the professor teaching the course that particular year. This course aims to present an in-depth perspective on the work of an author of French, Quebec or francophone literature in general. The author's work will be explored whenever possible by referencing at least two genres in which he/she has excelled. By the end of the course, the student, through study of complete works and representative excerpts, will discover the depth of the author's impact on the literature of his/her time and upon posterity. The student will learn in detail the literary currents associated with the author, as well as the distinctive characteristics of his/her writing and his/her thematic and stylistic preoccupations. Finally, this course will allow the student the opportunity to become familiar with the author's era, opening up further important historical, political and sociological considerations.

Note(s): Usually offered every other year.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF440 *Vie et mort des grands héros de l'Antiquité*

This course is a study of the ways in which Greek and Roman writers of antiquity represent great heroes. At the end of the course, students will be familiar with the main classical models dealing with heroism and will be able to explain their relationship with mythology and philosophy. They will be able to recognize and analyze the parameters within which the concept of wartime heroism is formed and is justified in the epics of Homer and Virgil; the tragedies of Sophocles, Aeschylus and Euripides; and the works of Plutarch, Lucan, Apuleius, Caesar and Athanasius of Alexandria.

Note(s): Usually offered every other year. This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF443 *La rhétorique antique*

This courses aims, through text analysis and lectures, to give students an in-depth knowledge of various concepts of ancient rhetoric. Through reading different treatises and studies, students will become familiar with the ways in which rhetoric was defined during the Greek and Roman antiquities, they will understand the nature of its components and sub-components, and they will learn the rhetorical and logical foundations of argument analysis. The rhetoric of philosophers such as Plato, Aristotle, Demosthenes, Cicero, Quintilian and Apsines will be studied in order to understand the historical mistrust of rhetoric and the way its merits have been defended. At the end of the course, students will have learned what characterizes ethos, logos, pathos, syllogism, enthymeme, hypotyposis, topos, paralogism, etc., so as to better analyze the way in which persuasive speeches are constructed.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF444 *La rhétorique moderne*

This course aims, through text analysis and lectures, to give students an in-depth knowledge of various concepts of rhetoric from the 18th century to present. Through reading different treatises and studies, students will become familiar with the ways in which the modern world has transformed our understanding of rhetoric. The rhetoric of philosophers such as Dumarsais, Fontanier, Schopenhauer, Chaïm Perelman, Stephen Toulmin, Marc Angenot and Michel Meyer will be examined from various angles in order to understand how this discipline has developed over the past three centuries. At the end of the course, students will have learned the cognitive advantages and limits of metaphorical production, ethical and eristic rhetoric, the foundations of problematology, and the relationship between persuasion and a given axiological system. Students will acquire the skills necessary for recognizing and using a large number of argumentative techniques in accordance with their purpose.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF453 *Le roman canadien-français avant la Révolution tranquille*

This course is a study of the development of the French-Canadian novel before the Quiet Revolution. After discussing a few basic historical and theoretical principles, we will examine the novels that mark the important phases of this development. Emphasis will be placed on themes and ideologies in a sociohistoric context.

Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF455 *Le roman canadien-français depuis la Révolution tranquille*

This course is a study of the new directions that the Quebec novel has taken in the wake of the sea change brought about by the Quiet Revolution. We will focus on the expression of a new nationalist sentiment in novels. We will cover the concept of the socially engaged writer, new styles of writing, the emergence of women's writing and, above all, the growing importance of migrant literature. This will lead us to reconsider the relationship between the various literatures of French-speaking Canada in the context of minority literatures.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF460 *L'écriture au féminin sous l'Ancien Régime*

This course will study the writings of women during the Ancien Régime. From Marguerite de Navarre to Mme de Genlis, many women writers, including Mme de Villedieu and Marie-Jeanne Riccoboni, to name only a few, tried to establish themselves as authors. Through a close reading of diverse texts - including fairy tales, short stories and novels - students will understand the conditions women authors faced and the reception of their works. They will be able to analyse the main themes raised in the works studied, to identify the strategies used to question the place of women in society and to formulate a critical reflection on the publications of women writers from the Renaissance to the French Revolution.

Prerequisite(s): FRF151, FRF152 or equivalent
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF466 *Poésie canadienne-française - I*

This course is a study of Quebec poetry from its origins up to the mid-20th century. After reviewing the beginnings of written poetry in French Canada, we will examine Quebec poetry specifically: the Literary and Patriotic Movement of Quebec; the Montreal literary school; the regionalist poets and the exotic poets, including the argument that brought them into conflict; and lastly, the solitude generation. We will situate these poetic movements in their respective sociocultural contexts and will see the role they played in the community. Their aesthetic characteristics will also be pointed out. To accomplish this, we will study numerous representative poets, but will look at a few of them more closely, such as Nelligan, DesRochers, Saint-Denys Garneau and Grandbois.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF468 *Poésie canadienne-française - II*

This course is a study of French-Canadian poetry, principally Quebec poetry, since the publication of *Refus global* in 1948. The movements and periods we will examine include automatism, including the works of Claude Gauvreau, Paul-Marie Lapointe and Roland Giguère; poés *ie du pays* [Quebec nationalist poetry], including the works of Paul Chamberland, Gérald Godin, Gaston Miron and Michèle Lalonde; formalism and feminism, including the works of Nicole Brossard and France Théoret; the counterculture and more contemporary poetry. We will analyze the often close relationship between the poet and society. Also, we will draw parallels with French poetry and the visual arts. Lastly, we will focus our attention on songs.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF470 *Théâtre canadien-français - I*

After an overview of the history of drama in French Canada, this course will study the real development of this literary genre from 1950 to 1970. The plays of some major playwrights will receive particular attention.

Cultural trips will be obligatory if circumstances and financial resources allow.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall .
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF472 *Théâtre canadien-français II*

This course will study dramatic production in French Canada since 1970.It will show the diversity and originality of that production through the works of important playwrights.

Cultural trips will be obligatory if circumstances and financial resources allow.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF474 *La littérature française de 1945 à 1980*

This course aims to provide students a better understanding of the profound changes taking place in the field of French literature in the aftermath of World War II which determined the shape of contemporary literature in France.

Through a detailed study of several important literary movements such as the OuLiPo, and through specific examples from the "age of suspicion" inaugurated by the Nouveau Roman to the death of the two great figures Roland Barthes and Jean-Paul Sartre, this course will capture the innovations developed by writers of that time, in terms of poetics and theory, by situating them in their context.

Prerequisite(s): FRF151, FRF152 or equivalent
Semester: Usually offered every other year in the Fall.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF476 *La littérature française de 1980 à aujourd'hui*

This course offer students an in depth understanding of current French literature, as well as an understanding of the issues to the contemporary era, not only within the study of literature, but also outside its boundaries.

The 1980s saw a new generation of writers appear, which, although they inherited from the formalists and experimental novels of their predecessors, as well as from their theoretical concerns, implemented a return to the notion of story and to the traditional novel. This shift also concerns the practice of the previous generation of writers, whose writing also tends to become transitive, with different aesthetic modes.

The course will begin by focusing on this turning point and by offering a portrait of the following thirty years. Several major works of this time will then be considered, while particular attention will be paid to the innovations that characterize their relationship with reality.

Prerequisite(s): FRF151, FRF152 or equivalent
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF478 *Les liens entre la littérature française et les arts (arts plastiques et musique)*

This course aims to reveal to the student the multiple connections between literature and other art forms. Through study of literary works of fiction and works of art criticism, the student will, by the end of the course, come to an understanding of the love-hate relationship between authors and artists (common esthetic movements, solidarity or rivalry between different arts and between artists, etc.). Moreover, the student will observe the functions and representations of work of art as integrated into the literary text (Hugo's *Gavroche* taken from Delacroix's *La liberté guidant le people* , Vinteuil's sonata as it appears in Proust's *Un amour de Swann* , for example) and will describe the manner in which writing itself aspires to become a work of art (the sculptural solidity of a work of literature for the Parnassiens, the cathedral-like structure of Proust's writings, for example).

Note(s): Usually offered every other year. This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF479 *Discours et pouvoir*

Through lectures and analysis of texts, this course will equip students with technical and theoretical knowledge of various discourses that represent power or use it to change opinions. The course will begin with a look back at previous centuries to illustrate the discursive use of power in relation to forms of social unrest such as revolutions, conscription, wars, crises and recessions. Through their reading of essays, pamphlets, treaties and opinion pieces, students will learn to decode the ways in which cultural, political, military, economic and bureaucratic powers interfere with discourse production. They will also see how those powers can be praised, criticized or rejected using a variety of arguments. Students will become familiar with a number of modes of domination and with how discourses have objectified them. By the end of the course, they will have acquired valuable skills in the discursive representation of power, its nature, its evolution and its complexity.

Note(s): This course is intended for students in their second, third or fourth year of study.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF483 *Civilisation canadienne-française avant le XXe siècle*

This course provides an overview of the development of the major currents of thought in French Canada, from the beginning of the colony (writings of New France) up to the eve of the 20thcentury. Emphasis will be placed primarily on the different themes and ideologies in a sociohistoric context, and the importance of the narrative style of the works will also be considered. We will look at the birth of numerous literary genres: essay, travel writing, poetry, drama, story and novel.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF485 *Civilisation canadienne-française de 1900 à nos jours*

This course picks up where FRF483 leaves off. Students will continue to examine written works that reveal a collective identity, both inside and outside Quebec; naturally, the universal scope of the themes and ideologies that developed will also be considered. We will focus our attention on narrative prose (stories and novels), popular music and the work of a number of stand-up comedians, to illustrate the development of nationalist thought.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF493 *Littérature canadienne-française hors Québec*

An introduction to the diverse manifestations of French-Canadian literature outside Québec. A study of French-Canadian culture---especially Acadian, Franco-Ontarian and Franco-Manitoban--- through their literary works. After a brief look at the history of the French presence in Canada, we will examine the sociopolitical and cultural connections between the French minorities of l'Acadie, of Ontario and of western Canada and, inevitably, the relationship of these minorities with Quebec. Special attention will be given to the literary concept of l'exiguïté, in connection with the search for identity and with the evolution of these minorities in the context of multiculturalism.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

FRF495 *La francophonie dans le monde*

This course will study the literature and culture of francophone societies outside France, Canada and Africa. More specifically, it will concentrate on the literature of the Americas (Antilles, Louisiana), of Europe (Belgium, Switzerland) and of French Polynesia (New Caledonia). It will analyze the evolution of these literatures and, if need be, of the oral traditions particular to the culture studied. A main theme of this course will be the sometimes problematic relationship of these literatures with metropolitan France. The goal of the course is to lead the student to a better understanding of lesser known francophone cultures.

Note(s): This course is intended for students in their second, third or fourth year of study.
Semester: Usually offered every other year in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

History Undergraduate Programme

Introduction

The Department of History shares in the primary mission of the college's academic wing, to provide university-level education to officer cadets as one of the essential elements of their professional development. To this end, the programme in history is designed to meet the specific needs of two types of students; those who major in history and those taking degrees in other departments who have an interest in the discipline.

The Department of History has four primary teaching goals:

to teach the essential elements of historical analysis so that students acquire the historical background required to understand the fundamental issues of our time;
to provide survey and specialist courses that cover Canadian history, military history and strategic thought, Canadian military history, the history of international relations, and the history of the United States, and Europe, as well as several other courses on more specialized themes and topics;
to explain the different historiographic schools of thought and apply the different methods; and
to develop students' intellectual rigour so that they can present their thoughts in the form of sound arguments, both orally and in writing.

Structure

All students pursuing a degree in history are required to complete the core curriculum. Students are not normally allowed to register for 300 or 400 level course without having completed one junior course.

All the HIE400-level courses are designed as seminar courses. If enrolment in one of these exceeds 18, priority will be given to those students who require them to fulfil mandatory degree requirements. Authority to authorize exceeding this cap rests with the head of the history department.

Core Curriculum Courses

The department offers a number of courses that are required as part of the core curriculum. In many instances, these courses can also be counted towards requirements for a B.A. Degree or Minor in History.

Core history courses for students in the arts:

- HIE102: History of Canada
- HIE202: Introduction to Canadian Military History

(For students in Business Administration HIE203 replaces HIE202. It is highly recommended that those wishing a minor in History, or who wish to maintain flexibility to change degree programs take HIE202) .

- HIE271: Introduction to Military History and Thought

(For students in History or Military and Strategic Studies HIE270 replaces HIE271. ***It is highly recommended that those wishing a minor in History take HIE270)*** .

Core history courses for students in science and engineering:

- HIE207: History of Canada
- HIE203: Introduction to Canadian Military History
- HIE271: Introduction to Military History and Thought
- HIE289: The Impact of Science and Technology on Society and the Environment *(an engineering degree requirement only).*

General Programme Requirements

Students enrolled in a B.A. History, who wish to pursue a B.A. Honours History, will apply to the department in the second term of their third year. Eligibility to enter the honours programme includes; a B- average in third year, maintaining a B average in all history courses to date and, the permission of the department.

"To earn an honours bachelor of arts degree within a discipline, a student must successfully complete the required courses set out in the applicable honours programme of study, with at least 20 credits within the discipline, must maintain a minimum B average in the honours courses in all 300 and 400 level courses in their honours programme of study, and must attain at least a B- average in the 400 level courses."

B.A. Honours History

Completion of a 40 credit programme in the arts, including the core courses for arts programmes . A minimum of 20 credits in history, approved by the department, including all of the following:

HIE102: History of Canada (2 credits)
HIE202: Introduction to Canadian Military History (2 credits)
HIE270: An Introduction to Military History (2 credits)
HIE284: A History of Europe since the 15th Century (2 credits)
HIE424: Thesis **or** HIE426: Advanced Directed Studies (2 credits)
Plus
four other history credits at the 400 level (4 credits)
Plus
six other history credits (6 credits)

B.A. History

Completion of a 40 credit programme in the arts, including the core courses for arts programmes . A minimum of 16 credits in history, approved by the department, including all of the following:

HIE102: History of Canada (2 credits)
HIE202: Introduction to Canadian Military History (2 credits)
HIE270: An Introduction to Military History (2 credits)
HIE284: A History of Europe since the 15th Century (2 credits)
Plus
four other history credits at the 400 level (4 credits) **Plus**
four other history credits (4 credits)

Programme Outline Tables

The programme outline tables are an example of the typical course load of a student enrolled in a history programme.

B.A. Honours History

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note1 POE116 PSE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 1 optional credit Note2 1 optional credit Note3	ENE210 HIE202 HIE270 HIE284 MAE106 Note1	ENE210 (**cont'd**) HIE202 (**cont'd**) HIE270 (**cont'd**) HIE284 (**cont'd**) 1 science credit Note4
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 **History** 3 credits **Elective** 1 credit	1 science Credit Note4 **History** 3 credits **Elective** 1 credit	POE205 HIE424 **or** HIE426 **400-level History** 2 credits 1 science credit Note4	PSE401 HIE424 **or** HIE426 (**cont'd**) **400-level History** 2 credits **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.A. History

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note1 POE116 PSE103	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 1 optional credit Note2 1 optional credit Note3	ENE210 HIE202 HIE270 HIE284 MAE106 Note1	ENE210 (**cont'd**) HIE202 (**cont'd**) HIE270 (**cont'd**) HIE284 (**cont'd**) 1 science credit Note4
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 **History** 3 credits **Elective** 1 credit	1 science credit Note4 **History** 3 credits **Elective** 1 credit	POE205 1 science Credit Note4 **400-level History** 2 credits **Elective** 1 credit	PSE401 **400-level History** 2 credits **Elective** 2 credits
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Notes

Note 1

MAE106 can be taken in Year 1 if a student is not required to take MAE103.

Note 2

One of the following: ECE103 or ECE104.

Note 3

One of the following: POE102 or PSE105.

Note 4

Credits required for the Science core requirement are: 1 credit in Chemistry or Biology, 1 credit Physics and 1 credit in information technology from the following courses:

CSE101: Introduction to Algorithms and Computing
CSE260: Introduction to Computer Concepts
BAE220: Introduction to Information Technology
BAE410: Information Systems

Double Major

Note: *Students wishing to complete a double major, one of which is in History, are required to complete the 16 credits as above, and meet the requirements for a major as set out in the second discipline.*

Minor in History

Note: *Open to students in any programme at RMC of Canada*

Requirements:

8 credits in history

History Courses

Course 100-199

HIE102 History of Canada

This course introduces students to the political, social, economic, and cultural history of Canada from the period of first contact between indigenous peoples and European explorers to the present day. Particular emphasis is placed on four major themes: the diversity of the Canadian experience and identity, Canada's place in the North Atlantic World, the development of the Canadian economy, and the growth and development of the Canadian state. By the end of the course students should have a solid knowledge of Canada's historical development; have become familiar with the basic elements of historical research and practice, such as the examination of primary documents and historiography; and be able to produce a university level research paper.

Exclusion(s): HIE104, HIE207
Note(s): For students in the First year Arts.
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE104 Survey of Post-Confederation Canada

This course introduces students to the political, economic and social history of Canada from 1867 to the present. Particular emphasis is placed on the following themes: Canada in the North Atlantic World, the development of the Canadian state, the development of the Canadian economy and its impact on society, and the diversity of the Canadian experience and identity.

Exclusion(s): HIE102, HIE207
Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 200-299

HIE202 Introduction to Canadian Military History

A survey of the military history of Canada from the early days of New France to the present. Emphasis will be placed on Canada's wars and their impact on national development. The evolution of Canada's Armed Forces, their role in the First and Second World Wars, in NATO, and in peacekeeping operations, will also be studied. Term one will cover the period to the end of the 19th century; term two will concentrate on the late 19th and 20th centuries.

Exclusion(s): HIE203, HIE205, HIE208
Note(s): For students in the Second Year taking Arts.
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE203 Introduction to Canadian Military History

A survey of the military history of Canada from the rise of New France to the present. Emphasis will be given to the evolution of the Armed Forces.

Exclusion(s): HIE202, HIE205, HIE208
Note(s): Mandatory for students in Science, Engineering and Business Administration.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE205 Canadian Military History: Origins to 1870

This course, which covers the pre-Columbian period to the beginning years of Confederation, introduces students to the most significant military organizations and events of the period, within their social and political context.

Exclusion(s): HIE202, HIE203
Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

HIE207 History of Canada

This course introduces students to the social, economic, political, and cultural history of Canada from first contact between indigenous peoples and Europeans until the present day. Particular emphasis is placed on four major themes: the diversity of the Canadian experience and identity; Canada's place in the North Atlantic World; the development of the Canadian economy; and the growth and development of the Canadian state. By the end of the course, students will have a better knowledge of Canadian history and a general understanding of historiography, and will be able to produce a university level research paper.

Exclusion(s): HIE102, HIE104
Note(s): Mandatory for students in Science and Engineering.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE208 Canadian Military History: A Study in War and Military History, 1867 to the Present

This course introduces students to the general themes of Canadian military history in the post-Confederation period. Particular emphasis is placed on the following topics: the evolution of the Canadian military since 1867; traditions and customs of the Canadian Forces; the evolution of the role of the Canadian officer and approaches to leadership since 1867; the relationship between Canadian politics and society and the evolution of the Canadian military; the impact of changes in military arts and sciences and doctrine on operations and war fighting; and Canadian participation in joint and combined operations.

Exclusion(s): HIE202, HIE203
Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

HIE270 An Introduction to Military History

This course is an introduction to the study of the evolution of strategy, war and conflict from Machiavelli to the present. It will include classical theories of battles and siege craft; theorists of sea power and amphibious warfare; the impact of the industrial revolution on war; mechanized and mass strategy; armoured and aerial warfare; nuclear weapons policy; arms control and disarmament; and civil military relations. Examples of how these various aspects interconnect in warfare will be presented through an analysis of military conflict from 1400-1988.

Exclusion(s): HIE271, HIE371
Note(s): Mandatory for students taking Honours or a Major History.
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE271 Introduction to Military History and Thought

This course is an introduction to military history and thought from the Napoleonic era to the present. In addition to an examination of the major (and some of the minor) conflicts of the era, the course will consider the impact of social and technological changes on the conduct of war. The student also will be introduced to the principal writers on themes and in military thought.

Exclusion(s): HIE270, HIE371
Note(s): Mandatory for all students who do not take HIE270.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE275 Survey of Technology, Society and Warfare

This course is a survey of the relationship between technology, society and warfare. Topics covered include the impact of the industrial revolution on warfare; technological developments and military doctrine during the two world wars and Cold War; the Revolution in Military Affairs; and emerging and evolving military technologies and doctrines. In studying these historical examples students will reflect on the major political, economic and social factors that inform the development of the technology and the role of technology in warfare.

Exclusion(s): HIE474, HIE475
Note(s): Only offered through Distance Education .
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE284 A History of Europe since the 15th Century

This course focuses on the history of European civilization from the late middle Ages to the middle of the 20 century. It seeks to identify and analyze the foundations of European civilization and especially those that still shape European life today. The main political, geographic, social, economic, and religious characteristics which have marked Europe's past will be identified and examined (for example, Christianity, individualism, capitalism and industrialization). Thus, this course will place the comparatively original and unique characteristics of Europe into historical perspective.

Note(s): Mandatory for students in History.
Students in History are strongly encouraged to take this course in their second year.

Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE289 The Impact of Science and Technology on Society and the Environment

A lecture course on the impact of modern science and technology on society and the environment from the 16th century to the present. The focus is primarily on technology and social change and will consider technical or scientific knowledge in their wider economic, political and social context.

Note(s): Mandatory for students in Engineering.
Semester: Usually offered in the Fall
Contact Hours: 2 - 0 - 4
Credit(s): 0.5

Courses 300-399

HIE301 Aboriginal Peoples in Canada: A History

Looking from the pre-contact era to the present, this course explores the history of Aboriginal Peoples in what is now Canada, with an emphasis on the historical relationship between Native and Non-Native groups. The course adopts a thematic rather than a chronological approach to the study of this relationship, and looks at themes such as military alliances, political relationships, civilization and education, culture and language, and Aboriginal Rights and Self-Government.

Prerequisite(s): A junior history course
Note(s): Also offered through Distance Education .
Contact Hours: 3- 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

HIE310 Political History of Italy, from Unification to the Republic, 1861-1946

First, this course emphasizes and analyses the main political developments of the period covered, for instance the making of the unitary state, the colonial policy, the involvement in the First World War, and Mussolini's rise to power. Second, it underlines the influence and contribution of economic, geographical and social factors in this political evolution. Finally, when relevant and useful, resemblances and differences between Italy's political history and other European states will be established. As a result, the complexity of the Italian political life, its successes and failures, its continuities and ruptures, but also and maybe more important, its paradoxes should appear clearly.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE312 History of the United States 1750-1877: From Revolution to Reconstruction

This course explores the political, social, economic, and cultural development of the United States from its birth in the Revolution through to the end of the Civil War and Reconstruction. The course focuses largely on the impact of the three “revolutions” – the American Revolution, the Market Revolution, and the American Civil War - that the American people experienced over this turbulent century and which continue to define American political, social, and cultural values to this day. This course is a mixture of lectures and seminars in which students are encouraged to examine and debate the issues which defined this period. By the end of the course, students should acquire a solid understanding of the major themes and historiographical approaches to American history, be able to work with primary source material, and be able to combine those elements into their own historical research and writing.

Note(s): Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE314 History of the United States 1870 to the Present: Reconstruction to the Age of Reagan

This course explores the political, social, economic, and cultural development of the United States from the end of the Civil War to the early 21st century. The course largely focuses on the rise of the United States as a global hegemon and its impact on American society at home and abroad. Key issues examined include: the Industrial Revolution, the New Deal, the Cold War, the Rights Revolution of the 1960s, and the Culture Wars of the late 20th century. This course is a mixture of lectures and seminars in which students are encouraged to examine and debate the issues which defined this period. By the end of the course, students should acquire a solid understanding of the major themes and historiographical approaches to American history, be able to work with primary source material, and be able to combine those elements into their own historical research and writing.

Note(s): Offered in alternate years.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE317 A History of Military Education since the 17th Century

This course considers major themes and developments in military education in the past 400 years. Beginning with the introduction of military schools in 17th century Europe it traces the evolving need for military education at all levels: basic numeracy and literacy, science and engineering, history and strategic studies. It examines the emergence of various military schools, the revolution in military education beginning with the creation of the Prussian Kriegsakademie and the subsequent opening of staff and war colleges in other nations. Some education philosophy, such as the difference between training and education is included. An examination of military education in Canada is conducted at the end of the course as a comparative case study.

Prerequisite(s): HIE270 or HIE271
Note(s): Offered in alternate years.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE319 Mercenaries in Military History

Since the end of the Cold War the media has displayed a growing fascination with the growing role of armed contractors in contemporary conflicts. Hailed as the ‘new mercenaries’, these actors are seen as the reincarnation of a phenomenon largely absent from warfare over the past two centuries, a period in which modern states have accrued increasing control over the use of armed force. In fact, mercenaries have . This course will examine the role of mercenaries in conflict since the classical period. It will comprise a series of case studies, including the Roman Empire, the Hundred Years War, Renaissance Italy, Britain’s Indian Army, the Vietnam War, the Cold War in the Middle East, and the Sierra Leone Civil War, (1991-2001). In examining these cases, the course will ask three questions: 1) why have states or other sovereign entities employed mercenaries? 2) To what extent have the roles of mercenaries changed over time? 3) In what ways has the use of mercenaries affected state control over the use of armed force?

Prerequisite(s): A 100-level or 200-level history course
Note(s): Course is currently offered in "English Only"
Offered in alternate years.

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE320 A Social and Cultural History of the Atomic Age

The technological possibility of eradicating life on earth was possibly the most dramatic development in human history. This lecture course will examine the scientific origins and the social and cultural effects of the introduction of nuclear energy and nuclear weapons onto the world stage from the 1930s through the 1960s.

Note(s): Offered in English Only
Contact Hours: 3- 0 - 6
Credit(s): 1

HIE322 Conflict in the Middle East, 1914-Present

This one-term lecture course will cover the history of state and interethnic conflict in the Middle East from the First World War to the war against ISIS. In addition to the contentious Arab-Israeli interactions, conflicts in Yemen and Oman, Lebanon, and the Iran-Iraq War of the 1980s will be highlighted, as well as the emergence and operations of non-state organizations like the Irgun, the Muslim Brotherhood, the PLO, and Al Qaeda. Students will develop an understanding of the origins of and motives for disputes in this region as well as the methodologies employed by the belligerents in pursuit of their aims.

Note(s): Offered in alternate years.
Contact Hours: 3- 0 - 6
Credit(s): 1

HIE324 Selected Issues in History

This directed reading course is open to 3rd and 4th year Arts students (normally students in History) who wish to pursue a particular area of historical interest that is not available through regular departmental offerings. This option will only be available in exceptional circumstances and requires the recommendation of a supervisor and the permission of the chair of the department.

Contact Hours: 3- 0 - 6
Credit(s): 1

HIE328 Selected Issues in Military History

This directed reading course is open to 3rd and 4th year Arts students (normally students in History) who wish to pursue a particular area of military historical interest that is not available through regular departmental offerings. This option will only be available in exceptional circumstances and requires the recommendation of a supervisor and the permission of the chair of the department.

Contact Hours: 3- 0 - 6
Credit(s): 1

HIE332 War in Classical Age

This course aims to provide students with an introduction to war and diplomacy, as they evolved in the era of Ancient Greece and both Republican and Imperial Rome. Beginning with the foundation of powerful city states in Greece, it studies the first elements of Greek diplomacy and warfare. It then looks at the evolution of the military systems of the Greeks, as well as the diplomacy behind it, in the rivalry between the principal city states, the rise of Philip and Alexander of Macedon, and the wars of the Alexandrian succession. It would then move to a study of the diplomacy and war making of Republican Rome, its army and navy and its expansion into Italy, and wider conquests, especially in the Punic Wars, and the diplomacy, military control, and other factors behind the 'Pax Romana.' The evolution of the Roman Army over these key centuries will receive particular attention.

Note(s): Offered in alternate years.
Semester: Usually offered in Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE334 Historical Evolution of Operational Art

The Historical Evolution of Operational Art will examine the practice of operational art in history — the pursuit of strategic objectives through the arrangement of tactical actions. It will look at how these concepts evolved since the eighteenth century by studying prominent military campaigns which evidenced operational art. By the end of the course students will have gained an appreciation of the ability of military forces to achieve strategic goals, the role of joint and combined operations, the impact of conflict termination in shaping military plans, the theory, planning and execution of historical campaigns and operational art, and the ability to analyze operational approaches.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE336 The American Civil War

No other event has marked the history of the United States so palpably. Even today, commentators and historians refer to Lincoln as one of the most important presidents the United States has ever elected, in particular due to the crucial role he played in this war and to his Emancipation Proclamation, which put an end to slavery. But there was more to this war. Among other things, it marked the end of pro-slavery rule in the South, the standardization of economic practices across the entire American territory for the first time, and the start of the second great wave of industrialization that would make the United States the greatest industrial power by the end of the First World War. We shall therefore cover the political, economic, social and military impact of this war.

Note(s): Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE338 North American Colonial Warfare, 1608 to 1815

This course will examine the colonial conflicts that, between the establishment of the first permanent European colonies in the early seventeenth century and 1815, defined the modern political boundaries of North America. Topics will include native and European fighting methods, the employment of regular, irregular, and locally raised forces, the development of British and French strategic cultures and expeditionary capabilities, the early development of American military and naval forces, the logistical challenges of campaigning in North America, naval warfare on the inland seas of North America, and civil-military relations. This course will emphasize the political, diplomatic, operational and logistical challenges of trans-Atlantic campaigning, and the integration of irregular indigenous warriors and colonial populations into campaign plans.

Note(s): Also offered through Distance Education .
Course is currently offered in "English Only"
Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE340 History of the First World War

A study of the nature of total war at the beginning of the 20th century, including the origins of war, the process of strategic planning, the problems of coalition warfare, great battles on land, on the sea and in the air, propaganda, public opinion and espionage, technological changes and the social, political and economic consequences of war.

Note(s): Also offered through Distance Education .
Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE342 History of the Second World War

A study of the nature of World War II, including the origins of war, the process of strategic planning, the problems of coalition warfare, great battles on land, on the sea and in the air, propaganda, public opinion and espionage, technological changes and the social, political and economic consequences of war.

Note(s): Offered in alternate years.
Also offered through Distance Education **Prerequisite(s):** A junior history course.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

HIE346 The History of Canadian Forces Operations

The Canadian Forces as an institution has participated in the widest variety of military operations types and deployed in more geographically diverse areas than any of its predecessor organizations in Canadian history. This course will trace the origins of the Canadian Forces in the 1960s and will examine how the CAF conducted overseas operations, including policies and strategies for waging the Cold War, UN peacekeeping and the era of intervention era in the early 1990s, and the current Al Qaeda War.

Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE348 Fascism, Nazism and Communism, 1917-1945

This course explores the birth and the development of the Fascist, Nazi, and Communist ideologies in Europe and their transformation into political regimes. The first part examines the ideological and historical origins of their rise, while the second part analyses the conditions and characteristics of their development in peacetime. Finally, we will see how these regimes survived or perished during the Second World War. Based on a comparative perspective, this course will help to reveal the exceptional nature of this period in European history.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF354 *Histoire du monde arabe et musulman*

This course provides an overview of the history of the Arab and Muslim World since Antiquity. We will study the history of its geography, language and culture and the rise of Islam. We will see its components and their impact on the formation of the Near, Middle and Far East. Finally, we will address the history of great crises of the 20th century and their historical roots. Students will develop, at the end of the course, an understanding of the major historical components of the Arab-Muslim world.

Note(s): Course currently offered in French Only
Offered in alternate years.
Semester: Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE360 The Rise of Peacekeeping

This course is a historical survey of the roots of peacekeeping from Antiquity until the 1980's. It will explore the Pax Romana, The Peace of God in the Middle Ages, the maintenance of peace and international law in the early modern period, and end with the creation of the first generation of UN peacekeeping operations. Students will be able, at the end of the course, to explain and analyse the early phases of peacekeeping.

Prerequisite(s): HIE202 or HIE203
Note(s): HIE360 and HIE362 are equal to the combination of both POE410 and POE324 and should not be combined.
Semester: Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE362 History of Peacekeeping since 1980

This course is a historical survey of the second and third generations of peacekeeping operations since the 1980s. The course explores the second generation of peacekeeping operations during the dark 1990s and the difficult birth of peacemaking. The history of the third generation of operations entrusted to regional organisations since 1995 will also be examined. Students will be able, at the end of the course, to explain and analyze the evolution of peacekeeping since the end of the Cold War.

Prerequisite(s): HIE202 or HIE203
Note(s): HIE360 and HIE362 are equal to the combination of both POE410 and POE324 and should not be combined.
Semester: Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF364 *Napoléon et son temps*

A study of the man, his ambitions, his political system, and of his way of war. We will discuss his great battles and campaigns, those with which his genius marked history: Marengo, Austerlitz, Jena, Wagram, Borodino, and the Germany and France campaigns, among others. We will also discuss the complex world surrounding the eventual Emperor of the French, from his family to his diplomacy, and the political life within France itself. The student should be able to better weigh the impact of Napoleon on the history of France and the world. The course will also allow students to think critically about the limit of one’s actions and of determinism in history.

Note(s): Course currently offered in French Only
Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE366 Europe, Napoleon, and the World War of 1789 to 1815

This course is an introduction to the wars that dominated Europe and extended around the globe from the opening of the French Revolution in 1789 until the conclusion of the Congress of Vienna and Napoleon’s final abdication in 1815. The course will examine the transformation of warfare that witnessed the rise of the nation in arms (the near total mobilization of manpower and resources) and introduced new operational concepts that changed the conduct of war. It will consider these themes through an overview of the major land and naval campaigns in Europe, the Levant, and in the East and West Indies, and through the major developments in operational art, force structures, command and control, and logistics, along with the use of coalitions and of economic warfare in defeating an opponent in a modern conflict. This course will provide students with a fundamental understanding of the changes this period brought to the conduct of warfare, and the effects this global conflict had on the Atlantic and Indian Ocean worlds.

Note(s): Course is currently offered in "English Only"
Offered in alternate years.

Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE369 The Diplomacy of Europe's Global Ascendancy: International History, 1815-1870

A lecture course concentrating on the major political, economic, and social developments in international history between 1815 and 1870. Emphasis will be placed upon the foreign policies of the European Great Powers, as well as the United States, China, and Japan, the advent of the Concert of Europe, the "Eastern Question", emerging colonial rivalries, differing national and imperial strategic requirements, and the impact of the German wars of unification.

Note(s): Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE371 Introduction to War and Strategy

This course is an introduction to and discussion of western strategic thinking in the nineteenth and twentieth centuries. Strategic thinking and theorists in all three elements (land, sea, and air), as well as imperialism, technological change, anti-colonialism and terrorism, nuclear weapons theory and unconventional warfare are discussed. The course analyzes various combinations of industrial power, public opinion, military power, intelligence processes, economic strength, and foreign policy a country uses to create a military "strategy."

Exclusion(s): HIE270, HIE271
Note(s): Only offered through Distance Education .
Prerequisite(s): A junior history course
Contact Hours: 0 - 0 - 9
Credit(s): 1

HIE372 The Diplomacy of Great Power Rivalry: International History, 1870-1914

A lecture course concentrating on the major political, economic, and social developments in international history between 1870 and 1914. Emphasis will be placed upon the foreign policies of the European Great Powers, as well as the United States and Japan, the rise and development of the European Alliance system, colonial rivalries, differing national and imperial strategic requirements, and the origins of the First World War.

Note(s): Offered in alternate years.
Semester: Usually offered in the Winter.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE374 From World War to World War: International History 1914-1945

A lecture course concentrating on the major political, economic and social developments in international history between 1914 and 1945. Emphasis will be placed upon the origins of the First World War, the development of war aims and peace terms, inter-alliance relations, the Paris Peace Settlement, interwar diplomacy, the "appeasement" debate, and the diplomacy of the Second World War.

Semester: Usually offered in the Fall
Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE375 Limited War during the Cold War 1945-1991

This course examines the plethora of smaller conflicts that occurred under the umbrella of the larger ideological and military competition between the West and the Soviet Union during the Cold War. These conflicts include French, British, and Portuguese wars of decolonization, the South African-Cuban confrontation in Angola, the Eritrean war, and proxy wars in Latin America. Special attention will also be paid to the Soviet Union’s war in Afghanistan and the lesser-known Indo-Pakistani wars. Students will develop an understanding of how the Cold War period involved multiple ‘hot’ wars and how and why these conflicts were fought.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE377 The Cold War

The Cold War had both lasting military and social impact. The Cold War was the only sustained conflict in history that had the potential to end life on earth with mass nuclear weapons use. It was a conflict that had its own unique methods of fighting, from the intelligence war and covert action to space and even sporting events. This course will examine how the war was fought between the superpowers, and the dramatic influence it had on numerous regional conflicts from 1945 to 1990 as well as on Western society and culture.

Note(s): Offered in alternate years.
Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF383 *Histoire de la France, de la guerre franco-prussienne à la présidence de Charles De Gaulle*

This course will deal with the history of France from the Franco-Prussian war of 1870 until the end of the presidency of Charles de Gaulle in 1969. The course will analyze the most important political, economic and social characteristics of each Republic, insisting particularly on mutations and turning points. Internal politics and constitutional developments, international relations, economic and social transformations of each republican period will be examined in a way to make apparent the most significant trends or consequences that have affected the collective life of the French people.

Prerequisite(s): HIE284
Note(s): Course is currently offered in "French Only"
Offered in alternate years.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE385 Modern Britain

A survey of British history from 1750 to the present. In addition to examining the course of British political history, particular attention will be paid to the industrial revolution and urbanization, Britain's extra-European dimension, Britain's role as a great power and the contraction of British influence in the second half of the twentieth century.

Prerequisite(s): HIE284
Note(s): Course is currently offered in "English Only"
Offered in alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE390 European Imperialism - The Early Stages in Renaissance Europe

An introduction to the early expression of European Imperialism in the 15th, 16th and 17th centuries, and particularly the Spanish and Portuguese experience. In addition, the formation of the first British Empire, to 1783 and the French Imperial experience to 1759 will be considered and contrasted with that of the Netherlands.

Note(s): Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE392 European Imperialism - Nineteenth and Twentieth Centuries

An examination of the phenomenon of modern European imperialism, concentrating on the British and French Empires. The growth of colonial nationalisms and the emergence of independence movements within those empires will also be considered.

Prerequisite(s): HIE390
Note(s): Offered in alternate years
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE394 A History of China: Origins and Identities

This course serves as an introduction to the long history of the region comprised by the current People’s Republic of China. Modern China’s long history of internal settlement and expansion, conflict and consolidation, order and idealism from the beginning of its recorded history through the great upheavals of 19th and 20th centuries continues to inform the rhetoric and behavior of the PRC. This course explores these rich histories and their enduring role in shaping political and international discourse within modern China. The course will allow students to grasp the broad outlines of China’s history with an emphasis on the enduring and distinct philosophical and political themes that inform its present.

Note(s): Course is currently offered in "English Only"
Offered in alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

HIF401 *Histoire Québec de 1945 à nos jours*

This course will examine the socioeconomic and political situation in Quebec at the end of the Second World War; Duplessis's return to power and the resulting political dynamic; Quebec's journey into modernity; the Quiet Revolution, its roots and impact; Quebec social movements, their creation and demands; the nationalist movement (RN, RIN, MSA); the Liberals in power and the language issue; the October Crisis; the Parti Québécois taking office; the 1980 referendum, its failure and impact; the repatriation of the Constitution; federal-provincial tensions; the Conservatives and the collapse of the Meech Lake Accord; the debates surrounding Charlottetown; the context of the second referendum; the rise of the new right; and the challenging of the "Quebec model."

Note(s): Course is currently offered in "French Only"
Offered in alternate years
Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE403 Social History of Canada (1870-1980)

This seminar will analyse selected issues in the development of Canada from 1870 till 1980. Topics will include industrialization, immigration, social movements, reform, urbanization, regionalism, cultural conflict, social effects of war and the changing cultural definitions of Canada.

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE405 History of the relations between Canada and the United States

An analysis of various themes in the Canadian-American relationship from the beginning of European colonization until the present. Based on readings and discussion in class. The course will consider the mutual influences exercised by these two countries on their respective political, economic, social, cultural and intellectual development.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE406 Canadians and the World: Canadian Foreign Relations 1867 to the Present

This seminar course examines the development of Canada's foreign and external affairs since 1867, with a particular emphasis on the post-1945 period. The broad purpose of the course is to discover and dissect some of the broad patterns of Canada's growing international presence over the course of the 20th century including: Canada's role as a "middle power", Canada as a peacekeeping/warrior nation, and its role in multilateral organizations such as the UN, NATO, and the G8, to name just a few. Also central to the course will be Canada's relationship with various empires including Great Britain and more recently the United States. The course analyzes those relationships and the development of Canadian foreign policy from various theoretical perspectives. By the end of the course students should be familiar with the major themes of and approaches to Canada's foreign relations; be able to understand and utilize various theoretical, methodological and historiographical perspectives; and express their knowledge and understanding in a major research project.

Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE408 Canadian Defence Policy

A study of selected aspects of Canadian defence policy including the development of the modern military force and its role in military operations; an examination of domestic and international factors influencing the formulation of defense policy and the use of the armed forces as an instrument of national policy.

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE410 Canada and War

An examination of the impact of modern wars on Canadian society from 1860 to the present. Specific themes will include Canadian reaction to North American conflicts and to British imperial wars; the impact of World War I and II; Canada and Cold War and Canada and peacekeeping.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE416 The United States as an Emerging World Power: 1750-1919

This seminar course explores the transformation of the United States from a disparate group of 13 British colonies to the world's most pre-eminent nation by the end of World War I through the lens of its foreign relations. This 150 year period was perhaps the most eventful and most important in the history of the "Great Republic." Between the American Revolution and the Treaty of Versailles, the United States fought a successful war for independence, expanded rapidly

across the continent, fought a fratricidal civil war, and then emerged as the world's most dynamic industrialized nation. The course examines how each of these developments shaped and was shaped by America's relationship with the rest of the world. By the end of the course students should be familiar with the major themes and approaches to American foreign relations; be able to understand and utilize various theoretical, methodological, and historiographical perspectives; and express their knowledge and understanding in a major research project.

Note(s): Students are encouraged to take one or more of the following courses: HIE312, HIE314.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE418 The United States as a World Power: 1919 to the Present

The seminar course explores the United States' rise to global hegemon during the 20th century through the lens of its foreign relations. The course covers the "the American Century" through three particular periods: first, the rise, fall, and resurrection of Wilsonian internationalism from 1920 through to the end of the Second World War; second, the emergence of the Cold War and the United States program of building alliances to counter the "Communist threat;" and third, how the decline and ultimate end of the Cold War both closed and opened areas of conflict and cooperation with the rest of the world. Though the course focuses mainly on America's relationship with the rest of the world, significant time is spent analyzing the domestic origins and impacts of those relations. By the end of the course students should be familiar with the major themes and approaches to American foreign relations; be able to understand and utilize various theoretical, methodological, and historiographical perspectives; and express their knowledge and understanding in a major research project.

Note(s): Offered in alternate years. Students are encouraged to take one or more of the following courses: HIE312, HIE314, or HIE416.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE422 Naval History. The Age of Sail

A survey of naval and maritime history from the 16th to the early 19th century. The broad themes addressed include organizational, technological and social developments impinging upon the conduct of naval operations, and the course of maritime commerce. In addition, selected aspects of the "world wars" of the 17th and 18th centuries will be examined to illustrate transitions in technology, tactical doctrine, and major strategic debates.

Note(s): Course is currently offered in "English Only"
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE423 Naval History: The Age of Steam

A survey of naval and maritime history from the mid-19th through the 20th centuries. The broad themes addressed include organizational, technological and social developments impinging upon the conduct of naval operations, and the evolution of modern navies to the nuclear age. In addition, selected aspects of the "world wars" of the 20th century will be examined to illustrate transitions in technology, tactical doctrine, and major strategic writers and debates.

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE424 Thesis

Special research on an approved subject to be prepared as a thesis, which will be examined by a committee constituted for the purpose. The thesis must be submitted for examination no later than 31 March. (Taken only with permission of the Department.)

Note(s): Only taken with permission of the department.
Credit(s): 2

HIF425 *Histoire de la Nouvelle-France : le rêve français en Amérique*

This course studies the development of French colonial societies in North America from their beginnings in the 17th century to 1763. Classroom discussions will deal with a full-fledged empire: Canada, Acadia, Louisiana and the Antilles. We will uncover the ambitions and plans of the French in America, but also look at the actual events experienced by the people in the New World.

Note(s): Course is currently offered in "French Only"
Offered in alternate years
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE426 Advanced Directed Studies

Special research on an approved subject, under the direction of an instructor, resulting in the submission of at least 2 major research papers. (Taken only with permission of the Department.)

Note(s): Only taken with permission of the department.
Credit(s): 2

HIF427 *Histoire du régime britannique au Canada*

This course examines the development of Canadian colonial societies in North America after the Treaty of Paris (1763). It explains the world of Les Anciens Canadiens and sets it in its economic, environmental, social and political context alongside the other British colonies in North America. Themes will be addressed according to the historical sequence of milestone events: the Conquest, the American Revolution and the Rebellions.

Note(s): Course is currently offered in "French Only"
Offered in alternate years
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF435 *Façonner un continent : les guerres en Amérique du Nord (1754-1815)*

Using all historiographical approaches, this course looks at the main armed conflicts involving the French and British powers in America during the colonial era. The Seven Years' War, the Battle of the Plains of Abraham and the War of 1812 will be analyzed in terms of what was at stake demographically, economically, socially and politically as well as from a strategic and military perspective.

Note(s): Course is currently offered in "French Only"
Offered in alternate years
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF437 *Le Québec et la guerre depuis 1867*

This course aims to familiarize students with the milestones, the concepts, the politico-military debates and the leaders in the military history of Quebec and French Canada. It includes discussions of the two world wars, bilingualism in the Canadian Forces, the Royal 22e Régiment, and 425 Squadron. It examines French Canadians' relationship with warfare and with the Canadian Forces throughout history. This social, political and institutional study of history takes stock of more than a century of the profession of arms as practised by Quebecers and French Canadians.

Note(s): Course is currently offered in "French Only"
Offered in alternate years
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE440 Public History

In this course students have the opportunity to do unpaid work in one of three historical domains: teaching, research, or museums. In the former case students work at RMC; in the latter cases students are placed in institutions in Kingston, Ottawa or other locations where they complete a project or task of approximately 100 hours under the co-supervision of a member of the professional staff of that institution and member of the RMC of Canada history department. (In general students should be prepared to work at the placement organization for approximately 8 hours per week: either one full day or two half days.) In addition to the practicum work the student will complete a 4000 word reflection which describes the literature and practice of the domain as well as the learning that they have achieved with regard to the practice of history.

Note(s):

1. Only taken with permission of the department.
2. Normally taken in the Winter term of Year 3 or the Fall term of Year 4.
3. Limited to students majoring in History who have a minimum B- average prior to taking the course.
4. Students working in Ottawa must make arrangements to complete sufficient other credits to remain on full time status during the term.
5. Students wishing to work in Ottawa must provide their own accommodation and rations. Some financial support may be available from time to time and rations and quarters at RMC are normally credited to help defray expenses.

Contact Hours: 0- 0 - 9
Credit(s): 1

HIE449 History of intelligence since 1870

Using historical case studies from the Franco-Prussian War onwards, this course examines the methodologies of intelligence operations, including issues of deception, human and technical intelligence gathering, counter-intelligence, and more. These case studies will include the operations of a number of states including the United States, Great Britain, France, Prussia/Germany, Tsarist/Soviet Russia, and Israel.

Note(s): Course is currently offered in "English Only"
Offered in alternate years
Semester: Usually offered in the Fall or Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE451 War and the Environment

This seminar course explores the complex inter-relationship between warfare and the natural environment from the 17th century to the present. The course will use case studies from a number of world regions to analyze the environmental and ecological impact of military mobilization over time. In addition, students will assess the influence of environmental factors on the conduct of war. Particular attention will be devoted to the impact of technological change/ industrialization and to changing understandings of the environment. Case studies will include the American Civil War, the World Wars, the Vietnam War, and the Cold War era.

Prerequisite(s): A 100-level or 200-level history course
Note(s): Course is currently offered in "English Only"
Offered in alternate years

Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE453 War, Peace, and Civil Society in the 20th Century

Historians have long contended that the 20th Century was the most violent in human history. Hundreds of millions of people were killed in two World Wars, which were then followed by a “long peace” that was marked by civil and local conflicts that were even more bloody than the those two decades of total war. And yet the 20th century was also an age of the great flowering of democracy, human rights, diplomacy and the rule of law. Across the globe, national and transnational movements formed non-governmental organizations (NGOs), paraded through streets, and lobbied governments for peace, an end of discrimination on the basis of gender, race and ethnicity, and placed limits on states and their military to wage conflict. This course examines this interplay between war and peace in the 20th century across the globe. In the process it will examine how war(s) in the 20th century affected the social, political and economic developments of nation states, and how in turn those developments sparked the rise of national and transnational movements and agencies whose actions had real impacts on the waging of war and the establishment of peace.

Prerequisite(s): A 100-level or 200-level history course
Note(s): Course is currently offered in "English Only"
Offered in alternate years
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE454 War, Peace and Diplomacy: Issues in the Foreign Policies of the Great Powers since 1815

A seminar course on the conduct of Great Power relations since the Congress of Vienna in which students will investigate various themes and topics in international history since 1815. The themes and topics will include: personality and policy-making; the diplomacy of the First and Second World Wars; civil-military relations and the development of national strategy; disarmament and peace-making; the early Cold War; and the later Cold War.

Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE456 Issues in Women, War and Society

An exploration, through seminars of selected themes and issues in the history of women, war and society from the 17th century to the present. Particular attention will be paid to women's changing involvement in war and revolution in the 18th and 19th century; the rise of modern military institutions; women's involvement in World War I and II; debates about gender integration in the late 20th century.

Note(s): Course is currently offered in "English Only"
Offered in alternate years
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE461 Air Warfare in World Conflict, 1903-1945

This course examines air warfare from the earliest days of powered flight to the end of the Second World War. It focuses primarily on the development of the idea of air power and on the organization and employment of air power in war. Major themes include: the emergence of air forces; key concepts of air power and the ways in which they were developed and tested in war; the use of air power in general and limited wars; the conduct of joint operations involving air and surface forces; the morality and legality of air warfare; the culture of the aviator; the impact of technology and, issues of command and leadership in air forces. A limited number of air campaigns will be examined as a means of integrating these themes.

Prerequisite(s): HIE270 or HIE271
Note(s): Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE463 Air Warfare in Cold War and Small Wars, 1945-2010

This course examines air warfare from the advent of the atomic weapon until the ‘peace operations’ of the early 21st century. It focuses primarily on the ongoing metamorphosis of the concepts and doctrines of air power, and on the organization and employment of air power and aerospace power in war and peace. As in HIE471 major themes include: the emergence of air forces; key concepts of air power and the ways in which they were developed and tested in war; the use of air power in general and limited wars; the conduct of joint operations involving air and surface forces; the morality and legality of air warfare; the culture of the aviator; the impact of technology and, issues of command and leadership in air forces. A limited number of air campaigns will be examined as a means of integrating these themes.

Prerequisite(s): HIE270 or HIE271
Note(s): Offered in alternate years.
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE470 Strategy and Strategists

A study of the most important interpreters of warfare from classical thinkers (Thucydides and Sun-Tzu) to the present. Also considered will be airpower and its proponents; geopolitical and maritime doctrines of war; the developments of military technology since 1945 and their impact on strategic thinking; the theories of deterrence, revolutionary and guerrilla war; disarmament and arms control and the international law of war.

Note(s): HIE470 is offered only to 3rd and 4th year History and MSS degree students. Others wishing to complete the course must have the approval of the History Department Head
Contact Hours: 3 - 0 - 6
Credit(s): 2

HIE474 Military Technology: Men, Machines and War

An examination of the impact of technology on war, and the relation of these to society as a whole. In addition to identifying the key technological advances in weapon development and defence-related fields, this course will look at the effect of technology on tactics, strategy, and society itself, from the pre-gunpowder period to the nuclear age.
Exclusion(s): HIE275, HIE475
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE475 Technology, Society and Warfare

The relationship between technology and warfare is undeniable: from the Great War (1914-18) to the War on Terrorism today, technology has played a central role in military operations. In this course students will define and analyze technology as a general concept and its relationship to warfare in particular. Students will also reflect on the factors - political, economic, cultural, etc.-that contribute to the creation of technology and that determine its use in warfare. The course will examine the principal developments in military technology from a historical perspective, beginning with the development of artillery in the fifteenth century and ending with an analysis of the contemporary and future battlespace.

Prerequisite(s): A junior history course
Exclusion(s): HIE275, HIE474
Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

HIE476 Guerrilla and Revolutionary War

A study of the role and conduct of guerrilla warfare and its connection with other types of conflicts. This course will trace the development of thinking about guerrilla warfare as well as the evolution of its practice.

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE477 An Introduction to the History of Terrorism

This is an introduction to terrorism and counter-terrorism in a variety of historical contexts. Among other things, it will consider the origins, complexities and basic elements of terrorism, as well as the various approaches taken to control this "poor man's weapon".

Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE478 Small Wars

The course is a study of the role and conduct of small wars and their connection with other types of conflict. This course will trace the development of thinking about conflicts other than major wars, as well as the evolution of their practice. Students will become acquainted with the nature, dimensions, and history of past and recent small wars and be able to critically evaluate these types of conflicts.

Note(s): Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIF479 *La guerre d'Algérie*

This course is the history of war in Algeria based largely upon the historiography of the last twenty years. It addresses the economic, political and social aspects of the Algerian « terrorist » movement. The course also looks at the response of the French government and military to the Algerian insurgency and its international context. The course is designed to allow the student to better understand the impact of terrorism, religion and nationalism upon the wars of decolonization in the period 1954-1962

Note(s): Course is currently offered in "French Only"
Offered in alternate years.

Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE481 The First World War in the Middle East

The First World War had a profound impact on the Middle East, redrawing the political map of the region and sowing the seeds of conflicts that prevail even today. This course will examine how the region became involved in the First World War, focusing on the state of the Ottoman Empire in the early twentieth century, as well as the goals of European powers such as France, Germany and especially Britain. It will also examine the conduct of the war in the region, focusing particularly on the Gallipoli campaign, the Mesopotamia campaign and the Palestine campaign. In addition, it will consider the political consequences of the war in the Middle East. The course will place particular emphasis on competing interpretations of the conflict, and students will be expected to produce a historiographical essay on a particular aspect of it.

Prerequisite(s): A 100-level or 200-level history course
Note(s): Course is currently offered in "English Only"
Offered in alternate years.
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE483 Continuity and Change in the Military History of Modern China

This course is a 4th year seminar course aimed at exploring the rich military history of modern China. The course is organized thematically to explore, through student led seminars, the many ages of China's military heritage. Eras addressed include the Warring States Period; Mongol Invasions and Influence; The Century of Humiliation and the end of the Imperial Era; the Anti-Japanese War; the Civil War; the Cold War; Red Army and Red Guards during the Cultural Revolution; The People's Liberation Army (PLA) from the People's War to Modernization. This course will provide a solid grounding in the enduring military philosophy and political-military interactions that inform the behavior of modern China.

Prerequisite(s): HIE394
Note(s): Offered in alternate years.
Contact Hours: 3 - 0 - 6
Credit(s): 1

HIE484 Themes in Modern History

This course is designed to facilitate the special expertise of visiting Professors to teach in their area of expertise. Each course will have a distinct theme reflecting that expertise and the subject of the course, if offered, will be published at the time of student registration. The course will be an advanced seminar and open only to history and MSS majors and honours students. Students may only take this course once.

Contact Hours: 3 - 0 - 6
Credit(s): 1

Military and Strategic Studies Programme

Introduction

This multidisciplinary programme is unique in North America at the undergraduate level. The Military and Strategic Studies (MSS) programme offers students an opportunity to acquire a sound grounding in military history, strategic thought, and international relations, as well as in Canadian government, Politics and Economics, English or French Studies, and Military Psychology and Leadership. It leads to a Bachelor of Arts degree in Military and Strategic Studies, as a Major or at the Honours level. The MSS degree provides a solid basis for graduate studies and a professional career.

Students are encouraged to take at least one MSS course in their second language. Students with the requisite language profile are free to take all or a combination of courses in either official language while earning their degrees.

In addition to their course work, students enrolled in the MSS programme are encouraged to participate in the various extracurricular activities of the programme, including field trips to Ottawa, Washington, New York, USMA, USNA, and NATO HQ and several Model UN and NATO simulations at leading North American universities.

General Programme Information

To earn a degree in Military and Strategic Studies students must pursue one of two patterns of study:

- Military and Strategic Studies; or,
- Military and Strategic Studies, with a Minor in Psychology, Business Administration, Economics, English, or French Studies.

B.A. Honours Military and Strategic Studies

A 40 credit degree programme including the core courses for arts programmes and 21 credits, comprised of the following:

Mandatory Courses

GOE202: Introduction to Political Geography (1 credit)
HIE202: Introduction to Canadian Military History (2 credits)
HIE270: Introduction to Military History (2 credits)
HIE380: Peacekeeping and Peacemaking (2 credits)
HIE470: Strategy and Strategists (2 credits)
POE116: Introduction to International Relations (1 credit)
POE317: Introduction to Contemporary Strategic Studies (1 credit)
POE460: International Conflict Analysis (1 credit)
POE462: Current Strategic Issues (1 credit)
PSE312: Military Psychology and Combat (1 credit)
MSE424: Thesis **or** MSE426: Research Project in Military Strategic Studies (2 credits)

Optional Courses

A minimum of 5 other optional credits, of which 2 must be at the 400 level, approved by the professor in charge of the Military and Strategic Studies programme.

Note: *MSE424 / MSE426: Special research on an approved subject, under the direction of a designated supervisor, resulting in the submission of a "MSE424: Thesis" or "MSE426: Research Project in Military Strategic Studies". Students will be provided with guidance on topics and methods before submitting a research proposal for approval. Theses must follow RMC of Canada thesis guidelines and will be evaluated by at least one subject expert in addition to the Chair and supervisor. An oral defence will normally be arranged for a thesis. Those transferring from "MSE424: Thesis" to "MSE426: Research Project in Military Strategic Studies" must do so no later than the add-course deadline of the winter term.*

B.A. Military and Strategic Studies

A 40 credit degree programme including the core courses for arts programmes and 17 credits, comprised of the following:

Mandatory Courses

GOE202: Introduction to Political Geography (1 credit)
HIE202: Introduction to Canadian Military History (2 credits)
HIE270: Introduction to Military History (2 credits)
HIE380: Peacemaking and Peacemaking (2 credits)
HIE470: Strategy and Strategists (2 credits)
POE116: Introduction to International Relations (1 credit)
POE317: Introduction to Contemporary Strategic Studies (1 credit)
POE460: International Conflict Analysis (1 credit)|
POE462: Current Strategic Issues (1 credit)
PSE312: Military Psychology and Combat (1 credit)

Optional Courses

A minimum of 3 optional credits, of which 1 must be at the 400 level, approved by the professor in charge of the Military and Strategic Studies programme .

Note: *Students enrolled in Military and Strategic Studies may not complete a Double Major with History or Political Science.*

Programme Outline Tables

The programme outline tables are an example the typical course load of a student enrolled in the Military and Strategic Studies (MSS) programme. The course numbers which are in " *italic* " are part of the core course for arts programmes.

B.A. Honours Military and Strategic Studies

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 PSE103 HIE102 MAE103 Note1 POE116	ENE110 (**cont'd**) ECE103 **or** ECE104 HIE102 (**cont'd**) MAE113 1 optional core credit Note2	ENE210 HIE202 HIE270 MAE106 Note1 GOE202	ENE210 (**cont'd**) HIE202 (**cont'd**) HIE270 (**cont'd**) POE205 1 science credit Note3
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 PSE312 HIE380 **Optional** Note4 2 credits	1 science credit Note3 POE317 HIE380 (**cont'd**) **Optional** Note4 2 credits	1 science credit Note3 POE460 HIE470 **Optional** Note4 1 credit MSE424 **or** MSE426	PSE401 PSE426 HIE470 (**cont'd**) **Optional** Note4 1 credit MSE424 **or** MSE426 (**cont'd**)
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.A. Military and Strategic Studies

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 PSE103 HIE102 MAE103 Note1 POE116	ENE110 (**cont'd**) ECE103 **or** ECE104 HIE102 (**cont'd**) MAE113 1 optional core credit Note2	ENE210 HIE202 HIE270 MAE106 Note1 GOE202	ENE210 (**cont'd**) HIE202 (**cont'd**) HIE270 (**cont'd**) POE205 1 science credit Note3
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 PSE312 HIE380 **Optional** Note4 1 credit **Elective** 1 credit	1 science credit Note3 POE317 HIE380 (**cont'd**) **Optional** Note4 1 credit **Elective** 1 credit	1 science credit Note3 POE460 HIE470 **Optional** Note4 1 credit **Elective** 1 credit	PSE401 PSE426 HIE470 (**cont'd**) **Elective** 2 credits
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Notes

Note 1

MAE106 can be taken in Year 1 if a student is not required to take MAE103.

Note 2

One of the following courses: ECE103, ECE104, POE102 or PSE105.

Note 3

The credits required for the Science core requirement are: 1 credit in Chemistry or Biology, 1 credit Physics and 1 credit in information technology from the following courses:

CSE101: Introduction to Algorithms and Computing
CSE260: Introduction to Computer Concepts
BAE220: Introduction to Information Technology
BAE410: Information Systems

Note 4

Optional courses must be chosen from the list below:

Minor in Military and Strategic Studies

Note: *There is no Minor in Military and Strategic Studies.*

Minors in Psychology, Business Administration, Economics, English, or French Studies may be earned together with a B.A. Honours Military and Strategic Studies or a B.A. Military and Strategic Studies. Students pursuing one or more of these minors will complete 8 credits in the minor.

List of Optional Courses

Students in the Military and Strategic Studies programme must choose from the following list of optional courses:

BAE344: Operations Management
CCE204: Military Chemistry
ECE424: Economics of Defence
ECE428: Economics of National Security
ENE363: American Literature: The American Dream: Race, Gender, War
ENE413: Literature, Culture & Ecology
ENE415: Literature, Culture & Evolution
ENE450: The News Media and the Military
ENE451: War Literature I
ENE453: War Literature II
ENE471: Passionate Flyers and Aircraft Design
FRF324 : *La littérature francophone subsaharienne des In dépendances à aujourd'hui*
FRF326 : *La littérature francophone du Maghreb et du Moyen-Orient, de la colonisation à nos jours*
FRF331 : *L'expression de la guerre dans la littérature française*
FRF333 : *L'expression de la guerre dans la littérature canadienne-française*
FRF335 : *Récits de militaires et d'explorateurs en Afrique de Napoléon à la Première Guerre mondiale*
FRF381 : *Les Moralistes français du XVIe siècle*
FRF383 : *Les Moralistes français du XVIIe siècle*
FRF428 : *L'essai au XXIe siècle : crise, terreur, paranoïa et sécurité intérieure*
FRF430 : *L'échec des utopies dans la littérature française depuis de la guerre froide*
FRF434 : *Témoigner*
FRF440 : *Vie et mort des grands héros de l'Antiquité*
FRF442 : *La rhetorique d' Aristotle à aujourd'hui*
FRF479 : *Discours et pouvoir*
GOE305: World Regional Geography: Europe and/or the Americas
GOE307: World Regional Geography: Asia and/or the Africa
GOE404: Issues in Contemporary Geopolitics
GOF420: *Fondements géopolitiques du droit international*
GOE470: Problems in Political Geography: Focus on Europe and Former Soviet Union
GOE472: Understanding Post-Soviet Europe and Asia
HIE317: A History of Military Education since the 17 th Century
HIE319: Mercenaries in Military History
HIE320: A Social and Cultural History of the Atomic Age
HIE322: Conflict in the Middle East, 1914- Present
HIE328: Selected Issues in Military History
HIE332: War in Classical Age
HIE334: Historical Evolution of Operational Art
HIE336: The American Civil War
HIE338: North American Colonial Warfare, 1608-1815
HIE340: History of the First World War
HIE342: History of the Second World War
HIE346: The History of Canadian Forces Operations
HIE348: Fascism, Nazism and Communism, 1917-1945
HIF354 : Histoire du monde arabe et musulman
HIF364 : Napoléon et son temps
HIE366: Europe Napoleon and the World War of 1789 to 1815
HIE369: The Diplomacy of Europe's Global Ascendancy: International History, 1815-1870
HIE372: The Diplomacy of Great Power Rivalry: International History, 1870-1914
HIE374: From World War to World War: International History 1914-1945
HIE375: Limited War during the Cold War, 1945-1991
HIE377: The Cold War
HIF383: *Histoire de la France, de la guerre franco-prussienne à la présidence de Charles De Gaulle*
HIE390: European Imperialism - The Early Stages in Renaissance Europe
HIE392: European Imperialism - Nineteenth and Twentieth Centuries
HIE405: History of the Relations between Canada and the United States
HIE406: Canadian External Relations
HIE408: Canadian Defence Policy
HIE410: Canada and War
HIE416: The United States as an Emerging World Power 1750-1919
HIE418: The United States as a World Power, 1919 to the Present
HIE422: Naval History. The Age of Sail
HIE423: Naval History: The Age of Steam
HIF435: *Façonner un continent : les guerres en Amérique du Nord (1754-1815)*
HIF437: *Le Québec et la guerre depuis 1867*
HIE440: Public History
HIE448: The Rise of Modern Communism and Fascism
HIE449: History of intelligence since 1870
HIE451: War and the Environment
HIE453: War, Peace, and Civil Society in the 20th Century
HIE454: War, Peace and Diplomacy: Issues in the Foreign Policies of the Great Powers since 1815
HIE456: Issues in Women, War and Society
HIE461: Air Warfare in World Conflict, 1903-1945
HIE463: Air Warfare in Cold War and Small Wars, 1945-2010
HIF465: *Les grandes batailles classiques*
HIE474: Military Technology: Men, Machines and War
HIE475: Technology, Society and Warfare
HIE476: Guerrilla and Revolutionary War
HIE477: An Introduction to the History of Terrorism
HIF479: *La guerre d'Algérie*
HIE481: The First World War in the Middle East
HIE482: War and the Emergence of Modern Japan
HIF492: *Crimes et criminels de guerre: Droit pénal international*
MAE234: Introduction to Cryptography
MAE236: Introduction to Game Theory
PHE280: Physics of Armaments
POE310: International Relations Theory
POE319: Terrorism: History and Strategy
POE320: Comparative Politics
POE324: International Organizations
POE410: International Conflict Management

POE412: Contemporary American Foreign and Defence Policy
POE413: Nuclear Weapons & International Relations
POE416: Canadian Foreign and Security Policy
POE425: Regional Comparative Politics
POE432: Civil Military Relations
POE435: Terrorism and Political Violence
POE437: Contemporary Regimes: States and Nations
POE453: Topics in International Relations
POE486: Air and Space Law
POE488: The Law of Armed Conflict
PSE332: Introduction to Interviewing and Counselling
PSE346: Persuasion and Influence
PSE370: Recruitment and Selection
PSE380: Psychology and Philosophy of Religious Conflicts
PSE454: Advanced Leadership
PSE462: Human Factors in Applied Military Science
SOE320: Sociology of the Armed Forces

Psychology Undergraduate Programme

Introduction

The department of military psychology and leadership serves two purposes. First, the degree programme in psychology provides a university level education that will meet the needs of those enrolled in B.A. Honours Psychology or a B.A. Psychology, as well as students taking psychology courses out of interest in the discipline. Second, the department offers a suite of courses under the core curriculum that provide officer cadets with the foundation of leadership, ethics, and military professionalism.

The department of military psychology and leadership has three primary objectives:

to provide a theory-based understanding of human behaviour and mental processes;
to teach critical thinking and the scientific method as they apply to psychology; and
to show students how to apply their knowledge of psychology in their day-to-day lives as well as throughout their military careers, regardless of their military occupations.
The programme focuses on the application of psychology in particular and behavioural science in general, to the military workplace and military operations. Thus, the courses of the programme examine topics in the general domains of military psychology; personnel psychology; leadership and ethics; basic experimental psychology; and special topics. A psychology degree from RMC of Canada provides an excellent grounding for professional development and represents an exceptional way to develop the leadership abilities of graduates.

Core Curriculum Courses

The military psychology and leadership department recognizes the need to provide leadership education, raise social consciousness and positively impact the psychological, philosophical and moral development of students. To achieve these goals, the department offers mandatory courses as part of the core curriculum required by students. The focus and scope of each is described below.

100-level Courses

PSE103: Introduction to Human Psychology and PSE105: Social Psychology.

Meeting the increasingly unique and complex challenges of an officer in the Canadian Forces requires a combination of conceptual, technical, interpersonal, and professional skills which were not required only a short while ago. To prepare officers for their future leadership responsibilities, the psychology programme promotes an appreciation of human behaviour by providing introductory courses for arts, science and engineering students that focus on basic psychological phenomena such as learning, perception, memory, personality and emotion. Beyond self-awareness, an officer must be able to determine the appropriate type and degree of influence required for effective leadership of individuals and groups. Students examine human behaviour in organizational and social contexts by studying such topics as values, attitudes, obedience, aggression, racial and gender relations, and prejudice.

300-level Course

PSE301: Organizational Behaviour and Leadership

An important element of successful leadership is an officer's ability to diagnose organizational performance, adapt effective leadership approaches to various situations, and convey the appropriate leadership style to followers. This course has been designed to help students understand leadership theory, human motivation, power and politics, organizational culture, and managing resistance to change.

400-level Course

PSE401: Military Professionalism and Ethics

An officer's ability to function will be greatly impaired if his/her leadership is perceived to lack integrity. Thus, the department focuses on the necessity for personal integrity, the importance of human dignity, and the need to reflect continually on one's own values and professional conduct in fourth year. The department reinforces these concepts by readings and discussions centered on the function of ethics in social and organizational life, ethical theories and decision criteria which distinguish between right and wrong, the impact of situational factors on ethical behaviour, the nature of military professionalism and ethical obligations, specific codes of conduct extant in war, and value conflicts and moral dilemmas inherent in military service.

General Information

Students successfully completing their first year in arts are eligible for entry into the programme leading to a B.A. Honours Psychology, a B.A. Psychology, or a Minor in Psychology. Students are normally admitted to these programmes after first year with permission of the department head. Students normally apply for B.A. Honours Psychology at the beginning of the third year. Students in B.A. Honours Psychology are required to complete a thesis in the fourth year.

Excerpt from Academic Regulation 3.1: *"To earn an Honours Bachelor of Arts degree within a discipline, a student must successfully complete the required courses set out in the applicable Honours Programme of Study, with at least 20 credits within the discipline, must maintain a minimum B average in the Honours courses in all 300 and 400 level courses in their Honours Programme of Study, and must attain at least a B-average in the 400 level courses."*

B.A. Honours Psychology

Of the 40 credits required for the B.A. Honours Psychology, including the core courses for arts programmes . A minimum of 20 credits must be from psychology, as approved by the department, including:

Mandatory Courses (14 credits):

PSE103: Introduction to Human Psychology
PSE105: Social Psychology
PSE211: Research Methodology in Psychology
PSE213: Statistics for the Behavioural Sciences
PSE236: Cognition and Learning
PSE240: Personality
PSE301: Organizational Leadership and Behaviour
PSE312: Applied Military Psychology
PSE350: Advanced Research Methods
PSE352: Advanced Statistical Analysis for the Behavioural Sciences
PSE401: Military Professionalism and Ethics
PSE424: Thesis (2 credits)
PSE454: Advanced Leadership

Optional Courses (6 credits from the following): Note 1

BAE326: Human Resources Management
PSE302: Brain and Behaviour
PSE324: Cross-Cultural Psychology
PSE328: Group Dynamics
PSE330: Introduction to Abnormal Psychology
PSE332: Introduction to Interviewing and Counselling
PSE334: Introduction to Human Sexuality
PSE346: Persuasion and Influence
PSE360: Human Development through the Lifespan
PSE370: Recruitment and Selection
PSE380: Psychology and Philosophy of Religious Conflicts
PSE410: Psychology, Morality, and Ethics
PSE413: Foundations of Evidence-based Therapies
PSE415: Tests and Measures
PSE426: Advanced Cognitive Psychology
PSE430: Stress
PSE444: Sports Psychology
PSE450: Advanced Social Psychology
PSE462: Human Factors in Applied Military Science
PSE464: Directed Studies in Psychology
PSE465: Directed Studies in Leadership
SOE320: Sociology of the Armed Forces

Note 1
A minimum of one credit, chosen from the optional courses, must be at the 400-level. *(Students may take up to two credits as optional programme courses from St-Lawrence College or Queen's University, with the approval of the head of the department)* .

B.A. Psychology

Of the 40 credits required for B.A. Psychology, including the core courses for arts programmes . A minimum of 16 credits must be from psychology, as approved by the department, including:

Mandatory Courses (10 credits)

PSE103: Introduction to Human Psychology
PSE105: Social Psychology
PSE211: Research Methodology in Psychology
PSE213: Statistics for the Behavioural Sciences
PSE236: Cognition and Learning
PSE240: Personality
PSE301: Organizational Leadership and Behaviour
PSE312: Applied Military Psychology
PSE401: Military Professionalism and Ethics
PSE454: Advanced Leadership

Optional Courses (6 credits from the following): Note 2

BAE326: Human Resources Management
PSE302: Brain and Behaviour
PSE324: Cross-Cultural Psychology
PSE328: Group Dynamics
PSE330: Introduction to Abnormal Psychology
PSE332: Introduction to Interviewing and Counselling
PSE334: Introduction to Human Sexuality
PSE346: Persuasion and Influence
PSE350: Advanced Research Methods Note 3
PSE352: Advanced Statistical Analysis for the Behavioural Sciences
PSE360: Human Development through the Lifespan
PSE370: Recruitment and Selection
PSE380: Psychology and Philosophy of Religious Conflicts
PSE410: Psychology, Morality, and Ethics
PSE413: Foundations of Evidence-based Therapies
PSE415: Tests and Measures
PSE426: Advanced Cognitive Psychology
PSE430: Stress
PSE444: Sports Psychology
PSE450: Advanced Social Psychology
PSE462: Human Factors in Applied Military Science
PSE464: Directed Studies in Psychology Note 2
PSE465: Directed Studies in Leadership Note 2
SOE320: Sociology of the Armed Forces

Note 2
A minimum of one credit, chosen from the optional courses, must be at the 400-level. *(Students may take up to two credits as optional programme courses from St-Lawrence College or Queen's University, with the approval of the head of the department)* .

Note 3
Courses are for senior students, with approval from the head of the department.

Programme Outline Tables

The programme outline tables are an example of a typical course load of a student enrolled in B.A. Honours Psychology or a B.A. Psychology.

B.A. Honours in Psychology

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note4 PSE103 POE116	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 PSE105 ECE103 **or** ECE104	ENE210 1 science credit Note5 MAE106 Note4 PSE211 PSE236	ENE210 (**cont'd**) HIE203 PSE213 PSE240 **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CSE260 1 science credit Note5 PSE352 **Psychology** Note6 1 credit	HIE271 PSE312 PSE355 **Psychology** Note6 2 credits	POE205 PSE424 PSE454 **Psychology** Note6 1 credit **Elective** 1 credit	PSE401 PSE424 **(cont'd)** **Psychology** Note6 2 credits **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.A. Psychology

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE110 HIE102 MAE103 Note4 PSE103 POE116	ENE110 (**cont'd**) HIE102 (**cont'd**) MAE113 PSE105 ECE103 **or** ECE104	ENE210 HIE203 MAE106 Note4 PSE211 PSE236	ENE210 (**cont'd**) 1 science credit Note5 PSE213 PSE240 **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CSE260 1 science credit Note5 **Psychology** Note6 2 credits	HIE271 PSE312 **Psychology** Note6 1 credit **Elective** 2 credits	POE205 PSE454 **Elective** 3 credits	PSE401 **Psychology** Note6 3 credits **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

Note 4
MAE106 can be taken in first year if a student is not required to take MAE103. *(**If a student is not required to take MAE103, another elective shall be taken instead**)* .

Note 5
Credits required for the science core are: 1 credit in Chemistry or Biology and 1 credit in Physics.

Note 6
A student may take any psychology course offered or approved by the department.

Double Major or Combined Major

Double Majors with other arts programmes are possible. Students who choose to follow a double major in psychology and one other arts programmes are required to follow the core courses for arts programmes .

Combined Majors with science programmes are possible. students who choose to follow a combined major in the sciences and psychology are considered to be science students, and as such are required to follow the core courses for science programmes . Please consult one of the department's undergraduate advisors for details.

Psychology and Business Administration Degree

Honours = 42 credits or **Major =** 40 credits

Core Courses for Arts Programmes

BAE220 counts as the Information Technology credit required in the core courses for arts programmes.
Within the Common Arts Core ECE103 and PSE105 will be preferred

Psychology Requirements

PSE211: Research Methodology in Psychology
PSE213: Statistics for the Behavioural Sciences
PSE236: Cognition and Learning
PSE240: Personality
PSE312: Applied Military Psychology
PSE346: Persuasion and Influence **or** PSE328: Group Dynamics
PSE350: Advanced Research Methods Note 7
PSE352: Advanced Statistical Analysis for the Behavioural Sciences Note 7
PSE370: Recruitment and Selection
PSE424: Thesis (2 credits) Note 7
PSE430: Stress **or** PSE450: Advanced Social Psychology
PSE454: Advanced Leadership
2 Optional Psychology credits at the 300/400 level Note 8

Business Administration Requirements

BAE202: Financial Accounting
BAE220: Information Technology
BAE238: Introduction to Strategic Management
BAE262: Business Analysis and Reporting
BAE300: Finance
BAE314: Marketing Fundamentals
BAE326: Human Resources Management
BAE330: Organizational Theory
BAE344: Operations Management

Note 7
Only required for the B.A. Honours Psychology and Business Administration.

Note 8
Only required for the B.A. Psychology and Business Administration.

Note: Follow this link for the details of the B.A. Business Administration and Psychology degree programme.

Concentration

Note: The Concentration is not open to ROTP/RETP Cadets

A concentration in psychology consists of a minimum of 12 credits in psychology approved by the department, including the core courses for arts programmes. Of these 12 credits in psychology, a minimum of 6 credits must be at the 300 or 400 level.

Students who select the concentration in psychology are required to take the following courses or their equivalent from a recognized university:

Mandatory Courses (3 credits):

PSE103: Introduction to Human Psychology (1 credit)
PSE301: Organizational Leadership and Behaviour (1 credit)
PSE401: Military Professionalism and Ethics (1 credit)

Optional Courses (2 credits from the following):

PSE105: Social Psychology (1 credit)
PSE211: Research Methodology in Psychology
PSE213: Statistics for the Behavioural Sciences
PSE312: Applied Military Psychology

Optional Courses (7 credits)

Any Psychology course offered, or approved by the department.

Minor

Students taking a minor in Psychology must complete a minimum of 8 credits in psychology, including the core courses for arts programmes.

Mandatory Courses (6 credits)

PSE103: Introduction to Human Psychology
PSE105: Social Psychology
PSE211: Research Methodology in Psychology
PSE213: Statistics for the Behavioural Sciences
PSE301: Organizational Leadership and Behaviour
PSE401: Military Professionalism and Ethics

Optional Courses (2 credits)

Any Psychology course offered, or approved by the department.
Note: Students may take up to two credits as optional programme courses from St-Lawrence College or Queen's University, with the approval of the Department Head.

Undergraduate Psychology Courses

Courses 100-199

PSE103 Introduction to Human Psychology

This course is designed to provide the student with an understanding of basic psychological principles. The essentials of the scientific method and its application to psychology will be presented. Concepts such as development, learning, memory, motivation, intelligence, stress and health, personality, psychological disorders, and social psychology will be discussed.

Note(s): Also offered through Distance Education. A required course for all students in Arts, Science and Engineering.
Exclusion(s): PSE123
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE105 Social Psychology

This course provides a comprehensive treatment of the major topics and issues in social psychology. The course will emphasize the unique contribution of social psychology to the theory of social behaviour in such areas as social beliefs and judgements, behaviour and attitudes, attitude change, culture and gender, conformity and obedience, persuasion, prejudice and discrimination, aggression, and social conflicts and their resolution. Students will apply theories and concepts of social psychology to the analysis of the military and social milieu.

Prerequisite(s): PSE103
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE120 Aboriginal Peoples and the Military

This interdisciplinary course introduces students to historical and contemporary understandings of the relations between Aboriginal Peoples and the military with an emphasis on drawing on the social sciences to examine the Canadian context. Areas covered include: relations amongst Aboriginal Peoples, the Crown and Canadian Society; the experiences of Aboriginal members serving in the military; examination of unique aspects of the cultures of Original/Aboriginal/Indigenous Peoples and the dominant cultures of military including the Canadian Forces; and, consideration of Aboriginal and military images, beliefs and practices of the warrior and the leader.

Note(s): Students should normally be enrolled in the Aboriginal preparatory programme
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE192 Directed Readings in Psychology

The content of this course is more advanced and is related to the studies already completed by the student.

Directed Reading Only

Note(s): Available upon permission of the department head to Arts students repeating 1st year.
Credit(s): 2

Courses 200-299

PSE211 Research Methodology in Psychology

This course takes a broad approach to research methods in the behavioural sciences. Students are introduced to basic concepts in experimental design and statistical analysis of psychological data. More specifically, students are taught how to obtain reliable and valid measures of human behaviour and psychological attributes. Insights into methodological issues related to the study of psychological phenomena in applied contexts are gained through having students carry out simple research projects in the context of a laboratory.

Note(s): For students in Arts. A required course for the students electing a B.A. in Psychology
Prerequisite(s): PSE103
Semester: Usually offered in the Fall
Contact Hours: 3 - 1 - 5
Credit(s): 1

PSE213 Statistics for the Behavioural Sciences

This course introduces the use of statistical concepts in the behavioural sciences. Students will learn about such concepts as measures of central tendency, measures of dispersion, and the normal distribution. Hypothesis testing will be introduced along with statistical tests for independent and related samples. The course will also include a brief introduction to non-parametric statistics.

Note(s): This course is intended only for students wishing to do a Major, Minor, or a Concentration in Psychology. A required course for the students electing a B.A. in Psychology.
Prerequisite(s): PSE103
Exclusion(s): BAE242 and ECE242
Semester: Usually offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE236 Cognition and Learning

This course is concerned with the basic mental processes involved in learning and information processing. Topics include the basic and fundamental processes involved in learning and in cognition, including mind design, cognitive aspect of learning theories, attention, short-term and long-term memory, and higher mental processes of knowledge and language. The course incorporates three in-class laboratory exercises. Each lab includes running an assigned experiment, subsequent data collection and analysis, and write up as an experimental study using APA format. Students will use concepts of decision-making to analyze military situations.

Prerequisite(s): PSE103
Note(s): A required course for the students electing a B.A. in Psychology
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE240 Personality

This course is intended to introduce students to theory and research in personality. Students will review various theoretical models, the historical context in which they were developed, and how empirical research has informed these theories and been informed by these theories. The course will provide a broad overview of several major theories of personality, including psychoanalytic/psychodynamic, social/life-span, humanistic, trait theories and cognitive/behavioural perspectives, and will examine both classic and current ideas about the nature and function of personality. Upon completion of this course, students will have an understanding of the basic concepts and principles of each theoretical perspective, be able to relate the personality theories to their own development, characteristics, and behaviours, and be able to apply the theories to others' lives in order to better understand their personalities and experiences.

Note(s): A required course for the students electing a B.A. in Psychology.
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

Course 300-399

PSE301 Organizational Behaviour and Leadership

This course is designed to familiarize students with basic theories, concepts, and skills related to organizational behaviour and effective leadership. Students will examine how individuals in organizations, groups in organizations, and organizational processes can be impacted by leaders in order to enhance organizational effectiveness. A special emphasis is placed on how leaders can use their knowledge and understanding of organizational behaviour to improve performance and increase the well-being of members. Major topics include motivation theories and applications, diagnosing performance discrepancies, performance feedback, power and influence, leadership theories and applications, organizational culture, organizational structure, and overall change strategies. Part of the material will be presented in a didactic form. A number of individual and group exercises will be used as a supplementary learning tool to reinforce class lectures and assigned readings. Student class participation is highly encouraged.

Note(s) :
Also offered through Distance Education. Restrictions for ROTP and RETP: This course is for students who have completed 16 credits or equivalent or with the permission of the department head.

Prerequisite(s): PSE103
Semester: Usually offered in the Fall
Contact Hours: 3 - 0 - 3 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE302 Brain and Behaviour

This course introduces the scientific study of how the brain relates to behaviour. The content falls in three areas: a) an examination of neurons, neurotransmitters, and how individual nerves work and communicate with other structures; b) a description of sensory and motor systems; and c) a summary of how the nervous system controls various aspects of behaviour and mental processes, such as learning, memory, motivation, emotion, aggression and cognition.

Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE312 Applied Military Psychology

The course gives students the opportunity to examine the psychological dimensions of military operations. The course begins with an overview of the field of military psychology and then focuses on selected topics like military socialization, combat stress, sleep deprivation, fear and courage, and psychological operations. At the end of the course, students will be able to describe the impact of these psychological factors on performance during military operations.

Note(s) :
Also offered through Distance Education . A required course for students electing a B.A. in Psychology.

Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE324 Cross-Cultural Psychology

Modern military operations typically involve multinational contingents comprised of units from a wide variety of cultures. The purpose of the course is to gain an understanding of the diversity that exists in the world and within Canada. This course provides an overview of some of the differences that exist across cultures and why these differences may exist. Topics to be covered include acculturation, stereotypes, prejudice, cross-cultural research, values, beliefs, gender roles, conflict and negotiation, communication, and intercultural training.

Note(s): For students in Arts
Prerequisite(s): PSE103 and PSE105
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE328 Group Dynamics

The objective of the course is to enable students to develop an understanding of small group processes, particularly influences that groups have on individual members, as well as those factors which determine group effectiveness. The principal topics to be addressed are: the stages of group development; socialization processes; communication; decision-making process; and, group norms, cohesion and role definition.

Note(s) :
Also offered through Distance Education . For students in Arts

Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE330 Introduction to Abnormal Psychology

Starting with the distinction between abnormal and normal behaviour, the course moves to the contemporary classification system of abnormal behaviour. The major psychological disorders are discussed in detail (e.g., anxiety disorders, major affective disorders, stress disorders, neurosis, psychosis, and personality disorders). Current schools of treatment are also discussed, as well as their relative strengths and weaknesses.

Note(s): For students in Arts
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE332 Introduction to Interviewing and Counselling

The goal of this course is to introduce students to counselling theory and skills that they can later apply as leaders and managers. This course will give students an opportunity to study theoretical perspectives on counselling and to apply these theories in situations that require interviewing and helping skills. After examining a number of theoretical concepts in counselling, the course will focus on the preparation and conduct of counselling interviews, solution-oriented interviews, active listening, verbal and non-verbal communication, problem solving and facilitating attitudes used in counselling interviews. A mix of psychological theory, case studies and practical applications will be presented throughout the course.

Prerequisite(s): PSE103 and PSE240
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE334 Introduction to Human Sexuality

The primary goal of this course is to provide a comprehensive overview of human sexuality. The focus of this approach is to examine human sexuality from a variety of backgrounds such as biology, physiology, public health, sociology, and psychology. This course is designed to provide students with informed sources, themes and research findings in order to develop their critical analysis. Through lectures, discussions, and the study of issues such as sexuality over the lifespan, reproduction, sexual identity and diversity, interpersonal communication, sexual health and risk, paraphilia's, and sexual dysfunctions students will gain an appreciation of the complexity of human sexuality.

Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE346 Persuasion and Influence

The goal of this course is to provide students with knowledge on the theories and concepts of persuasion and influence, from both social psychology and leadership perspectives. Main course topics include communicator's characteristics, receiver's characteristics, cognitive and social factors, attitude formation and change, behaviour modification and interpersonal communication. Also, different influence strategies will be presented.

Prerequisite(s): PSF103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE347 Positive Psychology

The purpose of this course is to explore some of the principles, concepts and theories within the field of positive psychology, such as living a meaningful and gratifying life, mindfulness, engagement and hope. Using a scientific perspective, we will study the factors (biological, psychological, social and emotional) that promote well-being and the positive aspects of human experience. In addition, we will examine techniques and exercises that contribute to a more fulfilling and satisfying life. This course includes two teaching methods: didactic (lecture courses and required reading) and experiential / interactive (group discussions and activities).

Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE350 Advanced Research Methods

This course will provide detailed coverage of key concepts and practices related to conducting behavioural science research in an institutional setting and will give students the opportunity to further develop their research skills. Students will be presented with the ethical and administrative considerations for behavioural science. By means of research projects and laboratories, students will also learn to select the proper statistical analysis for various research designs, to follow systematic data cleaning procedures, to read and interpret results from computer outputs, and to describe and report results in APA format.

Note(s): A required course for students electing a B.A. Honours in Psychology or by permission of the MPL department head.
Prerequisite(s): PSE352
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE352 Advanced Statistical Analysis for the Behavioural Sciences

This course addresses the theoretical concepts and applications of univariate statistical techniques in the behavioural sciences, and introduces multivariate statistical techniques. Statistical analyses covered include factorial analysis of variance, multiple regression, correlation techniques and non-parametric analyses. Laboratory sessions will introduce the use of computerized statistical software, data manipulation and the interpretation of results.

Note(s): A required course for students electing a B.A. Honours in Psychology or by permission of the MPL department head.
Prerequisite(s): PSE213 and PSE214
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1 - 5
Credit(s): 1

PSE360 Human Development through the Lifespan

This course is designed to familiarize students with basic research and theory of human development across the life span. Physical, cognitive, communicative/linguistic, and social/emotional development during childhood, adolescence, adulthood, and old age will be examined. Factors that affect human development and principles of development will be studied.

Note(s): For students in Arts.
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE370 Recruitment and Selection

This course is designed to familiarize students with basic theories, concepts and practices in industrial psychology. Students will examine how theoretical and empirical research in industrial psychology is used to solve typical human resources challenges. Representative topics include: recruitment, job analysis, competency evaluation and assessment, selection tests, psychometric issues in measurement, hiring procedures, applicant screening, the employment interview, legal issues in selection techniques and selection decisions, approaches to performance appraisal and performance rating systems. Students will be expected to demonstrate their comprehension of industrial psychology by completing projects with a direct application in these areas. References are made to the Canadian Forces personnel system to illustrate various points of discussion.

Prerequisite(s): PSE301
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE380 Psychology and Philosophy of Religious Conflicts

This course offers a critical study of the influence of religion on people and on conflicts. The first objective of this course is to closely examine the role of religion in the development of violence in conflicts and hostilities between different cultural and ethnic groups. The second objective is to understand what incites people or groups to use religion or particular beliefs as a means to provoke violence and create conflict. This course is designed to allow students to grasp a phenomenon that is more and more embedded in political-religious discourse and to analyse its various influences. This end will be accomplished with the help of psychological theories and research, religious concepts and studies, and philosophical insights. The acquisition of knowledge will be attained through formal teaching sessions, discussions and student presentations. Some of the themes that will be studied are: war in the name of God, personal and religious identity, religious fanaticism, suicide bombers, attachment theory, and terrorism.

Note(s): For students in Arts or with the permission of the professor
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE382 Peace and Conflict Psychology

The goal of this course is to provide students with knowledge of psychology's contribution to understanding and improving human relations at interpersonal, intergroup, and international levels. Students will be presented key concepts, major theories and practices underlying peace, conflict, violence, and social inequities. Main course topics include prejudice, social inequalities, militarism, conflict resolution, social justice, peace education and nonviolent approaches to peace.

Prerequisite(s): PSE103, PSE105
Contact Hours: 3 - 0 - 6
Credit(s): 1

SOE320 Sociology of the Armed Forces

This course uses perspectives and research from military sociology to introduce the student to the evolving character of military institutions within Canada. The following topics will be covered: the nature and role of the military in contemporary society, external change impacts (e.g., technological, political, economic, demographic, socio-legal and socio-cultural factors) and their consequences for military organization, models of military service, and special problems in the military system (e.g., recruitment and retention, diversity, media relations, the family, quality of life, mid-career transition). Emphasis will be placed on the Canadian military and on Canadian research literature.

Note(s): For students in Arts
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

PSE401 Military Professionalism and Ethics

The purpose of this course is to develop student understanding of the professional and ethical dimensions of officership. Throughout, a distinction is made between the normative ideals of behaviour prescribed by ethical and military theorists and the reality of behaviour as described and explained by cognitive, social, and other psychological factors. Course content is drawn from moral philosophy, psychology, and military sociology and includes readings and discussions on: the function of ethics in social and organizational life; the major ethical theories and decision frameworks developed by moral philosophers to distinguish between right and wrong; individual difference factors in moral development and moral cognition; situational and organizational factors which either foster or undermine ethical behaviour; psychological models of ethical decision-making and action; the nature of military professionalism and the ethical obligations which derive from the military social role and legitimate power; the military ethic and military codes of conduct; specific codes of conduct applicable in war; and value conflicts and ethical dilemmas inherent in military service.

Note(s): Also offered through Distance Education .
Restrictions for ROTP and RETP: This course is for students who have completed a minimum of 30 credits or equivalent or with the permission of the department head
Prerequisite(s): PSE103
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE410 Psychology, morality and ethics

The objective of this course is to examine the relation between psychology as an empirical discipline and ethics as a normative discipline. The aim is to engage students in a reflection that will help them understand the important role of psychology in ethical thinking. The course focuses on what psychology teaches us about the structure of human beings as principal agents of ethical decisions. To address this issue, the pedagogical approach for this course will borrow theories, concepts and practices from the domain of psychology and the field of ethics. These three angles (theories, concepts and practices) are intertwined in exploring themes such as personality, identity development, empathy, character development, and in closely studying ethical cases such as cognitive dissonance in ethical discourse, differences between sexes and conflict in values in ethical decision making.

Note(s): For students in Arts or with the permission of the professor.
Prerequisite(s): PSE103
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE413 Foundations of Evidence-based Therapies

The course will provide an analysis of the theory, research and practice of current evidence-based therapies. Special attention will be given to cognitive behavioural therapy, which helps people by examining, reflecting on and/or adapting their thoughts, feelings and behaviours. Interpersonal therapy, emotion-focused therapy, mindfulness-based cognitive therapy, metacognitive therapy, schema therapy and other therapies will also be discussed. Students will learn the fundamentals of empirically-based techniques and their appropriate use and will develop a comprehensive understanding of how these approaches can be useful in the treatment of psychological disorders with a particular emphasis on anxiety and depression.

Note(s): For students in Arts or with permission of the professor.
Prerequisite(s): PSE103
Corequisite(s): PSE330 or PSE332
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE415 Tests and Measures

This course provides the student with an understanding of the development and use of tests and measures of individual differences in key domains of psychology. Core material covered addresses: test design and psychometric analyses; ethical considerations in the use of tests; assessment of cognitive abilities; vocational assessment; and assessment of personality. Students will be introduced to measures commonly used in the military context.

Note(s): For students in Arts
Prerequisite(s): PSE213 and PSE214.
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE424 Thesis

Special research under the supervision of a faculty member on an approved subject that may include statistical analyses and results interpretation, or in-depth analysis and application of the extant literature. Special topics in research methods as they pertain to the student's research will be discussed. This thesis will be examined by a committee constituted for the purpose.

Note(s): A required course for the students electing a B.A. Honours in Psychology
Prerequisite(s): PSE350 and PSE352 or with the permission of the Department.
Contact Hours: 1.5 - 0 - 7.5
Credit(s): 2

PSE426 Advanced Cognitive Psychology

This is an advanced course on cognitive psychology. There are two major components to this course. The first, a content component, mainly focuses on major empirical findings and theories in cognitive psychology, including research methodology. The main focus of the second component, critical thinking, includes refining students' critical thinking skills through an active engagement in debates on major issues in applied cognitive psychology, such as, but not limited to, human factors as well as issues of awareness: memory, situation awareness, decision making, and team cognition.

Note(s): For students in Arts
Prerequisite(s): PSE214 and PSE236
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE430 Stress

This course will concentrate on the fundamental aspects of the biological and psychological approach to stress and its consequences. Students will develop an understanding of the plausible mechanisms that link psychological and behavioural factors to stressors, stress, and strain (stress reactions). They will also gain insight into the ways that interventions may interrupt these processes. The course will cover the different types of stressors and the cumulative nature of stress. Concepts of stress, vulnerability, adaptability, resilience, coping, regenerative power, social support and related research will also be included. Finally, the course will include major stress management techniques, helping others cope with stress, and promoting wellness.

Note(s): For students in Arts
Prerequisite(s): PSE301
Corequisite(s): PSE312
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE444 Sport Psychology

This course introduces the student to the psychological and social factors inherent in sport and exercise. Topics will include understanding participants (e.g., personality, motivation, stress); understanding sport and exercise environments (e.g., competition, feedback, reinforcement); understanding group processes (e.g., team dynamics, cohesion, leadership); enhancing performance (e.g., imagery, goal setting, concentration); improving health and well-being (e.g., athletic injuries and psychology, addictive and unhealthy behaviours, burnout and overtraining). This course will provide students with a greater understanding of the psychological dimensions of sport, exercise and health, and then be better prepared to implement this knowledge in military settings.

Note(s): For students in Arts
Prerequisite(s): PSE103 and PSE301
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE450 Advanced Social Psychology

This course will explore advanced topics in social psychology. Students will develop an understanding of the complexities of human relationships, gain an appreciation for how our behaviours come to be shaped by others, and how we, in turn, can exert an influence on those with whom we interact. Core material covered addresses: historical perspectives; interpersonal aspects; personal, interpersonal and collective phenomena; interdisciplinary perspectives; evolutionary social psychology; and emerging trends. Students will be introduced to commonly used social psychological experimentation and methodologies.

Prerequisite(s): PSE105 and PSE214
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE454 Advanced Leadership

The general objective of this course is to explore leadership theory and practice in depth, building on the concepts introduced in PSE301, and secondly, to develop an appreciation of how these impact on work performance and motivation. The general focus will be on the critical analysis of current leadership theories and their application to the military. Students will also be introduced to diagnostic and intervention strategies related to organizational development and to the leader as an agent of change. Ultimately, the student will be able to evaluate work situations and employ strategies to increase personnel performance and improve motivation and job satisfaction.

Note:
Also offered through Distance Education. A required course for students electing a B.A. in Psychology

Prerequisite(s): PSE103 and PSE301
Semester: Usually Offered in Winter
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

PSE462 Human Factors in Applied Military Science

This course will introduce students to the broad problems in human-machine interactions and interfacing. This will involve studying human capabilities as applied to engineering and design. Topics will also include the measurement of human and machine capabilities, the effects of noise on performance, and the effects of sustained operations on performance. The various techniques used to enhance human effects of sustained operations on performance. The various techniques used to enhance human performance will also be discussed and evaluated. Aids to memory, perception, discrimination, and detection will be examined and demonstrated in class. Students will also be introduced to the use of computers in psychological settings.

Note(s): For students in Arts
Prerequisite(s): PSE103 and PSE214 and PSE301
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE464 Directed Studies in Psychology

With permission of the department head, specialized study on an approved subject in one of the areas studies in Military Psychology, but not available in other courses offered by the department. The method of instruction (i.e., lecture, seminar, tutorial, directed reading, etc.) will be determined by student needs and faculty availability.

Note(s): For students Arts
Prerequisite(s): PSE214 and PSE301
Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

PSE465 Directed Studies in Leadership

With permission of the department head, specialized study on an approved subject in one of the areas studies in Military Leadership, but not available in other courses offered by the department. The method of instruction (i.e., lecture, seminar, tutorial, directed reading, etc.) will be determined by student needs and faculty availability.

Note(s): For senior students, with permission of the department
Prerequisite(s): PSE214 and PSE301
Semester: Usually offered in the Fall & Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

Undergraduate Political Science Programme

Introduction

The primary purpose of the Department of Political Science is to provide the officer cadets of the Royal Military College of Canada with the best possible university-level education in political science. This education must benefit foremost the students themselves and, as a direct consequence, the professional development of the future officers of the Canadian Forces. The quality of this education must be such that the doors of every graduate school will be open to the best of these students.

Social scientists seek to understand and to analyze human behaviour. In their study of society they make both normative and positive statements. Normative statements concern what one believes ought to be. They are based on value judgments related to philosophical, cultural and religious systems. Positive statements, on the other hand, are about matters of fact. They are testable statements and can be proved by empirical evidence. Successfully predicting the behaviour of a large group of people, for example, is made possible by the statistical "law" of large numbers, which asserts that irregularities in individual behaviour tend to cancel each other out and regularities tend to show up in repeated observations.

Language and writing skills are a basic requirement for studying social sciences. Hence students are encouraged to take maximum advantage of all the opportunities, including the services of the Writing Centre, made available to them during their first two years of study to develop these skills.

Courses in political science focus on a broad spectrum of domestic and international social issues whose resolution has political implications.

Courses cover a range of issues from the following fields of study:

- Canadian politics;
- International relations;
- Comparative politics;
- Political theory;
- Public administration and policy;
- Geography

Students will complete studies in each of the following fields, consisting of mandatory and optional courses:

The field of **Canadian politics** examines the structure, the institutions and the decision-making process of the Canadian polity in the context of the roles and goals of the citizens in the polity. Political parties, interest groups, elections, the constitution, the Charter of Rights, the Judiciary and the rule of law are studied. As a result, students are able to analyze and evaluate how politics works in Canada, how Canadian governments make decisions, and their own responsibilities as officers and public servants.

The field of **international relations** examines relations between states and within the international system. Theories of international relations help us to understand how and why states act. Strategic studies provide tools for understanding how both state and non-state actors achieve their objectives within the international system. International institutions, international economics, and geopolitics contribute to an understanding of international relations. Students are able to evaluate the contribution of different theories, interpret policies, and analyze international events.

The field of **comparative politics** provides both a method and a subject of study. Because we cannot experiment in the real world, comparative methods provide us tools to answer questions about probable causes. As a subject of study, comparative politics addresses similarities and differences within countries and regions, as well as over time within particular cases. Students learn to design research to answer real-world questions, interprets time series and cross section data, and test hypotheses related to political, economic, and social events, particularly in circumstances of conflict.

The field of **political theory** includes methods of inquiry and political philosophy, addressing the big questions of peace, justice, democracy, and equality. The major political thinkers (from Plato to Rawls) and the major political ideologies (communism, socialism, liberalism, conservatism, and so on) are addressed in theoretical and contemporary perspective. Students are able to interpret and evaluate the elements of major ideas in political life.

The field of **public administration** addresses the institutions of bureaucracy within a state, and the policy of the state to achieve particular ends in the public interest. It provides tools to describe, measure and evaluate programs and policies against their intended effects. Extending to the rules and laws that govern public policy, this field includes several courses in international law.

Geography courses survey the evolution of regions, geopolitical patterns and processes including disintegration of empires, geo-strategic theories, spatial patterns, migration, demographics, and the ecological consequences of resource exploitation. Geography courses contribute to Canadian, international, and comparative fields of political science.

Programme Requirements

General Information

Students successfully completing their first year in arts are eligible for entry into the programme leading to a B.A. Honours Political Science or a B.A. Political Science. The first year political science courses are part of the core compulsory courses and will count toward the degree requirements noted below. In consultation with the department head, students will select courses each year which fulfil the degree requirements, and which are best suited to student interest.

B.A. Honours Political Science

Academic Regulation 3.1:

To earn an Honours Bachelor of Arts degree within a discipline, a student must successfully complete the required courses set out in the applicable Honours Programme of Study, with at least 20 credits within the discipline, must maintain a minimum B average in the Honours courses in all 300-level and 400-level courses in their Honours Programme of Study, and must obtain at least a B- average in the 400-level courses.

The B.A. Honours Political Science requires 40 credits, including the core courses for arts programmes .

Mandatory Courses

POE102: Introduction to Political Science
POE116: Introduction to International Relations
POE205: Canadian Politics and Society
POE314: Modern Political Philosophy
POE317: Introduction to Contemporary Strategic Studies **or**
GOE202: Introduction to Political Geography;
POE320: Comparative Politics
POE328: Canadian Political Institutions
POE332: Public Administration in Canada
POE492: Seminar in Political Science

Optional Courses

Students must take at least one course in each of the five subfields of political science , plus five additional courses consisting of either Political Science or cross-listed courses offered by other departments, of which four should be at the 400-level.

B.A. Political Science

A B.A. Political Science requires 40 credits, including the core courses for arts programmes , with a minimum of 16 credits in Political Science.

Mandatory Courses

POE102: Introduction to Political Science
POE116: Introduction to International Relations
POE205: Canadian Politics and Society
POE314: Modern Political Philosophy
POE317: Introduction to Contemporary Strategic Studies **or**
GOE202: Introduction to Political Geography
POE320: Comparative Politics
POE328: Canadian Political Institutions
POE332: Public Administration in Canada

Optional Courses

Students must take at least one course in each of the five subfields of political science , plus three additional courses consisting of either political science or cross-listed courses offered by other departments, of which two should be at the 400-level.

It should be noted that "POE490: Directed Readings in Politics," can be offered as an optional course in each of the fields, but can be taken only once.

Subfields of Political Science

Canadian Politics

POE416: Canadian Foreign and Security Policy
POE438: Canadian Political Parties, Elections and Public Opinion
POE452: Topics in Canadian Politics
GOE302: Canadian Geography
GOF422: *Géographie politique du Canada*

International

POE317: Introduction to Strategic Studies
POE324: International Organizations
POE410: International Conflict Management
POE412: American Foreign and Security Policy
POE413: Nuclear Weapons & International Relations
POE436: International Law of the Sea
POE453: Topics in International Relations
POE460: Analysis of Contemporary International Conflict
POE462: International Security
GOE404: Issues in Contemporary Geopolitics
GOF420: *Fondements géopolitiques du droit international*

Comparative Politics

POE425: Regional Comparative Politics
POE432: Civil-military relations
POE434: Comparative Studies in Development
POE435: Terrorism and Political Violence
POE437: Contemporary regimes: States and Nations
POE454: Topics in Comparative Politics
GOE305: World Regional Geography: Europe and /or the Americas
GOE307: World Regional Geography: Asia and /or Africa
GOE418: Approaches to Cultural and Historical Geography

Political Theory

POE312: Classical Political Philosophy
POE421: Political Ideologies
POE428: Contemporary Political Theory
POE455: Topics in Political Theory
POE492: Seminar in Political Science

Public Administration

POE334: Canadian Public Policy
POE433: Public Choice
POE440: Foresight Tools and Methods for Public Policy
POE456: Topics in Public Administration
POE486: Air and Space Law
POE488: The Law of Armed Conflict

Cross-listed Courses

One credit can count towards each of the fields listed. Courses counting towards these fields will count in the total of politics credits.

Canadian Politics

HIE405: History of the Relations between Canada and the United States
HIE406: Canadian External Relations

Comparative Politics

ECE242: Introduction to Statistics
GOE470: Problems in Political Geography: Focus on Europe and Former Soviet Union
GOE472: Understanding Post-Soviet Europe and Asia
HIE289: The Impact of Science and Technology on Society and the Environment
HIE453: War, Peace and Civil Society in the 20th century

International Relations

GOE202: Introduction to Political Geography
HIE380: Peacekeeping & Peacemaking

Political Theory

PSE452: Advanced Research Methods in Behavioural Sciences

Public Administration

ECE411: Public Finance
ECE424: Economics of Defence
ECE428: Economics of National Security
ECE444: Economics of the Environment
ECE448: Cost-Benefit Analysis

Programme Outline

The programme outline tables represent the typical course load of a student enrolled in a B.A. Honours Political Science or a B.A. Political Science.

B.A. Honours Political Science

Semester	Fall Year 1	Winter Year 1	Fall Year 2	Winter Year 2
Courses	ENE110 HIE102 MAE103 Note1 POE116 PSE103	ENE110 (**cont'd**) HIE102 (**cont'd**) ECE103 **or** ECE104 Note 2 MAE113 POE102	ENE210 GOE202 or POE317 MAE106 Note 1 POE320, 1 Elective credit	ENE210 (**cont'd**) HIE203 POE205 POE314 POE332
Semester Total	**5 Credits**	**5 Credits**	**5 Credits**	**5 Credits**

Semester	Fall Year 3	Winter Year 3	Fall Year 4	Winter Year 4
Courses	PSE301 2 Science Credits Note 3 2 Political Science Credits Note 4	HIE271 POE328 1 Science Credit Note 3 2 Political Science Credit Note 4	POE492 Note 5 3 Political Science Credits Note 4 1 Elective credit	POE492 (**cont'd**) PSE401 3 Political Science Credits Note 4
Semester Total	**5 Credits**	**5 Credits**	**5 Credits**	**5 Credits**

B.A. Political Science

Semester	Fall Year 1	Winter Year 1	Fall Year 2	Winter Year 2
Courses	ENE110 HIE102 MAE103 Note1 POE116 PSE103	ENE110 (**cont'd**) HIE102 (**cont'd**) ECE103 **or** ECE104 Note 2 MAE113 POE102	ENE210 GOE202 or POE317 MAE106 Note 1 POE320, 1 Elective credit	ENE210 (**cont'd**) HIE203 POE205 POE314 POE332
Semester Total	**5 Credits**	**5 Credits**	**5 Credits**	**5 Credits**

Semester	Fall Year 3	Winter Year 3	Fall Year 4	Winter Year 4
Courses	PSE301 2 Science Credits Note 3 2 Political Science Credits Note 4	HIE271 POE328 1 Science Credit Note 3 2 Political Science Credit Note 4	2 Political Science Credits Note 4 3 Elective credits	PSE401 2 Political Science Credits Note 4 2 Elective credits
Semester Total	**5 Credits**	**5 Credits**	**5 Credits**	**5 Credits**

Notes

Note 1
MAE106 can be taken in First Year if a student is not required to take MAE103.

Note 2
Either ECE103 or ECE104.

Note 3
A credit in Physics is required. A credit in Chemistry is required. A credit in Information Technology is required.

Note 4
Students must take at least one credit in each of the five subfields of political science , plus five optional credits for Political Science (Honours) (of which four should be at the 400-level), or three optional credits for a Major in Political Science (of which two should be at the 400-level), consisting of either Political Science courses or cross-listed courses offered by other departments.

Note 5
A requirement for Political Science (Honours) only.

Minor in Political Science

This Minor is open to all students

The requirements for the Minor are 8 credits in Political Science. Only POE/POF courses count towards a Minor in Political Science.

Students choosing to Minor in Political Science must obtain a minimum average of B- in their 3 best courses of the Minor.

Undergraduate Political Science Courses

Courses 100-199

POE102 Introduction to Political Science

This introduction addresses the discipline, fields, concepts, and methods of political science, the ideologies that have shaped politics, and the institutions through which politics is conducted.

Note(s): Core Course for students taking Arts. Equivalent to the course offered by RMC St. Jean, Ideologies and Political Regimes, 385-033-ST
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE116 Introduction to international Relations

This course is designed to introduce students to the field of international relations. It addresses theoretical approaches to international relations and the utility of these approaches for describing and analyzing international events. These are discussed in conjunction with concepts related to foreign policy-making, national interest, security and weapons technology, regional and global organizations, international political economy, and globalization.

Note(s): Also offered through Distance Education . Equivalent to the course offered by RMC-St. Jean, International Relations, 385-044-ST or International Politics, 385-023-ST
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

Courses 200-299

POE205 Canadian Politics and Society

This introduction addresses political culture and socialization, federalism and the regions, parties and the electoral system, federal institutions, organization and accountability of the public service and armed forces, equity and diversity, role of the media, and Canada's place in the world.

Note(s): Also offered through Distance Education . Core course for students.
Exclusion(s): POE105, POE106, POE206
Contact Hours: 3 - 0 - 3
Credit(s): 1

POE210 Introduction to Peacekeeping

This course is designed to introduce students to the wide range of activities referred to as peacekeeping. The history of peacekeeping is reviewed through a series of case studies to better understand the evolution of contemporary peace support operations. This course provides an analysis of the consequences of peacekeeping and the emerging trends in the field, including gender and peacekeeping, HIV/AIDS and peacekeeping, and the impact of non-state actors on peacekeeping.

Note(s): Only offered through Distance Education .
Exclusion(s): POE410
Contact Hours: 0 - 0 - 9
Credit(s): 1

POE234 Science, Technology and Public Policy

It is widely understood that science and technological innovation are deeply linked to economic growth in a society and its corresponding ability to generate societal well-being. Thus, one could say that the public role of science is increasingly growing. This course will examine the public policy behind and the government's role in the science and technology innovation system and address questions that will explore the relationship between scientific research and political decision-making. The course will provide students with: a background on the science and technology policy environment; a multidisciplinary toolkit for thinking about science and technology policy and an understanding of the “social science” aspect of science and technology policy.

Exclusion(s): HIE289
Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE202 Introduction to Political Geography

Appreciating the geographical arena within which political life unfolds, and the geopolitical influences, resources, and possibilities that environment presents for political action, are key elements in understanding the political behaviour of actors, ranging in scale from the individual to the group on to the nation state and international organizations. This course presents an overview of the field of political geography and explores the centripetal and centrifugal dimensions of personal space, territoriality, regionalism, population growth and resource distribution, environmental degradation, boundary disputes, the rise and fall of nation states and civilizational conflicts.

Note(s): Also offered through Distance Education . Mandatory course for students in Political Science.
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

Courses 300-399

POE301 Aboriginal Issues in Canadian Politics

Students will examine the political actors, regimes and issues pertaining to aboriginal peoples and their interests in Canada. Actors include the First Nations, federal, provincial and territorial institutions, and interest groups. The institutions in question are the treaties, the Constitution (including the Canadian Charter of Rights and Freedoms) and various iterations of the Indian Act. Students will examine the relationships between the actors and institutions by analyzing a series of contemporary issues pertaining to aboriginal peoples.

Prerequisite(s): POE205
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE310 International Relations Theory

Building on the knowledge acquired in POE116 this course involves an examination of the main theoretical traditions of international relations, including realism, liberalism, and constructivism, as well as some of the key current issues in international politics. Students are expected to develop an in-depth understanding of these theories and to demonstrate a capability for analyzing and applying the theories to central issues in international relations.

Prerequisite(s): POE116
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE312 Classical Political Philosophy

At the end of the course students should be able to analyze, reconstruct and compare the main doctrines of Classical Political Philosophy, spanning the period between Ancient Greece and the beginning of the modern era and based primarily on a reading and discussion of Thucydides' Peloponnesian War, Xenophon's Memorabilia, Plato's Republic, Aristotle's Politics, and Machiavelli's The Prince.

Note(s): Also offered through Distance Education .
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE314 Modern Political Philosophy

Based primarily on a reading and discussion of Hobbes' Leviathan, Locke's Second Treatise on Civil Government, Hume's Treatise of Human Nature, Rousseau's On the Origin and Foundations of Inequality among Men and On the Social Contract, Kant's Grounding of the Metaphysics of Morals and Towards Perpetual Peace, Hegel's Philosophy of Right, Marx and Engels' Communist Manifesto, Mill's On Liberty, and Nietzsche's Beyond Good and Evil and On the Genealogy of Morals, the students should, at the end of the course, be able to analyze, reconstruct and compare the political theories of the major modern philosophers.

Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE317 Introduction to Contemporary Strategic Studies

This course introduces theories and techniques of contemporary strategic studies. Developments in the international system following the Second World War and the Cold War will provide the context for the consideration of contemporary strategic problems and solutions.

Note(s) :
Also offered through Distance Education . Mandatory for students in Political Science

Prerequisite(s): POE102, POE116 or equivalent
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE319 Terrorism: History and Strategy

This course will analyze terrorism from a theoretical and strategic point of view. The concepts and the evolution of terrorism over time will be among the topics discussed. It will focus on the relationship between terrorism and war in all its forms as well as anti-terrorist methods, policies and war. The aim of the course is to allow students to synthesize terrorism using their assimilation of political and strategic facts linked to this phenomenon.

Note(s): Only offered through Distance Education .
Prerequisite(s): POE116 or equivalent
Exclusion(s): POE458
Contact Hours: 0 - 0 - 9
Credit(s): 1

POE320 Comparative Politics

The course will commence with an overview of the many different and competing theories of comparative politics, and will evaluate the strengths and weaknesses of each framework. In so doing, discussion will take place on the key issues in comparative politics. The course will also explore the increasing variety of measures employed in comparisons of the major regions and countries of the world. During the latter portion of the course, each student will select one country as a brief case study.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE205 or equivalent
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE324 International Organizations

This course will cover the development of international organizations during the 20th century. The thinking associated with international organizations as a phenomenon of state-to-state cooperation will be examined. Primary emphasis will be given to the United Nations, along with other international organizations such as the international financial institutions. Students who complete the course will finish with an understanding of the theory and role of international organizations in international relations, a strong background in how the United Nations and associated international financial institutions have evolved and operated since World War II, as well as an awareness of the major issues facing international organizations generally in the current political environment.

Corequisite(s): POE116
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE328 Canadian Political Institutions

The course will commence with an overview of the demographic (particularly regional) makeup of Canada and will then proceed to offer a brief review of the historical roots of Confederation. The main component features of the contemporary Canadian constitution will be explored, along with the current dynamics of Canadian federalism. The course will close with an analysis of the current strains and stresses (e.g. from Quebec and the West) confronting the federation and the future of the Canadian federation.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE205 or equivalent
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE332 Public Administration in Canada

This course is designed to offer students an understanding of the bureaucratic structures underpinning decision-making processes in the Government of Canada. Lectures will focus on organizational theories, Central Organizations and the relationship between public servants and executive power. Particular attention will be paid to the issues of neutrality of public servants and their representativeness of the public they serve, alternative service delivery, bureaucratic reforms, good governance and best practices.

Prerequisite(s): POE205 or equivalent
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE334 Canadian Public Policy Making

This course studies policy-making as a core function of the Government of Canada. Through different decision-making theories, the course offers various perspectives on how the Government of Canada makes choices and manages resources to achieve economic and social objectives for the general interest of Canadians. Particular attention will be paid to the role of the Prime Minister, cabinet committees, and Central Organizations in setting government priorities and see to their implementation and evaluation.

Prerequisite(s): POE205 or equivalent
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE302 Canadian Geography

An introduction to the historical, cultural and political geography of Canada with a special emphasis on heartland-hinterland relations, regionalism, ethnic and immigration history, and the emerging multicultural nature of Canadian society.

Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE305 World Regional Geography: Europe and/or the Americas

An introduction to the geography of Europe and/or Americas, the study of the "geographic personalities" of Europe and America's major countries, and of emerging geopolitical interactions both within these regions and with other major world regions.

Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE307 World Regional Geography: Europe and/or the Africa

An introduction to the geography of Asia and/or Africa involving an examination of the "geographic personalities" of Asia and Africa's nation-states and of emerging geopolitical interactions both within these regions and with other major world regions.

Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

POE410 International Conflict Management

This course introduces students to the evolution of international peacekeeping, and the theory of third party intervention as a mechanism for managing armed conflicts. Students are introduced to a range of activities from 19th Century imperial policing and small wars to League of Nations Mandates, peace observation, and the UN system. The practice of peacekeeping is reviewed through a series of case studies as a background for introducing students to contemporary peace support operations and the evolving nature of the mandates and requisite activities that make up international peacekeeping efforts.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE116 or equivalent
Exclusion(s): HIE380, POE210
Contact Hours: 3 - 0 - 6 (Distance Learning: 0-0-9)
Credit(s): 1

POE412 American Foreign and Security Policy

A study of major policy trends in United States foreign and defence policy from the Nixon administration to the present. Beginning with a brief review of the Cold War years, the course will consider such topics as: the impact of the Vietnam War, *détente* , trends in nuclear and conventional weapons and strategy in the 1970s and 80s, arms control and United States Foreign Policy in the post Cold war era. Also covered will be the role of various branches of the U.S. government in the conduct of foreign and defence policy.

Prerequisite(s): POE116 or equivalent
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE413 Nuclear Weapons & International Relations

Since 1945, nuclear weapons have had a profound impact upon international relations. This course deals with the technology, strategy and politics of nuclear weapons. It examines how the superpowers and other nuclear weapons states approached their role in national security during the Cold War and how this has changed in the post-Cold War era. It looks at the major nuclear powers as well as current issues regarding the potential spread of nuclear weapons capabilities to more countries. To what extent have previous concepts of deterrence given way to notions of preventative defence and what will this mean for contemporary global security environment? The course also provides students with techniques for the evaluation of expected nuclear weapon effects and the ways in which these techniques may be used to determine the relative strength of nuclear states in the international system.

Note(s): Available in "English Only"
Prerequisite(s): POE317 or equivalent
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE416 Canadian Foreign and Security Policy

A study of major trends in Canadian external relations and defence policy from the Trudeau government to the present. Beginning with a review of the Cold War years, the course will consider such topics as: the Trudeau defence and foreign policy reviews, relations with the United States, including the Free Trade Agreement, the impact of international political and strategic trends on Canadian defence policy, and Canada's relations with international organizations and peacekeeping in the post Cold war era. Also covered will be the process, politics and organization of the Departments of Foreign Affairs and International Trade, and National Defence.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE116 or equivalent.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE421 Political Ideologies

At the end of this course, the student will be able to compare ideological development since the Enlightenment commencing with liberalism and will then examine conservatism, socialism, communism, fascism, anarchism, fundamentalism, nationalism, feminism and environmentalism. The student will also be able to contrast and critique the ideological perspectives on the concepts of liberty, power, justice, and the relationship of individuals to the state as well as to nature.

Prerequisite(s): POE102
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE425 Regional Comparative Politics

A comparative examination of the political process, functioning and interaction of the principal formal and informal political institutions, the relationship between those institutions and their environments, public policy, political socialization, democratization and 'good governance', violent conflict and state failure, economic development and foreign aid, class structures, populism, the role of the military, centrifugal forces of nationalism and communal violence, the role of religion, the nature of the state, political participation, social movements and political communication in a variety of countries across different continents.

Prerequisite(s): POE320
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE428 Contemporary Political Theory

Designed as the sequel to POE312: Classical Political Philosophy and POE314: Modern Political Philosophy, this course proposes a survey of political theory from 1900 to the present by way of an introduction to and discussion of the main schools of thought, currents and authors that have appeared roughly since 1900 and have had the greatest impact on this sub-field of political science. Upon completion of this course, the students should be able to understand, analyze, evaluate and discuss, on the basis of the mandatory readings and the course notes, the various currents in or of particular relevance to political theory in the 20th and 21st century and to explain the relations between them and with classical and modern political philosophy, and also to relate all of them to the evolving social and historical context of our world during that period of time.

Prerequisite(s): POE312 and POE314
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE432 Civil-Military Relations

Within the fields of public administration and comparative politics and drawing on theories of institutional development and organizational behaviour, this course provides models for understanding civil control of military, security and intelligence services, security force intervention in politics, and evolution of security forces to meet emerging challenges.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE320
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE433 Public Choice

The course covers a formal analysis of collective choice, public institutions, political competition in democracies, and market vs. government failure. Topics considered include social choice, constitutional and institutional equilibria, electoral competition, agenda setting, interest group politics, and bureaucratic behaviour. Examples considered may include logrolling, budgetary processes, role of procedural rules, accountability, different forms of democratic governance such as unitary vs. federal states, roles of fiscal and monetary policies, and direct interventions such as in healthcare and education.

Prerequisite(s): POE332
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE434 Comparative Studies in Development

The course will provide an introduction to theories of social change, modernization and political development. Most of the world's population is affected by the dramatic social, economic, political and cultural changes occurring in developing countries. Amongst the political concepts studied are the nature of traditional society, the processes of urbanization and democratization, elements of political instability ranging from coup d'état to revolution. Measures of change and development will be discussed in economic, social, political, and security fields.

Prerequisite(s): POE320
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE435 Terrorism and Political Violence

This third year university-level course offers an analytical overview of the current academic literature on both theories and selected case studies on terrorism and political violence at domestic and global levels with both Canadian and non-Canadian focus. The teaching will privilege comparative method and will primarily use empirical findings on the causes, actors, discourses, strategies of terror and political violence and government’s responses to them. A critical understanding of emerging forms and means of terror would be crucial to both security operations and public policy makers.

Prerequisite(s): POE320
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE436 International Law of the Sea

This course is an introduction to International Law of the Sea, and particularly the United Convention on the Law of the Sea (UNCLOS). Themes to be addressed include marine resources and environment; maritime zones under national jurisdiction (internal waters, territorial sea, contiguous zones, exclusive economic zone, continental shelf); maritime zones beyond the limits of national jurisdiction (high seas, the international deep seabed); international straits and canals; maritime boundaries; pacific settlement of maritime disputes, recent case-law; maritime legal issues in Canada and in the Arctic Ocean.

Prerequisite(s): POE116
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE437 Contemporary Regimes: States and Nations

A comparative examination of the nature of political regimes across advanced industrialized democracies and the developing world, including the ways in which states around the world respond to national, ethnic, linguistic, religious and racial diversity.

Note(s): Also offered through Distance Education .
Prerequisite(s): POE320
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE438 Canadian Political Parties, Elections and Public Opinion

This course will explore the historical, ideological and organizational developments of Canadian political parties. Amongst the themes to be explored are the complexities of the evolving party system and the relative impact of key demographic and attitudinal factors affecting the operation of parties. The course will offer case studies of the most important elections in the contemporary era and will conclude with an analysis of the most recent federal election campaign. Throughout the course, note will be made of the shifting landscape in Canadian and Quebec public opinion and how it impacts on elections and parties.

Prerequisite(s): POE102 and POE205 or equivalent
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE440 Foresight Tools and Methods for Public Policy

This course focuses on methods for public policy analysts, to gather intelligence on possible futures and apply the emerging insights useful to build shared visions, guide and enable present-day decisions. Students will learn about time-tested strategic foresight methods to gather and develop critical knowledge, guide proactive policy, and shape strategic plans and partnerships. The course teaches students how to frame futures projects, conduct horizon scanning, analyze the impact of trends and identify drivers, confront critical uncertainties, methodically develop foresight scenarios. The course provides tools to assess the policy implications of emerging issues. Key foresight methods covered in this course include trend impact analysis, horizon scanning, and the Delphi method. Students also learn to distinguish between normative and exploratory as well as qualitative and quantitative foresight.

Prerequisite(s): POE334
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE452 Topics in Canadian Politics

Advanced seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Prerequisite(s): POE328 or POE330
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE453 Topics in International Relations

Contemporary Conflict Studies.

Seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Prerequisite(s): POE116 or equivalent
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE454 Topics in Comparative Politics

Seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Prerequisite(s): POE320
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE455 Topics in Political Theory

Seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Prerequisite(s): POE312 or POE314
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE456 Topics in Public Administration and Policy

Seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Prerequisite(s): POE332 or POE334
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE460 Analysis of Contemporary International Conflicts

In the broadest context, this course considers the role of strategy and warfare in contemporary national and international society. Readings and Seminars are designed to offer students a wide range of perspectives on strategy and conflict in the post-modern world. Students will key on contemporary strategic issues relating to military and foreign affairs.

Prerequisite(s): POE116, POE317
Semester: Usually Offered in the Fall Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE462 International Security

In the broadest context, this course considers the role and significance of strategy and warfare with respect to current strategic issues . Readings and Seminars are designed to offer students a wide range of perspectives on strategy and conflict in the post-modern world and to permit students to openly express their views. Students will key on contemporary strategic issues relating to military and foreign affairs.

Prerequisite(s): POE116, POE317, POE460
Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

POE486 Air and Space Law

This course is an introduction to air and space law. The primary focus is the international and national law applicable to air operations and outer space activities, particularly of a military nature. It also considers historical and political factors in the development of these legal regimes. The international law concepts will be instilled by reference to the various applicable international conventions and legal principles, such as the Charter of the United Nations and the sources and nature of public international law. The study of public air law will focus on the Chicago Convention of 1944 and the 1963 Tokyo Convention stream. The Warsaw (1929) and Montreal (1999) Conventions relating to civil aviation liability provide the basis for the private international air law study. For space rights, the five major treaties governing that domain will be studied, along with the work of the UN General Assembly and the UN Committee on the Peaceful Use of Outer Space (UNCOPUOS). Outer space activities such as military uses and remote sensing will be considered, as will the rights and obligations of rescue and liability. Given the legal importance of and similarities between the outer space and air regimes and that of the oceans, the law of the sea will also be the object of analysis and discussion.

Semester: Usually Offered in the Winter Term
Contact Hours: 0 - 0 - 9
Credit(s): 1

POE488 The Law of Armed Conflict

This course gives students a solid knowledge of the law regarding the use of force in international and non-international armed conflicts. Following an examination of the situation of the Law of Armed Conflict within the broader context of Public International Law, there will be a general discussion of the general concepts of the LOAC and its two branches, *the jus ad bellum* (the right to the use of force) and the *jus in bello* (the law applicable in conflict). A study of the rules includes their applicability in operational situations, with reference to issues including the notion of combatants, prisoners of war, the treatment of civilians, the obligation to limit unnecessary suffering and damage, the legality of certain weapons, and special cases such as child-soldiers and mercenaries. The course concludes with an examination of means of enforcing the law, including national courts, ad hoc tribunals and the International Criminal Court.

Note(s) :
Also offered through Distance Education . This course may count as a Military Arts credit within the BMASc programme.

Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

POE490 Directed Readings in Politics

This course is available for students who wish to pursue in-depth research and study under one-on-one supervision with a faculty member on a topic within the range of expertise of the supervisor, mutually agreed between the supervisor and the student. Both the topic and the evaluation method must be approved by the Department Head. The topic must fall clearly within one of the five standard sub-fields of political science. Some projects undertaken as part of this course may be carried out in coordination with an external agency.

Prerequisite(s): Permission of the department head
Contact Hours: 0 - 0 - 9
Credit(s): 2

POE492 Seminar in Political Science

Students in this seminar course will develop breadth and depth in their knowledge and skills in the sub-fields of political science. Students will work with key texts, and demonstrate their knowledge of the standard methodological quantitative and qualitative approaches in each of the sub-fields. The seminar will meet regularly. As part of the course, students will undertake a detailed research project comprising a 40-60 page (15,000 – 20,000 word) paper under the direct supervision of a faculty member, which demonstrates their ability to analyze and evaluate an issue in one of the sub-fields of Political Science. As part of the seminar students will prepare and present a project proposal, draft and final versions of their papers, discuss their ongoing research, examine issues and approaches related to the structure, organization and presentation of the thesis, and comment and critique work presented by their peers.

Note(s): For Honours students in Political Science or with the permission of the Programme Chair.
Prerequisite(s): Permission of the department head
Contact Hours: 1 - 0 - 8
Credit(s): 2

GOE404 Issues in Contemporary Geopolitics

A lecture course intended to allow students of the Third and Fourth Year taking Politics, and with permission of the instructor, for other students of the Third or Fourth Year taking Arts, the opportunity to study selected world problems from a geographical perspective. This course is also open to selected candidates with permission from the Dean of Arts.

Semester: Usually Offered in the Winter Term
Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE418 Approaches to Cultural and Historical Geography

An examination of the cultural and historical dimensions of geographical inquiry with special emphasis on the changing relationships between human societies and their environments, as well as their relationships with each other. Themes to be addressed include the methods and theories of historical and cultural geography, the study of cultural landscapes and ecological relationships within modern and traditional societies, the impact of colonialism and modernization upon populations and resources, and geographies of cultural globalization. Special attention will be given to analysis of the historical and cultural geography of Canadian society in the global context.

Contact Hours: 3 - 0 - 6
Credit(s): 1

GOF420 *Fondements géopolitiques du droit international*

Genesis of International Public Law. International Organizations. Conditions for the recognition of the existence of individual States. Legal means of territorial expansion. Cases of reduced sovereignty. Geographical definition of the territories under national jurisdictions: horizontal and vertical extensions. Borders and jointly occupied territories. Rules governing territories under international jurisdiction: canals, seaways, rivers, high seas, sea-bed resources, polar regions, outer space. Peaceful methods of resolving international conflicts.

Note(s): Available in French only
Contact Hours: 3 - 0 - 6
Credit(s): 1

GOF422 *Géographie politique du Canada*

Study of the natural, historical, cultural and economic factors which determine Canada's present political geography. Special attention will be directed to border zones and to the question of territorial integrity.

Note(s): Available in French only
Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE450 Topics in Political Geography

Seminars offered by regular and visiting faculty on topics related to their own research or interests. Consult the departmental home page for further details.

Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE470 Problems in Political Geography: Focus on Europe and Former Soviet Union

This course deals primarily with the contemporary geopolitics of Eurasia. Students will be exposed to such topics as the rise and fall of the Soviet Union, understanding the Post-Soviet DisUnion, poverty and progress in the Indian subcontinent, the environmental setting for Europe's achievements, etc..

Note(s): Also offered through Distance Education . Available in English only
Contact Hours: 3 - 0 - 9 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

GOE472 Understanding Post-Soviet Europe and Asia

An appreciation of the political, historical, demographic and cultural geography of the former USSR, with an emphasis on the disintegrative potential of the "nationalities question" within the Soviet Empire, along with a consideration of the environmental and economic consequences of Soviet models of development throughout Eurasia. This course will conclude by introducing the "geographical personalities" of the States that re-emerged in post-Soviet Europe and Asia after 1991, exploring the resulting debate in Europe and particularly within NATO about the future of this alliance, its expansion eastwards, Russia's geopolitical concept of a "near abroad," and, ultimately, the continuing debates. East and West, over the very nature of what constitutes Europe.

Contact Hours: 3 - 0 - 6
Credit(s): 1

GOE494 Directed Readings/Area Study in Geography

In consultation with the instructor, and with the prior approval of the Head of the Department, this course offers students an opportunity to develop a more in-depth understanding of a country or region through directed reading, seminar participation, and/or a field trip, culminating in the preparation of a major research report addressing contemporary geopolitical issues in the selected state or area.

Note(s): For students in Arts, with the permission of the Head of the Department.
Contact Hours: 0 - 0 - 9
Credit(s): 2

NCM Executive Professional Development Programme

NEPDP Programme

The Non Commissioned Member Executive Professional Development Programme (NEPDP) is intended to further develop the intellectual, analytical and reasoning skills of the Chief Petty Officers 1st Class/Chief Warrant Officers (CPO 1/CWO) who have been selected to hold key positions and senior appointments in the Canadian Forces (CAF). Candidates must meet the admission requirements established by RMC of Canada to be admitted to the programme.

Admission Requirements

An applicant for admission to the NEPDP must have completed:

1. High school (Grade 12) leaving diploma or the equivalent (including GED); and
2. At least one university course taken in the previous five years and earning at least a 'C" average in the course, or the equivalent as assessed by RMC of Canada. Alternatively, students may provide other academic or work accomplishments as evidence of their ability to perform at a university level, subject to approval by RMC of Canada PLAR.

Up to a maximum of 6 students will be admitted to the programme in each academic year.

Programme Outline

- Students will take a minimum of 9 one credit courses over 2 terms at RMC of Canada. Each student will develop an individual learning plan (LP) that takes into account student's preparation for the program. The LP will incorporate the core requirements of the Certificate of General Military Studies and include courses chosen to reflect a student's interests and academic preparation.
- Students who successfully complete the full programme will be eligible for a Certificate of General Military Studies.
- Students may have the opportunity to upgrade their second language profile, depending on the availability of space and resources.

Certificate of General Military Studies

The Certificate of General Military Studies is a programme of study that is intended to enhance students' appreciation of military arts and science. The certificate programme requires the completion of 9 credits:

Required Courses

HIE203: Canadian Military History
POE205: Canadian Politics and Society
PSE123: Fundamentals of Human Psychology
POE116: Introduction to International Relations

Elective Courses

5 credits chosen from the Humanities and Social Sciences

Notes:

1. Students are encouraged to develop a concentration in a particular discipline.
2. The certificate can be applied to an Arts or BMASc degree.

Language Courses - Arabic, Mandarin, and Spanish

Introduction

The following courses are available to students who have attained a minimum of CCC in the language profile. The language of instruction for the courses will normally be French.

ARF201 *Introduction à l'arabe I*

This course requires a linguistic profile of CCC.

This course, intended for students who have no knowledge of modern standard Arabic, provides an introduction to the Arabic language. This course will study the basics of this language, including its alphabet, as well as its phonetic and linguistic structures.

Note(s): Intended for second, third, and fourth year students in Arts.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

CHF201 *Introduction au mandarin I*

This course requires a linguistic profile of CCC.

This course, intended for students who have no knowledge of contemporary Mandarin, provides an introduction to this language. This course is designed to introduce students to the basics of Mandarin, including phonetic symbols, vocabulary and grammatical structures. At the end of the semester, students will know a certain number of symbols.

Note(s): Intended for second, third, and fourth year students in Arts.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

ESF201 *Introduction à l'espagnol I*

This course requires a linguistic profile of CCC.

This course, intended for students who have no knowledge of Spanish, provides an introduction to the Spanish language. The course will present the basics of Spanish grammar, including the uses of verbs in the present and the future tenses, and will allow students to build an elementary vocabulary.

Note(s): Intended for second, third, and fourth year students in Arts.
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

Undergraduate Chemistry and Chemical Engineering Programmes

General Information

The Department of Chemistry and Chemical Engineering offers programmes of study leading to the degrees of a Bachelor of Science (Honours) in Chemistry or a Bachelor of Science (Major) in Chemistry and a Bachelor of Engineering in Chemical Engineering. A double major is also offered in:

- Chemistry / Physics
- Chemistry / Space Science
- Chemistry / Mathematics
- Chemistry / Computer Science

The typical course of study for Chemistry (Honours) or Major in Chemistry is set out in the Programme Outline Tables listed below. The students will have a choice between three options:

1. Chemistry
2. Chemistry with an Environment Option
3. Chemistry with a Life Sciences Option

The different options offered will have a common First and Second Year to ensure a strong background in Chemistry and to allow time for the students to choose a specialization.

The Chemical Engineering programme has a strong Materials Engineering component. Nuclear and Environmental Engineering are also included to reflect the spectrum of chemical engineering interests of value to the Canadian Forces and the Department of National Defence. In addition to the basic Chemical Engineering core, the programme emphasizes the areas of corrosion, fuel cells, batteries, alloys, polymers, ceramics, composite development, explosives. Combustion processes, nuclear energy applications and environmental stewardship. All these areas highlight the unique nature of the Chemical Engineering degree at RMC of Canada.

To enter the Second Year programme in Chemical Engineering, students must have completed successfully the First Year Engineering or Science programme, normally with a minimum "D+" combined average in Chemistry, Mathematics and Physics and have the approval of the Department of Chemistry and Chemical Engineering.

Accreditation

The baccalaureate degree programme in Chemical Engineering is accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers, and is recognized by the Chemical Institute of Canada and the Canadian Society for Chemical Engineering as qualifying its graduates for full membership status.

The Chemical Engineering degree programme is headed by a Professor-in-Charge, who reports to the Dean of Engineering through the Head of Department. The programme is administered by the Chemical Engineering Committee, of which the Professor-in-Charge is Chair.

Chemistry Programme Requirements

Chemistry

A 42.5 credit programme, including the core courses for science programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 MAE101 CCE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) MAE101 (**cont'd**) CCE101 (**cont'd**) MAE129	HIE207 CCE240 CCE241 CCE226 MAE226	HIE203 POE205 CCE241 (**cont'd**) CCE211 MAE227
Semester total	**5 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CCE218 CCE245 CCE422 PHE226 **Elective** 1 credit	HIE271 CCE328 CCE354 **Elective** 1 credit	POE116 CCE317 CCE420 Note1 **Elective** 1 credit	PSE401 CCE309 CCE420 (**cont'd**) Note1 CCE437 CCE460 **Elective** 1 credit
Semester total	**5.5 credits**	**5 credits**	**4 credits**	**5 credits**

Chemistry with an Environment Option

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 MAE101 CCE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) MAE101 (**cont'd**) CCE101 (**cont'd**) MAE129	HIE207 CCE240 CCE241 CCE254 MAE226	HIE203 POE205 CCE241 (**cont'd**) CCE211 MAE227
Semester total	**5 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CCE218 CCE245 CCE385 CCE422 PHE226	HIE271 CCE328 CCE354 CCE460	POE116 CCE317 CCE420 Note1 CCE466 CCE483	PSE401 CCE309 CCE420 (**cont'd**) Note1 CCE437 CCE475
Semester total	**5.5 credits**	**5 credits**	**5 credits**	**4 credits**

Chemistry with a Life Sciences Option

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 MAE101 CCE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) MAE101 (**cont'd**) CCE101 (**cont'd**) MAE129	HIE207 CCE240 CCE241 CCE254 MAE226	HIE203 POE205 CCE241 (**cont'd**) CCE211 MAE227
Semester total	**5 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CCE218 CCE245 CCE385 CCE422 PHE226	HIE271 CCE242 CCE328 CCE354	POE116 CCE317 CCE420 Note1 CCE483	PSE401 CCE309 CCE420 (**cont'd**) Note1 CCE437 CCE460 CCE246
Semester total	**5.5 credits**	**5 credits**	**5 credits**	**4.5 credits**

Notes

Note 1
CCE420 is only required for Chemistry (Honours). Students in a Major will choose two optional courses in Science or Engineering at the 300 or 400 level.
Note: Students must achieve an average of 70% minimum in CCE420 in order to receive an Honours designation.

Chemistry Minors

Minor in Chemistry

CCE101 (2 credits)
CCE218 (1 credit)
CCE240 (1 credit)
4 additional chemistry credits chosen from those in the table of "Chemistry Programme"

Minor in Life Science

The Faculty of Science sponsors an interdisciplinary minor in Life Sciences available to any candidate with the necessary prerequisites.

The required eight credits are:

CCE240 (1 credit)
CCE241 (3 credits)
CCE242 (1 credit)
CCE245 (0.5 credit)
CCE246 (0.5 credit)
CCE385 or CCE460 (1 credit)
1 credit in a statistics course offered by either the Faculty of Science or Faculty of Arts.

Requirements for Students taking Arts
CCE106
CCE200, CCE360, CCE362, CCE364, CCE366 (Electives)

Minor in Environment

The Faculty of Science sponsors a minor in Environment, available to any candidate with the necessary prerequisites.

The required eight credits are:

CCE211: Analytical Chemistry (1.5 credits)
CCE240: Molecular and Cellular Biology (1 credit)
CCE245: Biology Laboratory I (0.5 credits)
CCE385: Biotechnology (1 credit)
CCE460: Biochemistry (1 credit)
CCE466: Environmental Chemistry (1 credit)
CCE475: Environmental and Bioprocess Engineering (1 credit)
CCE483: Ecotoxicology (1 credit)

The list of courses has been chosen such that
CCE101: Introductory Chemistry for Scientists and Engineers is necessary to begin taking courses in the minor, and no additional courses in science, engineering, or chemistry are required to take these courses.

Chemical Engineering Programme Requirements

A 48.5 credit programme, including the core courses for engineering programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PHE104 MAE101 CCE101 PSE103 CSE101	ENE100 (**cont'd**) PHE104 (**cont'd**) MAE101 (**cont'd**) CCE101 (**cont'd**) MAE119 GEE167	HIE207 CCE240 CCE241 CCE203 CCE312 MAE226	HIE203 POE205 CCE241 (**cont'd**) CCE313 MAE209 MAE227 GEE291
Semester total	**6 credits**	**6 credits**	**6.5 credits**	**6.5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 CCE253 CCE305 CCE317 MAE315 MEE311	HIE271 CCE315 CCE325 CCE406 CCE407 GEE231 GEE393	HIE289 Note2 CEE351 CCE415 CCE417 CCE431 GEE241 GEE293	PSE401 CCE337 CCE433 CCE417 (**cont'd**) CCE475 **Optional** 1 credit Note3
Semester total	**6 credits**	**6 credits**	**6 credits**	**5.5 credits**

Notes

Note 2
POE289 can replace HIE289

Note 3
Students can choose either:
CCE409: Combustion and Explosives Engineering
CCE413: Systems Analysis: Modelling and Optimization
CCE425: Polymers Engineering
CCE428: Electrochemistry
CCE429: Corrosion
CCE445: Materials in the Space Environment
CCE463: Engineering Aspects of CBRN Defence
CCE474: Molecular Mechanisms of Chemical and Biological Warfare Defence

These courses may be offered in French, English or not at all depending on the academic year.

Ammunition Officer Certificate

Note: *The equivalent of five one credit courses along with mandatory seminar and tour courses are required for completion of this certificate.*

Mandatory Courses (5 credits):

CCE371: Chemical Principles of Ammunition
CCE372: Introduction to Ballistics
CCE470: Army Munitions and Weapon Systems
CCE471: Air and Naval Munitions
CCE472: Introduction to Ammunition Management
CCE468: Ammunition Seminar
CCE469: Ammunition Industrial Tours

Laboratories and Equipment

Departmental Laboratories

The departmental laboratories are located in the Sawyer Building, Modules 4 and 5. They are equipped for teaching and research in the areas of chemistry, materials science, environmental sciences, chemical and materials engineering, environmental engineering as well as nuclear engineering relevant to the course of study and to defence interests. More specifically, they include the following:

Materials Science and Engineering

Materials selection for engineering applications and determination of the chemical, physical and mechanical properties are the foci of study. High temperature furnaces are used in the preparation and treatment of metals, alloys and ceramics while an injection molder is among the tools employed in the area of polymer blends and with composites. Atomic absorption, IR, FTIR, and NMR spectrometers together with gas and liquid chromatography, gel permeation chromatography and viscometry are used in chemical analysis. X-ray diffraction, scanning electron microscopy, metallurgical and polarized-light microscopy, hardness, shear and tensile testing are used to determine physical properties. The various materials are also characterized by thermal gravimetry, by adiabatic and differential scanning calorimetry, and by differential thermal analyses.

Chemical Engineering

The chemical conversion of natural or synthetic materials into useful engineering products together with their management and maintenance are the foci of these studies. Various experiments, most of which are computer controlled, demonstrate typical operations involved in chemical engineering. Heat transfer is studied using a variety of heat exchangers commonly used in oil refineries. A packed bed adsorption unit demonstrates removal of obnoxious trace gases from a valuable product stream an application typical in pollution control. The design of chemical reactors is the objective of another experiment. A bench-scale heat pump provides a study in applied thermodynamics.

Nuclear Science and Engineering

The main tool for nuclear studies is the SLOWPOKE-2 research reactor, which is operated by this Department for the Department of National Defence. Experiments include neutron activation analysis, neutron radiography and isotope production applied to various military problems. Related experiments deal with health physics, radiation protection, liquid scintillations counting, reactor physics and thermal hydraulic studies. The SLOWPOKE-2 Facility serves professors, students, researchers and technical trainees, and provides other capabilities such as radiation detection and low-level counting.

Computer Resources

Computing infrastructure consists of 300+ networked personal computers, laptops and desktop computer modelling/programming workstations. The software available to these systems include:

Choice of any Microsoft application or programming language product (due to our departmental site licence)
National Instruments Labview Professional Development System (department site licence)
Honeywell Unisim - Process Modelling Software
Comsol - finite element analysis and solver software package
MathLab - mathematical computation and visualization software
Maple 10 - programming language for symbolic algebra and high-precision decimal integer and floating-point arithmetic.
SigmaPlot - technical graphing software

Undergraduate Chemistry and Chemical Engineering Courses

Courses 100-199

CCE101 Introductory Chemistry

The course is designed to present the fundamental principles of chemistry as illustrated through science and engineering applications. The course begins with a review of stoichiometry, chemical theory of bonding (orbitals, hybridization, Lewis structures), introductions to each of organic (nomenclature, functional groups, polymers), inorganic (metals, catalysts) and environmental chemistry. The course continues with the study of gases, chemical kinetics, acid-base equilibria, colligative properties and solubility. Thermodynamics, including the First Law, energy, work and heat, enthalpies of reaction, Second Law, entropy changes in simple physical and chemical processes and Gibbs free energy are studied. The final topic is electrochemistry (redox reactions, electrochemical cells, batteries, fuel cells and corrosion). Laboratory experiments and tutorials reinforce and supplement lecture material.

Note(s): For students enrolled in Science and Engineering. Laboratories taught in three (3) consecutive periods.
Prerequisite(s): High School Leaving Chemistry or equivalent
Contact Hours: 3 - 2 - 5
Credit(s): 2

CCE106 Basic Chemistry

The course begins with the classification and physical properties of matter, measurement, errors and dimensional analysis. It then progresses to chemical nomenclature, chemical formulas, valence, chemical reactions, chemical equations and stoichiometry, followed by the properties of gases, liquids and solutions. Finally, the atomic theory of matter, introduction to electronic structure, the periodic table of the elements and an introduction to chemical bonding completes this course. A laboratory accompanies this course.

Note(s): Also offered through Distance Education . Laboratories taught in three (3) consecutive periods. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion:
CCE101

Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

CCE151 Introduction to Nuclear Science

An introductory course for arts students with little or no previous background in nuclear or radiation science. This course will review the basic terminology and science of nuclear engineering. The current atomic structure models and the processes of radioactive decay are explained and discussed. Interaction of the various types of radiation with matter is covered, and this basis is used for the introduction of the subsequent subjects, including radiation detection, measurement, and shielding.

Note(s): Also offered through Distance Education .
Exclusion: CCE351
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 200-299

CCE200 Contemporary Chemistry

This course is designed to familiarize the student with a variety of current topics which are primarily chemical in nature. Some basic chemistry will be introduced at the beginning of the course to enable the student to comprehend the chemical systems that will be examined. The main topics to be covered include: the chemistry of water, water pollution, air pollution, modern energy sources, plastics and polymers and their environmental impact, food chemistry, agricultural chemistry, and pharmaceuticals and drugs.

Note(s): This is a core curriculum course for Arts students. An elective course for students of the Second Year taking Arts, and other students with the permission of the Department. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE203 Chemical Engineering Processes

This course is designed to prepare students to formulate and solve material and energy balances on chemical process systems. It establishes the fundamentals of chemical engineering and lays the foundation for subsequent courses. It also introduces the engineering approach to solving process-related problems. This includes separating a process into its components, establishing the relations between known and unknown process variables and assembling the information needed to solve for the unknowns using a combination of experimentation, empiricism and the application of natural laws. The course is designed to be interactive in nature where students are guided through problem solutions in a lecture environment while given opportunity to practice their own problem solving capabilities through problem sessions and homework assignments. The use of computer-aided process simulation is also introduced.

Prerequisite(s): CCE101
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1 - 4
Credit(s): 1

CCE204 Military Chemistry

Topics that will be covered, in a largely qualitative manner, include the nature, physiology and pathology, prophylaxis, detection and decontamination of classical chemical agents, such as nerve, vesicant, choking and blood agents and classical biological agents, such as viruses, bacteria, fungi and rickettsia. Radiological weapons will be discussed from the perspective of the variety of options and the biological hazard posed. Also covered will be the effects of nuclear weapons on vehicles, structures and personnel. Specific radiological and nuclear topics will include detection and dosimetry, and the distinct hazards posed by alpha, beta, and gamma and neutron radiation. Protective measures, both individual and collective, counter NBC agents, will also be discussed.

Note(s): Also offered through Distance Education An elective course for students of the Second, Third or Fourth Year taking Arts. Not offered every year. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion(s): CCE463 or CCE474
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

CCE211 Analytical Chemistry

This is a lecture course that will be combined with a laboratory component. Topics include the process of chemical measurement from sampling through analysis to the interpretation of results with applications to chemistry and related disciplines. Experimental errors and statistics of measurements will be included. Topics also include wet analytical chemistry, spectrophotometry and instrumental chemical analysis – principles of gas and liquid chromatography, mass spectrometric detection, new separation methods, electrochemical analysis, and inductively coupled plasma-based elemental analysis. Sample preparation techniques for environmental and biological materials will also be included.

Note(s): For students taking Honours Chemistry, or a Major in Chemistry, and an elective course for students taking other Science programmes.
Prerequisite(s): CCE101
Semester: Usually Offered in the Winter
Contact Hours: Contact Hours: 3 - 3 - 7
Credit(s): 1.5

CCE218 Physical Chemistry of Matter

The first part of the course covers the solid, liquid and gaseous states of matter including real gases, kinetic theory, introduction to transport phenomena, ideal solutions, crystal structure and introduction to crystallography. In the second part of the course the following topics are investigated: second Law of thermodynamics, conditions for spontaneity, statistical and thermodynamic definitions of entropy. Finally the course will look at the third Law of thermodynamics and absolute entropies, standard states and standard thermodynamic functions, as well as Gibbs equations and Maxwell relations

Note(s): Offer to second year students in Science.
Prerequisite(s): CCE101
Corequisite(s): MAE226
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE240 Molecular & Cellular Biology

This introductory course is focused on molecular and cellular biology. It will prepare students for the upper year courses, CCE385, CCE460 and CCE483. The course introduces the four primary biomolecules (proteins, lipids, carbohydrates, and nucleic acids), and discusses their properties, roles and importance in living organisms. Basic cellular biology (prokaryotes vs. eukaryotes) is also covered, including the metabolic requirements of cells, and processes of photosynthesis and respiration. The course also introduces genetics. Efforts are made to present unifying biological and chemical concepts with examples to encourage student understanding rather than memorization.

Note(s): Also offered through Distance Education . For students taking Chemical Engineering, Honours Chemistry or a Major in Chemistry. An elective course for students taking other Science programmes.
Corequisite(s): CCE101 or CCE106 (CCE101 can be taken as a corequisite)
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3 (Distance learning 0 - 0 - 9)
Credit(s): 1

CCE241 Organic Chemistry

An introductory course in organic chemistry chiefly concerned with the structure, properties, reactions and synthesis of mono-functional aliphatic and aromatic compounds. Stereochemistry and reaction mechanism theory are integral parts of the course. A brief study is also made of infrared, nuclear magnetic resonance and mass spectroscopy, including the interpretation of spectra. Simple preparations are performed in the laboratory. Methods of characterization and identification of organic compounds as well as spectroscopic methods of analysis are included in laboratory assignments.

Note(s): For students of the Second Year taking Chemical Engineering, Honours Chemistry or a Major in Chemistry. An elective course for students taking other Science programmes.
Prerequisite(s): CCE101
Contact Hours: 3 - 3 - 6
Credit(s): 3

CCE242 Biology of Organisms

This introductory course in general biology follows directly from CCE240. It moves beyond the basics of molecular and cellular biology, to focus on basic themes and concepts of biology spanning organizational levels from organisms to ecosystems. Specifically, this course will explore how multicellular organisms evolved to exploit different environments, and the diverse array of biochemical, physiological, and behavioural mechanisms promoting survival and reproduction. The first part of the course focuses on plant form and function, and the second on animal form and function. The course then studies how groups of species (both plants and animals) interact with the environment to form dynamic ecosystems. Effort will be made to present unifying biological and chemical concepts with examples to encourage student understanding rather than just memorization.

Prerequisite(s): CCE240
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE245 Biology Laboratory I

This course is an introduction to basic methods and instrumentation in biology, emphasizing fundamental laboratory procedures. Topics studied will include enzyme catalysis and protein determination, anaerobic fermentation, photosynthesis, mitosis and meiosis, and other topics that complement CCE240.

Corequisite(s): CCE240
Semester: Usually Offered in the Fall
Contact Hours: 0 - 3 - 3
Credit(s): 0.5

CCE246 Biology Laboratory II

This course is an introduction to basic methods and instrumentation in biology, emphasizing fundamental laboratory procedures. Topics studied will include control of microbes, invertebrate and vertebrate dissections, plant growth and other topics that complement CCE242.

Corequisite(s): CCE242
Semester: Usually Offered in the Winter
Contact Hours: 0 - 3 - 3
Credit(s): 0.5

CCE253 Materials Science

This introductory course in the chemical science and engineering of materials is focused on solids. The fundamentals of crystal structure and crystallography are introduced that include unit cells, and symmetry elements for metals, ionic and covalently bonded materials, which serve as the basis for the study of imperfections in solids that lead to dislocations, point and surface defects that ultimately can lead to materials failure. Diffusion mechanisms are examined based on Fick's First and Second Laws. Phase diagrams for two and more component systems are studied including those for steel and other engineering alloys. Ceramics are studied and phase diagrams used for applications to silicates and glasses. The properties and structures of polymers are introduced with their engineering applications. The electrical properties of materials, including semi-conductors, are also studied.

Note(s): For students taking Engineering.
Prerequisite(s): CCE101
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE254 Concepts in Inorganic Chemistry

This course covers the principles and applications of inorganic chemistry, beginning with an overview of the periodic table and a detailed investigation of atomic structure and the modern bonding theories, emphasizing the periodicity of chemical and physical properties and molecular structure of main group compounds and briefly describing the structure and bonding of select inorganic solids. Concepts of acids-bases are developed, followed by a review of oxidation-reduction chemistry, with special emphasis on the diagrammatic representation of potential data. The laboratory portion of the course will emphasize the concepts developed in class, focusing on inorganic synthesis, characterization, and properties.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE101
Contact Hours: 3 - 3 - 6
Credit(s): 1.5

CCE274 Introductory Organic Chemistry for Chemical Warfare Agents

An introductory course in organic chemistry beginning with organic functional groups and nomenclature. The structure and properties of organic compounds, with emphasis on chemical warfare agents, are integral parts of the course. Select reactions pertaining to the synthesis and decomposition of chemical warfare agents will also be covered. This course will include a primarily qualitative discussion on the nature and identification of traditional chemical warfare agents including: nerve, vesicant, choking, blood, psychochemical and incapacitating classifications. In addition, a brief introduction to energetic materials and their reactions will be discussed.

Note(s): Also offered through Distance Education . An elective course for students of the second, third or fourth year taking arts.
Prerequisite(s): CCE106 or equivalent
Semester: Offered on-site in the Fall or the Winter **(in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

CCE281 Corrosion: Impact, Principles, and Practical Solutions

Corrosion is responsible for the failure of many systems and structures. This course describes the importance of corrosion problems in relation to material cost, reduced performance, reliability, and impact on the environment. The course covers the basics of what makes environments corrosive, with an introduction to corrosion chemistry, to corrosion thermodynamics, and to the electrochemical theory that relates corrosion current with mass and thickness loss rates of various materials. Forms of corrosion are described in relation to environmental accidents and to methods commonly used to control corrosion. Examples of corrosion in water, soils, and in various atmospheres are also used to introduce these prevention techniques.

Note(s) :
Only offered through Distance Education
Contact Hours: 0 - 0 - 9
Credit(s): 1

CCE285 Introduction to Environmental Impact Assessment

This course prepares students to complete and review Environmental Impact Assessments. The origins, philosophies and approaches to environmental assessment are compared and discussed in detail. Different facets of the Canadian Environmental Assessment Act (CEAA) are also studied in depth, including its history, application, regulations, and process. Students are introduced to the assessment of social and economic as well as biophysical impacts; typical impacts from military operations are also discussed. Through assignments, students will apply the knowledge and skills in the application of environmental assessment at the screening level to typical projects or operations.

Note(s) :
Only offered through Distance Education No prerequisites, although completion of "CCE289: Impact of Science and Technology on the Environment" is recommended. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Contact Hours: 0 - 0 - 9
Credit(s): 1

CCE289 Environmental Sciences: Impact of Science and Technology on the Environment

This course analyzes the relationship between human activity and the environment. It assesses the impact of technological development on the environment and introduces such concepts as biogeochemical cycles, atmospheric processes (ozone layer, greenhouse effect, acid rain), and ecosystem self-regulation. An overview of the international environmental challenges and of current federal environment agenda will help the student develop a personal perspective on global environmental protection.

Note(s): Only offered through Distance Education . For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 300-399

CCE300 Fluid Mechanics

This course emphasizes the basic concepts of fluid mechanics and includes a study of the following: fluid and flow properties, fluid statics, fundamental equations of fluid motion, control volume concept applied to the continuity, momentum and energy equations; flow measuring devices; shear stress in laminar and turbulent flow, viscous and inviscid flow; introduction to the concepts of boundary layer and drag; engineering applications of flow in closed conduits. Special mathematical techniques, industrial and military applications are included.

Note(s): Not offered every year. Students taking Chemical Engineering substitute MEE311.
Prerequisite(s): PHE104, MAE227 (or equivalent)
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE305 Heat Transfer

The fundamental concepts and mechanisms of heat transfer processes are studied. The following topics in heat transfer are covered: differential equations of heat transfer, steady and unsteady state conduction in one and two dimensions using analytical and numerical; heat transfer with free and forced convection in laminar and turbulent flow; boiling and condensation heat transfer; heat transfer equipment; radiation heat transfer. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE313, MAE227
Corequisite(s): MEE311
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE306 Hazardous Materials Management

This course gives students the tools to understand the general nature of hazardous materials and their management, as well as the specifics of the hazards presented by, and the requirements for safe handling of, the various classes of hazardous materials. The course includes a review of chemistry, including nomenclature and reaction chemistry. In addition, the various classes of hazardous materials are discussed, covering the specific nature of the hazard and selected examples of representative materials, and proper handling, storage and disposal procedures. CAF/DND orders and directives and Canadian legislation relevant to hazardous materials are also examined.

Note(s): Only offered through Distance Education . For Arts students only. This course cannot be applied to a Science or Engineering degree.
Prerequisite(s): CCE289
Contact Hours: 0 - 0 - 9
Credit(s): 1

CCE309 Introduction to Quantum Chemistry and Spectroscopy

This course covers the following major topic areas: Schrodinger equation for the H-atom, hydrogen-like orbitals, energy levels and atomic transitions, multi-electron atoms, variational principle, Hund's Rule. Born-Oppenheimer approximation, vibrational and rotational states. Molecular orbital treatment of diatomic molecules, hybridization and polyatomic molecules. Absorption and emission of radiation in simple molecules, selection rules, fluorescence, phosphorescence and radiation less transitions. Infrared spectroscopy.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): PHE225 or PHE226
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE312 Applied Thermodynamics I

The fundamentals are developed and applied to engineering problems in the following topics: First law in open and closed systems; volumetric properties of fluids and equations of state to include compressibility and Pitzer acentric factors for ideal and real systems with applications to isothermal, adiabatic and polytropic changes in open and closed systems; Second law and entropy applied to Carnot and Rankine cycles and the concept of lost work; ideal dilute solutions, equilibrium in condensed phases in ideal and non-ideal systems, Raoult's and Henry's Laws.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE101
Corequisite(s): CCE203
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE313 Applied Thermodynamics II

The thermodynamics is extended to multi-component liquid mixtures with a focus on free energy functions, Maxwell's equations and chemical potential; homogeneous mixtures to include partial molar properties; fugacities, activity coefficients and activities, Lewis-Randall relations and excess properties; non-electrolytes to include vapour-liquid equilibria, upper and lower critical solution temperatures, Van Laar, Margules and the Gibbs-Duhem equations; chemical reaction equilibria, reaction coordinate, equilibrium constant; power cycles for the Otto, Diesel, gas turbine and jet engines; refrigeration and liquefaction. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE203, CCE312
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE315 Chemical and Materials Engineering Computations

This course develops the mathematical background required to formulate and solve ordinary and partial differential equations arising in chemical engineering. Topics include Fourier series and orthogonal functions, the method of Frobenius and Legendre equations, and eigenfunctions expansions for the Sturm-Liouville problem. Solution of partial differential equations is done by analytical methods, including the use of Fourier and Laplace transforms methods. The course covers the numerical solutions of ordinary and partial differential equations. Probability and Statistics are covered as basis for application to the analysis of experimental results and in the design of experimental procedures and computer simulation results interpretation.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CSE101, CCE203, MAE315
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE317 Kinetics and Surface Science

This course develops the empirical treatment of the rate laws and orders of reaction, complex reactions, theories of reaction rates, the Arrhenius relationship and experimental methods. Introduction to combustion and explosions including chain reactions, free radicals, thermal and branched-chain explosions, delayed branching and degenerate explosions will also be introduced. The course is completed by a study of the nature and properties of surfaces of solids, physical absorption and chemisorption; the development of Langmuir - Hinshelwood equations, the linking of kinetics and chemisorption, and heterogeneous catalysis.

Note(s): For students taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE101
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE325 Materials Engineering

The following topics are included in this course: mechanical properties of materials, mechanical testing, non-destructive testing, phase transformation in metals, applications and processing of metal alloys, failure, applications and processing of ceramics, polymers and composites, corrosion and degradation of materials. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering. An elective course for students taking other science programmes.
Prerequisite(s): CCE253
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE328 Physical Chemistry of Reactions

The following major topic areas are covered in the course: Chemical potential and application of thermodynamics to phase equilibria in one and multi-component systems; Application of thermodynamics to chemical equilibria in ideal gas mixtures and ideal solutions; Activities and thermodynamics of non ideal systems; Reaction kinetics: phenomenological rate laws, mechanisms, steady state treatments, linear and branched chain reactions; Surface chemistry: Langmiur adsorption and mechanisms of heterogeneous catalysis. The course will be combined with a laboratory section which will include experiments designed to illustrate physicochemical principles with selected experiments. The concepts presented will include: phase transitions in binary systems; glass transition and viscosity of polymers; physical adsorption and reversibility; and ionic activity coefficients as determined from ion concentrations using ion-selective electrodes. The lecture period includes an introduction to several experimental techniques used including thermogravimetric analysis and differential scanning calorimetry.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE218 or CCE312
Semester: Usually Offered in the Winter
Contact Hours: 3 - 3 - 5
Credit(s): 1.5

CCE337 Seminar

Technical, ethical, legal, environmental, and safety topics are covered by seminars given by staff and invited speakers. Topics will be chosen to encompass and extend the technical subjects of the other courses so as to be useful to the working graduate engineer in the military.

Note(s): For students taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE203
Semester: Usually Offered in the Winter
Contact Hours: 0 - 0.5 - 0
Credit(s): 0

CCE351 Nuclear Science and Engineering

From a review of current atomic structure models, the several processes of radioactive decay are explained and discussed, followed by the various nuclear reactions, including the fission process. The interactions of the various types of radiation with matter are covered, and are used as the basis for covering subsequent subjects such as radiation detection and measurement, and shielding against radiation. The students then learn how radiation affects the living tissues, and the concepts of health physics are introduced, leading to defining the radiation dose concepts and units and to the subject of radiation protection and safety. Several examples of applications of radioisotopes and radiation are then presented in areas as diversified as nuclear medicine, research, analysis, food preservation, radiation processing in the chemical industry and smoke detectors. Emphasis is given to applications of interest to the Canadian Forces, such as the neutron-based anti-personal land mine detector. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering. An elective course for students taking Honours Science or a Major in Science.
Prerequisite(s): MAE227 or permission
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE354 Transition Metal Chemistry

Aspects of the coordination chemistry of metal complexes are discussed with reference to structures and symmetry elements, ligand field theory, reaction mechanisms and kinetics, and magnetic and spectroscopic properties. Modern organometallic chemistry is introduced, including a discussion of metal-ligand bonding and selected catalytic applications of industrial importance. The laboratory portion of the course will emphasize the concepts developed in class, focusing on inorganic synthesis, characterization, and reaction mechanisms.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE254
Contact Hours: 3 - 3 - 6
Credit(s): 1.5

CCE360 Environmental Sciences: Hazardous Materials

The course is designed to assist the young officer in the role of Base Environmental Officer or Unit General Safety Officer, roles that the officer must fill regardless of Classification. Topics include the properties of flammable, corrosive, reactive, toxic and radioactive materials; handling and storage techniques; safe disposal methods of radioactive and non-radioactive wastes. The impact of various materials on living systems and the environment will be explored.

Note(s): A core curriculum course. An elective course for students of the Third or Fourth Year taking Arts. Not offered every year.
Prerequisite(s): CCE106 or CCE200
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE362 Environmental Sciences: Energy

Traditional energy sources and the associated technology are reviewed including those of fossil resources, hydroelectric power, and nuclear fission. The required raw materials, their world-wide occurrence and distribution will be examined in a political, strategic and economic context. Methods to determine the Total Unit Energy Costs will be outlined and the various sources of energy compared economically. Novel energy sources including solar, wind, geothermal, hydrogen and fusion are studied. Various aspects of the hydrogen economy will be explored. The environmental risks and social impact of large scale energy production are discussed.

Note(s): A core curriculum course. An elective course for students of the Third or Fourth Year taking Arts. Not offered every year.
Prerequisite(s): CCE106 or CCE200
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE366 Environmental Sciences: Impact of Technology on the Environment

The concept of energy is introduced by discussing the definition, terms, units, use, resources, conversion and conservation. The laws of thermodynamics, temperature, heat transfer, heat engines and heat pumps are briefly covered. Conventional energy sources (fossil, hydroelectric, fission) are studied as well as alternate sources (solar, wind) and currencies (electricity, hydrogen). The environmental impact of these sources is included. Group seminars on specific topics, such as energy sources and uses of interest to DND, are presented.

Note(s): A core curriculum course. An elective course for students of the Third or Fourth Year taking Arts. Not offered every year.
Prerequisite(s): CCE106 or CCE200
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE370 Combustion and Explosions

The course will address the physical and chemical processes associated with combustion and explosion reactions, including the production processes, chemical properties and reactions of energetic materials, for primary and secondary explosives, propellants and pyrotechnic formulations used in military and common civilian applications. Additional topics include detection, disposal, safety in handling and transportation, as well as appropriate classifications and regulations, will also be discussed. Criteria for sensitivity, and techniques for predicting and measuring stability and thermal yields, are examined. The generation of blast and its effects on personnel and structures will also be addressed.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): Introductory-level Organic Chemistry or CCE241 or CCE274
Semester: Usually Offered in the Fall and or the Winter (**in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE371 Chemical Principles of Ammunition

The course examines the historical development of propellants and explosives, their production, and military employment. After a basic review of heat and work, the basis of the adiabatic flame temperature and effects of an explosion in gaseous, liquid, and solid media are presented. The unique phenomena in detonation waves and real effects in an explosive are qualitatively described. Detonation and deflagration, sensitivity, and performance criteria are presented. Representative current propellants, primary explosives, secondary explosives, and pyrotechnic formulations are examined in detail. Limitations and potential areas of development for future materials are explored.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): CCE106 or CCE200, PHE134
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE372 Introduction to Ballistics

This course is an introduction to the field of ballistics. Emphasis is placed on achieving a fundamental understanding of principles through the solution of basic ballistics problems in areas of internal, intermediate, and external ballistics. The physical requirements and limitations to the design of specific ammunition, from small arms and grenades to guided weapons, are also explored.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): CCE106 or CCE200, PHE134
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE373 Chemical Warfare Agents: Physiological Toxicity and Protection

This course will include a primary qualitative discussion on the mechanism of action, toxicity and subsequent physiological effects for each of the traditional chemical warfare agents and an overview of dispersion methods, detection and decontamination. The issue of toxic industrial chemicals (TICs) will be addressed as they present a primary threat, particularly in the context of the asymmetric threat presented by terrorism. Chemical/biological protective measures, both individual and collective, will be covered, with an emphasis on the issues that are driving future research in this field. Current and future trends regarding the availability and usage of medical countermeasures (MCMs) will be examined.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): Introductory-level Organic Chemistry or CCE241 or CCE274
Semester: Usually Offered in the Fall and or the Winter (**in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE374 Chemical Warfare Agents: Dispersion, Detection and Decontamination

This course will include a primarily qualitative discussion on the dissemination characteristics of chemical agents as well as their behaviour in the environment. Dispersion modeling techniques and software will be introduced and an overview of the basic reactions characteristic of the environmental degradation of CWAs discussed. The basics of current detection technologies, as well as an examination of future trends, are covered, with emphasis on equipment used by the first responder community. In addition, this course examines the factors that must be considered when determining the appropriate means to deal with the decontamination of personnel, equipment, infrastructure and the environment following an accidental or voluntary CWA release.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): Introductory-level Organic Chemistry or CCE241 or CCE274
Semester: Usually Offered in the Fall and or the Winter **(in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE375 Radiological Devices and Nuclear Weapons

Several applications of radioisotopes and radiation are presented in this course. These include nuclear medicine, nuclear analysis, food preservation, and energy production. Special emphasis is given to applications of interest to the Canadian Forces and survey equipment / dosimeters employed by the CBRNE community. The principles and characteristics of nuclear weapons will also be discussed and related to the physical and nuclear radiation effects on humans, structures and equipment.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): Introductory-level Nuclear Science course or CCE151 or CCE351
Semester: Usually Offered in the Fall and or the Winter (**in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE376 Health Physics and Radiation Protection

The interaction of the various types of radiation with matter is reviewed and the topics of radiation detection, measurement, shielding are discussed in greater detail. The students learn how radiation affects living tissues and the concepts of health physics are introduced. Particular attention is paid to distance-yield relationships leading to the definition of radiation dose and appropriate dosimetry units. The topics of radiation protection, radiological pathology and dosimetry will be covered. Finally, radiological instruments used by the Canadian Forces will be reviewed and the science behind their operation discussed.

Note(s): An elective course for students of the second, third or fourth year taking Arts.
Prerequisite(s): Introductory-level Nuclear Science course or CCE151 or CCE351
Semester: Usually Offered in the Fall or the Winter (**in a condensed block of two weeks).**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE385 Biotechnology

This course involves the basic principles of chemistry, biochemistry and microbiology applied to environmental systems and problems. The fundamentals and principles of biochemistry, including important biomolecules, bioenergetics and kinetics are discussed. A systematic and quantitative description is given for the necessary inorganic and organic reactions in aerobic and anaerobic media, biokinetics, medium formulation, growth rates and population dynamics, sterilization and genetic engineering. Applications include waste water treatment, bioremediation, fermentation processes and vaccines.

Note(s): For students taking Chemical Engineering or Honours Chemistry, or a Major in Chemistry. An elective course for students taking other Science programmes.
Prerequisite(s): CCE240, CCE241
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE386 Introduction to Environmental Management Systems

This course provides an overview of the principles of environmental management. The ISO 14001, the Standard for Environmental Management Systems (EMS), is the International standard for environmental management adopted by industry and governments worldwide, and the Canadian federal government has adopted the principles of this standard for all federal departments and organizations. These key principles are the focus of this course, and discussions include how to implement EMS in an organization. A detailed examination of the definitions and requirements of ISO 14001, as well as of the concepts of environmental performance indicators, encourage students to think about environmental responsibility.

Note(s): Only offered through Distance Education . For Arts students only. This course cannot be applied to a Science or Engineering degree.
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 400-499

CCE406 Mass Transfer

The following topics are included in this course: molecular diffusion in gases, liquids and solids, unsteady-state diffusion, equations of change and the boundary layer, convective mass transfer, interphase mass transfer. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE305, CCE313
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE407 Reaction Engineering

This course builds on the material of CCE317 and introduces students to the analysis and design of chemical reactors as employed in materials conversion and purification systems. Homogeneous and heterogeneous reactions in single ideal batch and flow reactors, and in reactor combinations, are studied. The analysis of real reactors is introduced. As part of the design function, optimization of reactor performance is introduced. The course includes laboratory work that illustrates and complements the lecture materials.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE313, CCE317
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE409 Combustion and Explosives Engineering

The study of the physical and chemical processes associated with applied combustion science that include concepts from thermodynamics, chemical kinetics, fluid mechanics, mass transfer and heat transfer. Also studied are pre-mixed and diffusion flames, combustion suppression and combustion pollutants. An introduction is given to energetic materials, explosions and gun propellants.

Note(s): Elective for students taking Chemical Engineering.
Prerequisite(s): CCE203, CCE312, CCE313, CCE317
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE413 Systems Analysis: Modelling and Optimization

The formulation of mathematical models from word statements of engineering problems and digital computer simulation are emphasized in this course. The students are introduced to the methods of computer simulation of engineering systems as used within the industry, for the prediction of the (steady-state) behaviour and performance of various processes and systems of contemporary and future significance to the Canadian Forces. Several modern optimization techniques are studied and applied to solve optimization problems by numerical methods on computers. Economic models are examined for process systems in terms of the relationships between physical and economic parameters.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE203, CCE300, CCE305, MAE315, CCE315, CCE351, CCE406
Corequisite(s): CCE407.
Semester: Not offered every year.
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE415 Control Systems and Instrumentation

This course emphasizes the basic concepts of control system analysis. Topics include: review of the Laplace transforms; transfer functions and responses of open-loop systems; measurement techniques; analysis of linear closed-loop systems including control system, closed-loop transfer functions, transient response and stability; frequency-response methods; direct digital control (DDC) covering the functions of digital computers for control of industrial processes, analysis of sampled data, response and stability of open and closed-loop sampled systems. Practical examples are selected from various courses in the programme.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): MAE315
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE416 Nanotechnology

This course presents the mains theoretical principles of nanotechnology, molecular interactions and recognition, self-assembly, and nanolithography. The concepts of layer-by-layer self-assembly, self-assembly of polymers and nanolithography are presented. The course will also present the synthesis and use of carbon nanotubes, their structure and electronic properties for high technology applications. A review of modern techniques for characterization at the nanometer level for ordered and disordered materials will be presented. The students will prepare a presentation on a subject of their choice related to the course and will present a literature review.

Note(s): For students taking Chemistry
Prerequisite(s): CCE328
Contact Hours: 3 - 0 - 4
Credit(s): 1

CCE417 Design Project

The purpose of this course is to permit each engineering student, normally working as one of a group, to participate in the engineering design of a process or system. Emphasis is placed on design techniques, on the integration of material taught in previous science and engineering courses, on design project organization and administration, and on economic evaluation of the system being designed. Ethical concerns such as safety, environmental and societal impact of engineered systems are also integral parts of the projects. The course includes two oral presentations as well as a written technical report that develop the student's skill in oral and written communication. When possible, students are encouraged to present their work at student conferences. Design projects are selected, where possible, based on current and foreseen engineering applications in the Canadian Forces which fall within the scope of the programme, and may involve direct liaison with DND technical establishments and directorates.

Note(s): For students taking Chemical Engineering.
Prerequisite(s): CCE203, CCE305, CCE325, CCE406, CCE407
Corequisite(s): CCE431
Contact Hours: Fall Term: 0 - 4 - 4 Winter Term: 0-5-5
Credit(s): 2

CCE420 Chemistry Senior Project

The purpose of this course is to offer the possibility of doing an in-depth study of a scientific topic in which the student is particularly interested. The format is flexible and depends on the topic area. At one end of the spectrum, the student could be associated with a research team in the department focused in Chemistry, Biology or Environmental Sciences, and be given responsibility for part of a research project. At the other end, the student may choose a programme of independent study under the supervision of a member of the faculty. In all cases, the student's progress would be regularly monitored and an interim report would be submitted by the student at the end of the Fall term. The final mark would be based on a combination of assessment by the faculty supervisor(s) and an oral presentation to the Honours Science students and a faculty assessment committee.

Note(s): Mandatory for Chemistry (Honours) students.
Contact Hours: 0 - 0 - 4
Credit(s): 2

CCE422 Applied Experimental Design and Data Analysis

The methodology for developing efficient experimental plans for reduced experimentation and maximum informational output will be presented, and the use of analysis of variance (ANOVA) and multiple linear regression models for data analysis emphasized. Multivariate analysis methodologies including cluster analysis, use of correlation matrices, principle component analysis (PCA), and partial least squares (PLS) regression will be presented with a focus on applied data analysis and industrial process optimization. Data distributions including normality and homoscedasticity will be discussed in the context of analysis methodology assumptions and the use of transformations for data analysis covered.

Note(s): For students taking Honours Chemistry or a Major in Chemistry. An elective course for students taking other Science programmes.
Prerequisite(s): CCE101
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE425 Polymers Engineering

The following topics in polymer science and engineering are covered: chemistry and kinetics of polymerization, polymerization processes, physical and mechanical characterization, additive systems, reinforcements and fillers as well as polymeric part fabrication processes. The relationship between the polymer properties and their use in civilian and military applications is emphasized.

Note(s): For students taking Chemical Engineering. An elective course for students taking other Science programmes.
Prerequisite(s): CCE241
Semester: Not offered every year.
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE428 Electrochemistry

The course covers the following topics: definition, coulometry, current efficiency, typical electrochemical cells and electrical energy storage/utilization: primary cell (MnO2-Zn), secondary cell (Pb-acid), fuel cell (SOFC), plating (Watts Ni), winning (Zn-acid) and refining cells (Cu-acid); electrolytic conductance: strong and weak electrolytes, ionic mobility, transference number, ionic diffusivity, limiting current, anode blocking; Throwing power of electroplating systems; Electrolytic conductance in molten salts and oxides; Thermodynamics of cells, Nernst equation; Thermal exchange accompanying electrolysis; Concentration cells and electrometric probes, Electrochemical conventions for ions in aqueous solution, reference electrodes, standard electrode potential, ionic activity and Debye-Huckel equation; Thermodynamic properties of ions in aqueous electrolytes; Electrode overvoltage and its measurement; Significance of hydrogen overvoltage in aqueous electrochemistry; Butler-Volmer equation and simplified forms; Exchange current density concept; Concentration overpotential; Passivity and overvoltage; Multiple reactions at one electrode; Implications on current efficiency, energy consumption and cell operation; Modelling the performance of an electrochemical cell. The course ends with a discussion of power cells and fuel cells in relation to electrochemical concepts developed in course.

Note(s): For students taking Chemical Engineering. An elective course for students taking other Science programmes
Prerequisite(s): CCE253, CCE325
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE429 Corrosion

The principles of corrosion are applied to solving modern technological problems. The course covers the following topics: units and forms of corrosion; economic implications; materials in relation to environments; electrochemical concept of corrosion; corrosion current density; aqueous versus dry (high temperature) corrosion; Redox potential-pH (Pourbaix) diagrams; their use in active, passive and immune classification concept; development from electrochemical and thermochemical data; limitations and circumvention thereof; extension to systems involving complexing ions and alloys; mixed potential (Evans) diagrams; concept of corrosion potential and rate controlling reaction; effects of galvanic coupling; flow assisted corrosion; differential aeration; passivation; development of mixed potential diagrams for polarization studies; corrosion control; sacrificial systems; impressed current cathodic and anodic protection, inhibitors and non-metallic coatings; corrosion monitoring and testing techniques emphasizing electrochemical methods. The course concludes on the topic of high temperature corrosion: calculation of predominance diagrams and their use, scale adhesion and growth, internal oxidation of alloys and environmental modifications.

Note(s): An elective course for students taking Chemical Engineering or other Science Programmes. Not offered every year.
Prerequisite(s): CCE253, CCE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE431 Unit Operations and Process Design

This course is a semester-long case study that illustrates the complete process design sequence and teaches unit operations through application. Course topics includes: flow sheeting and block diagrams, practical design of heat exchangers, practical design of selected unit operations, siting and environmental assessment, use of process modelling software, process optimization.

Note(s): For students taking Chemical Engineering
Prerequisite(s): CCE203, CCE406, CCE407
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

CCE433 Product Design

In this course students learn to develop new products. Steps in the product-development process are studied starting with determining the customer needs and ending with a detailed design. Students are taught how to find materials having desired properties and performance and how to vet information from different sources. Optimization of the design and incorporation of novel technologies are also explored.

Note(s): For students taking Chemical Engineering
Prerequisite(s): CCE203, CCE305, CCE325, CCE406, CCE407
Semester: Usually Offered in the Winter
Contact Hours: 2 - 2 - 4
Credit(s): 1

CCE437 Seminar

Technical, ethical, legal, environmental and safety topics are covered by seminars given by staff and invited speakers. Topics will be chosen to encompass and extend the technical subjects of the other courses so as to be useful to the working graduate engineer in the military.

Note(s): For students taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Semester: Usually Offered in the Winter
Contact Hours: 0 - 0.5 - 0
Credit(s): 0

CCE440 Special Topics

This course will consist of topics selected from the subject areas of inorganic materials, polymeric materials, organometallic chemistry, molecular spectroscopy, electrochemistry and corrosion, adsorption among others.

Note(s): An elective for students taking Honours Chemistry or a Major in Chemistry.
Contact Hours: 3 - 0 - 6
Credit(s): 2

CCE445 Materials in the Space Environment

The effects of the space environment on properties of various materials are studied. The impact of the space environment on metals, ceramics, polymers and composites is considered to include an examination of the design and performance requirements. Comparisons of the effectiveness of the various materials in space are reviewed.

Note(s): For students of the taking Space Science. An elective for students taking Honours Science or a Major in Science. Not offered every year.
Prerequisite(s): CCE218 or CCE253
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE450 Advanced Topics in Organic Chemistry

This course will examine the application of structural elucidation and synthetic methods to organic chemistry and the fundamental mechanistic concepts of organic reactions. The functions of enolate chemistry, functional group interconversions and pericyclic reactions in multi-step synthetic schemes will be introduced, as well as, the effects of the physical and electronic properties of the reactants and the solvent on reaction mechanisms. Case studies involving detailed studies of organic reactions and processes of industrial and economic importance will be used throughout this course. All of the concepts that are introduced in this course have been selected for students with prior knowledge of the structure and reactivity of organic compounds.

Note(s): For students taking Chemistry
Prerequisite(s): CCE241
Contact Hours: 3 - 0 - 4
Credit(s): 1

CCE451 Topics in Physical Chemistry

Kinetic theory: Maxwell distribution, collision theory, introduction to transport processes; Chemical kinetics: mechanisms, rate laws, temperature dependence, transition state theory; Surface chemistry: physisorption, chemisorption, adsorption isotherms, catalysis, surfactants, colloids, modern experimental methods; Polymers: structures, types, properties, polymerization mechanisms.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE309, CCE328
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 4
Credit(s): 1

CCE460 Biochemistry

This course is an introduction to the chemistry of biological compounds. A systematic study of carbohydrates, lipids, amino acids, proteins, nucleic acids, and their components is presented. Emphasis is placed on the broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of these biologically important molecules. Metabolism of these biological compounds is studied in terms of the generation and storage of metabolic energy. Principles of regulatory mechanisms involving these biological compounds are introduced.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE101, CCE240
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

CCE463 Engineering Aspects of CBRN Defence

The course will include an examination of the composition and biological action of classical nerve, blood, choking and blister agents, as well as detection and decontamination methods and antidotes available. Individual and collective protection measures will also be covered. Such biological agents as bacteria, viruses, fingi and rickettsia, as well as mid-spectrum agents to include toxins, venoms and bioregulators, will be addressed. Radiological weapons will be discussed in terms of variety and biological threat. The principles and characteristics of nuclear weapons will be introduced and related to the physical (thermal, blast) and nuclear radiation (initial, residual, TREE, EMP) effects on humans, structures and equipment. Particular attention will be paid to distance-yield relationships, the distribution of fallout, the characteristics and pathology of acute whole-body radiation, physical and biological dosimetry and radiological survey. In addition to the above topics, aspects of engineering design will also include issues of Chemical Weapons Convention verification, detection technologies and industrial-level chemical agent destruction.

Note(s): An elective course for students taking Chemical Engineering. This course will not be offered every year.
Prerequisite(s): CCE203 CCE351
Exclusion(s): ATWOP, LFTSP, CCE474
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE466 Environmental Chemistry

The objective of this course is to understand contemporary environmental issues and the chemistry and underlying scientific principles behind these issues. Sources and effects of air and water pollution, in addition to soil contamination will be covered in detail. The most common contaminant types will be presented and their properties and environmental fate discussed. Basic toxicology and risk assessment will be covered giving an understanding of policy development and current research efforts in the field. Green chemistry will be introduced and described via several examples. The concept of sustainability will be introduced and used to tie course concepts together under a single unifying theme.

Note(s): An elective course for students taking Chemistry, Honours Science, or a Major in Science.
Prerequisite(s): CCE101
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE468 Ammunition Seminar

Technical, ethical, legal, environmental, management and safety topics related to ammunition are covered by seminars given by staff and invited speakers. Topics will be chosen to encompass and extend the technical subjects of the other courses so as to be useful to the working graduate ATO students in the military.

Note(s): For students taking the Ammunition Technical Officer programme.
Semester: Usually Offered in the Fall
Contact Hours: 0 - 1 - 0
Credit(s): 0

CCE469 Ammunition Industrial Tours

The course objective is to expose students to practical application related to ammunition within private industry, the Canadian Forces and governmental and non-governmental agencies.

Note(s): For students taking the Ammunition Technical Officer Programme.
Semester: Usually Offered in the Fall.
Contact Hours: 0 - 1 - 0
Credit(s): 0

CCE470 Army Munitions and Weapon Systems

The theory of gun systems and ammunition for the attack of various targets is described. The focus is on the fundamental physical relationships guiding the design and use of guns and ammunition. The mounts, recoil systems, recuperators, breeches, manual and auto loading systems and sighting and fire control systems for a modern gun are described. The principles for the desired ballistic effect in the attack of targets are described, along with rules of thumb for successful attack. Other weapons, such as fragmenting munitions, demolition charges, and pyrotechnic devices are also reviewed. Unique packaging requirements are described.

Note(s): An elective course for students of the third or fourth year taking Arts
Prerequisite(s): CCE106 or CCE200
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE471 Air and Naval Munitions

The description of ships and aircraft as a target is reviewed, with a focus on the requirement for terminal effect of the weapon system. The design requirements for the attack of aircraft by guns and missiles, the attack of surface and subsurface vessels by torpedoes, depth charges, missiles and guns, and the attack of ground targets from the air are derived from basic principles. Fuzes and possible energy sources for initiation are described in some detail. The hazards of operation in an electromagnetic environment and the principles of mitigation are presented.

Note(s): An elective course for students of the third or fourth year taking Arts
Prerequisite(s): CCE106 or CCE200
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE472 Introduction to Ammunitions Management

This course discusses a variety of topics involved with the management of ammunition and explosives, such as probability and statistics (e.g., applied to lot acceptance and the analysis of proof firings), risk reduction analyses and approaches, inventory management, decision analysis, and the Canadian defence procurement and life cycle management systems. Portions of the course will run concurrently with CC510 Ammunition management

Note(s): An elective course for students of the third or fourth year taking Arts
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE473 Biological Agents

The purpose of this course is to introduce students to bioterrorism and biological warfare agents including bacteria, viruses and rickettsiae, as well as other disease-causing biological agents (e.g. toxins, venoms and bioregulators). History of use, targeting against humans, plants and animals, and specifics of clinical disease forms induced by exposure to the agents will be studied. Prophylaxis and treatment for the resulting diseases and the primary routes of dissemination of the agents will also be covered.

Note(s): An elective course for students of the third or fourth year taking Arts.
Prerequisite(s): CCE385 or equivalent
Semester: Offered in the Fall or Winter **in a condensed block of two weeks.**
Contact Hours: 3 - 0 - 6
Credit(s): 1

CCE474 Molecular Mechanisms of Chemical and Biological Warfare Defence

This course will provide an in-depth examination of the science and engineering principles that are involved with the use of Chemical and Biological Warfare agents and the equipment utilized to support operations in these specific threat environments. Topics that will be covered in this class include synthesis and fabrication of CB agents, the physiological effect of each class of warfare agent, medical countermeasures and principles of decontamination and routes of dissemination and detection technologies. Students must have the necessary preparation in biochemistry and physical and organic chemistry as reflected in the prerequisites.

Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Prerequisite(s): CCE218, CCE240, CCE241
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CCE475 Environmental and Bioprocess Engineering

The objective of this course is to examine the sources, properties, fate and treatment of solid, liquid and gaseous wastes while understanding the basis of bioprocess engineering and how it relates to both industrial scale processing and environmental biotechnology. Water and wastewater treatment, solid waste disposal -including radioactive waste- and air pollution will be investigated. Contaminated site investigation procedures, environmental regulations and guidelines, and site remediation methods will be reviewed as will environmental management systems. Case studies and material from the current technical literature will be used to illustrate key points and applications. Basic microbiology concepts will be introduced to understand a range of bioprocesses including fermentation and pharmaceutical production. Bioprocess concepts will also be discussed in the context of environmental biotechnology.

Note(s): For students taking Chemistry or Chemical Engineering.
Prerequisite(s): CCE101
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

CCE483 Ecotoxicology

Interactions among chemical exposure (e.g., pesticides, pharmaceuticals, personal care products, organic and inorganic pollutants) and organisms can lead to sub-lethal and lethal consequences. This course will explore the mechanisms of action of chemicals and the complexities of physiological responses in biota. Recent advances will be presented among selected topics: mutagenesis, genetic toxicology testing, DNA repair and recombination, genetic disease and cancers, endocrine disruption chemicals, bioaccumulation, oxidative stress, pharmacokinetics and/or developmental & reproductive toxicology.

Note(s): For students taking Chemistry or Chemical Engineering.
Prerequisite(s): CCE101, CCE240 (or equivalent)
Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 4
Credit(s): 1

Mathematics and Computer Science Undergraduate Programmes

General Information

The Department of Mathematics and Computer Science offers programmes leading to undergraduate degrees: B.Sc. Honours Mathematics, B.Sc. Honours Computer Science, B.Sc. Mathematics, B.Sc. Computer Science

Double Majors with other sciences are possible. Please consult one of the department's undergraduate advisors for details.

Mathematics Programme Requirements

B.Sc. Honours Mathematics

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 20 credits in Mathematics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 Note 1 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (cont'd) MAE101 (**cont'd**) MAE129	HIE207 MAE229 MAE226 MAE231 **Elective** 1 credit	HIE203 POE205 MAE227 MAE209 **Elective** 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 MAE340 **Senior Computer Science** 1 credit **Optional** Note2 1 credit **Elective** 1 credit	HIE271 MAE336 MAE337 MAE329 **Optional** Note2 1 credit	POE116 MAE420 MAE406 **Optional** Note2 1 credit **Elective** 1 credit	PSE401 MAE420 (cont'd) **One of** MAE407 MAE429 MAE452 **Elective** 2 credits
Semester total	**6 credits**	**5 credits**	**5 credits**	**5 credits**

B.Sc. Mathematics

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 16 credits in Mathematics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 Note1 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (**cont'd**) MAE101 (**cont'd**) MAE129	HIE207 MAE229 MAE226 MAE231 **Elective** 1 credit	HIE203 POE205 MAE227 MAE209 **Elective** 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 **Elective** 3 credits	HIE271 MAE336 MAE337 MAE329 **Elective** 2 credits	POE116 **Optional** Note2 2 credits **Elective** 2 credits	PSE401 **Optional** Note2 1 credit **Elective** 3 credits
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Note 1
CCE101 may be replaced by CCE101(1) + CCE240.

Note 2
A minimum of 3 optional courses selected from MAE234, MAE236, MAE310, MAE333, MAE334, MAE352, MAE354, MAE374, MAE413, MAE451, MAE456 are required for the B.Sc. Honours in Mathematics and the Major in Mathematics.

Computer Science Programme Requirements

B.Sc. Honours Computer Science

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 20 credits in Computer Science, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 Note3 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (cont'd) MAE101 (**cont'd**) MAE129	HIE207 EEE250 CSE350 CSE244 MAE226 MAE229 Note4	HIE203 POE205 CSE390 MAE233 MAE209 MAE227 Note4
Semester total	**5 credits**	**6 credits**	**5/6 credits**	**5/6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 EEE351 CSE321 **Elective** 2 credits	HIE271 EEE320 CSE341 **Elective** 2 credits	POE116 CSE420 EEE435 EEE466 **Elective** 1 credit	PSE401 CSE420 (cont'd) CSE362 CSE472 **Elective** 1 credit
Semester total	**5 credits**	**5 credits**	**5 credits**	**5 credits**

B.Sc. Computer Science

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 16 credits in Computer Science, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 Note3 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (**cont'd**) MAE101 (**cont'd**) MAE129	HIE207 EEE250 CSE350 CSE244 **Elective** 1 credit	HIE203 POE205 MAE233 **Optional** Note5 1 credit **Elective** 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 EEE351 CSE321 **Optional** Note5 1 credit **Elective** 1 credits	HIE271 EEE320 CSE341 **Elective** 3 credits	POE116 **Optional** Note5 1 credit **Elective** 3 credits	PSE401 **Optional** Note5 1 credit **Elective** 3 credits
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Note 3

CCE101 may be replaced by CCE101(1) + CCE240.

Note 4

Only one of MAE227 and MAE229 is required for the Honours programme in Computer Science.

Note 5

A minimum of 5 optional courses, selected from the following, are required for the Major in Computer Science. They must include a minimum of two courses from; (CSE362, CSE390, CSE472, EEE435, EEE466, and MAE209). The remaining can come from the previous list, any 300-400 level computer science courses and the following: EEE243, EEE307, EEE330, EEE350, EEE420, EEE469, EEE499, MAE234, and MAE334.

Double Majors

B.Sc. Mathematics and Computer Science

The courses required for the Double Major in Mathematics and Computer Science are the courses required for Major in Mathematics and the Major in Computer Science.

Double Majors with other Sciences

B.Sc. Mathematics and Physics
B.Sc. Mathematics and Space Science
B.Sc. Mathematics and Chemistry
B.Sc. Computer Science and Physics
B.Sc. Computer Science and Space Science
B.Sc. Computer Science and Chemistry
Course requirements for a Major in both disciplines must be met. See one of the department's undergraduate advisors for details.

Minors

Minor in Mathematics

A minor in Mathematics is 8 credits including:

MAE101: Introductory Calculus (2 credits)
MAE129: Introduction to Algebra (1 credit)
MAE229: Linear Algebra (1 credit)
at least 3 credits from 300 or 400 level Mathematics courses (except: "MAE315: Differential Equations and Fourier Series" and "MAE328: Differential Equations, Boundary Value Problems and Complex Variables")
one additional credit in Mathematics

Minor in Computer Science

A minor in Computer Science requires 8 credits from the list of courses acceptable for Honours Computer Science or a Major in Computer Science which have a CSE or EEE prefix. (At least 5 of these credits must come from courses with the CSE prefix).

Canadian Operational Society Diploma (CORS Diploma)

Together with their RMC of Canada diploma, students can obtain the Canadian Operational Research Society Diploma.

Successfully complete the following 8 credits:

BAE342: Quantitative Methods II
BAE344: Operations Management
CSE101: Introduction to Algorithms and Computing
CSE341: Introduction to Database Systems
CSE453: Modeling and Simulation
MAE310: Statistics
MAE209: Probability and Statistics **or** BAE242: Quantitative Methods I
CSE472: Foundations of Artificial Intelligence **or** BAE410: Information Systems
Complete a project that involves the use of an Operational Research technique.

Obtain an overall average of B- or better for these 8 courses and the project.

One can obtain more information about this diploma at the Mathematics and Computer Science Department, at the Business Administration Department and at the Internet site: Canadian Operational Research Society .

Undergraduate Mathematics and Computer Science Courses

Courses 100-199

MAE010 Review of College Algebra

Topics in algebra include number systems, algebraic operations on simple expressions. exponents, roots and radicals, factoring of simple expressions, solution of first degree equations and inequalities, solution of linear systems in two variables. Topics in elementary geometry include graph of a straight line, slope and intercept of a line and equations of lines in different forms.

Note(s): Primarily intended for students in the Aboriginal Leadership Opportunity Year Programme (ALOY).
Contact Hours: 3 - 0 - 3
Credit(s): 0

MAE101 Introductory Calculus

Fall term: Introduction to real numbers. Real sequences. Functions: algebraic, exponential and trigonometric functions and their inverses. Limits, continuity and derivatives. Rules for differentiation. Main theorems of the differential calculus. L'Hôpital's rule. Applications of derivatives.
Winter term: Antidifferentiation: all basic methods. Definition of the integral, Riemann sums and fundamental theorem of calculus. Improper integrals. Applications of integration. Plane polar and 3-dimensional coordinates. Computer laboratory using MAPLE symbolic computation software to illustrate concepts and solve problems in calculus.
MAE101(1): Refers to the Fall term of this course (1 credit)

MAE101(2): Refers to the Winter term of this course (1 credit)

Note(s): For First Year Students taking Science or Engineering.
Contact Hours: 3 - 1 - 4
Credit(s): 2

MAE102 Introduction to Probability and Statistics

This course provides a non-calculus treatment of topics in Probability and Statistics. Lessons include a brief review of set operations, definitions and examples of sample space and probability of events, random variables, various discrete and continuous distributions, mean, variance and general expectations, sampling, tests of hypothesis for mean and variance, and power of tests.

Note(s): Only offered through Distance Education. This course is intended for students who have not completed a course in data analysis. It (or its equivalent) serves as a prerequisite for MAE106 and may not be used to fulfill a core requirement of the BMASc and BA programmes For Arts students only.This course cannot be applied to a degree in Science or Engineering.
Contact Hours: 0 - 0 - 9
Credit(s): 1

MAE103 Precalculus Mathematics

This course includes an introduction to sets, set notation, the properties of real numbers and the real number system. It also covers various topics in algebra including factoring algebraic expressions and arithmetic operations involving polynomial, rational and exponential expressions. Principal roots are covered, as is the connection between exponential and radical notation. The properties of inequalities and absolute values are introduced, and techniques for solving linear, non-linear and absolute value equalities and inequalities are presented. The material on functions includes the combination and composition of functions and the determination of the domain of combined and composed functions. Inverse functions are examined, and the properties of logarithmic and exponential functions are studied along with some applications to "real-world" problems.

Note(s): A required course for all Arts students who do not complete, with success, the placement test which is administered at the start of the Fall term. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE106 Discrete Mathematics with Probability

Elementary logic. Introduction to sets and operations on sets. Combinations and permutations. Discrete probability.

Note(s): Also offered through Distance Education . For First Year students taking Arts. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Prerequisite(s): MAE102 or equivalent
Semester: Usually Offered in the Fall & Winter
Contact Hours: 3 - 1 - 6 (Distance Learning: 0 - 0 - 9)
Credit(s): 1

MAE113 Calculus for the Liberal Arts

This course is intended to emphasize the basic concepts of Calculus: functions, limits, derivatives and integrals. Students will be introduced to the use of mathematical software to carry out computations.

Part I: Differential Calculus. Limits and continuity. Definition of a derivative. Derivatives of polynomials, exponential and logarithmic functions. Basic differentiation: product, quotient and chain rules. Second order derivatives and convexity. Extreme points, optimization and application to business and economics.

Part II: Integral Calculus. Anti-derivatives and some basic rules of integration. The definite integral as an area and the Fundamental Theorem of Calculus. Application of the definite integral to business and economics.

Note(s): Also offered through Distance Education.
For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Prerequisite(s): MAE103 or permission of the Department
Exclusion(s): MAE108
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE119 Linear Algebra for Engineers

Vectors in 2 and 3 dimensions. Dot products, orthogonality. Lines and planes in three-space. Introduction to complex numbers. Systems of linear equations. Matrix algebra. Determinants. Finite-dimensional real vector spaces, subspaces, bases and dimension. Eigenvalues, eigenvectors, diagonalisation of matrices.

Note(s): For First Year Students in Engineering
Semester: Usually Offered in the Winter
Contact Hours: 4 - 1 - 4
Credit(s): 1

MAE129 Introduction to Algebra

Vectors in 2, 3 and higher dimensions; geometric applications. Linear systems of equations. Matrices: matrix algebra, inverses and determinants. Solution of matrix equations. Integers: GCD, LCM, division algorithm, integers modulo n, RSA encryption. Complex numbers, arithmetic, powers and roots. Fundamental theorem of algebra and solution of polynomial equations.

Note(s): For First Year Students taking Science.
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE131 Introductory Differential Calculus

Introduction to the real numbers. Functions: algebraic, exponential and trigonometric and their inverses. Limits, continuity and derivative. Rules for differentiation. Main theorems of the differential calculus. L'Hospital rule. Applications of derivatives.

Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

MAE133 Introductory Integral Calculus

Antidifferentiation : techniques of integration. Riemann sums, definition of the integral and fundamental theorem of Calculus. Improper integrals. Applications of integration. Polar coordinates. First and second order linear differential equations.

Note(s): Only offered through Distance Education .
Prerequisite:
MAE131 or equivalent

Exclusion(s): MAE101(2)
Contact Hours: 0 - 0 - 9
Credit(s): 1

CSE101 Introduction to Algorithms and Computing

The subject of this course is the design and implementation in a high level language of computational solutions to simple problems. The course includes basic algorithms useful in problem solving and introduces the student to computational thinking. Basic computational tools such as sequence, selection and iteration are covered as well as algorithms for tasks such as searching, sorting and pattern matching. The use of assemblers, compilers, and interpreters will be discussed as well as low-level concepts that support the execution of programs on modern computers, such as representation of data, the structure of the Von Neumann machine, and their impact on correct program execution. The student will also be introduced to software testing and program documentation.

Note(s): For First Year students taking Engineering and Science.
Semester: Offered in the Fall session.
Contact Hours: 2 - 2 - 4 (0-0-9 distance)
Credit(s): 1

Courses 200-299

MAE209 Probability and Statistics

Foundations of Probability and Statistics. Brief review of set operations. Definitions and examples of sample space and probability space. Random variables, various discrete and continuous distributions. Mean, variance and general expectations. Sampling, tests of hypothesis for mean and variance, power of tests.

Prerequisite(s): MAE226
Semester: Offered in the Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

MAE226 Multivariable and Vector Calculus

Vector-valued functions, curves. Functions of several variables. Partial derivatives. Extreme values. Scalar and vector fields. Gradient, divergence, curl. Line and surface integrals. Green's, divergence and Stokes' theorems.

Prerequisite(s): MAE101 and MAE119 or MAE129
Semester: Usually Offered in the Fall
Contact Hours: 4 - 1 - 5
Credit(s): 1

MAE227 Differential Equations and Infinite Series

Ordinary differential equations: theory, methods of solution and applications of first order and higher order linear. Limit of sequences. Infinite series: definition of convergence, tests, power series, Taylor polynomials and remainder, Taylor series and applications.

Prerequisite(s): MAE101
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE229 Linear Algebra

Introduction to vector spaces. Subspaces, bases and dimension. Linear transformations and matrix representations. Eigenvalues, eigenvectors and diagonalization of matrices. Inner products; Gram-Schmidt process. An introduction to mathematical proofs and propositional logic is given throughout the course.

Note(s): Mandatory in Mathematics programmes and for the Honours BSc in Computer Science.
Prerequisite(s): MAE119 or MAE129
Semester: Offered in the Fall
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE231 Introduction to Sets and Logic

This course is a general introduction to sets, logic and methods of proof. It is aimed at students of mathematics, computer science as well as anyone interested in the study of logic for formal reasoning. The topics include: introduction to set theory, infinite sets and cardinality, propositional logic, predicate logic and quantifiers, common methods of proof, mathematical induction, structure of integer, rational and real number systems.

Prerequisite(s): MAE101 and one of MAE119 or MAE129
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE233 Discrete Mathematics for Computer Science

This course covers the mathematical foundations required in computer science. The topics included are: An introduction to sets, relations, and functions. An introduction to propositional and predicate logic, normal forms and quantifiers. Basic methods of proofs (notion of implication, equivalence, contraposition, direct proof, counterexample, proof by contradiction, weak and strong induction). Basics of counting (including arithmetic and geometric progression, permutations and combinations, the binomial theorem and the principle of inclusion-exclusion). Recurrence relations and modular arithmetic.

Note(s): Mandatory in the Computer Science programmes, it should be taken in the 2nd year.
Prerequisite(s): CSE101
Semester: Usually Offered in the Winter session.
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE234 Introduction to Cryptography

This course will be an introduction to cryptography including its military, political and mathematical aspects. The course will survey both historical cryptography (antiquity to 1967) and modern (post 1967) cryptography. Students succeeding in this course will understand the workings of important modern techniques including public key cryptography, key exchange protocols and elliptic curve cryptography; both modern encryption and cryptoanalysis will be covered.. More specifically, the following topics will be covered: Historical techniques such as: Alphabetic Ciphers, Frequency Analysis, Vigenere Ciphers, Kaisiski's Method, One Time Pads; The mathematical basis behind modern encryption and decryption: Basic group theory and basic properties of the integers; Modern encryption techniques such as: Public Key Cryptography, RSA, Diffie-Helman Key Exchange, Rabin Encryption, El Gamal, Discrete Log, Elliptic Curves. Modern decryption techniques such as: Birthday Attacks, Quadratic Sieve, Known Plaintext attacks, Man-in-the-middle attacks.

Semester: Usually Offered in the Fall
Contact Hours: 3 - 0 - 3
Credit(s): 1

MAE236 Introduction to Game Theory

This course is an introduction to two types of mathematical models of games: those introduced by von Neumann and Morgenstern, which have many applications in economics, and combinatorial games. Topics from classical game theory include: two-person zero-sum games, dominant and mixed strategies, solution techniques for small games, Minimax theorem; non-zero-sum games, Nash equilibrium, pure and mixed strategy equilibria. Impartial combinatorial games such as take-away games and Nim are studied, along with the Sprague-Grundy theorem and some of its applications.

Semester: Offered in the Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

CSE244 Programming Development Fundamentals

This course covers an introduction to fundamentals of programming design techniques, such as Programming Concepts (object oriented programming, event-driven and reactive programming); Fundamental Data Structures (arrays, strings, strategies for choosing the appropriate data structure); Fundamental Algorithms (simple numerical algorithms, approximation and mathematical analysis, sequential search, simple sorting algorithms, simple string processing); Development Methods (program correctness, specification, defensive programming, testing fundamentals, pre/post-conditions, modern environments, debugging strategies, documentation, and program style).

Note(s): Mandatory in the Computer Science programmes, it should be taken in the 2nd year.
Prerequisite(s): CSE101
Semester: Offered in the Fall session
Contact Hours: 3 - 2 - 5
Credit(s): 1

CSE260 Introduction to Computer Concepts

Course intended for students in Arts. This course is part of the core curriculum. This course gives an introduction to information technology and its applications. Topics include an overview of computer hardware and system software, algorithm design, programming in a high level language, use of spreadsheets and data base systems, computer networks and the internet, and security considerations.

Note(s): For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Semester: Usually offered in the Winter session.
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 300-399

MAE310 Statistics

Sampling distributions; estimation of population parameters - point and interval estimators; hypothesis testing for one or two groups; test for goodness of fit, contingency tables; quality control and simple linear regression; time series.

Prerequisite(s): MAE209
Semester: Usually Offered in the Fall or Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE315 Differential Equations and Fourier Series

Laplace transforms and application to solution of initial-value problems. Fourier series and integrals. Solution of linear differential equations using power series and Frobenius method. Bessel equation and functions.

Note(s): For Third Year students taking Chemical Engineering.
Prerequisite(s): MAE226, MAE227
Semester: Usually Offered in the Fall
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE325 Laplace Transforms, Fourier Analysis and Differential Equations

Laplace transforms and initial value problems. Fourier series, integrals and transforms. Power series and Frobenius methods for linear differential equations. Bessel's equation and functions.

Note(s): Mandatory for students taking Electrical and Computer Engineering, or Mathematics
Prerequisite(s): MAE226, MAE227
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE326 Partial Differential Equations and Complex Analysis

Partial differential equations and solution of boundary value problems using method of separation of variables. Functions of a complex variable: analytic functions, Taylor and Laurent series, complex integration, residue theorem.

Note(s): For students taking Electrical Engineering or Science
Prerequisite(s): MAE325
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE328 Differential Equations, Boundary Value Problems and Complex Variables

Laplace transforms and the solution of ordinary differential equations. Fourier series. Partial differential equations and the method of separation of variables. Boundary value problems. Functions of a complex variable. Practical examples applied to problems in Mechanical and Aeronautical Engineering.

Note(s): For Third Year students taking Mechanical Engineering.
Prerequisite(s): MAE226, MAE227
Semester: Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

MAE329 Group Theory

Groups, cyclic groups, subgroups and normal subgroups. Homomorphisms, quotient groups, isomorphism theorems and permutation groups. Sylow Theorems and applications to group theory.

Note(s): Mandatory in Mathematics programmes.
Prerequisite(s): MAE229
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE331 Mathematics of Signal Processing

Distributions, Dirac's delta function and convolutions. Correlation and autocorrelation. Linear time-invariant systems. Continuous and discrete signals. Impulse and step responses. Transfer function and frequency response. Applications of the Laplace transform, Z-transform and solutions of finite difference equations. Applications of the Fourier Transform. Nyquist rate and Shannon's signal reconstruction formula, discrete Fourier transform, wavelet analysis.

Prerequisite(s): MAE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

MAE333 Introduction to Discrete Mathematics

Brief review of permutations and combinations. Fundamentals of logic. Properties of the integers including induction, recursion, primes and modular arithmetic. Enumeration including the pigeonhole principle, inclusion/exclusion, generating functions and recurrence relations.

Semester: Usually Offered in the Fall or Winter session.
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE334 Graph Theory

Graphs and sub-graphs, trees, connectivity, Euler tours and Hamiltonian cycles, matchings, independent sets and networks. Graph theoretic algorithms for finding spanning trees, shortest paths in weighted graphs and maximal flows in networks. Selected applications will cover timetabling, travelling salesman and tournament scheduling type problems.

Prerequisite(s): CSE101 and one of MAE119 or MAE129
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE336 Ordinary and Partial Differential Equations, Special Functions, Boundary-Value Problems

Sturm-Liouville theory and problems; study of the associated special functions. Sturm separation and comparison theorems. Introduction to partial differential equations. Separation of variables method for solving boundary-value problems. Solution of problems involving the Laplace, wave, diffusion and Schrodinger equations. Introduction to calculus of variations.

Note(s): Required for students in Mathematics degree programmes
Prerequisite(s): MAE325
Semester: Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE337 Complex Analysis

The study of complex analysis is the study of functions of a complex variable and is very useful in many areas including number theory and applied mathematics. The subjects covered include: Complex numbers, Complex functions (limit and derivative). Analytic functions: Cauchy-Riemann conditions. Elementary complex functions. Cauchy theorem. Cauchy Integral & Formula. Fundamental theorem of algebra. Types of singularities. Taylor and Laurent series. Residue Calculus. Conformal Mapping.

Prerequisite(s): MAE119 or MAE129, MAE226, MAE227
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE340 Foundations of Probability

Probability; random variables and distributions; joint distributions; functions of random variables; conditional expectations; sequences of random variables; stochastic processes.

Prerequisite(s): MAE209, MAE226, MAE227
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE352 Non-Linear Optimization

Nonlinear Optimization deals with the problem of optimizing i.e. minimizing or maximizing an objective function in the presence or in the absence of equality and inequality constraints. Nonlinear Optimization has many applications in Engineering, Sciences, Economics and in several domains of military activities. In this course will be presented the main mathematical concepts, optimality conditions and numerical methods considered now in Nonlinear Optimization. Short introductions to Optimal Control Theory and Global Optimization will be also presented.

The main subjects of this course are the following. Convex Analysis. Geometrical Optimality Conditions. Optimality Conditions and Duality. Lagrangian Duality and Saddle Point Optimality Conditions. Numerical Algorithms and their convergence. Introduction to optimal Control Theory. Introduction to the Global Optimization.

Several examples and applications will be given.

Prerequisite(s): MAE226, MAE227
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

MAE354 Non-linear Dynamical Systems, Chaos and Fractals

Some non-linear systems exhibit unexpected behaviours that require novel methods of explanation. Such are the chaotic systems, the evolution of which is unusually sensitive to small variations in the initial conditions. Chaos in the heavens; asteroids and comets and on Earth; simple iterated functions. Fractals; objects of fractional dimensions. MAPLE will be used to illustrate the effects studied.

Key subjects are: periodicity, orbits, bifurcations, non-linear maps (Hénon), Julia set, Mandelbrot set, pendulum motion, Lorenz butterfly and strange attractor.

Prerequisite(s): Having done two years at RMC of Canada or the equivalent in Mathematics and Computer Science.
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

MAE374 Conflict Analysis

The ability to understand and resolve conflicts is a required skill for decision makers in every domain. The purpose of this course is to present the part of Game Theory and its techniques designed to solve real world problems. The material presented includes models and analysis methods from Stability Analysis, Hypergame Analysis, Two and N-Player Games Analysis, Equilibrium Analysis (such as Nash's equilibrium), as well as Dynamic Modelling.

This course is of great value to future analysts of both civil and military issues. It provides them with the tools to disentangle complex real economical or geopolitical issues in order to determine the cause(s) and assist in the selection of a rational solution.

The main subjects of this course are the following. Types of conflicts; Simple conflict analysis, Garrison conflict. Hypergames; Cuban Missile Crises, Normandy Invasion. Metagames; Mathematical description, Analysis, Characterization theorem. Conflict analysis methods; Two and N-Player games, Nuclear conflict. Theory and implications of conflict analysis; Foundations, Equilibriums and solution concepts, Classical Game Theory. Solution procedures for non-cooperative games; Stability, Existence with examples, Special classes of games. Dynamic modeling; Supergames, Nuclear conflict, Time transition matrices.

Prerequisite(s): MAE226, MAE227, MAE229
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

CSE301 Scientific Computing

Sources of error in numerical computation. Stable and unstable algorithms, computational pitfalls. Topics in numerical analysis including the solution of linear and non-linear equations, numerical integration and differentiation, polynomial and spline interpolation, discrete least squares approximation, numerical solution of ordinary differential equations.

Prerequisite(s): MAE129, MAE226, MAE227, CSE101
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

CSE321 Algorithm Analysis

Analysis of algorithms and computational complexity, complexity measures and standard complexity classes, use of recurrence relations to analyze recursive algorithms. Fundamental algorithmic strategies: brute-force, greedy, divide and conquer, recursive backtracking. Strings and pattern-matching algorithms. Graph and tree traversals, algorithms for shortest-path, transitive closure, minimum spanning tree. Implementations of graphs and trees. Introduction to computability, Turing machines, algorithmically unsolvable problems, halting problem.

Note(s): Mandatory in the Computer Science programmes.
Prerequisite(s): CSE350, MAE233, and one of CSE244 or EEE243.
Semester: Usually Offered in the Fall session.
Contact Hours: 3 - 1 - 5
Credit(s): 1

CSE323 Formal Languages and Automata

Introduction to the theory of automata and formal languages with application to the theory of computation. Deterministic finite automata, regular languages, pushdown automata, context free grammars, Turing machines (TM), unsolvable problems about TM and grammars, P and NP classes, NP completeness.

Prerequisite(s): CSE350 or permission of the department
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 4
Credit(s): 1

CSE341 Introduction to Database Systems

Database system concepts; Primary file organization and index structures; Data modeling using entity-relationship model and enhanced entity-relationship model; Relational model, Normalization; relational algebra and relational calculus; SQL, Embedded SQL and JDBC; query optimization, transaction processing; security and database integrity.

Note(s): Mandatory in the Computer Science programmes.
Prerequisite(s): CSE350 and one of CSE244 or EEE243, or permission of the department
Semester: Usually Offered in the Winter session.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CSE350 Data Structure and Algorithms

Use of recursion and abstract data types. Basic object-oriented programming: using and defining classes. Introduction to computational complexity, big- O notation, and analysis of simple algorithms. Fundamental data structures (stacks, queues, hash tables, trees and graphs) and their implementations. Fundamental algorithms: quicksort and other $O(n \log n)$ sorting algorithms, hashing and collision-avoidance, binary search, operations on binary trees. Introduction to graphs and finding shortest-paths.

Note(s): Mandatory in the Computer Science programmes, it should be taken in the 2nd year.
Corequisite(s): Students taking CSE350 should take or have passed CSE244 or EEE243.
Semester: Offered in the Fall session
Contact Hours: 3 - 2 - 5
Credit(s): 1

CSE362 Software Development and Professional Practice

This course starts with a description of human-computer interaction issues in software design. The course then covers a range of topics integral to the design, implementation, and testing of a medium-scale software system with the practical experience of implementing such a project as a member of a programmer team. Finally, the course includes material on the social context of computing as well as professionalism and ethical responsibilities in software development.

Note(s): Mandatory for the Honours BSc in Computer Science.
Prerequisite(s): CSE350
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

CSE390 Multiprocessing, user interfaces, graphics systems and e-commerce

The course starts by covering aspects of conventional computer architecture such as memory systems and functional organization. Then, multiprocessing and alternative architectures beyond the classical von Neumann model are studied. The second portion of the course will teach fundamental issues in human-computer interaction, event-driven programming and effective graphical user interface (GUI) design, with practical experience building a GUI. The third part of the course is concerned with graphics software and video. The fundamental techniques involved in the design of graphic systems are studied using a graphics API and more advanced topics such as geometric modeling and graphics rendering algorithms are also included. Finally, in the course fourth and last part, e-commerce is covered.

Note(s): Mandatory for the Honours BSc in Computer Science.
Prerequisite(s): CSE350
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

Courses 400-499

MAE406 Advanced Mathematical Analysis - Part I

The main goal of this course is to present the first part of some fundamental notions and results of modern mathematical analysis, necessary for applied analysis. This course is necessary for anyone who intends to follow advanced courses in fields such as Optimization, Game Theory, Dynamical Systems, Partial Differential Equations, Integral Equations, etc.. The content of this course forms a good background for many courses in Masters and PhD programs. The topics presented include: necessary notions related to real numbers, topological spaces, metric spaces, Lebesgue integral, and convex analysis.

Prerequisite(s): MAE226, MAE227, MAE229
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE407 Advanced Mathematical Analysis - Part II

The main goal of this course is to present the second part of some fundamental notions and results of modern mathematical analysis, necessary for applied analysis. Part I of this course is a prerequisite. This course is necessary for anyone who intends to follow advanced courses in fields such as Optimization, Game Theory, Dynamical Systems, Partial Differential Equations, Integral Equations, etc. The content of this course forms a good background for many courses in Masters and PhD programs. The material presented is as follows: Banach and Hilbert Spaces, Linear operators between Hilbert Spaces, Fixed Point theorems, and Variational Inequalities.

Prerequisite(s): MAE406
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE408 Numerical Analysis

Solutions of partial differential equations using implicit difference methods for parabolic, elliptic and hyperbolic equations, and methods for gradient boundary conditions; introduction to finite element methods; root finding and optimization; modern simulation techniques including Monte Carlo, pseudo-random number generation, and simplex applications; other advanced topics as appropriate.

Prerequisite(s): MAE226, MAE227, CSE301
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

MAE413 Mathematical Physics

Integral representation of functions. Green's functions in one and higher dimensions. Solutions of integral equations. Additional topics in mathematical physics as time permits. Software packages for symbolic and numerical computation will be used wherever possible.

Prerequisite(s): MAE325, MAE326
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 3
Credit(s): 1

MAE420 Senior Project

The purpose of this course is to offer the possibility of doing an in-depth study of a scientific topic in which the student is particularly interested. The format is flexible and depends on the topic area. At one end of the spectrum, the student could be associated with a research group in Mathematics and be given responsibility for part of a research project. At the other end, the student may choose a programme of independent study under the supervision of a member of the faculty. In all cases, the student's progress would be regularly monitored and an interim report would be submitted by the student at the end of the Fall term. The final mark would be based on a combination of assessment by the faculty supervisor(s) and an oral presentation to the Honours Science students and a faculty assessment committee.

Note(s): Mandatory for Honours Mathematics students.
Contact Hours: 0 - 0 - 4
Credit(s): 2

MAE429 Rings and Fields

Rings, polynomial rings, homomorphisms. Euclidean and principal ideal domains. Unique factorization domains. Fields, extensions of fields, finite fields and applications.

Prerequisite(s): MAE329
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE451 Topics in Mathematics

The objective of this course is to allow members of the department to share their expertise with students in areas of mathematics not covered in other courses. Students will present seminars and written reports, as appropriate.

Prerequisite(s): Permission of the instructor
Semester: Usually Offered in the Fall and Winter
Contact Hours: 0 - 3 - 3
Credit(s): 1

MAE452 Probabilistic Operations Research Models

Conditional distributions; probability generating functions; Poisson processes; the role of exponential and Poisson distributions in applications. Introduction to stochastic processes; birth-and-death processes; renewal processes. Markov chains and their properties. Use of computer software programs to solve problems in various stochastic processes.

Prerequisite(s): MAE340, MAE325
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

MAE456 Mathematical Modelling

This course involves a study of the principles of mathematical modelling. Continuous models based on ordinary differential equations, systems of ordinary differential equations, partial differential equations and integral equations. Models based on optimization and variational calculus. Each model type will be illustrated by concrete examples and numerical methods appropriate to these equations will be investigated. The latter part of the course will be dedicated to a qualitative study of mathematical models. Mathematical models for military problems will be considered.

Prerequisite(s): MAE325, MAE326
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 0 - 4
Credit(s): 1

CSE410 Semantic Web and Databases

The course Semantic Web and databases aims at familiarizing students with the basic principles of the Semantic Web and presents its current state of development and challenges. Another goal of the course is to compare Semantic Web triple stores and query language (SPARQL) with relational databases and to explain the main differences and similarities between both areas. The course also explores the various technologies, tools and languages currently used in the Semantic Web. In particular, we detail Semantic Web languages, ontology engineering methods, linked data, queries and semantic search tools and finally inference engines used with ontologies.

Note(s): The lectures take various forms: 1) discussions on various readings (conferences, journals), 2) formal lectures, and 3) Presentations by students. Students must also complete a Semantic Web project in a given application domain using Java and Semantic Web Technologies.
Prerequisite(s): CSE350
Contact Hours: 3 - 0 - 5
Credit(s): 1

CSE411 Advanced Database Concepts and Applications

Concurrency and recovery. Decision support . Object databases. Distributed databases and client-server architecture. Active databases and temporal databases. Deductive databases. Data warehousing and data mining. Study of applications such as GIS, genome database, bioinformatics, digital library and multimedia databases.

Prerequisite(s): CSE341
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

CSE420 Senior Project

The purpose of this course is to offer the possibility of doing an in-depth study of a scientific topic in which the student is particularly interested. The format is flexible and depends on the topic area. At one end of the spectrum, the student could be associated with a research group in Computer Science and be given responsibility for part of a research project. At the other end, the student may choose a programme of independent study under the supervision of a member of the faculty. In all cases, the student's progress would be regularly monitored and an interim report would be submitted by the student at the end of the Fall term. The final mark would be based on a combination of assessment by the faculty supervisor(s) and an oral presentation to the Honours Science students and a faculty assessment committee.

Note(s): Mandatory for Honours Computer Science students
Contact Hours: 0 - 0 - 4
Credit(s): 2

CSE444 Advanced Programming

Laboratory exercises designed to introduce the students to the basic concepts of multiprocessing, multithreading, interprocess communication, distributed programming, parallel computing, socket connection, client/server model, networking, UDP and TCP protocols, routing information protocols, web security, fundamentals of cryptography, firewalls.

Note(s): Each student must develop a project.
Prerequisite(s): CSE350
Semester: Usually Offered in the Fall and Winter
Contact Hours: 0 - 2 - 4
Credit(s): 1

CSE451 Topics in Computer Science

The objective of this course is to allow members of the department to share their expertise with students in areas of computer science not covered in other courses. Students may be expected to work on software projects, and will present seminars and written reports as appropriate.

Prerequisite(s): Permission of the instructor
Semester: Usually Offered in the Fall and Winter
Contact Hours: 0 - 3 - 3
Credit(s): 1

CSE453 Modeling and Simulation

After the course, students will be able to solve problems using computer simulations. More specifically, students will be able to describe the procedures involved in modeling and simulation; they will know how to structure and then verify models for complex systems, how to conduct designs of experiment on models, i.e., simulation, and how to measure and evaluate these experiments (simulation analysis). Advanced applications will be shown and students will be able to solve problems by using various skills of modeling and simulation. Finally, they will be able to apply their knowledge of modeling and simulation to solve defence related applications.

Prerequisite(s): CSE101
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 4
Credit(s): 1

CSE472 Foundations of Artificial Intelligence

This course gives a comprehensive introduction to the foundations of Artificial Intelligence (AI). It starts with an introduction to intelligent agents. Secondly, it reviews the methods of solving problems by searching and game playing. Then, it explores knowledge, knowledge representations and reasoning with the help of propositional and first order logics. Furthermore, AI programming languages such as Prolog/Clips/JESS and their usages in building expert systems are studied. Afterwards, knowledge and reasoning with uncertainty are discussed. It also explains some concepts of machine learning from the aspects of statistics and mathematics. In addition, computer vision, dealing with sound, and robotics are introduced. Finally, it highlights major applications of AI for military defence.

Note(s): Mandatory for the Honours BSc in Computer Science.
Prerequisite(s): CSE350 or CSE321
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 3
Credit(s): 1

CSE475 Genetic Algorithms and Neural Networks

Genetic information processing. Natural mechanisms of optimization of species. Molecular computers. Algorithm of artificial genetics. Neural networks. Elements of functioning of natural networks and of learning. Artificial networks: the most important models, including the perception, the adaline, the associative memories, error back-propagation, Kohonen's SOM, the radial basis functions networks, and many of their practical applications.

Note(s): This course includes two periods of laboratory per week. Students will use commercial software and will also write their own programs.
Prerequisite(s): MAE226, MAE227
Semester: Usually Offered in the Fall and Winter
Contact Hours: 3 - 2 - 3
Credit(s): 1

CSE490 Computer Graphics

This course introduces the fundamentals of modern 3D computer graphics. The students will learn about the standard graphic card pipeline and to how program it. Using OpenGL, they will learn to send data to the graphic card memory, to do basic rendering, and to program the GPU vertex and fragment shaders. The students will also learn about 3D projections, transformations, frames of reference, and homogeneous coordinates system. Other topics covered include mesh triangulation, lightning, shading, and texturing. At the end of the semester, the students will have a good idea how modern 3D computer graphics are working and will have written some 3D graphic software of their own.

Note(s): Limited to 10 students.
Prerequisite(s): MAE119 or MAE129, CSE390 (EEE243 recommended)
Semester: Usually Offered in the Fall
Contact Hours: 2 - 2 - 4
Credit(s): 1

Physics and Space Science Undergraduate Programmes

Physics Programmes

B.Sc. Honours Physics

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 20 credits in Physics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 MAE101	ENE100 (cont'd) CSE101 PHE104 (cont'd) CCE101 (cont'd) MAE101 (cont'd) MAE129	HIE207 MAE226 PHE205 (**w\lab**) PHE225 (**w\lab**) **Optional** Note1 1 credit	HIE203 POE205 MAE227 PHE217 (**w\lab**) **Optional** Note1 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 PHE302 PHE304 PHE332 **or** (1 optional credit) Note2 **Optional** Note1 1 credit	HIE271 PHE460 PHE305 PHE462 PHE307 **or** (1 optional credit) Note2	POE116 PHE420 **Senior Physics** 2 credits **Elective** 1 credit	PSE401 PHE420 (**cont'd**) **Senior Physics** 2 credits **Elective** 1 credit
Semester total	**6 credits**	**5 credits**	**5 credits**	**5 credits**

B.Sc. Physics

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 16 credits in Physics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (**cont'd**) MAE101 (**cont'd**) MAE129	HIE207 MAE226 PHE205 (**w\lab**) PHE225 (**w\lab**) **Optional** Note 1 1 credit	HIE203 POE205 MAE227 PHE217 (**w\lab**) **Optional** Note 1 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 PHE302 PHE304 PHE332 **or** (1 optional credit) Note2 **Optional** Note1 1 credit	HIE271 PHE460 PHE305 PHE462 PHE307 **or** (1 optional credit) Note2	POE116 **Optional** Note1 1 credit **Elective** 3 credits	PSE401 **Optional** Note1 1 credit **Elective** 3 credits
Semester total	**6 credits**	**5 credits**	**5 credits**	**5 credits**

Space Science Programmes

B.Sc. Honours Space Science

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 20 credits in Physics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 MAE101	ENE100 (cont'd) CSE101 PHE104 (**cont'd**) CCE101 (**cont'd**) MAE101 (**cont'd**) MAE129	HIE207 MAE226 PHE205 (**w\lab**) PHE225 (**w\lab**) PHE255	HIE203 POE205 MAE227 PHE217 (**w\lab**) **Optional** Note3 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 PHE302 PHE350 PHE332 **or** (1 optional credit) Note2 **Optional** Note3 1 credit	HIE271 PHE460 PHE355 PHE462 PHE307 **or** (1 optional credit) Note2	POE116 PHE448 PHE445 PHE452 **Elective** 1 credit	PSE401 PHE448 (**cont'd**) PHE450 **Elective** 2 credits
Semester total	**6 credits**	**5 credits**	**5 credits**	**5 credits**

B.Sc. Space Science

Completion of a 42 credit programme, including the core courses for science programmes . A minimum of 16 credits in Physics, approved by the department.

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 PHE104 CCE101 MAE101	ENE100 (**cont'd**) CSE101 PHE104 (**cont'd**) CCE101 (**cont'd**) MAE101 (**cont'd**) MAE129	HIE207 MAE226 PHE205 (**w\lab**) PHE225 (**w\lab**) PHE255	HIE203 POE205 MAE227 PHE217 (**w\lab**) **Optional** Note3 1 credit
Semester total	**5 credits**	**6 credits**	**5 credits**	**5 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE325 PHE302 PHE350 PHE332 **or** (1 optional credit) Note2 **Optional** Note3 1 credit	HIE271 PHE460 PHE355 PHE462 PHE307 **or** (1 optional credit) Note2	POE116 **Elective** 4 credits	PSE401 **Optional** Note3 1 credit PHE450 **Elective** 3 credits
Semester total	**6 credits**	**5 credits**	**5 credits**	**5 credits**

Note 1
Optional courses for Physics, selected from the the suggested courses listed: CCE240, CCE242, MAE209, MAE229, PHE333, PHE352, PHE364, PHE370, PHE415, PHE442, PHE445, PHE450, PHE452, PHE470, .

Note 2
Students must take either PHE332 or PHE307, however both courses can be taken. If only one is taken an additional credit must be taken from optional courses listed

Note 3
Optional courses for Space Science, selected from the the suggested courses listed: CCE240, CCE242, MAE209, MAE229, PHE307, PHE333, PHE352, PHE364, PHE370, PHE412, PHE442, PHE470.

Double or Combined Major

Double Majors may be available in:

- Physics and Space Science
- Physics and Computer Science
- Physics and Chemistry
- Physics and Mathematics
- Space Science and Mathematics
- Space Science and Computer Science
- Space Science and Chemistry

Combined Major may be available in:

- Space Science and Military and Strategic Studies

Note: *Before registering in a double or a combined major both departments concerned should be consulted for details.*

Minors

Minor in Physics

Mandatory Courses

PHE104: General Physics
PHE205: Mechanics
PHE217: Electromagnetism
PHE225: Modern Physics

One of:

PHE302: Electromagnetic Waves
PHE304: Quantum Mechanics
PHE305: Classical Mechanics

Optional Courses :

2 Physics credits at the 300 or 400-level.

Minor in Space Science

Mandatory Courses:

PHE104: General Physics
PHE205: Mechanics
PHE217: Electromagnetism
PHE225: Modern Physics
PHE255: Introduction to Space Science
PHE355: Space Science Concepts and Applications

Optional:

1 Physics credit at the 300 or 400-level.

Table of Corequisites / Prerequisites

Course	Corequisites	Prerequisites
PHE102 Elementary Physics		for students in Arts who have not taken senior High School physics credit
PHE104 General Physics	MAE101	
PHE205 Mechanics	MAE226	PHE104
PHE217 Electromagnetism		PHE104 and MAE226
PHE225 Modern Physics	MAE226	PHE104
PHE226 Modern Physics	MAE226	PHE104
PHE228 Electromagnetism (for electrical and computer engineering students)		PHE104 and MAE226
PHE255 Introduction to Space Science		High School Leaving Physics
PHE302 Electromagnetic Waves	MAE325	PHE217 or PHE228
PHE304 Quantum Mechanics	MAE325	PHE225
PHE305 Classical Mechanics	MAE325	PHE205
PHE307 Optics		PHE302
PHE332 Instrumentation I		PHE217
PHE333 Instrumentation II		PHE332
PHE350 Orbital Mechanics		PHE104 and MAE226
PHE352 Astronomy	PHE104 and MAE101	
PHE355 Space Science Concepts and Applications		PHE255 and PHE350
PHE364 Physics Laboratory		(PHE205 and PHE225) or PHE217
PHE370 Introductory Synoptic Oceanography		PHE104
PHE403 Solid State Physics	MAE325	PHE304
PHE412 Advanced Electromagnetic Theory	MAE325	PHE302
PHE413 Nuclear Physics	MAE325	PHE304
PHE415 Advanced Quantum Mechanics	MAE325	PHE304
PHE420 Senior project		Honours Physics, permission of Department
PHE442 Introduction to Astrophysics		PHE225
PHE445 Physics of the Space Environment		PHE302
PHE448 Space Mission Analysis and Design		Honours Space Science, permission of Department
PHE450 Space Communication and Navigation		PHE302
PHE451 Senior Physics Laboratory		(PHE205 and PHE225) or PHE217
PHE452 Remote Sensing	MAE325	PHE302
PHE460 Computational Physics		PHE302
PHE462 Statistical and Thermo Physics		PHE225
PHE470 Physical Oceanography		PHE104 and MAE325

Undergraduate Physics Courses

Courses 100-199

PHE102 Elementary Physics

Topics in this introductory physics course will include: Newtonian mechanics including projectile motion, work and energy, acoustic, speed of sound, sound intensity, optics, lasers, mirrors, lenses, interference and diffraction.

Note(s): For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion(s): PHE134
Contact Hours: 3 - 0 - 6
Credit(s): 1

PHE104 General Physics

Introduction to the principles of physics involved in Optics and Electricity, Mechanics.

First Semester, PHE104(1)

Optics: geometrical optics, reflection and refraction, images from mirrors and lenses, optical instruments. Wave nature, Huygens principle, interference and diffraction, phenomena in diffraction gratings and thin films and for analyzing the resolution of optical instruments.

Electricity: Coulomb's law, electric field and electric potential, motion of a charged particle, emf source, capacitance, current and resistance in electric circuits. Direct current circuits, Ohm's law and Kirchhoff's rules.

There is a lab associated with this course. The lab covers the basic principles of experimental investigation. In particular, the following topics are considered: the nature of measurement and associated errors, experiment planning and execution, the analysis of data errors, and the writing of scientific reports.

PHE104(1) and PHE136 are equivalent courses. A student cannot receive credit for both PHE104(1) and PHE136.

Second semester, PHE104(2)

Mechanics: kinematics, displacement, velocity, acceleration, motion in one and two dimensions, Newton's laws of motion, free-body diagrams, circular motion, friction, kinetic and potential energy, work, momentum, conserved quantities, rigid bodies, rotational motion, moment of inertia gravitation.

PHE104(2) and PHE131 are equivalent courses. A student cannot receive credit for both PHE104(2) and PHE131.

The first year physics lab (which is taken as part of PHE104) and PHE135 are equivalent academic activities. A student cannot receive credit for both the "First year physics lab" and PHE135.

Note(s): For all students in the First Year of Science and Engineering.
Corequisite(s): MAE101
Contact Hours: 3 - 4 - 6
Credit(s): 2

PHE110 Elements of Electro-optics

Introduction to the nature of light, reflection and refraction, lenses and spherical mirrors, optical instruments, Huygen's principle, interference of light and diffraction, polarization, the photoelectric effect, lasers and holography, condensed matter, band theory of solids, and semiconductor junctions and devices.

Note(s) :
Only offered through Distance Education
Contact Hours: 0 - 0 - 9
Credit(s): 1

PHE131 Mechanics

Intended for students who wish to proceed in science or engineering. The content consists of an introduction to the principles of physics through the study of mechanics. The course covers the following material: vectors, kinematics, motion in one and two dimensions, displacement, velocity, acceleration, curvilinear motion, relative velocities, Newton's laws of motion, free-body diagrams, friction, circular motion, work done by a force, kinetic energy, conservative and non-conservative forces, potential energy, work-energy theorem, conservation of energy, linear momentum and collisions in one and two dimensions, rotational motion of rigid bodies, angular velocity, angular acceleration, rotational kinetic energy, moments of inertia, torque, angular momentum, rolling motion, and the law of universal gravitation.

Note(s): Only offered through Distance Education .
Exclusion(s): PHE104(2)
Contact Hours: 0 - 0 - 9
Credit(s): 1

PHE134 Elements of Physics

The concepts of energy and its conservation are used as a vehicle to explore a number of areas in modern physics. The course is designed for students with a non-technical background. Topics include: motion and Newton's laws, work, energy, and the laws of energy conservation. Mechanical waves and sound, electromagnetic waves and light, atomic structure, states of matter, and the nucleus and nuclear energy.

Note(s): Only offered through Distance Education. Offered in English Only. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion(s): PHE102
Contact Hours: 0 - 0 - 9
Credit(s): 1

PHE135 Experimental Physics

Basic principles of experimental investigation, in particular: the nature of measurement and associated errors, experiment planning and execution, analysis of data errors, and writing of a scientific report.

Note(s): Only offered through Distance Education . Course only offered on-site in a two week time block. Contact the Division of Continuing Studies for details.
Exclusion(s): PHE104 (Lab portion)
Contact Hours: 0 - 2 - 0
Credit(s): 0.5

PHE136 Optics and Electricity

Introduction to the principles of physics through the study of optics and electricity. The course will include the following topics:

Optics: geometrical optics, reflection and refraction, images from mirrors and lenses, optical instruments, wave nature, Huygen's principle, interference and diffraction, phenomena in diffraction grating and thin films, and analyzing the resolution of optical instruments.

Electricity: Coulomb's law, electric field and electric potential, motion of a charged particle, power source, capacitance, current and resistance in electric circuits, direct current circuits, Ohm's law, and Kirchhoff's rules.

Note(s): Only offered through the Distance Education .
Exclusion(s): PHE104(1)
Note(s): Intended for students who wish to proceed in Science or Engineering.
Contact Hours: 0 - 0 - 9
Credit(s): 1

Courses 200-299

PHE203 Introduction to Astronomy

This course provides a broad overview of modern astronomy, from the Earth and the Solar System to the limits of the Universe. The course consists of four study units: 1) Fundamentals of Astronomy; 2) Galaxies and Cosmology; 3) The Stars; and 4) The Solar System. The course is presented in online delivery mode with multimedia elements. It has both a descriptive and quantitative component. The descriptive component is visually based, with extensive use of the recent astronomical imagery. The quantitative component involves a series of problem-solving modules. These modules permit the student to carry out elementary calculations relevant to our interpretation of astronomical phenomena.

Note(s): Only offered through Distance Education. For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion(s): PHE260
Contact Hours: 0 - 0 - 9
Credit(s): 1

PHE205 Mechanics

Oscillatory motion is studied including: undamped and damped harmonic motion, forced harmonic motion and resonance, damped forced oscillations, standing and progressive waves, conditions for static equilibrium in two and three dimensions, and introduction to fluid statics and fluid dynamics.

Note(s): There is a lab associated with this course.
Prerequisite(s): PHE104
Corequisite(s): MAE226
Semester: Usually Offered in the Fall & Winter
Contact Hours: 3 - 4 - 4
Credit(s): 1

PHE217 Electromagnetism

Course in intermediate electricity and magnetism beginning with concepts of electric and magnetic field and leading to Maxwell's equations in differential and integral form. The following topics are discussed: Alternating current circuits, complex impedance, RLC circuits, electric field, electric flux density, Gauss's law, electric potential, electric polarization, dielectrics and electric boundary conditions, magnetic field, magnetic flux density, magnetic vector potential, Biot-Savart law, Ampere's law, magnetic dipole, magnetization and magnetic boundary conditions, Faraday's law, displacement current, and Maxwell's equations in their final integral and differential forms. There is a lab associated with this course.

Prerequisite(s): PHE104 and MAE226
Contact Hours: 3 - 4 - 4
Credit(s): 1

PHE225 Modern Physics

Concepts in physics developed from 1900 are discussed including: relativistic kinematics and dynamics, space and time, Doppler effect, momentum and energy, particle aspects of electromagnetic radiation, wave aspects of particles, Rutherford and Bohr models of the atom, development of the Schrodinger equation, application of the Schrodinger equation to a particle in a box and finite potential wells, and tunnelling. Models of the single and many electron atoms, molecules, nuclear structure and energetics of reactions. Radioactivity: alpha and beta decay, gamma emission.

Note(s): There is a Lab associated with this course.
Prerequisite(s): PHE104
Corequisite: MAE226
Contact Hours: 3 - 4 - 4
Credit(s): 1

PHE226 Modern Physics

This course is identical to PHE225 except students do not take the experimental physics lab.

Prerequisite(s): PHE104
Corequisite(s): MAE226
Contact Hours: 3 - 1 - 4
Credit(s): 1

PHE228 Electromagnetism

High level introduction to electromagnetism formulating the fundamental laws (Maxwell's Equations) in both integral and differential form, in vacuum and in material media. Major topics include: Gauss's law, electric potential, electric dipole, polarization, electric boundary conditions, Poisson's and Laplace's equations, electrostatic boundary-value problems, Biot-Savart law, Ampere's law, Maxwell's equations for static EM fields, magnetic vector potential, magnetic forces, the Hall effect, magnetization, magnetic materials, magnetic boundary conditions, magnetic circuits and magnetic energy.

Prerequisite(s): PHE104 and MAE226
Contact Hours: 3 - 2 - 5
Credit(s): 1

PHE252 Marine Remote Sensing

A survey of the satellite remote sensing of the ocean in the visible, thermal infrared and microwave regions of the electromagnetic spectrum. The source will focus on the underlying physics of the imaging process, the sensors and satellites used to exploit these processes, the derivation of basic geophysical and biophysical properties from the satellite data and imagery, and the integration of these properties into products useful for both strategic and tactical operations in oceanic regions of interest to the Canadian Forces. The course contains computer laboratory exercises in basic satellite image processing using both commercial scientific software, and software packages specific to maritime operations in the CAF.

Note(s): 2 week intensive short course: 3 or 4 lecture hours, 2 lab hours per day for 10 days.
Prerequisite(s): Permission of the Department
Contact Hours: 36 - 20 - 0
Credit(s): 1

PHE255 Introduction to Space Science

Review of the history of space exploration and exploitation with emphasis on Canadian contributions and CAF uses. Overview of satellite mission types, content of near-Earth space. Physical characteristics of the space environment, solar activity, impact on hardware and human function; satellite design considerations. Basic physics of satellite orbits and manoeuvres. Interpretation of orbital ground tracks. Surveillance of space. Elements of space missions, satellite systems and subsystems: structure, electrical power, thermal control, propulsion and altitude control. Systems: sensors, telemetry, surveillance, navigation, meteorology, and remote sensing. Military and scientific satellite systems, and launch systems.

Prerequisite(s): High School leaving Physics
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE260 Astronomy and the Evolving Universe

The course will discuss an understanding of our place in the Universe. Topics to be covered will include: solar system and its constituents, basic properties and evolution of stars and star systems, past, present and future structure of the Universe and topics of current interest.

Note(s): For Arts students only. This course cannot be applied to a degree in Science or Engineering.
Exclusion(s): PHE203
Contact Hours: 3 - 0 - 6
Credit(s): 1

PHE270 Introduction to Oceanography

Broad overview of ocean climate at a level suitable for the non-physics student. Course begins with an introduction to plate tectonics and ocean topography, followed by an examination of how the unique properties of seawater and their controlling budgets lead to the formation of distinct water masses, drive the global surface and deep-water circulation, and control the characteristics of sea ice, and ice climatology. Discussions focus on periodic phenomena (waves and tides) and coastal waters, including a regional description of the tides and currents, water masses and, where applicable, ice climatology specific to the Pacific, Arctic, and Atlantic Coasts of Canada.

Note(s): Only offered through Distance Education .
Contact Hours: 0 - 0 - 9
Credit(s): 1

PHE280 Physics of Armaments

A brief history of the role of Physics in the development of weapons: ancient times, modern wars, and nuclear times. Will receive special emphasis: ballistics, detonation, missiles, laser, radar, nuclear weapons receive special treatment, including nuclear principles, and the destructive and radiation effects of nuclear bombs. Certain aspects, such as ballistics and missiles, will be treated with the help of simulation computer programs.

Contact Hours: 3 - 0 - 6
Credit(s): 1

PHE290 The Physics of Music

Introduction to the physics of music including: physical principles of vibrating systems, waves and resonance, physics of perception and measurement of musical sounds, hearing, intensity, loudness levels, tone quality, frequency and pitch, combination tones and harmony. Physical acoustics of musical instruments; string, brass, woodwind, percussion and keyboard instruments. Musical scales and temperament, auditorium and room acoustics.

Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 300-399

PHE300 Modern Physics

Atomic Physics: hydrogen atom, exclusion principle, electronic structure of atoms and the periodic table, atomic Spectra, and the Zeeman Effect.

Molecular Physics: Ionic and covalent binding, rotational and vibrational energies, and molecular spectra.

Nuclear Physics: Nuclear stability and binding energy, radioactivity, nuclear reactions, fission and fusion.

Statistical Physics: Classical and quantum distribution functions, Maxwell velocity distribution in classical gases, equipartition theorem, Blackbody radiation, electron gas, degenerate fermion and boson gases, and specific heat of solids and gases.

Prerequisite(s): PHE225
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE302 Electromagnetic Waves

This course develops Maxwell's equations in differential form, and proceeds directly to the Helmholtz equation, describing the wave propagation of electromagnetic fields. Electromagnetic waves are studied in free space, lossy media, conductors, and dielectrics, with particular attention to power transfer (Poynting vector), and the reflection and transmission of waves at interfaces (Fresnel equations). Propagation along waveguides and transmission lines are studied in detail. The modes of propagation in rectangular waveguides (transverse electric and transverse magnetic) are analyzed in terms of field amplitudes, phases, and attenuation. The guiding of waves along a transmission line is analyzed in terms of the propagation constant, characteristic impedance, input impedance, standing wave ratio, and power. Various applications of transmission lines are examined.

Prerequisite(s): PHE217 or PHE228
Corequisite(s): MAE325
Contact Hours: 3 - 1 - 3
Credit(s): 1

PHE304 Quantum Mechanics

Postulates of quantum mechanics, the Schrédinger equation, operators, eigenfunctions and eigenvalues, superposition and stationary states, the one-dimensional square well, time independent perturbation theory, hydrogen atom, energy levels, angular momentum, magnetic moment, Stark effect, Zeeman effect, He, electron spin, Hartree-Fock approximation, Slater determinants, many electron atoms, LS coupling, jj coupling, spectroscopic notation, electronic structure and Hund's rule, and periodic table.

Prerequisite(s): PHE225
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE305 Classical Mechanics

Newton's laws, applications, calculus of variations, Lagrangian and Hamiltonian formulation, central force motion, Kepler's laws, collisions, Rutherford scattering, rotating coordinate systems, Coriolis force, rigid body motion, inertia tensor, and Euler's equations.

Prerequisite(s): PHE205
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE307 Optics

Propagation of light rays in an optical system using ray matrices, light as an electromagnetic wave, polarization, linear, circular, and elliptical. Superposition, interference, thin films, Michelson interferometer, coherence: spatial and temporal, diffraction, Huygens approximation, Fraunhofer diffraction, Fourier optics, and applications. These concepts are rendered tangible by a relevant choice of laboratory experiments.

Prerequisite(s): PHE302
Contact Hours: 2 - 2 - 3
Credit(s): 1

PHE332 Instrumentation I

Transfer functions, Bode Plots, passive filters, periodic signals, Fourier Transforms, A/D conversion, sampling and Nyquist Theorems, ultrasonic waves and imaging.

Laboratory:

Use of common laboratory instruments, amplitude and phase measurements, passive filter construction, ultrasonic wave measurement, and synthetic aperture image production.

Prerequisite(s): PHE217
Contact Hours: 2 - 2 - 3
Credit(s): 1

PHE333 Instrumentation II

Operational amplifiers, active filters, op-amp circuits for computation, signal conditioning, convolution, sensor physics, light and temperature sensors, and instrument design.

Laboratory:

Introduction to Electronics Workbench, investigation of operational amplifiers and their applications, time and frequency domain filtering, properties of light and temperature sensors, design and construction of automated measurement systems.

Prerequisite(s): PHE332
Contact Hours: 2 - 2 - 3
Credit(s): 1

PHE350 Orbital Mechanics

Newton's laws, two-body problem in a central force field, orbit calculations, motion of an artificial satellite, orbit insertion, orbit transfers, and perturbations.

Prerequisite(s): PHE104 and MAE226
Contact Hours: 3 - 0 - 4
Credit(s): 1

PHE352 Astronomy

Introduction to fundamental concepts of astronomy and the application of astronomical techniques to space operations. Electromagnetic spectrum, measurements and distances. Earth, moon, solar system, stellar structure and evolution, and galactic structure.

Corequisite(s): MAE101 and PHE104
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE355 Space Science Concepts and Applications

Application and exploration of concepts from orbital mechanics (orbits, instantaneous field-of-view, ground station visibility, link time) and mission geometry using Satellite Tool Kit. Concepts of space situational awareness, space surveillance data acquisition and analysis. Elements of space missions: intermediate subsystem concepts with basic analysis. Satellite lab. Basics of mission design. Astrodynamics, orbit maintenance and station-keeping. Navigation, satellite dynamics, attitude control. Navigation lab. Payloads and payload concepts.

Prerequisite(s): PHE255, PHE350
Contact Hours: 2 - 2 - 3
Credit(s): 1

PHE362 Ideas and Concepts of Modern Physics

Introduction to the conceptual structure of modern physics and will include the following topics: concept of fields as introduced in electromagnetism, evolution of the statistical description of matter, ideas of relativity, introduction of the quantum hypothesis and its development, quantum interpretation of matter and the impact of the new concepts on contemporary thought.

Prerequisite(s): PHE102 or equivalent
Contact Hours: 3 - 0 - 6
Credit(s): 1

PHE364 Physics Laboratory

This laboratory course is designed to increase the familiarity of the students with physical experimentation. Students are expected to perform a variety of different experiments in solid state physics, optics, and space physics.

Prerequisite(s): PHE205 and PHE225 or PHE217
Contact Hours: 0 - 4 - 1
Credit(s): 1

PHE370 Introductory Synoptic Oceanography

General introduction to the oceans. The principal topics covered are: a survey of the physical properties of sea water, distribution of salinity, temperature, etc.., and their seasonal variations; circulation of the oceans;,energy budgets, oceanographic instrumentation and measurement techniques, and underwater sound velocity distributions resulting from temperature and salinity variations.

Prerequisite(s): PHE104
Exclusion(s): PHE270
Contact Hours: 3 - 0 - 6
Credit(s): 1

Courses 400-499

PHE403 Solid State Physics

Crystal structure, Bragg scattering and reciprocal space, bonding in solids, lattice vibrations and the specific heat of solids, energy bands, electrical and thermal conduction in solids, semiconductors, dielectric and optical properties of solids, and magnetic properties of solids.

Prerequisite(s): PHE304
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE412 Advanced Electromagnetic Theory

Various topics in electromagnetic theory are investigated in detail. Electrostatic fields are studied with attention to continuous charge distributions, the electric dipole, electric potential, polarization and boundary conditions. Magnetic fields, magnetic dipoles, and the magnetization of materials are described in terms of the magnetic vector potential. Further topics in magnetism include magnetic torque, magnetic moment, and magnetic boundary conditions. Time varying fields are shown to lead a "displacement current" in Ampere's Law, yielding the final form of Maxwell's equations. Antenna theory is developed for simple geometries, including those of the Hertzian dipole, the half-wave dipole, the quarter-wave monopole, and the small antenna loop. Other topics in antenna theory include: antenna characteristics, arrays, effective area, and radar.

Prerequisite(s): PHE302
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE413 Nuclear Physics

Nuclear constituents and Rutherford scattering, evidence of the nuclear force, deuteron, binding energy and the semi-empirical mass formula, nuclear stability, single-particle shell model, beta and alpha decay, gamma ray emission, fission and fusion, qualitative aspects of particle physics and quark and lepton nomenclature.

Prerequisite(s): PHE304
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE415 Advanced Quantum Mechanics

The three dimensional square well, harmonic oscillator, zero point energy, Hermite polynomials, creation and annihilation operators, time dependent Schrédinger equation, time evolution of states and operators, Ehrenfests's principle, time dependent perturbation theory, transitions, selection rules, Fermi's golden rule, and scattering.

Prerequisite(s): PHE304
Corequisite(s): MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE420 Senior Project

The object of this course is to provide students with an opportunity to be involved in a project which requires them to assimilate knowledge gained from a variety of sources and apply it to a specific, well-defined problem. A formal report is required for presentation in the Winter Term, along with a prototype apparatus, if appropriate. Students are encouraged to seek out projects from any of the Science or Engineering Departments.

Prerequisite(s): Honours Physics or permission of department
Contact Hours: 0 - 4 - 6
Credit(s): 2

PHE440 Selected Topics in Physics

This course will consist of two topics selected annually by the class from among the following: the physics of plasmas, statistical physics, low temperature physics, applied acoustics, introductory astrophysics, optical properties of solids, and other topics.

Note(s): Permission of the department required.
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE442 Introduction to Astrophysics

The object of this course is to apply our knowledge of physics to obtain an understanding of astrophysical phenomena. The topics to be covered would be selected from: Observational Astronomy, Stars and Stellar Evolution, Galaxy Formation and Evolution, Observational Cosmology, Theory and Chronology of Big Bang, and Model of the Universe.

Prerequisite(s): PHE225
Contact hours: 3 - 0 - 4
Credit(s): 1

PHE445 The Physics of the Space Environment

Comprehensive introduction to the physical phenomena that result from the interaction between the sun and the earth. Examination of the basic processes of plasma physics and how it relates to the earth's neutral atmosphere and ionosphere. Detailed study of the relevant transport equations and related coefficients, wave and chemical processes, energy deposition and transfer mechanisms.

Prerequisite(s): PHE302
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE448 Spacecraft Mission Analysis and Design

Lectures and research assignments in the first term, and spacecraft design for a proposed space mission in the second term by the students working in teams. The teams are to submit a detailed report covering all aspects of the spacecraft design. This course fulfils the thesis requirement for an Honours degree. The proposed space mission is normally varied each year.

The lectures and research assignments will cover various aspects of a typical spacecraft mission such as: system design; orbital mechanics and propulsion; spacecraft subsystems - power, thermal, communications, attitude; risk management and reliability.

Note(s): This course satisfies the Honours degree thesis requirement.
Prerequisite(s): PHE355. Honours Space Science or permission of instructor.
Contact Hours: 0 - 4 - 6
Credit(s): 2

PHE450 Space Communications and Navigation

Introduction to communication between spacecraft and ground stations. Students are introduced to antenna theory: dipole antenna, antenna gain, antenna patterns, directivity and signal strength.

The theory is then applied to modulation, transmission, propagation, reception and demodulation of signals between the ground and a satellite. Fundamentals of ionospheric effects, frequency bands, communication link equations and telemetry are covered.

Space based navigation systems are examined. Topics include positioning using RF Doppler and GPS positioning. Precision navigation and surveying, personal communication systems as well as search and rescue systems are also examined. Satellite tracking is discussed.

Prerequisite(s): PHE302
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE451 Senior Physics Laboratory

A continuation of PHE364B including experiments in magnetism, Mössbauer spectroscopy, applied optics and nuclear science.

Prerequisite(s): PHE205 and PHE225 or PHE217
Contact Hours: 0 - 4 - 2
Credit(s): 1

PHE452 Remote Sensing

This course provides a foundation for the theory and applications of remote sensing of the earth's surface from space. Optical, infra-red and passive and active microwave sensing systems are examined from basic electromagnetic principles, through expected surface responses and atmospheric effects, to modern satellite systems utilizing these systems. Techniques of digital image processing are developed in the context of satellite imagery. Applications of remote sensing technology to terrestrial and marine environments are discussed, highlighting topics of interest to the Canadian Forces.

Lecture material is supplemented with weekly computer laboratory exercises in image processing and in the examination of different types of satellite imagery.

Prerequisite(s): PHE302
Corequisite(s): MAE325
Contact Hours: 3 - 2 - 4
Credit(s): 1

PHE460 Computational Physics

Introduction to the solution of problems in Space Science and Physics using computational techniques. Topics will be selected from dynamics (numerical integration), data modeling and analysis (interpolation, regression), boundary value solutions, and other relevant areas.

Prerequisite(s): PHE302
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE462 Statistical and Thermal Physics

Introduction to classical and quantum statistical ensembles. Boltzmann, Fermi and Bose distributions: ideal gases, statistical fluctuations. Principles of thermodynamics. First, second and third laws of thermodynamics, equilibrium, entropy with applications to space plasmas and solid state physics.

Prerequisite(s): PHE225
Contact Hours: 3 - 0 - 3
Credit(s): 1

PHE470 Physical Oceanography

The physics of the circulation of the world ocean is investigated. The principal topics covered include: the primitive equations of motion, geostrophy, baroclinic and barotropic flows, wind-driven currents (Ekman spiral), vorticity, western intensification and the thermohaline circulation. Familiarity with differential equations is recommended.

Prerequisite(s): PHE104 and MAE325
Contact Hours: 3 - 0 - 3
Credit(s): 1

Undergraduate Civil Engineering Programme

Programme of Study

Accreditation

The baccalaureate degree programme in Civil Engineering is accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers.

Course of Study

The prescribed course of study for Civil Engineering is set out in the Programme Outline Tables listed below. The student must review the course descriptions to see if they have the preconditions to register in specific courses. Students must have the required prerequisites or the agreement of the Department.

Programme Requirements

B.Eng. Civil Engineering

A 51.5 credit programme, including the core courses for engineering programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100	ENE100	HIE207	HIE203
	PSE103	(**cont'd**)	MAE226	POE205
	CSE101	MAE119	PHE205	MAE209
	CCE101	GEE167	CEE215	MAE227
	MAE101	CCE101	CEE265	GEE231
	PHE104	(**cont'd**)	GEE293	CEE235
		MAE101		GEE291
		(**cont'd**)		
		PHE104		
		(**cont'd**)		
Semester total	**6 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301	CEE305	HIE289 Note for	PSE401
	CEE303	CEE311	Outline 2	HIE271
	CEE317	CEE313	CEE405	CEE485
	CEE355	CEE319	CEE415	CEE493
	CEE360	CEE343	CEE493	(**cont'd**)
	CEE385	CEE363	CEE417	**Optional**
	MEE315	Note1	CEE443	Note3
		CEE387	CEE457	2 credits
		CEE393		
		Note1		
Semester total	**7 credits**	**6.5 credits**	**7 credits**	**6.5 credits**

Note 1
The duration of the Winter Term is 12 weeks followed by a two week examination period. The two-week survey field school is held immediately after the examinations.

Note 2
POE289 can replace HIE289.

Note 3
Two optional courses to be selected from:

- CEE413: Prestressed Concrete
- CEE419: Advanced Military Engineering
- CEE445: Hydraulic Structures and Systems
- CEE451: Applied Hydrogeology
- CEE459: Geotechnical Engineering
- CEE460: Introduction to Geosynthetics in Geotechnical Engineering
- CEE462: Advanced Geomatics Design and Analysis
- CEE489: Transportation Planning ***(available in English only)***

Laboratories and Equipment

Introduction

The laboratory experiments and exercises are designed to provide the students with practical experience in handling field, office and laboratory equipment used in the civil engineering profession. The teaching laboratories provide equipment to permit groups of three or four students to conduct experiments in structural engineering, soil mechanics, pavement materials, asphalt technology, hydrology, water supply, wastewater treatment, and environmental engineering; and to conduct exercises in surveying, photogrammetry and traffic engineering. The Department's equipment includes:

Structural Engineering
Six electronic data acquisition systems with PC's; MTS loading system with 1000 kN, 500 kN, 2 @ 250 kN, 100 kN and 50 kN capacity pistons; various reaction frames including one 1000 kN 4 column load reaction frame; numerous universal testing machines of 900 kN, 600 kN, 250 kN and 100 kN capacities and one 810 MTS 250 kN unit; one impact tester, four bench torsion testing instruments; three bench tension testing instruments; one electric concrete mixer; one screening plant; one vibrating table; one 1350 kN concrete cylinder testing machine; two environment-controlled rooms.

Geotechnical Engineering
Soil testing drive rods and sampling spoons; Atterberg limit testing devices; sieves, hydrometers, and specific gravity apparatus; standard and modified Proctor compaction apparatus; Harvard miniature compaction apparatus; CBR equipment; consolidometers; unconfined, direct shear and triaxial test apparatus; seismic refraction surveying apparatus; computerized electronic data acquisition systems; temperature & humidity controlled chamber; rigid and flexible wall permeaters; pressure plate and pressure membrane extractors; 50,000 kg shaking table.

Transportation Engineering
Apparatus for solubility, specific gravity, flash point, penetration, distillation, viscosity and ductility tests for bituminous materials, Marshall asphalt test equipment. Los Angeles abrasion machine, polished stone value machine, portable skid-resistance tester and extensive equipment for testing road aggregates. Traffic counters and associated equipment.

Environmental Engineering
Instruments to determine water pH, turbidity, colour, specific ion concentration and bacteriological quality; balances; instruments for pollution studies including colorimetric and spectrophotometric devices; apparatus for wastewater analysis including BOD, COD, nutrient enrichment and toxicity, temperature controlled rooms; atomic absorption spectrophotometer with flame and furnace for trace metals analysis; TOC analyzer; two ion chromatographs; three gas chromatographs, mass selective detector, to scan samples for organic contamination; neutron activation for metal analysis. Instruments to study pipe flow, open channel flow, ground water flow and hydrological phenomena. Laboratory and field equipment for vadose zone and groundwater investigations. Laboratory and field equipment for surface water quality and ecological studies.

Geomatics
Real-time and post-analytical differential GPS receiver equipment; total station, electronic and optical surveying equipment; photogrammetric stereoscopes and parallax measurement equipment.

Undergraduate Civil Engineering Courses

Courses 200-299

GEE231 Introduction to Mechanics of Materials

Topics include a review of statics; stress and strain in axially loaded members; elastic torsion of circular members; bending stresses in beams; axial force, shear and bending moment diagrams; shearing stresses in beams; compound stresses; principal stresses; plane stress; combined loading.

Laboratory exercises include: tension, torsion, and bending tests.

Prerequisite(s): PHE104
Semester: Usually Offered in the Winter
Note(s): For students of the Second Year taking Engineering.
Contact Hours: 3 - 2 - 4
Credit(s): 1

CEE215 Introduction to Problem Solving and Civil Engineering Design

Introduction to fundamental engineering skills and application of engineering science and mathematics content to civil engineering problems. The course introduces the basics of the problem solving process including problem definition and scoping, idea generation techniques, modelling, experimentation and measurement, and multi-criteria decision making. The course introduces concepts of engineering design to create workable solutions to open-ended complex problems using standard design methods and tools. The course introduces the concepts of personal learning styles, teamwork, technical communication, laboratory data collection and analysis, design methodologies, and workplace safety. At the end of the course students will be able to apply engineering design principles to solve practical problems.

Corequisite(s): CEE265
Semester: Usually Offered in the Fall
Note(s): For students of the Second Year taking Civil Engineering.
Contact Hours: 2 - 2 - 4
Credit(s): 1

CEE235 Introduction to Earth Sciences

Fundamentals of physical and structural geology. Mineral and rock identification and classification. Introduction to hydrogeology (occurrence, flow and quality of groundwater). Geological and Engineering aspects of soils in cold regions.

Note(s): For students of the Second Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Semester: Usually Offered in the Winter
Credit(s): 1

CEE265 Computer Aided Design in Civil Engineering

This course continues the study of engineering graphics and its use in civil engineering design and construction. Students will produce 3-dimensional models and conventional engineering drawings. Students will be introduced to topography, architectural and structural drawings. Students will complete conceptual designs of civil engineering systems and apply modern Computer Aided Design (CAD) and Building Information Management (BIM) software. Engineering codes and limit states design are introduced and loads will be calculated according to the National Building Code of Canada. By the end of this course, students will be able to prepare drawings for Civil Engineering projects and calculate loads required for Civil Engineering design.

Prerequisite(s): GEE167
Semester: Usually Offered in the Fall
Note(s): For students of the Second Year taking Civil Engineering.
Contact Hours: 1 - 2 - 3
Credit(s): 1

Courses 300-399

CEE303 Strength of Materials

Review of statics; two and three-dimensional linear elasticity; bar and beam equations; various beam equations and analysis of beam-columns; nomographs; introduction to plasticity; yield criteria.

Prerequisite(s): GEE231, MAE227
Semester: Usually Offered in the Fall
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE305 Structural Theory

Loads according to the National Building Code of Canada, structural systems and load transfer, superposition principle; work and energy; virtual work, unit load method, method of consistent deformation; influence lines; slope deflection method; and approximate methods for lateral and gravity loads.

Prerequisite(s): CEE303, CEE317
Semester: Usually Offered in the Winter
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE311 Engineering Materials and Introduction to Steel and Timber Design

Topics include: mechanical properties of steel, fatigue, brittle fracture, residual stresses, welding types and properties of steel construction .

Steel design is introduced by topics such as limit state design; design of tension members, beams, compression members, and the design of beam columns.

Timber design includes the property, use and preservation of timber; design of tension members, beams, columns, and connections.

Prerequisite(s): CEE303, CEE265
Semester: Usually Offered in the Winter
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE313 Introduction to Concrete and Reinforced Concrete Design

This course introduces concrete technology and limit states design for reinforced concrete structures. Students will design and prepare mixes in the laboratory, study the effects of admixtures and carry out laboratory tests to assess concrete strength and quality. Students will analyse and design reinforced concrete rectangular and T-beams for both flexure and shear. Students will fabricate and test reinforced concrete beams in the laboratory to fully understand the influence of reinforcement on the beams' behaviours. By the end of this course, students will be able to analyse and design determinate concrete beams.

Prerequisite(s): CEE303, CEE265
Semester: Usually Offered in the Winter
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 2 - 2 - 4
Credit(s): 1

CEE317 Civil Engineering Analysis I

Ordinary differential equations that apply to Civil Engineering problems are derived. Problems studied include: structural vibration and beam deformation.

Concepts of linear algebra are applied to structural analysis.

Statistical analysis of data will also be studied.

The course is intended to develop the students' abilities in the application of the computer to Civil Engineering problems. A significant proportion of the course will entail computer use.

Prerequisite(s): GEE231, MAE119, MAE227
Semester: Usually Offered in the Fall
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 1 - 2 - 3
Credit(s): 1

CEE319 Civil Engineering Analysis II

This course represents a direct continuation of course CEE317 and simply extends the range of problems considered, whilst following the same approach of mathematical formulation, numerical solution and computer applications.

Prerequisite(s): CEE317, CEE355, CEE303
Semester: Usually Offered in the Winter
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 2 - 1 - 3
Credit(s): 0.5

CEE343 Hydrology

Students will be introduced to the hydrologic cycle, rainfall/runoff relationships, and unit hydrograph theory. Statistics and advanced probability concepts will be discussed and applied for solution of practical problems in hydrology. Hydrologic and hydraulic routing techniques will be introduced and applied for design applications addressing storm sewer collection systems, storm water management facilities and low-impact-development measures. The fundamental ground water flow equations will be developed and applied. Principles of drinking water and wastewater flow rates estimation will be discussed. Numerical models such as HEC-HMS and EPA SWMM will be introduced and used for preliminary design exercises. At the end of the course, students will be able to estimate and predict flow at specific locations of a watershed for given hydrologic conditions and complete preliminary designs of storm water management facilities.

Prerequisite(s): MEE315
Semester: Usually Offered in the Winter
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 3 - 1 - 4
Credit(s): 1

CEE355 Soil Mechanics

Physical properties of soils, classification, plasticity, mass-volume relationships, compaction. Seepage, in-situ stresses and effective stresses, stress distribution. Consolidation, shear strength.

Prerequisite(s): CEE235, GEE231
Semester: Usually Offered in the Fall
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE360 Introduction to Geomatics in Civil Engineering

This introductory geomatics course includes the following topics: surveying principles, error analysis, instrument checks and calibrations, measurements, detail surveys, Geographical Information Systems (GIS), route construction surveys and Global Positioning Systems (GPS). Equipment used by students includes levels, theodolites, total stations, and GPS receivers. The use of Computer Aided Design (CAD) and GIS software augments the design portion of the course content. Upon completion of this course, students will be able to design and implement surveying strategies in support of civil engineering design projects.

Prerequisite(s): MAE209
Semester: Usually Offered in the Fall
Note(s): For students of the 3rd Year taking Civil Engineering.
Contact Hours: 1 - 3 - 4
Credit(s): 1

CEE363 Survey Field School

During this course, students plan and conduct simple horizontal and vertical control networks for the production of detail and construction surveys. Activities include: laying out circular, spiral and vertical curves; calculating earthwork volumes (cut/fill); producing topographic maps; and collecting data for input into a geographic information system.

Upon completion of this course, students can plan and carry out geomatics projects to meet civil engineering needs. These abilities will be put to immediate use during the third year civil engineering project following this course.

Two weeks duration, following Winter Term examinations

Prerequisite(s): CEE360
Semester: Usually Offered in the Winter
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 10 - 30 - 40
Credit(s): 1

CEE385 Introduction to Environmental Engineering

Concepts of water chemistry, toxicity and water quality will be introduced. Fundamentals of typical water and wastewater treatment plants will be presented. Water quality impacts associated with wastewater discharges will be investigated, with particular emphasis on dissolved oxygen. Municipal solid and hazardous wastes treatment and disposal options will be introduced. Common approaches to environmental assessment and risk assessment for engineering projects will be studied. Recent developments with regard to climate change and renewable energy alternatives will be discussed. Extensive use of case studies will be made for illustration purpose and will include field trips to local sites of interest. At the end of the course, the student will be able to identify water and air quality parameters, select appropriate treatment or disposal options for water and wastewater, and design a environmental assessment program.

Prerequisite(s): CCE101
Semester: Usually Offered in the Fall
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 2 - 1 - 3
Credit(s): 1

CEE387 Highway Design

Classification of soils as pavement subgrades, compaction, drainage, frost susceptibility and frost action. Introduction to analysis of stresses and strains in layered systems. Concept of pavement failure, road materials - aggregates, binders, bituminous mixtures. Function and composition of pavement layers. Stabilization. Introduction to methods of design of rigid and flexible pavements. Geometric design of roads and intersections.

Prerequisite(s): CEE355
Semester: Usually Offered in the Winter
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE393 Civil Engineering Field School

This course is designed to provide civil engineering students with an opportunity to gain relevant experience associated with practical applications of civil engineering principles, analysis and design. Under the supervision of teaching and technical staff from the civil engineering department, students study relevant problems raised by organizations within the Canadian Forces and/or other sponsors requiring civil engineering support. The students plan and execute sub-disciplined civil engineering tasks (i.e. geomatics, environmental, structural, geotechnical etc..) for an actual client. Activities associated with this course include: project planning, data collection, data interpretation, project design and the preparation and presentation of an engineering report on their work for the client. Upon completion of this course, students will have obtained relevant experience within a sub-discipline of civil engineering and will have been exposed to the very real issues associated with the conduct and delivery of a civil engineering assessment or design project.

One week duration following CEE363: Survey Field School

Corequisite(s): CEE363
Semester: Usually Offered in the Winter
Note(s): For students of the Third Year taking Civil Engineering.
Contact Hours: 10 - 30 - 0
Credit(s): 0.5

Courses 400-499

CEE403 Introduction to Concrete and Reinforced Concrete Design

This course provides an overview to the design of reinforced concrete buildings. Continuity in concrete construction for beams, one-way continuous slab design and development length of reinforcement are introduced. Students will analyse the effect of loads in multi-story buildings and design two-way slab systems, columns and footings. Modern concrete design software will be introduced. By the end of this course, students will produce a preliminary design of a multi-storey reinforced concrete building.

Prerequisite(s): CEE303
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE405 Structural Analysis

Stiffness method: plane and space trusses; beams; plane and space frames; grids. Finite element method: beams and trusses; triangular and quadrilateral elements for plane stress, plane strain and plates.

Application of in-house and commercial structural analysis programs.

Prerequisite(s): CEE305, CEE319
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE413 Prestressed Concrete Design

This course provides an overview to the design of prestressed concrete structures. Prestressing techniques and materials will be considered. The behaviour, analysis and design of both pretensioned and post-tensioned concrete systems for bridges and buildings including simply-supported and continuous beams and two-way slabs will be studied. Prestress losses and deflections will be calculated. Modern prestressed concrete design software will be introduced. By the end of this course, students will produce a preliminary design of a prestressed concrete structure.

Prerequisite(s): CCE415
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE415 Reinforced Concrete Design

This course provides an overview to the design of reinforced concrete buildings. Continuity in concrete construction for beams, one-way continuous slab design and development length of reinforcement are introduced. Students will analyse the effect of loads in multi-story buildings and design two-way slab systems, columns and footings. Modern concrete design software will be introduced. By the end of this course, students will produce a preliminary design of a multi-storey reinforced concrete building.

Prerequisite(s): CEE313
Corequisite(s): CEE405
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE417 Steel Design

Topics include: connections; plate girders, composite structures, steel bridges, and P-Delta effects in steel structures. Term projects include: design of bridges, industrial buildings and task structures.

Prerequisite(s): CEE311
Corequisite(s): CEE405
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 1 - 4
Credit(s): 1

CEE418 Management of Design and Construction of Structures

Structural building systems and bridge systems. Construction Materials and loadings. Conceptual/Preliminary Design. Government Requirements/Regulations/Guides and Codes. Design Team/Process/ Professional Obligations. Mech/Elect Building Systems. Construction - Process, Equipment, Planning.

Prerequisite(s): CEE405, CEE415, CEE417, GEE293
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth year taking Civil Engineering
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE419 Advanced Military Engineering

Field assessment of structures/damaged structures. Military Load Classification of Bridges; Design against blast loading and basic fortification design. Design of slab on grade.

Prerequisite(s): CEE313, CEE405, CEE417
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE443 Urban Hydraulics

Review of principles of fluid mechanics, and of flow rates estimation. Study of flow in pressure conduits. Presentation of urban water supply and distribution systems design techniques. Study of open channel flow. Presentation of sewage and storm water collection systems design techniques.

At the end of the course, the student should be able to calculate the conduit or channel dimension required to carry a given flow rate under specified conditions.

Prerequisite(s): CEE343
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 2 - 1 - 3
Credit(s): 1

CEE445 Hydraulic Structures and Systems

Design of hydraulic retention structures. Study of the forces induced by flow. Application examples to culverts, bridge piles, dams, reservoirs and port facilities. Control structures such as gates and weirs.

Prerequisite(s): CEE443
Contact Hours: 3 - 2 - 5
Credit(s): 1

GEE451 Applied Hydrogeology

Groundwater and hydrologic cycle. Aquifer and aquitard. Hydraulic head and piezometers. Subsurface movement of water. Darcy's law. Permeability values and measurements. Groundwater flow net. Pumping test: transient flow, steady state, boundary effects, leaky aquifers. Factors affecting water levels. Geochemistry. Groundwater quality. Contaminant fate and transport. Treatment methods and barriers. Modeling techniques. Groundwater exploration and management. Artificial recharge. Saltwater intrusions. Problems and applications.

Prerequisite(s): GEE235, CEE319, CEE355
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth year taking Civil Engineering
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE457 Foundations, Earthworks and Slope Stability

Bearing capacity; analysis and design of shallow and deep foundations; settlements, soil-structure interaction. Earth pressure theories; analysis and design of rigid, flexible and braced retaining structures. Slope stability; analysis and design of cuttings and embankments, performance of natural slopes. Construction methods. Site investigation.

Prerequisite(s): CEE355, CEE319
Semester: Usually Offered in the Fall
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1.5

CEE459 Geotechnical Engineering

A case-history approach to geotechnical engineering practice. The course covers advanced design and modeling topics in geotechnical engineering including: shallow foundations, deep foundations, design using geosynthetics, propped walls and bulkheads, rock and soft ground tunnelling, slopes, culverts, geoenvironmental issues. The relationship between predicted and observed behaviour is explored.

Prerequisite(s): CEE457
Semester: Usually Offered in the Winter
Note(s): For students of the fourth year taking Civil Engineering
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE460 Introduction to Geosynthetics in Geotechnical Engineering

An introductory course for use and design of geosynthetics. The course introduces topics including geosynthetics and manufacturing processes; properties and test methods; methods of analysis and design for geosynthetics used for separation, filtration, soil reinforcement, erosion control and liquid/hazardous waste containment. At the end of the course, students will be able to design geosynthetics applications for filtration, separation and reinforcement.

Prerequisite(s): CEE457
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE462 Advanced Geomatics Design and Analysis

The focus of this geomatics course is the study of the mapping sciences. Topics include: project planning, projections, coordinate systems, remote sensing, digital image processing, photogrammetry, cartography, design of monitoring programs, least squares analysis and the adjustment of survey observations. A geomatics design project is a core course requirement. Upon completion of this course, students will be able to analyze survey network computations and use mapping science tools in order to support civil engineering design projects.

Prerequisite(s): CCE360
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 2 - 2 - 4
Credit(s): 1

CEE485 Water and Waste Water Treatment System Design

A review of relevant chemistry for water and wastewater treatment will be completed and will address inorganic and organic chemistry, acid-base concepts, and biochemistry. Relevant microbiology concepts will be presented, with particular emphasis on biological treatment processes in wastewater. Common reactor configurations and reaction rate equations will be investigated. Numerical analysis and design approaches of various physicochemical and biological treatment processes will be completed. Physiochemical process design will address screening, sedimentation, aeration, coagulation and flocculation, filtration, disinfection, and softening while biological treatment design will address aerobic and anaerobic treatment and biological reactor design. At the end of the course, the student will be able to complete preliminary designs of the main components of water and wastewater treatment facilities.

Prerequisite(s): CEE385
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 4 - 2 - 6
Credit(s): 1.5

CEE489 Transportation Planning

Characteristics of different modes of transport. The land use/urban transportation planning process. Transportation studies, data collection and analysis, demand models, forecasts. Traffic flow and capacity, level of service and freeway operations.

Prerequisite(s): CEE319
Semester: Usually Offered in the Winter
Note(s): For students of the Fourth Year taking Civil Engineering.
Contact Hours: 3 - 2 - 5
Credit(s): 1

CEE493 Civil Engineering Project

This course consists of practical projects undertaken by Fourth Year Civil Engineering students. Project topics are selected from proposals submitted by the Department of National Defence and are subject to the approval of the Department of Civil Engineering. The course consists of practical civil engineering fieldwork to be conducted after the Third Year, and an engineering design to be completed during the Fourth Year. Students are required to make oral presentations at the end of each term during the Fourth Year.

An engineering report will be submitted at the end of the course.

Contact Hours (Fieldwork): 0 - 4 - 4
Contact Hours (Fall): 1 - 2 - 3
Contact Hours (Winter): 1 - 3 - 4
Prerequisite(s): CEE265
Co-requisite(s): Appropriate 4th year courses. Topic depend on department approval.
Note(s): For students of the Fourth Year taking Civil Engineering.
Credit(s): 2

Electrical Engineering and Computer Engineering Undergraduate Programmes

General Information

Any second year course pattern in Engineering is acceptable for admission to third year Electrical Engineering provided the requisite standing in Chemistry, Mathematics and Physics is obtained.

Any second year course pattern in Engineering is acceptable for admission to third year Computer Engineering provided the requisite standing in Chemistry, Mathematics and Physics is obtained.

Accreditation

The baccalaureate degree programmes in Electrical Engineering and Computer Engineering are accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers.

Electrical Engineering Requirements

This is a 47.5 credit programme, including the core courses for engineering programmes . The course numbers which are in *"italic"* are part of the core courses for engineering programmes.

***Note:** In exceptional cases, GEE167 may be replaced by another course deemed acceptable by the Department of Electrical and Computer Engineering.*

Semester	Fall Year 1	Winter Year 1	Fall Year 2	Winter Year 2
Courses	ENE100 PSE103 CCE101 MAE101 PHE104 CSE101	ENE100 (cont'd) MAE119 CCE101 (cont'd) MAE101 (cont'd) PHE104 (cont'd) GEE167	HIE207 MAE226 GEE241 EEE243 EEE250 GEE293	HIE203 POE205 MAE209 MAE227 EEE210 EEE381 GEE291
Semester Total	**6 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall Year 3	Winter Year 3	Fall Year 4	Winter Year 4
Courses	PSE301 MAE325 EEE310 EEE331 EEE351 EEE373	HIE271 EEE307 EEE311 EEE325 2 credits Note2 GEE393	HIE289 Note1 EEE455 EEE410 EEE411 2 credits Note2	PSE401 EEE455 **(cont'd)** EEE412 EEE413 EEE414 EEE447
Semester Total	**6 credits**	**6 credits**	**5.5 credits**	**6 credits**

Electrical Engineering Note 1
POE289 can replace HIE289.

Electrical Engineering Note 2
Students must select two of the following three options:

- EEE332: Electric Power Systems (winter of year 3) and EEE449: Energy Conversion (fall of year 4)
- EEE350: Digital Design II (in winter of year 3) and EEE495: Digital Systems Architecture (fall of year 4)
- EEE374: Radio-Frequency Systems (winter of year 3) and EEE474: Radar and Electronic Warfare (fall of year 4)

Computer Engineering Requirements

This is a 48 credit programme, including the core courses for engineering programmes . The course numbers which are in *"italic"* are part of the core courses for engineering programmes.

In exceptional cases, GEE167 may be replaced by another course deemed acceptable by the Department of Electrical and Computer Engineering.

Semester	Fall Year 1	Winter Year 1	Fall Year 2	Winter Year 2
Courses	ENE100	ENE100	HIE207	HIE203
	PSE103	(**cont'd**)	MAE226	POE205
	CCE101	MAE119	GEE241	MAE209
	MAE101	CCE101	EEE243	MAE227
	PHE104	(**cont'd**)	EEE250	EEE381
	CSE101	MAE101	GEE293	EEE350
		(**cont'd**)		GEE291
		PHE104		
		(**cont'd**)		
		GEE167		
Semester Totals	**6 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall Year 3	Winter Year 3	Fall Year 4	Winter Year 4 Note1
Courses	PSE301	HIE271	HIE289	PSE401
	MAE325	EEE307	Note2	EEE457
	MAE234	EEE320	EEE457	**(cont'd)**
	EEE310	EEE325	EEE435	EEE404
	EEE351	EEE330	EEE466	EEE447
	CSE350	1 credit	EEE495	EEE469
		Note3	1 credit	EEE499
		GEE393	Note4	
Semester Totals	**6 credits**	**6 credits**	**5.5 credits**	**6.5 credits**

Computer Engineering Note 1
It is noted that, except for course PSE401 Military Professionalism and Ethics, the Winter Term of the fourth year of the Computer Engineering programme has duration of twelve weeks in order to accommodate for the CDX (Cyber Defense Exercise) as a requirement for course EEE404 Cyber Defence. The twelve week term is followed by a three-week period consisting of the two-week CDX (Cyber Defense Exercise) and a one-week exam period. Depending on CDX scheduling, the exams may take place in either the thirteenth or the fifteenth week, they will be conducted out-of-hall and they will not interfere with course PSE401.

Computer Engineering Note 2
POE289 can replace HIE289.

Computer Engineering Note 3
Students must select one optional credit from the following:

- EE210: Electronic Devices and Circuits
- CSE341: Introduction to Database Systems

Computer Engineering Note 4
Students must select one optional credit from the following:

- EEE410: Integrated Circuits Design
- EEE420: Compilers and Program Execution Environments

Laboratories and Equipment

The laboratories and offices of the department are located on the third, fourth and fifth floors of Modules 1 and 2 of the Sawyer Building (Building 69).

The department has a number of modern, well-equipped laboratories which permit the students to supplement their theoretical knowledge with practical experience. They allow the students to conduct experiments in electronics, communications and radar, energy conversion and machines, automatic control and robotics, analog simulation, microcomputers, computer networks and operating systems, 3-D graphics, VLSI system design and digital signal processing.

In addition, research rooms and facilities are provided for staff and post-graduate research. The principal research areas of the department are Communications and Radar, Automatic Control and Robotics, Power, Microprocessor applications and Embedded Computer systems, VLSI, Software Engineering and Real-Time Operating systems, with emphasis on applicability to the needs of the Canadian Armed Forces.

Undergraduate Electrical Engineering and Computer Engineering Courses

Courses 200-299

GEE241 Electrical Technology

This course provides the fundamentals of electrical engineering, with an emphasis on the generation of electrical energy, its transmission, and its use in motors and other loads. Students completing this course will be able to analyze electric circuits and will have an understanding of the essentials of electric power. Topics include: electric circuit concepts; DC and AC circuit analysis; sources of energy, including renewable energy sources such as wind and solar energy; three-phase AC circuits; ideal transformers; synchronous generators; and synchronous, induction, single-phase, and DC motors.

Prerequisite(s): PHE104
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

GEE293 Managing Engineering Projects

An introduction to the management of engineering resources, specifically time, money, and risk. Specific topics include: fundamentals of project management; scheduling; time-value of money; cash flows and equivalence; depreciation concepts and analysis; economic equipment replacement decision; effects of inflation; standards in engineering; financial and project risks, multi-criteria decision making; and, the engineer's responsibility towards employee health and safety.

Semester: Usually Offered in the Fall
Contact Hours: 3 - 1 - 6
Credit(s): 1

EEE210 Electronic Devices and Circuits

This course introduces the electronic components that are used to implement the circuits found in most electrical systems. Students completing this course will be able to design and analyze wave shaping circuits, voltage rectifiers and regulators, low-power amplifiers, and digital logic gates. The course includes a significant laboratory component in which the students build diode and transistor circuits for a variety of low-power analog and digital applications. Topics include: the junction diode; field effect transistors; MOSFETs; diode circuits; the analysis and design of single stage low-power amplifiers; small signal models; and, the static and dynamic analysis of the CMOS inverter.

Prerequisite(s): GEE241
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE243 Applied Computer Programming

Software systems frequently drive physical devices and are often complex in their own right. This course uses mobile robots as an application area to explore software design. Students completing the course will be able to design significant software programs and components in the presence of other software and hardware subsystems. Topics include: effective decomposition of software into modules; modular programming and design techniques; structured programming; the execution model for software; the software build cycle; basic data structures; the use of third-party components and underlying operating system support; rudimentary control of physical systems through high-level interfaces to digital input/output channels; and analog/digital and digital/analog converters.

Prerequisite(s): CSE101
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE250 Digital Design I

This introductory course sets the foundation for designing digital systems for a wide range of applications. It provides the basics of logic design concepts and the implementation of logic functions using modern design tools and hardware platforms. Students completing this course will be able to design digital circuits for a multitude of logic and arithmetic applications. The course includes a significant laboratory component in which students analyze, design, simulate and implement digital circuits. Topics include: number systems; boolean algebra; combinational logic; hardware description language (HDL); design of data path components and arithmetic logic unit (ALU); sequential circuit elements; design of sequential circuits; and algorithmic state machines.

Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

Courses 300-399

EEE307 Computer Interfacing Techniques

The aim of this course is to expand programming skills to the interfacing of low-level devices. Students completing this course will be able to design and implement simple interfaces to modern microcomputers or microprocessors. Interfacing theory will be studied in the classroom and reinforced by a strong laboratory component during which the students will put theory into practise. Topics include: description of the computer bus; timing analysis of buses and devices; analog-to-digital and digital-to analog conversion; serial and parallel interfaces; polling, interrupt and direct memory access input/output techniques; and interfacing to memory and other storage devices.

Prerequisite(s): EEE351
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE310 Electric Circuits

Electric circuits form the basis of all electrical and electronic equipment. Students completing this course will be able to apply the laws of circuit analysis to practical electronics and power systems problems. This course will also make use of computer simulations and electronic equipment to design, build and test several circuits. Topics include: circuit theory; circuit analysis techniques; ideal operational amplifiers and their circuits; transient analysis of second order linear circuits; transfer functions and system frequency response; application of Laplace transforms to the solution of system equations; and an introduction to passive and active filters.

Prerequisite(s): GEE241, MAE227
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE311 Signals and Systems

The concepts of signals and systems arise in a wide variety of areas, such as communications, speech and image processing, and biomedical engineering. This course deals with signals, systems, and transforms, from their theoretical mathematical foundations to practical implementation in communication systems. Students completing this course will understand transfer functions and system responses in both the time and frequency domains, and will be able to perform system modelling, analysis and design. Modern computational software and laboratory equipment are used extensively for simulation and real-time signal processing. Topics include: Fourier analysis of signals; linear systems and filters; sampling theory; filter design and implementation; probability theory, random variables, and random processes.

Prerequisite(s): EEE303 or EEE310 and MAE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE320 Object-Oriented Analysis and Design

Most modern programming languages and development approaches are based on the concept of “objects.” Students completing this course will be able to apply the object concept to the analysis and design of significant software systems. Techniques for managing complexity are introduced including data and procedural abstraction, encapsulation, hierarchy, and decomposition of problems into classes and objects. The uses of overloading, multiple inheritance and polymorphism are studied. Object-oriented analysis, design and implementation of software are practised in the context of an iterative, use case driven development process using modern software modelling tools, development environments and programming languages. Good design and design reuse are introduced through the application of design patterns.

Prerequisite(s): CSE350
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE325 Introduction to Control Systems

Feedback control is used in many applications in the military such as flight control and target tracking. This course provides the theoretical foundations of feedback control systems. Students completing this course will understand issues related to the stability of systems, be able to analyze systems and determine their performance criteria, and design basic computer control for physical systems. The course includes a significant laboratory component in which the students will analyze, design, simulate and implement control strategies for relevant military equipment such as helicopters, ground vehicles and automated tracking systems. Topics include: physical system modelling; analysis of transient and steady state responses; and compensator design.

Prerequisite(s): MAE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE330 Computer Network Design

The Internet and other major networks permit the interconnection of diverse networks, computers and mobile devices in a myriad of configurations. Students completing this course will gain an understanding of the computer network operations environment, learn to practise basic network design, and investigate how networks behave under cyber attack. The course includes a significant laboratory component in which students will design, build and analyze networks. Topics include: layers 2 - 4 of the OSI Model, circuit and packet switching; network topology; queueing and its application to networks; routing and flow control; networking equipment, including bridges, hubs and switches; and the security implications of network protocols.

Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE331 Energy Conversion

Electric motors and generators are used in daily life for energy conversion, transportation, and within industry, and hence are an important part of the field of electrical engineering. This course explains the operation of electric machines, including machines used in electric vehicles and renewable energy systems, and considers control issues for different machine types. Students completing this course will understand the basic modes of operation of electric machines, and will be able to analyze their performance. Topics include: a survey of energy conversion methods; a review of three-phase systems; magnetic laws and circuits; transformers; analysis of electromechanical systems; and DC, induction, and synchronous machines, and their principles of operation.

Prerequisite(s): GEE241 or EEE203
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE332 Electric Power Systems

Electric power systems are vital for generating, transmitting and transforming energy for industrial, military and transportation uses, and are also at the heart of alternative energy systems. This course, and its accompanying laboratory component, are based on shipboard electrical power systems, although the material presented is also applicable to aircraft and land-based systems. Students completing this course will be able to identify and address current and future electrical engineering problems related to energy sources, generation, conversion, transmission, utilization, efficiency, protection, and control of electrical power. Topics include: common aspects of power equipment; generators; electric motors; transformers; power distribution schemes; fault analysis; system protection; and power systems standards.

Prerequisite(s): EEE331
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE350 Digital Design II

Digital circuitry is changing the way we perceive and interact with our environment, as it continues to replace many of the older analog systems used in audio recording, image processing, mechanical control, etc. The aim of this course is to develop skills in designing moderately complex digital functions based on modern design tools. Students completing this course will be able to design digital systems such as a simple computer. The course includes a significant laboratory component in which students will model, simulate, synthesize, test and implement various digital systems. Topics include: hardware description language (HDL); verification techniques; programmable devices; finite state machines; synchronous systems; sequential design; and algorithmic state machines.

Prerequisite(s): EEE250
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE351 Computer Organization and Assembly Language

The aim of this course is to develop skills in assembly language programming for simple sequential computers. Students completing this course will be able to design and implement simple to moderately complex assembly language programs using a modern assembly language. Practical programming assignments will be completed during a strong laboratory component in which students will solve problems by coding in assembly language. Topics include: the microprocessor as a system building block; computer organization and interconnections; an introduction to the architecture of simple sequential computers; an introduction to assembly and machine languages; instruction sets and addressing modes; assembly language programming; and interrupts, vectors, interrupt requests and handshakes.

Prerequisite(s): EEE250 or EEE245
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE373 Signal Transmission

Electrical signals are used in computers and in communications systems to relay information. This course examines the physical properties of electrical signals and how they travel along wires and through space. Students completing this course will be able to apply the laws of electromagnetism to transmission problems, design efficient long-distance and high frequency communication links using either transmission lines or free space propagation, and understand how electromagnetic waves propagate through, and interact with, different materials. Laboratory experiments allow students to explore many signal properties. Topics include: transmission line models; signal transmission in the time and frequency domains; electromagnetic theory; plane waves; and shielding.

Prerequisite(s): PHE104 and MAE226
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE374 Radio-Frequency Systems

Radar and communication systems use high frequency signals to transmit information wirelessly through the air. This course studies the transmitter and receiver circuitry that converts data into wireless signals, and vice versa. Students completing this course will be able to explain how transmitters and receivers work, design, build and test transceiver circuitry, and estimate link budgets. The course includes a significant laboratory component in which the students will design, fabricate and test their own radio-frequency circuits. Topics include: radio-frequency network analysis; couplers; filters; amplifiers; oscillators; mixers; planar circuit technology and computer-aided design techniques; receivers and transmitters; radio links; and noise analysis.

Prerequisite(s): EEE373
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE381 Aircraft Systems and Avionics

The course is designed to acquaint the students with modern aerospace avionics systems and associated system integration issues. Topics include radar, navigation, communications and identification systems. An overview of electro optics and electronic warfare systems will follow, and electromagnetic interference and compatibility will be investigated. Aircraft power generation and distribution, flight controls, displays, vehicle and weapons management, and avionics architectures will be covered, and finally the critical role of embedded avionics software is explored. The lectures are supplemented by problem assignments, case studies of existing avionics systems, laboratory experiments and demonstrations. Examples specific to the Canadian Forces are used whenever possible.

Prerequisite(s): GEE241
Semester: Usually Offered in the Winter
Contact Hours: 3 - 1 - 4
Credit(s): 1

Courses 400-499

EEE404 Cyber Defence

Military and civilian computing systems are frequently attacked by espionage services, organized crime, and hacking groups. In this course, students will investigate the cyber threat environment, network attack, the design of network perimeter defence, and defence-in-depth. The capstone activity is a two-week cyber defence exercise at term end, organized and run by the National Security Agency, involving military college teams from Canada and the United States. Students completing this course will be able to design a defensive computer network architecture and understand the network cyber operations environment. Topics include: firewall design; deployment of intrusion detection and preventions systems; design and implementation of security policy; and identification and authentication.

Note(s): For students of the fourth taking Computer Engineering
Prerequisite(s): EEE330, EEE435, and EEE466
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1.5

EEE410 Integrated Circuits Design

Integrated circuits have made modern computation and communications possible. This course presents modern integrated circuit design concepts for both bipolar and MOS technologies, with an emphasis placed on CMOS technology. Students completing this course will be able to model, analyze, simulate and design analog and digital integrated circuits. Computer-aided design tools and laboratory exercises complement the course. Topics include: non-ideal operational amplifiers; internal circuitry of operational amplifiers; frequency response of single-stage and multistage integrated circuit amplifiers; integrated circuit biasing including current sources, current mirrors and current steering circuits; analog-to-digital and digital-to-analog converters; digital CMOS logic and memory; oscillators; multivibrators; and integrated circuit timers.

Prerequisite(s): EEE210, EEE310
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE411 Communication Theory

Communications systems are prevalent in today's world, and play an essential role in the military and in everyday life. This course explains the criteria in the design of communications systems, their implementation at a systems level, their operation and requirements. Students completing this course will be able to design communications systems, understand how a system works, and determine what kind of performance can be expected from a system. Topics include: analog and digital modulation techniques; reception techniques including matched filtering, the correlation receiver, and non-coherent detection; error performance; spread-spectrum communications; and error-control coding, including block codes, convolutional codes, and Viterbi decoding.

Prerequisite(s): EEE311
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE412 Wireless Communication Systems

New generations of wireless communication systems have the potential to provide civilian and military users with high-speed and high-quality information exchange using their portable devices such as smart phones, laptops, and tablets. This course presents the design and analysis of wireless systems and the techniques used to overcome the fundamental limits of wireless channels. Students completing this course will be able to perform design, simulation, and testing of terrestrial and satellite wireless systems. Topics include: wireless systems and standards; models of wireless channels; multipath fading, satellite orbits and link budgets; digital modulation under wireless channel impairments; multipleantenna technology; multicarrier modulation; spread spectrum; multiple access techniques; GPS; wireless sensor and ad hoc networks.

Prerequisite(s): EEE411
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE413 Digital Signal Processing

The vast and flexible processing power of computers allows signals to be manipulated in useful ways. This course applies digital signal processing (DSP) techniques to target tracking, positioning and navigation applications. Students completing this course will be able to design code and apply DSP algorithms. The course laboratory involves the design of DSP algorithms for military applications, including: GPS, portable navigation devices for dismounted soldiers, de-noising of navigation sensors, and vehicle terrain profiling systems. Topics include: sampling, quantization and data acquisition; discrete-time signals and systems; Fourier and Z-transforms; discrete-time linear time-invariant systems; finite impulse and infinite impulse response filters; and, distortion and channel equalization for mobile communications.

Prerequisite(s): EEE411
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE414 Advanced Control Systems

Control systems have made possible many applications of the modern world, ranging from the autopilot to the autonomous car, and from the turret control of warships to the operation of Unmanned Aerial Vehicles (UAVs). This course studies the design of controllers using digital computers and their application to military systems. Students completing this course will be able to design controllers on several platforms. The course includes a significant laboratory component in which students will model, analyze, design, simulate and implement controllers for various military applications. Topics include: modelling and identification of dynamic systems; design by frequency response; stability analysis; modern control techniques; and performance assessment of controllers.

Prerequisite(s): EEE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE420 Compliers and Program Execution Environments

The aim of this course is to analyze how software implemented in high-level programming languages is ultimately executed on running processors, and to explore what runtime support mechanisms are used in the execution environment. Students will develop a solid understanding of these mechanisms and the ways in which they can be optimized for performance, or abused to violate security. Topics include: language grammars, syntax and semantics; parsing, lexical analysis and abstract symbol tables; software memory models and runtime support mechanisms; static, shared and dynamic libraries; linking and loading; language specifications, code optimizations and security vulnerabilities; interpreted environments and scripting; static and dynamic code analysis; and code injection.

Prerequisite(s): EEE243 and EEE320 or EEE321
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE435 Principles of Operating Systems

Operating systems act as virtual machines that manage a computer’s resources and facilitate interactions with the computer hardware. Specialized operating systems are found in personal devices, automobiles and aircraft. This course explores the internal workings of operating systems such as the Windows family, including modes of operation protected by hardware (kernel modes). Students completing this course will understand the design of operating systems used in modern computing systems, including the management of shared hardware and software resources. Students will implement operating systems concepts in programming laboratories. Topics include: the process; concurrent processes; inter-process communication; deadlock; scheduling; input/output; file systems; file servers; memory management; and virtual storage management.

Prerequisite(s): CSE350, EEE243
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE447 Robotics

Robots and unmanned systems such as UAVs are becoming more common in the modern world, with applications in industry, transportation and the military. Most of the design of robots is not related to the physical platforms, but to the programming of the robots' intelligence to provide them with problem solving capabilities. This course studies the design of intelligent autonomous robots and their application to military systems. Students completing this course will be able to analyze complex environments and design robot behaviours to autonomously solve difficult problems. Topics include: sensors and actuators used in robotics; kinematics; design of mobile ground robots; robotic architectures; implementation of behaviours; and collaboration among robots.

Prerequisite(s): EEE243, EEE307, EEE325
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE449 Power Electronics

Power electronic converters are circuits that transform electrical energy from one form to another, and are used extensively within industry, National Defence, and in most consumer products. Students completing this course will be able to analyze and design the most common converters and their control systems. This course includes a significant laboratory component in which the students will design and build converters to supply AC and DC motors, to charge a battery, and to extract maximum power from a photovoltaic system. Topics include: DCDC choppers; single phase and three-phase DC-AC inverters and AC-DC rectifiers; AC-AC converters; and the application and design of those converters.

Prerequisite(s): EEE331 or EEE332
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE455 Electrical Engineering Design Project

The year-long design project allows students to demonstrate that they are capable of applying the electrical engineering knowledge, skills, and techniques learnt in their electrical engineering program to design and build a working product. Under the supervision of two faculty members, groups of 2-4 students design an electrical system starting with the definition of system requirements, followed by a preliminary and a detailed design, after which they construct a prototype system and test its actual performance against the original requirements. Oral and written progress reports are required along with a written final report, a final demonstration, and a formal oral examination by a board of faculty members.

Contact Hours: Fall: 2 - 2 - 4 Winter: 0 - 4 - 4
Credit(s): 2

EEE457 Computer Engineering Design Project

The year-long design project allows students to demonstrate that they are capable of applying the computer engineering knowledge, skills, and techniques learnt in their computer engineering program to design and build a working product. Under the supervision of two faculty members, groups of 2-4 students design a computer-based system starting with the definition of system requirements, followed by a preliminary and a detailed design, after which they construct a prototype system and test its actual performance against the original requirements. Oral and written progress reports are required along with a written final report, a final demonstration, and a formal oral examination by a board of faculty members.

Contact Hours: Fall: 2 - 2 - 4 Winter: 0 - 4 - 4
Credit(s): 2

EEE466 Distributed Systems

Distributed software systems communicate over computer networks and provide applications such as internet banking, social networks, and military command and control information systems. Students completing this course will understand the key technologies used in distributed systems, and will be able to design and implement them. In the laboratory, students will build distributed systems using sockets, remote invocation, and web-based technologies. Topics include: principles and characteristics of distributed systems; protocol design; client/server and peer-to-peer systems; distributed objects; time services; distributed transactions and replicas; concurrency control; the two-phase commit protocol; name services; network security threat models; cryptographic key distribution; authentication and signature; and common internet services and protocols.

Prerequisite(s): (EEE320 or EEE321) and EEE330 and (MAE234 or MAE333)
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE469 Computer Architecture

The computer processor is one of the most complex and intricate machines ever designed and built, and is at the heart of the information age. The aim of this course is to provide the current state of the practise in computer processor architectures. Students completing this course will be able to design, model, simulate and analyze processor architectures using state-of-the-art computer aided engineering tools and will have honed their skills during a rigorous laboratory component. Topics include: instruction set architectures; instruction level parallelism; data-level parallelism, including GPU and vector processors; thread-level parallelism, including simultaneous multithreading and multicore processors; hardwired and microprocessor-based control units; memory hierarchies; and performance analysis.

Prerequisite:
EEE307 and EEE350 or EEE361

Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE474 Radar and Electronic Warfare

Military forces the world over use radar as a primary sensor for navigation, mapping, weather monitoring, and weapons guidance. This course provides an introduction to radar systems and to the techniques that can be used to detect and defeat electronic systems. Students completing this course will understand the principles of radar, be capable of designing radar subsystems, and understand aspects of electronic warfare. Students will design, fabricate and test their own radar subsystems during the course's laboratory component. Topics include: monopulse, pulse, and pulse-Doppler radar architectures; antennas and beam steering; high-power transmitters; radar modes and mapping; signal detection and emitter direction finding; jamming and decoys; and electronic protection measures.

Prerequisite(s): EEE374 or EEE441
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE495 Digital Systems Architecture

Components and architecture are complementary in the design of digital systems implemented in many technologies. This course provides students with an understanding of the architecture, design and implementation of modern digital systems using state-of-the-art computer aided engineering tools with emphasis on field programmable gate array (FPGA) devices. Students completing this course will understand the internal components and architecture of a typical FPGA device, and will be able to implement complex systems in FPGAs while meeting design constraints. The course, supported by an important laboratory component, includes: FPGA architectures and resources; digital system design methodology; static timing analysis; high performance computer arithmetic architectures; and design for testability.

Prerequisite(s): EEE307 and EEE350 or EEE361
Semester: Usually Offered in the Fall
Contact Hours: 3 - 2 - 5
Credit(s): 1

EEE499 Real-Time Embedded System Design

Real-time systems are found in everyday applications such as smart phones, military avionics, safety systems in automobiles, and in the control systems found in nuclear facilities and chemical processing plants. Students completing this course will be able to analyze, design and implement real-time systems. Typical applications and considerations for systems are presented and practised in laboratory work. Topics include: specification and design methods for real-time systems and applicable computer aided software engineering tools; specification and verification of timing; scheduling and schedulability analysis; real-time operating systems, kernels, and programming languages; fault tolerance, critical races, deadlock and livelock; host target development; and real-time distributed systems.

Prerequisite(s): EEE320 or EEE321 and EEE435
Semester: Usually Offered in the Winter
Contact Hours: 3 - 2 - 5
Credit(s): 1

Mechanical and Aeronautical Engineering Undergraduate Programmes

General Information

Note: *The baccalaureate degree programmes in Mechanical Engineering and Aeronautical Engineering are accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers.*

The tables below represent a typical course pattern when completing the B.Eng. Mechanical Engineering or the B.Eng. Aeronautical Engineering programme in a 4-year period.

The department has a number of modern, well-equipped laboratories that permit students to supplement their theoretical knowledge with practical experience. These include major installations for the study of Heat Engines, Fluid Mechanics, Materials Science, and Engineering Computer-Aided Drawing, Computer-Aided Design and Manufacture, Rapid Prototyping, Dynamics, Heat Transfer, Robotics and Control Systems, Biomechanics, and Jet Propulsion. The department operates a large teaching and research machine shop.

In addition, research facilities are available for faculty and graduate student study in the areas of combustion processes, turbomachinery, aerodynamics, fluid mechanics, aeroelasticity, structural dynamics, reciprocating engine performance, alternative fuels, composite materials, fatigue and fracture mechanics, tribology, structures, anemometry and robotics.

Mechanical Engineering

This is a 48 credit programme, including the core courses for engineering programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100 PSE103 CSE101 CCE101 MAE101 PHE104	ENE100 (**cont'd**) MAE119 GEE167 CCE101 (**cont'd**) MAE101 (**cont'd**) PHE104 (**cont'd**)	HIE207 MAE226 PHE205 MEE233 GEE241 GEE293	HIE203 POE205 MAE209 MAE227 MEE231 MEE245
Semester total	**6 credits**	**6 credits**	**6 credits**	**6 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301 MAE328 MEE311 MEE331 MEE333 MEE351	HIE271 MEE301 MEE303 MEE313 MEE346 MEE353 GEE393	HIE289 Note1 MEE471 Note2 MEE407 MEE421 MEE431 MEE443 MEE482	PSE401 MEE471 (**cont'd**) **Optional** Note3 4 credits
Semester total	**6 credits**	**6 credits**	**6.5 credits**	**5.5 credits**

Aeronautical Engineering

This is a 49 credit programme, including the core courses for engineering programmes .

Semester	Fall year 1	Winter year 1	Fall year 2	Winter year 2
Courses	ENE100	ENE100 (**cont'd**)	HIE207	HIE203
	PSE103	MAE119	MAE226	POE205
	CSE101	GEE167	PHE205	MAE209
	CCE101	CCE101 (**cont'd**)	MEE233	MAE227
	MAE101	MAE101 (**cont'd**)	GEE241	MEE231
	PHE104	PHE104 (**cont'd**)	GEE293	MEE245
				AEE261
Semester total	**6 credits**	**6 credits**	**6 credits**	**7 credits**

Semester	Fall year 3	Winter year 3	Fall year 4	Winter year 4
Courses	PSE301	HIE271	HIE289	PSE401
	MAE328	AEE301	Note1	AEE471 (**cont'd**)
	MEE311	AEE333	AEE471	AEE461
	MEE331	MEE313	Note2	**Optional**
	MEE333	MEE346	AEE431	Note3
	MEE351	MEE353	AEE433	3 credits
		GEE393	AEE465	
			MEE421	
			MEE443	
Semester total	**6 credits**	**6 credits**	**6.5 credits**	**5.5 credits**

Notes

Note 1
POE289 can replace HIE289.

Note 2
MEE471 and AAE471 are projects worth 1.5 credits. These credits are counted as follows: 1 in the total of "Fall (year 4)" and 0.5 in the total of "Winter (year 4)".

Note 3
Mechanical Engineering: Four (4) optional credits in the winter semester, are to be selected from the following list:

Aeronautical Engineering: Two (2) optional credits in the winter semester, are to be selected from the following list:

- MEE401: Machine Design II
- MEE404: Computer-Aided Design and Manufacturing
- MEE417: Introduction to Biomechanics
- MEE423: Applied Heat Transfer
- MEE425: Renewable Energy
- MEE437: Robotic Dynamics and Control
- MEE439: Industrial Process Control
- MEE445: Introduction to Micro-Engineering
- MEE451: Combustion Engines
- MEE469: Marine Systems Engineering
- AEE435: Aerodynamics of Aircraft Designed for Supersonic Flight
- AEE461: Aeronautical and Space Propulsion **(available as an optional credit for Mechanical Engineering students only)**
- AEE463: Aeroelasticity
- AEE467: Rotary Wing Aircraft
- AEE491: Maintenance Management

These courses will only be offered in one of the two official languages.

Mechanical Engineering Undergraduate Courses

Courses 100-199

GEE167 Engineering Graphics I

The course introduces the students to the use of engineering graphics in the engineering design process. Graphical communication and visualization are emphasized by both paper sketching and computer-aided methods. The student is introduced to computer-aided drafting and design techniques using SolidWorks 3D CAD software. Topics studied are sketching, applied geometry, solid modeling, multi-view and pictorial projection, sectional views, auxiliary views and dimensioning.

Semester: Usually offered in the Winter Term
Contact Hours: 1 - 2 - 3
Credit(s): 1

Courses 200-299

MEE231 Structural Analysis and Introduction to Strength of Materials

This course exposes students to various types of supports and external forces acting on an elastic body and to the equilibrium equations for 2-D and 3-D structures. Calculation of reactions for structural members subjected to external forces and moments is presented, as well as the concept of dry friction and its influence on static equilibrium. Students will study the calculation of internal forces and the concept of free body, axial, torsion, shear force and bending moment diagrams. They acquire the ability to visualize associated deflected shapes and to perform the structural analysis of mechanisms, statically determinate and statically indeterminate struts and shafts. Properties of cross-sections are presented, including the location of the centroid and the first and second area moments. The course includes the definition and calculation of basic stress and strain components at a point due to the internal loadings found in typical mechanical and aerospace systems, such as shafts, bolts, gears, spars, struts, ribs, wing panels, fuselages etc. Hooke’s law including thermal stresses and strains is also presented. Finally, students are introduced to the calculation of 2-D and 3-D combined stresses, to the concept of stress transformation at a point and to column buckling. Basic laboratory tests are undertaken to illustrate the behavior of various structural components in tension, torsion and bending.

Prerequisite(s): PHE104
Note(s): For students taking Mechanical and Aeronautical Engineering.
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 2 - 4
Credit(s): 1

MEE233 Introduction to Manufacturing Processes

This course presents an introduction to a wide variety of fabrication processes used in modern manufacturing such as casting, forging, composite construction, joining and rapid prototyping. Emphasis is placed on understanding the strengths and limitations of each approach. Other topics include manufacturing standards, such as fits and tolerances, geometric dimensioning and tolerancing (GD&T), engineering drawings, intellectual property and safety.

Prerequisite(s): GEE167
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 2 - 4
Credit(s): 1

MEE245 Applied Mechanics

This course builds upon the foundations established in PHE104. The principles of kinetics and kinematics of particles are reviewed. Planar and 3D kinematics of rigid bodies is presented. Newton's Second Law, Work and Energy, and Impulse and Momentum are applied to planar and 3D rigid body kinetics. Practical engineering applications are used as examples to illustrate the theory and as problem assignments.

Prerequisite(s): PHE104, MAE226
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

Courses 300-399

MEE301 Machine Design

Previous work in mechanics, stress analysis, and metallurgy, as well as new knowledge regarding safety factors, failure criteria, stress concentration factors and fatigue, is applied to the practical design of machinery. The course is oriented towards the specific design of various machine elements such as shafts, welds, cables, bolts, journal bearings, gears, gear trains, belt drives, brakes, etc..

Prerequisite(s): MEE331, MEE333
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE303 Engineering Design

This course presents the processes of problem solving and engineering design. The design and/or redesign of sub-systems/components are examined in isolation. At the component level, the tasks of establishing a design specification, considering alternative principles of operation and arrangements of functional elements, selecting potential solutions and utilizing computer aided design software to assess the design are applied with respect to societal and technical needs. Alternative solutions are assessed based on achievement of the component specification. The course utilizes integrated lectures and mini-projects to develop and understand the design process for a simple technical system. Written technical reports will be submitted by students about the devices they design to satisfy a given set of requirements.

Prerequisite(s): MEE233
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE311 Fluid Mechanics I

This course emphasizes the basic concepts of fluid dynamics. The course includes a study of the following: fluid properties, fluid statics, fundamental equations of fluid motion, control volume concept applied to the continuity, momentum, and energy equations, the Euler and Bernoulli equations, flow measuring devices, similitude and dimensional analysis, incompressible flow in conduits, introduction to the concepts of boundary layer in laminar and turbulent flows, external flows, and hydraulic turbo machines. The lectures are supplemented by problem assignments and experiments conducted in the laboratory, including forces on submerged surfaces, velocity measurements in internal flows, and pumps.

Prerequisite(s): PHE205, MAE226
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE313 Fluid Mechanics II

This course extends the study of Fluid Dynamics initiated in MEE311. The following topics are covered: dynamics of inviscid flows; potential flow theory and methods of solution based on superposition of potential flows; viscous flow theory (Navier-Stokes equations); boundary layer and external flows. An introduction to computational fluid dynamics is also presented. The course is supplemented with assignments and laboratory experiments.

Prerequisite(s): MEE311, MAE328
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE315 Fluid Dynamics

This course provides the basic concepts of fluid mechanics. It includes a study of the basic fluid properties, hydrostatics and the fundamental equations of fluid motion. The control volume concept is introduced and applied to the continuity, momentum, and energy equations. Appropriate simplifications result in the Bernoulli equation that is used for practical applications. Students are initiated to dimensional analysis and similitude. An introduction to the concepts of boundary layer for laminar and turbulent flows is given. Viscous flow understanding is then applied to the empirical calculation of incompressible flow in pipes. Finally, the students are exposed to the analysis of open channel flows, as well as an introduction to pumps. The lectures are supplemented by problem assignments and experiments conducted in the laboratory, including measurement of pressure and hydrostatic pressures on submerged surfaces, velocity and flow rates, and weirs.

Prerequisite(s): PHE205, MAE226
Semester: Usually offered in the Fall Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE321 Heat Engines Laboratory

A laboratory course illustrating the general principles, operating characteristics, and thermodynamic analysis of internal combustion engines, and steam and gas turbines.

This course is part of CCE321.

Semester: Usually offered in the Winter Term
Contact Hour(s): 0 - 2 - 2
Credit(s): 0

MEE331 Strength of Materials

This intermediate course in strength of materials develops the relationships between stresses, strains, deformations, and external loads for linear elastic bodies. Emphasis is given to the following topics: stress and strain at a point, the principle of superposition, combined stresses, Mohr's circle. Other topics include indeterminate structures, non-symmetric bending, non-homogeneous bars, shear flow in thin-webbed beams, etc..

Prerequisite(s): GEE231
Semester: Usually offered in the Fall Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE333 Metallurgy and Engineering Materials

This course in materials science and engineering emphasizes the relationships between the structure and the mechanical properties of engineering materials. The effects of different strengthening mechanisms and thermal processing are studied. Failure mechanisms such as ductile and brittle fractures, fatigue, creep, and corrosion are covered. Emphasis is placed on properties and processing of metallic materials. The lectures are supplemented by tutorials, assignments on theory and applications, and laboratory experiments with cold working, heat-treating and metallography.

Prerequisite(s): CCE101, GEE231
Semester: Usually offered in the Fall Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE346 Modelling and Simulation of Dynamic Systems

This course is a continuation of MEE345. Topics covered include: derivation and solution of equations of motion using Newtonian and Lagrange methods, transfer function, time response of first and second order systems, free and forced vibration of single and multiple degrees of freedom systems, time domain and frequency response of cascaded and coupled systems. MATLAB/SIMULINK is used to simulate the dynamic response of these systems.

Prerequisite(s): MAE328, MEE245, PHE205
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE351 Thermodynamics I

This course is a study of classical Thermodynamics by examining its application to practical devices such as engines and refrigeration systems. The First and Second Laws of Thermodynamics are analyzed in detail and applied to gases and two phase mixtures used in the studied devices. The lectures are supplemented by problem assignments and experiments during laboratory periods.

Prerequisite(s): CCE101, MAE226
Semester: Usually offered in the Fall Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

MEE353 Thermodynamics II

This course continues the study of classical thermodynamics begun in MEE351. Further applications in power producing devices and refrigeration systems, mixtures and solutions, and compressible flows are studied in detail. The course is oriented towards practical applications such as power production and cogeneration, heating and air conditioning, humidification and dehumidification. The course introduces gas dynamics; it covers compressible flow in nozzles and diffusers, and normal shock waves. The lectures are supplemented by problem assignments and laboratory experiments.

Prerequisite(s): MEE351
Semester: Usually offered in the Winter Term
Contact Hour(s): 3 - 1.5 - 4.5
Credit(s): 1

Courses 400-499

MEE401 Machine Design II

A number of basic machine elements not previously studied, such as ball and roller contact bearings, belt and chain drives, springs, brakes and clutches are first introduced, followed by practical case studies involving the detailed design of these elements. This course is centered on the detailed design project of a machine assembly such as a multi-stage transmission comprising of a number of machine elements. The course project involves teams of two students working on the assigned machine assembly, starting from the evaluation of the external loads (from the initial given data) to the detailed design and selection of the individual components and the production of the required technical drawings, as if this assembly were to be fabricated in the machine shop.

Prerequisite(s): MEE301
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE404 Computer-Aided Design and Manufacturing

The aim of the course is to teach the principles of computer-aided design and manufacturing. Topics covered include parametric design, simulation, optimization, prototyping and computerized manufacturing. Students will gain hands-on experience through classroom examples, assignments and projects.

Prerequisite(s): MEE233
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE407 Finite Element Methods

This course is an introductory course studying the theory and application of the finite element method as used in solving engineering problems. Topics covered include the discretization of the model, the derivation of elemental and global stiffness matrices, the determination of appropriate boundary conditions and resolution of the obtained global matrix system. Additional modeling topics that are encountered in practice are also discussed. This course has a large practical component, where commercial finite element software is used to perform stress analyses on two and three dimensional structures or components.

Prerequisite(s): MEE331
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

MEE417 Introduction to Biomechanics

Biomechanics consists of the application of mechanical principles to human or animal bodies in movement or at rest. This introductory course to biomechanics aims at providing the student with notions and principles of biomechanics with specific applications to the modeling of the musculoskeletal system. Among the topics covered, one finds the introduction to the functional anatomy, the kinematic and dynamic modeling of the human body in movement, the anthropometric models and the modeling of the mechanical behaviour of some tissues.

Prerequisite(s): MEE245
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE421 Heat Transfer

This course introduces students to the three basic heat transfer processes, namely, conduction, convection and radiation. Specific topics include steady one- and two-dimensional conduction; external convection over a flat-plate and over a circular cylinder in cross-flow; laminar and turbulent internal convection through a straight pipe; conduction-convection heat exchanger analysis; Stefan Boltzmann law, Planck distribution law and Wien displacement law for blackbody surface thermal radiation. The lectures are supplemented by laboratory work which includes the determination of thermal conductivity and convective heat transfer coefficient.

Prerequisite(s): MEE311, MEE351
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5- 4.5
Credit(s): 1

MEE423 Applied Heat Transfer

This course covers concepts of heat transfer as they apply to engineering. Topics include, free and forced convection, boiling and condensation, thermal radiation exchange between surfaces, and combined heat transfer as it applies to HVAC. These heat transfer concepts are approached analytically and numerically, and semi-empirical correlations are also discussed. The coupling between the hydrodynamic and thermal fields is underlined in the case of free or mixed convection. The engineering applications that are considered are: Cooling in nuclear reactors and gas turbine blades and conceptual Design of heat exchangers. Solar power generators for space vehicles are also studied.

Prerequisite(s): MEE421
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE425 Renewable Energy

The aim of this course is to examine renewable energy sources and generation systems and the impact of their use on the environment. The course includes the study of different technologies used to harness natural energy. Examples studied are: Thermal and photovoltaic solar, wind, tidal and geothermal energy. This course applies concepts learned in fluid dynamics and heat transfer. Projects on solar and wind energy are undertaken during the term.

Prerequisite(s): MEE313
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE431 Stress Analysis

This is an advanced course in stress analysis, covering various topics such as the theory of elasticity, rotating disks, thick-walled pressure vessels, non-circular bars in torsion, failure theories, and energy methods. Additional topics may include composite materials and finite element method applications.

Prerequisite(s): MEE331
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

MEE433 Mechanical Behaviour of Advanced Materials

This course continues the study of engineering materials to cover in depth plastics, ceramics, composites, and specialty alloys. The focus is on mechanical properties, uses, manufacturing and processing of these advanced materials.

The applications of these materials in engineering are also outlined. The effects of temperature, environment, failure mechanisms and prevention are covered. Mechanical behaviour under cyclic loading, fatigue, and fracture mechanics are presented.

The lectures are supplemented by laboratory experiments and demonstrations.

Prerequisite(s): MEE331, MEE333
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE435 Experimental Techniques in Materials Engineering

This is a course on the measurement of mechanical properties of engineering materials. Emphasis is placed on precise measurement and application of relevant standard test methods for material properties. Lecture material covers the microstructure – material behaviour interactions, data reduction techniques and statistical analysis. Students develop their knowledge and skills in material behavior, experimental techniques, data analysis, and technical report writing.

Prerequisite(s): MEE333
Note(s): Enrolment is limited to 8 students, with priority given to the Mechanical Engineering programme. Individual grades in MEE333 will be used as the enrolment criterion.
Contact Hours: 2 - 2 - 4
Credit(s): 1

MEE437 Robot Dynamics and Control

This course covers the following topics: Classification of robot manipulators, Homogeneous Transformations, Euler Angles, Denavit Hartenberg Convention, Forward and Inverse Kinematics. Manipulator Jacobians, Robot Dynamics, Design of joint actuating systems, Independent joint control, Point-To-Point control, Path planning and trajectory control, Sensory components for robot control, Space application of robotic systems.

Prerequisite(s): MEE346
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE439 Industrial Process Control

Main topics: Control loops, Design of control systems, Industrial aspects

This course represents a continuation of the "Feedback Control of Electro-Mechanical Systems" course . The student has the opportunity to study in more detail the aspects of control with different industrial applications. In addition to concepts of stability and robustness, the main topics that are covered are the control of industrial processes, control loop structures, PID control and tuning methods, cascade, ratio and feed-forward control, controllers hardware, Programmable Logic Controllers (PLC), micro-controllers , etc.. Aspects of real-time control are initiated using methods for analysis and design of discrete-time control systems, sampling theorem and Z-transform. Case studies include simulation and experiments of electromechanical systems, hydraulic and pneumatic position control, liquid level control, etc..

Prerequisite(s): MEE443
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE443 Feedback Control of Electro-Mechanical Systems

A first course in linear feedback control systems which logically follows MEE346: Modelling and Simulation of Dynamic Systems. The material is covered under the following main topics: performance specification and preliminary design, stability criteria and techniques of feedback control. The examples and the problems used to illustrate the theory will concentrate on hydraulic and pneumatic systems as used on current military hardware. MATLAB/SIMULINK is used extensively for the design of control systems and to carry out the simulations.

Prerequisite(s): MEE346
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

MEE445 Introduction to Micro-Engineering

This course will introduce students to fundamental principles governing fluids and materials at the small scale. Microfabrication techniques, such as plasma-based etching and deposition, of microscale and nanoscale elements will be investigated and illustrated for relevant mechanical and aerospace engineering applications. The small scale elements can also be assembled into more complex systems: a course project will consider the design of selected mechanical engineering applications (e.g.: micro-pump; micro-motor; micro heat-exchanger).

Prerequisite(s): MEE311, MEE313, MEE421
Contact Hours: 2 - 2 - 4
Credit(s): 1

MEE451 Combustion Engines

After a review of basic thermodynamic and combustion principles necessary for studying the topics of interest, the lectures consider the design and operation of spark-ignition, Diesel, and gas turbine engines. Some of the topics studied are: fuel and ignition systems; supercharging, combustion chambers; properties and performance of fuels; sources and control of air pollution; alcohol, hydrogen, and other non-conventional fuels. The lectures are supplemented by assignments and laboratory experiments.

Prerequisite(s): MEE353
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE469 Marine Systems Engineering

This course considers the main engineering issues involved in the design and operation of ships. The topics studied include: hull design for surface ships and submarines, including drag and stability; selection and performance of propulsion engines, including diesels, gas turbines and electric propulsion; propellers and water jet drives; generation and control of on-board electricity; weapon systems; and life support systems. The course is focused on the fundamental principles that drive the design of the systems studied, but also discusses recent technology and future developments.

Prerequisite(s): MEE311, MEE351
Contact Hours: 3 - 1 - 4
Credit(s): 1

MEE471 Engineering Project

This course provides the student with the opportunity to undertake a project of sufficient magnitude to include all essential elements of an independent engineering study, under the supervision of a faculty member. Students are expected to perform a thorough literature survey on their selected topic, propose a plan of action, prepare a schedule for the major phases of the project, design and build the apparatus and the instrumentation as required, integrate theory taught in previous engineering courses and acquire the new knowledge required for the analytical portion of the project. Students submit short biweekly written progress reports and one final written report to their project supervisor and make two oral presentations to classmates and faculty members during the course of the year.

Contact Hours: 0 - 2 - 2 (Fall Term)
Contact Hours: 0 - 5 - 5 (Winter Term)
Prerequisite(s): MEE303 and 7 Mechanical Engineering credits at the 300-level.
Credit(s): 1.5

MEE482 Instrumentation

This course presents a complete analysis of various measurement and actuation devices used in mechanical systems. The course will allow students to strengthen certain fundamental aspects such as the modeling and simulation of electrical, mechanical, hydraulic, and thermal systems as well as to identify important parameters in these models. Various measuring instruments and interfacing and control techniques of electro-mechanical systems will be studied. This course will also present methods of signal processing and analysis and their application in Mechanical Engineering.

Prerequisite(s): GEE241, MEE346, MAE209
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

Undergraduate Aeronautical Engineering Courses

Courses 200-299

AEE261 Aircraft Performance

This course will introduce the students to the fundamentals of conventional aircraft flight. This is followed by an introduction to propulsion methods, the standard atmosphere and simplifications necessary for performance estimation. The analysis and methods used in the evaluation of aircraft flight performance parameters follow, for level, unaccelerated flight. Topics covered will include the determination of flight ceiling, range and endurance, climbing and manoeuvring flight, take-off and landing parameters for jet-powered aircraft. Students will prepare aircraft level flight and manoeuvre envelopes and wind effects will be introduced providing the context for the Aeronautical Engineering specialization from the Mechanical Engineering baseline. The classroom lectures will be supplemented by homework questions, one laboratory and a case study.

Prerequisite(s): MAE101 and PHE104
Contact Hours: 3 - 2 - 5
Credit(s): 1

Courses 300-399

AEE301 Design of Aircraft Components

The Systems Engineering Process and its application to aircraft design are presented; highlighting the conceptual design phase. The first iteration sizing of the wing, fuselage, empennage, landing gear based on the requirements is learned. The concepts of constraint diagram, aircraft loads, V-n diagram, aircraft weight and c.g. location and their importance are grasped. The understanding of the sizing models is verified by several projects conducted in small teams. A final project aimed at conducting the first iteration sizing of an aircraft based on specific requirements serves to highlight the complex interaction between the multiple design parameters.

Prerequisite(s): AAE261
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

AEE333 Aerospace Materials

This course covers the nomenclature, properties and processing of engineering materials used in airframes, landing gear, and gas turbine engines. Materials examined will include structural aluminum alloys, titanium alloys, stainless steels, nickel based super alloys, high strength heat treated steels, fibre composites, honeycomb sandwich panels and layered composites, such as GLARE (Glass Laminate Aluminum Reinforced Epoxy). Manufacturing processes including chemical milling, forging, extrusion and composite lay-up are also discussed. The role of non-destructive inspection and airworthiness are presented along with the effects of long service exposure on mechanical properties of structural alloys. Lectures are supplemented with laboratory exercises and demonstrations.

Prerequisite(s): MEE331, MEE333
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

Course 400-499

AEE431 Aerospace Structural Design and Stress Analysis

Topics covered include aircraft structural layout, historical aspects, principles of structural design and the stress analysis of its main components such as the wing and the fuselage. The following subjects will be studied in more detail: the basic principles of the theory of elasticity in three dimensions, followed by direct applications related to the stress analysis of various aircraft structural components. They include the stress analysis of non-circular bars and thin-walled open and closed (single and multiple cell) sections due to torsion, the stress analysis of monocoque and semi-monocoque (open and closed cell) structures due to non-symmetric bending and direct shear, including the resulting shear flow distribution in the panels and the stringers of the torsion box. Location of the shear center. Energy methods applied to the deflection and the structural/stress analysis of statically determinate and indeterminate aircraft structures including the wing and the fuselage. Failure criteria. Macro-mechanical analysis of composite material plates, aspects of their manufacturing and non-destructive testing.

Prerequisite(s): AEE301, MEE331
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

AEE433 Aerodynamics

This course builds on fundamental fluid dynamics and thermodynamics concepts covered in previous courses, and applies them to the study of airflow over 2D airfoils, 3D wings and lifting bodies in general. The material is divided according to the two most important canonical non-dimensional numbers that dictate the behaviour of flows, namely Reynolds number (Re) for viscous effects and Mach number (M) for compressibility effects. Some of the major topics covered are classical thin airfoil theory, low Re and high angle of attack aerodynamics, Prandtl's classical lifting-line theory, subsonic compressible flow over airfoils, linearized supersonic aerodynamics, and transonic aerodynamics. At the end of the course, the students should possess a good understanding of lift and drag forces, and aerodynamic moment, for various flow conditions and geometric configurations. The lectures are supplemented with assignments and laboratory experiments.

Prerequisite(s): MEE313, MEE353
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

AEE435 Aerodynamics of Aircraft Designed for Supersonic Flight

This course builds on the material developed in the study of compressible flow to analyze high speed flight. The topics covered include applications such as supersonic intakes and nozzles, oblique shock waves and their reflections, airfoil and fuselage designs for transonic flight. The course emphasizes applications of the principles of compressible flow to high speed aircraft design. The course also covers some aspects of hypersonic flight. The lectures are supplemented by assigned problems and projects.

Prerequisite(s): MEE313, MEE353
Contact Hours: 3 - 1 - 4
Credit(s): 1

AEE461 Aeronautical and Space Propulsion

Illustrations of the application of the fundamental principles of fluid mechanics and thermodynamics to the analysis of present-day and proposed propulsion systems. Topics covered include turbojets, turbofans, turboprops and their associated components including compressors and turbines. Ramjets are also examined. Current developments in chemical and electrical rockets are discussed as related to space vehicle missions and requirements. The lectures are supplemented by assigned exercises and laboratory problems in related areas.

Prerequisite(s): MEE311, MEE353
Semester: Usually offered in the Winter Term
Contact Hours: 3 - 1 - 4
Credit(s): 1

AEE463 Aeroelasticity

Aeroelasticity is the discipline that deals with the interaction of elastic structures and aerodynamic loads. The main objective of this course is to provide the student with the knowledge of basic principles in aeroelasticity, while some typical applications are also studied. Three archetypes of aeroelastic stability problems are then discussed in detail, namely divergence, classical or coupled flutter and stall flutter. As part of these discussions, unsteady aerodynamics and few nonlinear dynamics concepts are covered. In the last part of the course the aeroelastic response to gust and atmospheric turbulence is presented. Finally, aspects of vortex-induced vibrations are discussed. The understanding of the material is strengthened via the application by the students of a balanced mix of analytical work, numerical simulations and wind tunnel testing.

Prerequisite(s): MEE313, MEE346
Contact Hours: 3 - 1 - 4
Credit(s): 1

AEE465 Introduction to Aircraft Stability and Control

This course applies aerodynamics to the stability and control of fixed wing aircraft. Static stability and trim concepts are explored in the longitudinal, and lateral/directional senses. The contribution of the propulsion system, fuselage, ancillary surfaces and components of the aircraft are analyzed. Classic flight control design and employment are accompanied by the introduction of aerodynamic stability derivatives and their role in aircraft control and stabilization. Dynamic response to control inputs are introduced, together with aircraft flying and handling qualities. Flight Test Techniques are introduced, and overall emphasis is placed on the implications of aircraft design features to stability and control of the flying vehicle.

Prerequisite(s): AEE261, MEE311
Corequisite(s): MEE443
Semester: Usually offered in the Fall Term
Contact Hours: 3 - 1.5 - 4.5
Credit(s): 1

AEE467 Rotary Wing Aircraft

This course examines attributes and characteristics of rotary wing aircraft which are capable of vertical takeoff and landing and which utilize the rotor to produce forward thrust. Topics include hovering, horizontal and vertical flight, actuator disc and blade element theories of rotor performance, flow patterns (including ground effect) in various flight regimes, rotor dynamics and control, autorotation, tail rotor aerodynamics and gyroscopic effects, single rotor helicopter performance. Other topics include methods for evaluation of power requirements and fuel consumption, and analysis of simple missions.

Prerequisite(s): MEE311, MEE346
Contact Hours: 3 - 1 - 4
Credit(s): 1

AEE471 Capstone Aeronautical Engineering Design Project

This course requires the students to prepare a conceptual aircraft design over the course of their fourth year in a team environment. A unique and operationally relevant and realistic aircraft role is defined each year. The overall design is conducted in teams working in sub-groups such as aerodynamics, aircraft structures, and propulsion. Leadership within the design teams is emphasized. Individual work includes the preparation of design reports, and the formal review of the design reports of other team members. The design study culminates with a thorough final report and a public presentation incorporating components from the subgroups, both of which are evaluated.

Prerequisite(s): 8 Credits at the 300-level from Mechanical and/or Aeronautical Engineering
Contact Hours: 0 - 2 - 2 (Fall Term)
Contact Hours: 0 - 5 - 5 (Winter Term)
Credit(s): 1.5

AEE491 Maintenance Management

This course investigates the requirements, design and implementation of effective aircraft maintenance programs. Topics include the objectives of a maintenance plan in meeting the requirements of operational and technical airworthiness; various elements of maintenance plan development; and considerations for effective implementation of preventive maintenance programs. Detailed reviews of component lifting methodologies, preventive maintenance concepts such as failure analysis, condition-centred and reliability centred maintenance, logic driven maintenance scheduling, and level of repair analysis methodologies are supplemented by case study assignments.

Prerequisite(s): MAE209, AEE301 or MEE301
Contact Hours: 3 - 1 - 4
Credit(s): 1

General Engineering and Engineering Service Courses

General Engineering Course Descriptions

GEE291 Introduction to Engineering Professional Development

These are short courses that are already being taken by all engineering students at RMC of Canada as part of their respective programmes. The courses fulfill requirements imposed by the CEAB (Canadian Engineering Accreditation Board) for the accreditation of RMC of Canada's engineering programmes. The idea of adding the courses to the calendar is motivated by a desire to impress upon students the importance of completing these requirements as part of their programme in addition to allowing for the satisfaction of these requirements by individual students to be properly documented.

Semester: Usually Offered in the Winter term
Note(s): Mandatory for students in Engineering.
Contact Hours: 8 - 0 - 0
Credit(s): 0

GEE393 Engineering Tours

The course objective is to expose students to the practical application of engineering within private industry, the Canadian Forces and governmental and non-governmental agencies. This course consists of tours of engineering sites (such as construction, production, manufacturing, laboratory, research) and discussions with engineering professionals related to the field of engineering being studied.

Prerequisite(s): Successful completion of second year engineering requirements
Semester: Usually Offered in the Winter term
Note(s): Mandatory for students in Engineering.
Contact Hours: 0 - 12 - 0
Credit(s): 0

Table of General Engineering Courses

Courses given to students taking degree programmes from numerous engineering departments are deemed general engineering courses. The following table gives details of those general engineering courses, along with the department nominally responsible for teaching them.

Course Code	Course Title	Engineering Programmes Affected	Delivered by
GEE167	Engineering Graphics - 1	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mechanical Engineering
GEE231	Introduction to Mechanics of Material	Chemical, Civil	Civil Engineering
GEE241	Electrical Theory	Aeronautical, Mechanical, Chemical	Electrical & Computer Engineering
GEE291	Introduction to Engineering Professional Development	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	N/A
GEE293	Managing Engineering Projects	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Office of the Dean of Engineering
GEE393	Engineering Tours	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	N/A

Table of Engineering Service Courses

Courses given by departments outside of the Faculty of Engineering to engineering students are deemed Engineering Service Courses. The following table gives details of these Engineering Service Courses, along with the Department responsible for their delivery.

Course Code	Course Title	Engineering Programmes Affected	Delivered By
MAE226	Engineering Calculus: Multivariate Functions	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mathematics and Computer Science
MAE227	Engineering Calculus: Differential Equations and Infinite Series	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mathematics and Computer Science

General Information for Division of Continuing Studies

Continuing Studies at RMC of Canada

The degree programmes offered through Division of Continuing Studies (DCS) at RMC of Canada are thoroughly grounded in the elements of the military profession, permitting students to acquire a university degree regardless of where they live and work, and minimizing any negative impact on their commitments to family and career. The programmes integrate in-service training and experience with special and standard university courses. Courses are offered in English and French and students may complete assignments, essays and exams in the official language of their choice.

Distance Education (DCS-administered courses) are Web-based (Internet) and delivered through the RMC of Canada **Moodle** Learning Management System (LMS).
For information on Course Offerings, Course Descriptions, Course Overviews and Delivery Mode, please refer to the following web page: UG Course Offerings for Distance Education

Continuing Studies Committee

The Continuing Studies Committee, a committee of Faculty Board with representation from each academic department, acts as a steering committee for the administration of all continuing education activities and is responsible for the academic governance of the non-resident undergraduate programmes. The Continuing Studies Committee makes recommendations to Faculty Board concerning the development and approval of Undergraduate Programmes offered through DCS and the recognition of courses offered by other organizations.

The membership of the Continuing Studies Committee, chaired by the Associate Dean of Continuing Studies, consists of:

- a representative from each academic department,
- the Registrar, or appointed representative,
- the DCS Course Design and Development Manager,
- the DCS Course Delivery Support Manager, and
- the Director of Prior Learning Assessment and Recognition.

Canadian Armed Forces Subsidized Study Programmes

In addition to part-time studies, DCS provides administrative support to some of Department of National Defence (DND) programmes of sponsored full-time studies toward degrees. Part-time studies can be a lead-in toward being selected for sponsorship under these programmes.

Initial Baccalaureate Degree Programme (IBDP)

Education is an essential and integral part of officer professional development and the CAF encourages officers to pursue continuing education on their own volition. The CAF has established a goal to have all officers hold a university degree, with the exception of those commissioned from the ranks. In support of this goal, the CAF has established a programme to provide subsidized education to eligible officers in pursuit of their initial baccalaureate degree.

DAOD 5031-7 outlines the conditions and benefits associated with this programme. It does not preclude other initiatives that have been put in place in support of continuing education.

University Training Plan Non Commissioned Members (UTPNCM)

The UTPNCM Programme is a DND-sponsored subsidization plan to generate commissioned officers which is open to certain non-commissioned members of the CAF who meet the academic requirements for admission to RMC of Canada or other Canadian universities as candidates for a baccalaureate degree. Depending on their level of academic standing, UTPNCM candidates may enter either at the first-year level or with an advanced standing. Except for certain allowances made for age, service experience and marital status, these officer cadets must meet substantially the same academic and military requirements as those in the Regular Officer Training Plan.

The conditions governing eligibility, application and selection procedures are set forth in CFAO 9-13, and as modified by subsequent orders.

Division of Continuing Studies Academic Programmes

Bachelor of Military Arts and Science (BMASc)

The Bachelor of Military Arts and Science (BMASc) is equivalent to a conventional thirty (30) credit degree in terms of quality and quantity of instruction. The BMASc degree is designed to be earned over an extended period, integrating professional training and academic study.

The compulsory core for the BMASc programme includes the following 10 credits:

- BAE268: Introduction to Defence Resource Management
- HIE208: Canadian Military History: A Study of War and Military History, 1867 to the Present **or** another Military History course
- HIE275: Survey of Technology, Society and Warfare
- POE205: Canadian Politics and Society **or** POE116: Introduction to International Relations
- PSE103: Introduction to Human Psychology
- PSE401: Military Professionalism and Ethics *(PSE402: Leadership and Ethics is an acceptable alternative in this programme)*
- 2 credits in English: 1 credit in literature, plus 1 credit in either literature or grammar
- 2 credits in Science (Chemistry, Computer Science, Mathematics, or Physics)

At least 15 of the minimum 30 required credits must have military content, as determined by the Continuing Studies Committee, and at least 10 credits must be taken through RMC of Canada. An appropriate number (at least 10) must be at the senior level (300 or 400-level courses), and among these at least 5 must be earned through RMC of Canada.

For the purpose of the BMASc degree, a credit with military content is defined as one in which the learning is directly related to a military topic. There are several ways in which a credit is considered to contain military credit:

- the student has completed a course in which the main focus is clearly of a military nature (e.g., CCE204: Military Chemistry, or HIE371: War and the Military Profession)
- the student has taken a general course but directed his/her personal research to areas of a military nature (ex: the student is taking a course on the rise of modern Germany but in which papers are focused on military aspects, such as "German Defensive Innovations on the Eastern Front, 1943-44"). In these cases, students are required to submit proof of their research (i.e., a copy of the relevant papers) before any military content credits are granted
- the student has permission to take an academic course which the Continuing Studies Committee deems to be directly relevant to the serving member's military career (i.e., permission from the BMASc Chair); and military training courses and proficiency that have been approved by the Continuing Studies Committee for academic credit

It should be noted that this is a terminal degree, in that it has not been designed to support further studies at the graduate level. Students` interested in future graduate studies should consider the BMASc (Honours) programme.

Bachelor of Military Arts and Science (Honours) (BMASc (Hons)

The Bachelor of Military Arts and Science (Honours) (BMASc (Hons)), is equivalent to a conventional forty (40) credit Honours degree in terms of quality and quantity of instruction. The BMASc (Hons) degree is designed to be earned over an extended period, integrating professional training and academic study. This 40-credit Honours degree, with a specialization in Military Studies, is designed for students registered in the BMASc Programme who intend to pursue graduate studies after completion of their Bachelor's degree. The students who complete the Honours Programme will have met one important requirement for admission into a Graduate Studies Programme.

Those interested in registering in the BMASc (Hons) Programme are required to:

- file the Request to Change Programme form once they have earned at least 20 university credits;
- maintained an average of not less than B- in their university courses; and
- fax the form to Admissions.

The BMASc (Hons) Programme has the same 10-credit core curriculum as the General Programme, plus a Directed Research Project (MAS400), which counts for 2 credits, for a total of 12 compulsory credits.

At least 20 of the minimum 40 required course credits must have military content, as determined by the Continuing Studies Committee, and at least 20 (i.e., 18 one-term credits, plus 2 for the Directed Research Project (DRP)) of the course credits must be taken through RMC of Canada. An appropriate number (at least 20) must be at the senior level (300 or 400-level courses) of which 10 must be RMC of Canada senior credits. To ensure honours standing, students must achieve at least a B in the DRP (MAS400) and maintain, as a minimum, a B average in senior-level courses and at least a B- average in 400-level courses.

Directed Research Project (MAS400)

The Directed Research Project (DRP) is seen as a major component of the BMASc (Hons) degree in that it affords the student the opportunity to demonstrate his or her ability to critically analyze some element of his or her military experience. Students are required to submit a proposal to DCS, along with their application to be admitted into the programme. Upon acceptance of the proposal, a supervisor will be assigned and the work will be carried out under the guidance of that individual. If appropriate, this project may take the form of a technical project or a directed reading course with one or two major essays. Directed Readings allow students to explore subjects of particular interest through the execution of a series of assignments, while under the supervision of a university professor.

The proposal (1-3 pages) must identify a general area of interest (e.g., twentieth-century Canadian Naval Strategy). Specifically, it must provide the following information:

- why the area is of military interest
- why the student is interested in the topic
- the overall objective of the project
- what issues the student would like to discuss
- whether or not the research materials are expected to be readily available (i.e., is the material classified)
- any extraordinary sources that might be required to carry out the work
- a preliminary bibliography (approximately 20 titles)
- the name of an advisor in the local area of the student (if applicable)

During the review period, DCS, in consultation with the appropriate department head, will approve or reject the proposal. If approved, an appropriate supervisor will be selected for the student (or the suggested supervisor will be appointed).

The supervisor will then, in consultation with the student, determine the specific aim of the research and direct the student's efforts towards the completion of a major research paper (generally at least 50 pages) or two or more smaller research papers (between 20 and 25 pages each). These papers must have a definite military content and represent significant individual research and critical analysis. All papers must be submitted according to an essay format deemed acceptable by the supervisor (e.g., The Chicago Manual of Style, or The Modern Language Association).

The student and the supervisor will work out a timetable for the various parts of the work and for final submission. The paper(s) will be submitted to a second reader and the second reader, in conjunction with the supervisor, will determine the grade. The Directed Research Project must earn at least a B to be counted as 2 credits towards the BMASc Honours degree.

The DRP is awarded 2 senior credits and should be likened to an Honours thesis, which is normally completed within 2 consecutive terms. Because most DRPs are completed at a distance, there are some delays to be expected due to this circumstance. Thus, a 12-month due date is set for the final draft of the DRP, starting from the date the project has a supervisor and has been approved. An extension beyond this 12-month due date may only be granted by the Dean of Continuing Studies, and only due to deployment/operational, medical or other exceptional circumstances.

Admission, Registration and Fees | Division of Continuing Studies

Admission

For all students interested in pursuing undergraduate studies at RMC of Canada please visit Undergraduate Admissions.

Registration

All courses administered through the Division of Continuing Studies have limited enrolment and all registrations require approval from DCS.

Undergraduate Course Registration

Students admitted to the undergraduate programme can register for distance learning courses using the RMC of Canada Portal during the registration period. Course registrations are not accepted over the phone. In exceptional circumstances they may be accepted if sent by fax, but use of facsimile must be pre-authorized by a Programme Representative. DCS undergraduate course registrations are not processed until payment has been confirmed.

It is strongly recommended that students register for and complete junior-level courses prior to attempting any senior-level undergraduate courses. Please refer to UG Important Academic Dates for the registration periods.

Fees

The fees are listed at: RMC of Canada Fees.

Academic Reimbursement

All fee-paying students can print their tuition fees receipt and tuition income tax receipt via the RMC of Canada portal.

Military members should consult DAOD 5031-3 for academic reimbursement procedures or consult their local Base/Wing/Unit Education Officer or Personnel Selection Officer.

Letters of Permission

RMC of Canada Continuing Studies students who wish to take courses at other institutions for credits towards their degree programme must obtain prior written permission in the form of a letter of permission. The course(s) so taken must satisfy a requirement identified in the student's programme plan. Failure to obtain permission prior to the course start date may result in credits not being acceptable. A course calendar description must be submitted with the written request, as well as a Request for a Letter of Permission. The amount of instructional hours should be clearly indicated. Normally, at least four weeks should be allowed for the request to be processed.

It should be noted that RMC of Canada is a partner of the Canadian Virtual University (CVU), a consortium of Canadian universities offering programmes and courses that can be completed at a distance. Universities that are partners in this consortium have agreed to waive the fees normally levied for the processing of a Letter of Permission when the student is registered in a programme of study at a university that is a partner of CVU.

Language Centre

Aim

Note: *All students who do not achieve the "exemption" level of bilingualism on initial testing are required to take second language.*

The aim of the Language Centre is to enable students to function well in their second language as officers of the Canadian Armed Forces.

Every effort is made to ensure that students become bilingual in the shortest possible time. Classes are small, with a maximum of 10 students. Five periods, each lasting 50 minutes, are timetabled for each week of the academic year. The learning process is given a practical aspect by the frequent use of technology. Classroom activities are designed to promote a high level of participation by the student. Students who have not reached the appropriate fluency level by the end of their second year take an intensive summer course of 250 hours.

Official testing is granted when students reach an acceptable level; the tests determine whether they have achieved a satisfactory rate of progress, they also indicate their actual level via a linguistic profile.

Language Centre Director

Mr. R.P. Paquet, B.A., M.A. (Laval)

Athletic Department

Athletic Director / Head of the Department of Athletics
Mr. D. Cates, BKin, MA

Administrative Assistant
Mrs. Patricia Bennett

Telephone: 613-541-6000 ext. 6019

Varsity

Varsity Manager
Mr G. Dubé, BComm (SPAD)

Varsity Coordinator
Mr J. Girard, CD

Fencing programme Coordinator and Head Coach
Mrs P. Howes, CHPC - BA, National Coaching Institute diploma in high performance coaching, NCCP IV Fencing, Accreditation Maître d'Armes

Men's Hockey programme Coordinator and Head Coach
Mr A. Shell, BCOM, CA, NCCP Level 2

Men's Rugby programme Coordinator and Head Coach / Sports Information Officer
Mr S. McDonaugh, BEd (Phys ed), BA (Psych)

Men's Soccer programme Coordinator and Head Coach
Mr V. Mendes, HR Marketing, Ontario Soccer Association Provincial "B"

Men's Volleyball programme Coordinator and Head Coach
Mr S. Leknois, CD I, NCCP III Volleyball

Women's Soccer programme Coordinator and Head Coach
Mr C. Beaulieu, National Coaching Institute diploma in high performance coaching, BSc H.K., NCCP IV Soccer, Ontario Soccer Association Provincial "B" License

Women's Volleyball programme Coordinator and Head Coach
Ms. Joely Christian, BA (Applied Studies), NCCP Level 3

Athletic Therapist
Ms J. Hudson, CAT I

Physical Education

Physical Education Manager
Mr S. Robert, BSc (HK), CSEP-CEP, NSCA-CPT, NCCP Level I- Olympic Weightlifting, PICP Level II- Strength and Conditioning Specialist, Commando Krav Maga Level 3 Instructor, STW Level I – Fascial Stretch Therapist, CHEK HLC Level 1

Physical Educator Aquatic programme Coordinator
Mr N.J.M. Breuvart, CD, CSEP-CPT, NCCP I Soccer, NLS Instructor and Examiner, NLS Open Water, Swimming Inst, Bronze Sail IV Sailing, Canoe Inst Level I, First Aid Inst, Personal Trainer Level I SPI

Physical Educator Collective Sports programme Coordinator
Ms K. Mazerolle, BKin, CSEP-CEP, NLS, NCCP II Volleyball, Basketball, Special Olympics, FMS Level 1 and 2, SPI - Personal Trainer, Can-Fit Pro - FIS, BOSU Trainer, Fitness Kickboxing, Jump Rope Level I, Rappel Master (Tower), Commando Krav Maga Level 2 Instructor

Physical Educator Curriculum Development Coordinator
Mr T. Deren, BSc (HK), MSc, CSEP-CEP, FMS Level I, NCCP Level I

Physical Educator Evaluation programme Coordinator
Mr S. Mitchell, BA Kin, CSEP-CEP, CSCS, NCCP Level I – Olympic Weightlifting, Rapple Master (Tower), Commando Krav Maga Level 2 Instructor

Physical Educator Individual Sports programme Coordinator
Mr B. Bennett, CD, CSEP-CPT, NCCP II Volleyball, Commando Krav Maga Level 2 Instructor

Physical Educator Military Skills programme Coordinator
Mr J. Blanchet, CD, CSEP - CPT, Rappel Master

Physical Educator Supplementary Physical Training Instructor
Ms E. Thompson, BKin, CSEP-CEP, NLS, FMS Level I and II

Physical Educator Combative programme Coordinator
Mr J. Ridley, B.Eng.Sc, CSEP-CPT, CHEK I, NCCP III Theory, 4th Dan Master Instructor taekwondo, 1st Dan Hapkido, Commando Krav Maga Level 3 Instructor

Recreation and Intramural

Recreation and Intramural Manager
Mrs E. Gibson B.A. Soc, NCCP Level 1 Gymnastics, NCCP Coach Stream Hockey

Recreation Coordinator
Mr Craig Palmer, CSEP-CEP, B.A. Honours Kinesiology

Intrmural Coordinator
Mr Ryan Thompson, CSEP-CPT, Honours Sports Management

General Information

Mission

As an integrated part of the Royal Military College, the Athletic Department supports the mission of RMC of Canada by providing operationally oriented physical education, competitive intramural sports, varsity and recreational club programmes for officer-cadets. These programmes provide extensive leadership development opportunities in an atmosphere that helps instill the values of the Canadian Forces, the College and the Department. This is achieved through mandatory Cadet involvement in physically and mentally challenging activities.

Vision

The Athletic Component of the Royal Military College will provide programmes of excellence that contribute to the development of outstanding leaders for the CAF who value physically active and healthy lifestyles. These programmes will enhance the national reputation and profile of the College and help attract outstanding athletes.

Values

Loyalty
to your team and/or squadron including obedience of superiors, e.g., coaches and team captains. Loyalty should always be upward first.

Integrity
hinges on consistently giving precedence to ethical values in our decisions and actions.

Courage
Physical courage is a self-evident requirement for contact sports. Moral courage, related to integrity, is also necessary.

Diligence
Persistence, hard work, meticulous attention to detail and perfection of athletic skills all describe diligence in the athletic context.

Fairness
implies treating people, groups and situations justly, equitably, and without bias.

Responsibility
is the ethical obligation that exercises and maintains integrity. Responsibility implies an obligation to be accountable, competent, and caring.

Excellence
the desire to pursue excellence is fundamental to being an outstanding leader and officer.

Physically Active and Healthy Lifestyle
to maintain a good personal level of physical fitness and a healthy body.

Perseverance
striving to finish and/or to win against seemingly insurmountable obstacles, difficulties, pain and/or setbacks.

Goals and Strategies

The Athletic Department's goal is to help attract high quality officer candidates and to develop them into outstanding junior leaders.

Goals in the Department can be described as department or programme oriented and are as follows:

- to maintain diverse athletic programmes, i.e., Physical Education, Competitive Intramural Sports, Varsity and Recreation;
- to provide athletic programmes that encourage and provide opportunities for development of leadership, physical fitness and a healthy lifestyle;
- to take advantage of the flexible and willing support of the RMC of Canada Club and Foundation;
- to take advantage of the Red and White Club for recruiting varsity athletes;
- to take advantage of the reduced Varsity programme to focus and increase College support for the remaining Varsity sports;
- to increase the presence of the RMC of Canada Athletic Department on the Internet and in local, provincial and national media;
- to improve upon the historic performance of RMC of Canada Varsity teams;
- to gain greater control or influence over the recruiting and selection process for candidates to facilitate the recruiting of Varsity athletes;
- to provide recruiting centres, through the Red and White Club, with accurate and correct Athletic Department information for new recruits;
- to acquire expanded facilities to facilitate RMC of Canada hosting of athletic events and competitions;
- to establish a stable departmental budget; and to contribute to the rationalization and coordination of demands on officer-cadets' time.

Facilities and Equipment

RMC of Canada's athletic facilities are shared with those of CFB Kingston and include a large triple wood floor gymnasium with various combinations of basketball, volleyball and badminton courts; one field house which includes one 200-meter indoor track and four large sports courts; one 25-meter, 8 lanes pool; one small warm-up pool; one weight training and cardio area; an arena; eight soccer fields; five outdoor tennis courts; six squash courts, two martial arts rooms, and an artificial turf field covered year round by an air supported dome.

With its location on Lake Ontario, the College has excellent facilities for recreational sailing and boating.

In addition to the athletic facilities, use is made of nearby military recreation facilities, which include an eighteen-hole golf course and a curling rink.

Equipment is provided for participation in the Physical Education programme, Varsity programme, Competitive Intramural Sports programme and Recreational programme.

Programmes

Physical Education Programme

The aim of the Physical Education Programme is to:

- develop a basic knowledge of physical education theory and philosophy;
- develop physical fitness through a programme of strenuous physical activities;
- develop sports skills and introduce the fundamentals of team play as commonly practiced by members of the Canadian Forces (CAF);
- develop skills in lifetime sports which have both a social and a fitness value;
- develop leadership and organizational abilities through opportunities in various team and individual activities; and
- award military and/or civilian recognized qualifications

Officer Cadets participate in two consecutive compulsory 50 min periods. The Physical Education Programme is divided in two folds:

- the development and maintenance of a high level of physical fitness which will enable all officer cadets to attain the required standard on the Royal Military College physical fitness test; and
- the development of officer cadets who are knowledgeable and experienced in fitness training methods, who are capable of performing a variety of sports skills and military activities, and who have the ability to organize and administer athletic events.

Physical fitness testing takes place two times a year i.e. during the Fall and Winter Academic semesters.

PPT and FORCE Evaluation

To meet the Athletic component Leadership level Progression (LLP) requirement students must successfully pass the Personal Physical Test (PPT) Standards as outlined in the Course training Plan (CTP). Further, every officer cadet must pass the Canadian Forces Minimum Physical Fitness Standard (MPFS) in accordance with CAF policy. Currently the FORCE Evaluation is the MPFS.

Varsity Programme

The aim of the varsity programme is to achieve competitive excellence. This will mean different things to different sports; however, the aim in general is that:

- RMC of Canada become a highly respected opponent in terms of competitive challenge and sportsmanship;
- RMC of Canada is the smallest university member of the Canadian Interuniversity Sport (CIS) with a student population of 900 officer-cadets in the undergraduate programme. It has to overcome a talent deficit through recruiting, outstanding preparation and performance;
- provide an opportunity for students to participate in organized, highly-skilled and competitive athletics;
- instill, through the demands of training and competition, self-discipline, the desire to excel and willingness to compete in a team effort;
- create a college "esprit de corps;"
- provide an opportunity for interaction with other contemporary university athletes thereby bringing RMC of Canada into the focus of the civilian community;
- improve physical fitness; and
- provide leadership opportunities.

The Royal Military College of Canada offers an extensive varsity sports programme for students capable of participating at a higher skill level.

RMC of Canada competes as a member of the Ontario University Athletics (OUA) in the following sports: fencing (men and women), hockey (men), rugby (men), soccer (men and women) and volleyball (men and women).

The varsity programme is an extension of the physical education programme and thus contributes to the achievement of the overall aim by instilling a high degree of self-discipline, the desire to excel, and the willingness to sacrifice personal interest for coordinated team effort. The Varsity Programme also provides an opportunity for involvement with contemporary university students, thereby bringing the Royal Military College of Canada into the focus of the civilian community.

Competitive Club Programme

The aim of the Competitive Club Programme is to provide members the opportunity for training and competition that is appropriate for their level of competition. While in their competitive season, members are exempted from the Intramural Sports Programme allowing them more time to develop and improve their skills.

The clubs compete in various competitions at the Local, National and International level in the following sports: Rowing, Running (Cross-Country and Track), Sailing, Swimming, Taekwondo and Women's Rugby.

Intramural Sports Programme

The Intramural Sports Programme has a two-fold purpose.

1. **First,** it provides each cadet with the opportunity to develop sports skills and apply the principles, which are taught in the Physical Education Programme.
2. **Second,** it provides each cadet with the opportunity to compete in a variety of team sports on a weekly basis.

The Intramural Sports Programme is composed of sports leagues within the college, where each squadron forms teams to compete. The programme is compulsory for cadets who are not varsity or competitive club athletes

The fall and winter term Intramural Sports Programme offers leagues such as soccer, hockey, ultimate, handball, water polo, ball hockey, basketball, dodgeball, and flag football. Optional Intramural sports offered are badminton, pickle ball, tennis and squash.

The programme is organized on a seasonal basis. The fall programme runs from October to the end of November, and the winter programme runs from January to the end of March. Responsibility for the day-to-day operation of the programme is given to the cadets themselves under the supervision of the Intramural Coordinator, thus affording them an opportunity to develop qualities of leadership. In addition to playing, cadets are expected to learn and carry out the duties of team captains, game officials, and league convenors.

All officer cadets must participate in the Cadet Wing Sports Days offered each Fall and Winter. Additional Wing tournaments are organized for various activities such as flag football, Ball hockey, soccer, ultimate and beach volleyball.

All officer cadets must participate in the Cadet Wing Sports Days which include Tabloids, the Harrier cross- country race and Winter Sports Day. The Wing tournaments normally offer activities such as flag football, Ball hockey, soccer, ultimate and beach volleyball.

Recreational Programme

The aim of the RMC of Canada Recreational Programme is to:

- Offer a diversified program that supports the interests of the OCdts;
- Provide opportunities for leadership training and development;
- Increase visibility by promoting club accomplishments;
- Offer an enjoyable program that increases morale;
- Promote a balanced lifestyle

The RMC of Canada Recreation Association includes 18 Recreational Clubs and 6 Competitive Clubs. All students and staff at RMC of Canada are permitted and encouraged to participate in the Recreational Program. The Competitive Clubs are: Rowing, Running, Sailing, Swimming, Taekwondo and Women's Rugby. The list of recreational clubs is subject to change depending on the interest but they currently are: Astronomy, Climbing, Chess, Curling, Debating, Judo, Expedition, Paintball/Airsoft, Photography, Flying, Rowing, Running, Sailing, Scuba, Skydiving, Stage Band, Swimming, Taekwondo, Theatre, Multisport, War Games, Windsurfing, Women's Rugby and Yacht.

Course Descriptions

ATH1 PSC1

The first year athletics programme is aimed at giving officer cadets the tools to take charge of their personal fitness and health in preparation to lead military members in physical training in their future careers. Topics covered include the principles of strength and conditioning (S&C) (i.e. warm ups, cool downs, basic movement patterns in S&C, running training, energy systems training, building a training program), aquatics, Health, and introduction to combative. There is a practical exam for the strength and conditioning section, and a written exam for the S&C and health topics. They are also required to complete the Basic Military Swim Standard test.

ATH2 Sports

The second year programme offers a variety of elective sport courses where officer cadets select one course per term. Each course includes instruction in 2 sports of the same genre (i.e. Stick Sports, Racquet Sports, Field Sports, Court Sports, Aquatic Sports).. The second year programme outcomes include learning the basic rules and skills of the sport so that they can lead a sport session for PT with military members in their future roles in the CAF. There is a practical skills assessment and rules quiz for each sport covered in the course. Further each OCdt will be evaluated on their skills as Class Leader. Class Leader responsibilities include sport session plan, session attendance and introduction, warm up, and cool down. The Class Leader portion is there to prepare OCdt to bridge the gap between being a follower in PT (I year) to being a leader in a sport or PT session (III and IV year).

ATH3 MCSK

The third year programme exposes OCdts to a physical environment outside of their comfort zone in which they will develop self-confidence, self-efficacy, and leadership opportunities in a military skills and combative environment. This is the aspect that RMC calls “education with a difference”. Skills covered include rappelling, waterborne training, and combative training. There are practical evaluations in each of the three areas of instruction.

ATH4 Enhancement Activity

The fourth year programme offers enhancement opportunities to the OCdts to provide more in-depth instruction on areas already taught in the PE program, introduce them to new skills that will enhance active living as individuals when they graduate , or provide them with certifications that they can use in the future either as a CAF member or for personal use. OCdts have a choice of courses which include canoeing, rock climbing, Rappel Master Course, advance strength and conditioning, swimming and life guarding, advanced combative, racquet sports, yoga, and spinning leadership. Evaluations in this course may include either a practical or written test.

Professional Military Training

General Information

Purpose

The main purpose of the Military Component is to identify, develop, and consolidate the moral qualities and ethical values which are essential for a military officer. These qualities and values include: honesty, loyalty, integrity, honour, and courage. These are also very effectively captured in the College's motto of "TRUTH, DUTY, VALOUR."

The Military Component also develops and prepares OCdts to function effectively within the College and Cadet Wing organization.

Training Cell

The Military Component of the ROTP, RETP, and UTPNCM programs at RMC of Canada provide Professional Military Training during the academic year. This Component is compulsory for all OCdts in all years.

Programme Design

Introduction

The personal, team, and leadership skills and values required of an officer must be exercised on a continuous basis, at all times, in all places, in all situations. The Military Component provides the necessary forum for the development and assessment of these qualities by exposing OCdts to a wide variety of training scenarios.

Focus by Year

The programme is designed to achieve three important transformations in the officer candidates over the four years at RMCC of Canada. These are: adolescent to adult, imposed discipline to self-discipline, and followership to leadership. The emphasis by year is as follows:

1st year: Personal Development, Followership, Teamwork

2nd year: Personal Development, Teamwork, prepare for Leadership positions

3rd year: Personal development, Leadership

4th year: Personal development, Leadership, prepare for Commissioning

Courses of Study

There are six main areas of competence, which are identified as Performance Objectives (PO's). These can be considered as courses of study, using a combination of formal classroom instruction and a wide variety of practical exercises. The six PO's are:

- General Military Knowledge
- Personal Attributes
- Teamwork
- Leadership
- Communications, and
- Drill

Programme Delivery

Three periods per week are allocated for drill classes or other formal military instruction. Weapons and refresher training is completed during Division Training Weekends. Additional training, professional development, and occupation and element-specific exposure are also provided on chosen weekends throughout the academic year. Practical leadership and teamwork activities such as dress and room inspections in addition to Squadron level parades are scheduled on weekday mornings. Wing and College level activities take place during Duty Weekends as listed in the Table at the end of this Section.

In third and fourth year, OCdts are appointed to various command and staff positions known as “Bar Positions” in order to provide semester-long development and assessment opportunities.

Equivalences and Credits

The military record of service for OCdts in the UTPNCM programme, or for OCdts in the ROTP and RETP programmes who have previous military service, is reviewed upon joining RMCC of Canada. Previous training may be accepted for credits under the Military Component.

Training Periods

In addition to the two periods per week scheduled during the day (0800-1630), the following periods are used to deliver the Military Component:

Legend: A = All **D** = Designated **E** = Elective / Optional **S** = If / When Scheduled

Fall Semester

Activities	Year 1	Year 2	Year 3	Year 4	Note(s)
Cadet Wing Start-of-Year Weekend	A	A	A	A	
Reunion Weekend	A	A	A	A	
Battle of Britain	D	D	D	D	
Remembrance Day	A	A	A	A	
Wing Sports Day (Fall)	A	A	A	A	
Christmas Ball	A	E	E	A	

Winter Semester

Activities	Year 1	Year 2	Year 3	Year 4	Note(s)
Mess Dinner				A	1 per environment
Wing Sports Day	A	A	A	A	
West Point Weekend	A	A	A	A	
MOC Weekend	A	A	A		
Colour Party Competition			D		
Sandhurst Competition	D	D	D	D	
Sports Awards Ceremony	A	A	A	A	
Copper Sunday/Battle of Atlantic Weekend	A	A	A	A	
Graduation Weekend	A	A	A	A	

Course Descriptions

General Military Knowledge

The PO covers general knowledge regarding Canadian Forces policies and regulations such as drugs and alcohol, harassment, counselling, duties and responsibilities, etc.. This PO also covers RMCC of Canada-specific knowledge such as College history, organization, Cadet Wing structure, etc..

Personal Attributes

Officers in the Canadian Forces must exhibit exemplary conduct and deportment at all times. Such conduct stems from well-developed personal character traits such as honesty, integrity, loyalty, self-respect, respect of others, responsibility, and courage. It includes the concept of "service before self," and the development of a work and play ethic to bring out the best in individuals and subordinates. These traits are developed and assessed throughout the 4yr programme.

Teamwork

Teamwork and cooperation are essential elements of a successful military unit. This PO provides practical opportunities for team building and fostering esprit-de-corps. It also develops the necessary confidence and trust in peers. The PO stresses the need to become a good follower and team player in order to become a good leader.

Leadership

The core element of officership is leadership. This PO provides practical opportunities to develop and practice leadership in a wide variety of scenarios. All opportunities for leadership, including Cadet Wing bar appointments, sports team captains, class leaders, class seniors, project and event organizers, etc.. are exploited to expose OCdts to leadership challenges, and to assess their development and performance. The minimum requirement for successful completion of the programme is to perform satisfactorily as a Cadet Section Commander for one semester in either third or fourth year.

Communications

This PO is follow-on to the material commenced during BOTP, and concentrates on the development of essential written and oral communication skills. These skills form a cornerstone of leadership and will be needed for all aspects of RMCC of Canada life.

Drill

Drill is a powerful method to develop individual pride, mental alertness, precision, and esprit de corps which will assist OCdts to carry out orders instinctively and immediately at all times. The attainment of good discipline calls for a high development of personal qualities, particularly self-control and cooperation. Drill and formal parades are designed to develop these qualities so that their practice becomes habitual and will persist under the strain of activities in peace and war. This PO will teach OCdts foot, rifle, and sword drill, and will place OCdts in increasing levels of authority and responsibility on the parade square in order to further develop their self-confidence and bearing.

NAME	POSITION	DEPARTMENT
Capt CA Williams	Assistant Professor	Chemistry And Chemical Engineering
Capt L Carnduff	Assistant Professor	Chemistry And Chemical Engineering
Capt M.R. McTaggart	Assistant Professor	Chemistry And Chemical Engineering
Dr. Thurgood	Associate Professor	Chemistry And Chemical Engineering
Dr. B Reck	Associate Professor	Chemistry And Chemical Engineering
Dr. BA Zeeb	Professor	Chemistry And Chemical Engineering
Dr. BJ Lewis	Professor Emeritus	Chemistry And Chemical Engineering
Dr. C Malardier-Jugroot	Professor	Chemistry And Chemical Engineering
Dr. DG Kelly	Associate Professor	Chemistry And Chemical Engineering
Dr. E Corcoran	Associate Professor	Chemistry And Chemical Engineering
Dr. EF Dickson	Associate Professor	Chemistry And Chemical Engineering
Dr. FS Zeman	Assistant Professor	Chemistry And Chemical Engineering
Dr. GM Torrie	Professor Emeritus	Chemistry And Chemical Engineering
Dr. HWJ Bonin	Professor	Chemistry And Chemical Engineering
Dr. J Scott	Associate Professor	Chemistry And Chemical Engineering
Dr. J.G. Beltran	Assistant Professor	Chemistry And Chemical Engineering
Dr. JB Amphlett	Professor Emeritus	Chemistry And Chemical Engineering
Dr. JP Laplante	Professor Emeritus	Chemistry And Chemical Engineering
Dr. JYSD Page	Dept Head: Chemistry And Chemical Engineering	Chemistry And Chemical Engineering
Dr. KAM Creber	Professor Emeritus	Chemistry And Chemical Engineering
Dr. KJ Reimer	Professor Emeritus	Chemistry And Chemical Engineering
Dr. KM Jaansalu	Associate Professor	Chemistry And Chemical Engineering
Dr. KP Weber	Associate Professor	Chemistry And Chemical Engineering
Dr. L Piché	Assistant Professor	Chemistry And Chemical Engineering
Dr. LGI Bennett	Professor Emeritus	Chemistry And Chemical Engineering
Dr. M Greenwood	Research Grants Officer & Professor	Chemistry And Chemical Engineering
Dr. M.-A.F.L. Meunier	Assistant Professor	Chemistry And Chemical Engineering
Dr. MD Douma	Assistant Professor	Chemistry And Chemical Engineering
Dr. MJB Evans	Professor Emeritus	Chemistry And Chemical Engineering
Dr. O Lebel	Associate Professor	Chemistry And Chemical Engineering
Dr. P Chan	Professor	Chemistry And Chemical Engineering
Dr. PA Bodurtha	Assistant Professor	Chemistry And Chemical Engineering
Dr. PJ Bates	Vice Principal Academics	Chemistry And Chemical Engineering
Dr. PR Roberge	Dean of Continuing Studies / CFMC	Chemistry And Chemical Engineering
Dr. RD Weir	Professor Emeritus	Chemistry And Chemical Engineering
Dr. RF Mann	Professor Emeritus	Chemistry And Chemical Engineering
Dr. RH Pottier	Professor Emeritus	Chemistry And Chemical Engineering
Dr. SA Creber	Assistant Professor	Chemistry And Chemical Engineering
Dr. VSL Langlois	Associate Professor	Chemistry And Chemical Engineering
Dr. VT Bui	Professor Emeritus	Chemistry And Chemical Engineering
Dr. W.J. Lewis	Professor Emeritus	Chemistry And Chemical Engineering
Dr. WS Andrews	Professor	Chemistry And Chemical Engineering
Dr. WT Thompson	Professor Emeritus	Chemistry And Chemical Engineering
Mr. B Zazoum	Contractual - Assistant Professor	Chemistry And Chemical Engineering
Mr. J McCallum	Lecturer	Chemistry And Chemical Engineering

NAME	POSITION	DEPARTMENT
Mr. M Farahani	Lecturer	Chemistry And Chemical Engineering
Mrs. IS Jansons	Lecturer	Chemistry And Chemical Engineering
Capt M.P.C. Douglas	Lecturer	Civil Engineering
Capt SA Fraser	Lecturer	Civil Engineering
Capt SW Holt	Lecturer	Civil Engineering
Dr. BB Dececchi	Assistant Professor	Civil Engineering
Dr. D Chenaf	Associate Professor	Civil Engineering
Dr. DR Hamilton	Contractual - Associate Professor	Civil Engineering
Dr. F Kassimi	Assistant Professor	Civil Engineering
Dr. G Akhras	Professor	Civil Engineering
Dr. GA Siemens	Professor	Civil Engineering
Dr. GR Wight	Professor	Civil Engineering
Dr. JA Stewart	Professor Emeritus	Civil Engineering
Dr. M Hulley	Acting Dept Head: Civil Engineering	Civil Engineering
Dr. M Tetreault	Dept Head: Civil Engineering	Civil Engineering
Dr. MA Dagenais	Assistant Professor	Civil Engineering
Dr. MA Erki	Professor Emeritus	Civil Engineering
Dr. N Vlachopoulos	Associate Professor	Civil Engineering
Dr. N. Bencharif	Professor	Civil Engineering
Dr. P Lamarche	Assistant Professor	Civil Engineering
Dr. PJ Heffernan	Dean of Graduate Studies & Vice Principal Research	Civil Engineering
Dr. R. Beddoe	Assistant Professor	Civil Engineering
Dr. RJ Bathurst	Professor	Civil Engineering
Maj J.A.T. Allen	Lecturer	Civil Engineering
Mr. CT Shyu	Lecturer	Civil Engineering
Mr. S Watt	Lecturer	Civil Engineering
Dr. A Chapnick	Associate Professor	Defence Studies
Dr. AC Okros	Professor	Defence Studies
Dr. B Falk	Associate Professor	Defence Studies
Dr. C Madsen	Professor	Defence Studies
Dr. C Pahlavi	Associate Professor	Defence Studies
Dr. CR Spearin	Associate Professor	Defence Studies
Dr. G Scoppio	Associate Professor	Defence Studies
Dr. JAE Ouellet	Associate Professor	Defence Studies
Dr. JC Stone	Associate Professor	Defence Studies
Dr. PT Mitchell	Professor	Defence Studies
Dr. WH Dorn	Professor	Defence Studies
Mr. M Chennoufi	Assistant Professor	Defence Studies
Capt A Lapointe	Lecturer	Electrical And Computer Engineering
Capt J Guignion	Lecturer	Electrical And Computer Engineering
Capt J.C. Lloyd	Lecturer	Electrical And Computer Engineering
Capt J.R. Paquet	Lecturer	Electrical And Computer Engineering
Dr. A Noureldin	Professor	Electrical And Computer Engineering
Dr. AF Okou	Associate Professor	Electrical And Computer Engineering
Dr. B Mongeau	Professor Emeritus	Electrical And Computer Engineering
Dr. CD Shepard	Professor Emeritus	Electrical And Computer Engineering

NAME	POSITION	DEPARTMENT
Dr. CN Rozon	Professor Emeritus	Electrical And Computer Engineering
Dr. D Al-Khalili	Professor Emeritus	Electrical And Computer Engineering
Dr. D Mcgaughey	Professor	Electrical And Computer Engineering
Dr. DE Bouchard	Dean of Engineering	Electrical And Computer Engineering
Dr. F Chan	Associate Professor	Electrical And Computer Engineering
Dr. G Drolet	Associate Professor	Electrical And Computer Engineering
Dr. GS Knight	Dept Head: Electrical And Computer Engineering	Electrical And Computer Engineering
Dr. J.P.S.S. Leblanc	Associate Professor	Electrical And Computer Engineering
Dr. JB Plant	Professor Emeritus	Electrical And Computer Engineering
Dr. JD Wilson	Professor Emeritus	Electrical And Computer Engineering
Dr. JGA Beaulieu	Associate Professor	Electrical And Computer Engineering
Dr. JR Bray	Associate Professor	Electrical And Computer Engineering
Dr. M Hefnawi	Associate Professor	Electrical And Computer Engineering
Dr. MH Rahman	Professor Emeritus	Electrical And Computer Engineering
Dr. MT Tarbouchi	Professor	Electrical And Computer Engineering
Dr. N Chabini	Associate Professor	Electrical And Computer Engineering
Dr. PE Allard	Professor Emeritus	Electrical And Computer Engineering
Dr. R.V. Roberge	Assistant Professor	Electrical And Computer Engineering
Dr. S Amari	Professor	Electrical And Computer Engineering
Dr. S. Givigi	Assistant Professor	Electrical And Computer Engineering
Dr. U. Iqbal	Contractual - Research Assistant	Electrical And Computer Engineering
Dr. WG Phillips	Associate Professor	Electrical And Computer Engineering
Dr. YMM Antar	Professor	Electrical And Computer Engineering
Dr. YT Chan	Professor Emeritus	Electrical And Computer Engineering
Lt(N) WA Andre	Assistant Professor	Electrical And Computer Engineering
Maj G.P.M. Vigeant	Lecturer	Electrical And Computer Engineering
Maj P.T. Jardine	Lecturer	Electrical And Computer Engineering
Maj RB Hartmann	Lecturer	Electrical And Computer Engineering
Ml D Dwyer	Communications Support Specialist & Lecturer	Electrical And Computer Engineering
Mr. M. Bagherzadeh	Lecturer	Electrical And Computer Engineering
Mr. R. Beguenane	Associate Professor	Electrical And Computer Engineering
Mrs. A. Khalil	Assistant Professor	Electrical And Computer Engineering
Mrs. SL Smith	Lecturer	Electrical And Computer Engineering
Dr. C Dale	Lecturer	English
Dr. C Hamelin	Instructional Designer & Lecturer	English
Dr. CM Lavoie	Associate Professor	English
Dr. D Tracy	Assistant Professor	English
Dr. E Behrisch Elce	Associate Dean of Arts (Program)	English
Dr. H Evans	Assistant Professor	English
Dr. H Luu	Assistant Professor	English
Dr. HE Osborne	Dept Head: English	English
Dr. IH Streight	Associate Professor	English
Dr. J Hardwick	Assistant Professor	English
Dr. J Sexton	Contractual - Assistant Professor	English
Dr. L Robinson	Professor	English
Dr. L Shirinian	Professor Emeritus	English

NAME	POSITION	DEPARTMENT
Dr. M Hurley	Professor	English
Dr. N Norris	Assistant Professor	English
Dr. PS Sri	Professor Emeritus	English
Dr. SE Johnson	Assistant Professor	English
Dr. SJ Lukits	Associate Professor	English
Dr. SR Bonnycastle	Professor Emeritus	English
Dr. TB Vincent	Professor Emeritus	English
Maj AD Belyea	Assistant Professor	English
Mr. J Tambar	Assistant Professor	English
Mr. K Singh	Assistant Professor	English
Ms. V. A. Hamilton	Contractual - Lecturer	English
Dr. A Caumartin	Assistant Professor	French Studies
Dr. F Offredi	Assistant Professor	French Studies
Dr. FE Boucher	Dept Head: French Studies	French Studies
Dr. G Quillard	Professor Emeritus	French Studies
Dr. IMA Tremblay	Assistant Professor	French Studies
Dr. JL Le Ber	Contractual - Assistant Professor	French Studies
Dr. MA Benson	Professor	French Studies
Dr. P Landry	Assistant Professor	French Studies
Dr. PA Lagueux	Assistant Professor	French Studies
Dr. S Bastien	Professor	French Studies
Dr. S Ech Cherif El Kettani	Associate Professor	French Studies
Dr. S.A.H. Bélanger	Professor	French Studies
Capt AW Gullachsen	Lecturer	History
Dr. AH Ion	Professor Emeritus	History
Dr. B Lemay	Assistant Professor	History
Dr. B Martyn	Assistant Professor	History
Dr. B Richard	Assistant Professor	History
Dr. BJC Mckercher	Professor Emeritus	History
Dr. C DesRoches	Assistant Professor	History
Dr. CL Mantle	Assistant Professor	History
Dr. D.K. Varey	Assistant Professor	History
Dr. DE Delaney	Professor	History
Dr. E.J. Spencer	Assistant Professor	History
Dr. EJ Errington	Professor Emeritus	History
Dr. F Gendron	Professor Emeritus	History
Dr. HGC Coombs	Assistant Professor	History
Dr. HP Klepak	Professor Emeritus	History
Dr. J Kenny	Dept Head: History	History
Dr. J Lamarre	Professor	History
Dr. JC Perrun	Contractual - Assistant Professor	History
Dr. KT Brushett	Chair: Military and Strategic Studies	History
Dr. M Deleuze	Acting Chair of War Studies	History
Dr. M Djebabla	Contractual - Assistant Professor	History
Dr. M Doucet	Assistant Professor	History
Dr. M Fitzpatrick	Assistant Professor	History

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Dr. MA Hennessy	Associate Vice Principal Research	History
Dr. N Dreisziger	Professor Emeritus	History
Dr. N Gardner	Associate Professor	History
Dr. R Carrier	Assistant Professor	History
Dr. R Engen	Assistant Professor	History
Dr. R Legault	Professor	History
Dr. R.W. Stouffer	Associate Professor	History
Dr. RA Prete	Professor Emeritus	History
Dr. RG Haycock	Professor Emeritus	History
Dr. RT Wakelam	Associate Chair of War Studies	History
Dr. SM Maloney	Professor	History
LCol CG Magee	Assistant Professor	History
LCol(Ret'd) DL Bashow	Associate Professor	History
LGen(Ret'd) JOM Maisonneuve	Professor	History
Maj J.R. Grodzinski	Assistant Professor	History
Maj(Ret'd) G.M. Boire	Lecturer	History
Ms. SJ Toomey	Chief Librarian	History
Dr. A Gianotti	Second Language Teacher	Language Centre
Mr. B Séguin	Second Language Teacher	Language Centre
Mr. D Maltais	Second Language Teacher	Language Centre
Mr. R Paquet	Language Center Director	Language Centre
Mrs. C Fournier	Second Language Teacher	Language Centre
Mrs. C Lord	Second Language Teacher	Language Centre
Mrs. C Tremblay	Second Language Teacher	Language Centre
Mrs. CM Perron	Second Language Teacher	Language Centre
Mrs. E St-Pierre	Second Language Teacher	Language Centre
Mrs. G Vieth-Bell	Second Language Teacher	Language Centre
Mrs. L Trifu	Second Language Teacher	Language Centre
Mrs. M Ouattara	Second Language Teacher	Language Centre
Mrs. MP Veillette	Second Language Teacher	Language Centre
Mrs. MTB Thivierge-Bournival	Senior Language Teacher	Language Centre
Mrs. S Gauthier	Senior Language Teacher	Language Centre
Ms. A Riel	Second Language Teacher	Language Centre
Ms. A Thibault	Second Language Teacher	Language Centre
Ms. C Labrosse	Second Language Teacher	Language Centre
Ms. L Lemieux	Second Language Teacher	Language Centre
Ms. M Pelletier	Second Language Teacher	Language Centre
Ms. M-F. B. Côté	Second Language Teacher	Language Centre
Capt G Campbell	Contractual - Lecturer	Management and Economics
Dr. A Khazri	Assistant Professor	Management and Economics
Dr. A St Pierre	Professor	Management and Economics
Dr. BJ Paterson	Assistant Professor	Management and Economics
Dr. BW Simms	Professor	Management and Economics
Dr. F Youssofzai	Associate Professor	Management and Economics
Dr. GT Pond	Associate Professor	Management and Economics
Dr. H Motaghi	Contractual - Assistant Professor	Management and Economics

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Dr. J Gueyie	Contractual - Assistant Professor	Management and Economics
Dr. J.S. Denford	Acting Dean of Arts	Management and Economics
Dr. JS Cowan	Professor Emeritus	Management and Economics
Dr. LC McDonough	Professor Emeritus	Management and Economics
Dr. MD Douch	Associate Professor	Management and Economics
Dr. N Berube	Associate Dean of Continuing Studies	Management and Economics
Dr. N Essaddam	Professor	Management and Economics
Dr. O Secrieru	Dept Head: Management and Economics	Management and Economics
Dr. P Paquette	Professor	Management and Economics
Dr. T Dececchi	Associate Professor	Management and Economics
Dr. UG Berkok	Associate Professor	Management and Economics
Dr. WJ Graham	Associate Professor	Management and Economics
Dr. WJ Hurley	Professor	Management and Economics
Dr. Y Dakey	Contractual - Assistant Professor	Management and Economics
LCol CG Selkirk	Assistant Professor	Management and Economics
LCol(Ret'd) TW Loveridge	Assistant Professor	Management and Economics
Lt(N) NDR Moulson	Assistant Professor	Management and Economics
Maj MJB Allaire	Lecturer	Management and Economics
Mr. B Dorval	Assistant Professor	Management and Economics
Mr. B Graystone	Contractual - Lecturer	Management and Economics
Mr. F Fachin	Assistant Professor	Management and Economics
Mr. KB Schobel	Associate Vice-Principal, Research (Finance)	Management and Economics
Mr. N Messabia	Contractual - Assistant Professor	Management and Economics
Mr. N Mohammed	Lecturer	Management and Economics
Ms. E Gibeau	Contractual - Lecturer	Management and Economics
Ms. MBK Shepherd	Assistant Professor	Management and Economics
Ms. O Tabunshchikova	Contractual - Lecturer	Management and Economics
Ms. S Garrab	Assistant Professor	Management and Economics
Capt DR Eisenhauer	Lecturer	Mathematics And Computer Science
Dr. A Zouaq	Associate Professor	Mathematics And Computer Science
Dr. A. Gosselin	Dept Head: Mathematics And Computer Science	Mathematics And Computer Science
Dr. AJ Barrett	Professor Emeritus	Mathematics And Computer Science
Dr. BJ Fugere	Professor Emeritus	Mathematics And Computer Science
Dr. CH Tardif	Professor	Mathematics And Computer Science
Dr. D Kelly	Associate Professor	Mathematics And Computer Science
Dr. D Lavigne	Assistant Professor	Mathematics And Computer Science
Dr. DL Wehlau	Professor	Mathematics And Computer Science
Dr. F Daghefali	Assistant Professor	Mathematics And Computer Science
Dr. F Rivest	Associate Professor	Mathematics And Computer Science
Dr. G Labonte	Professor Emeritus	Mathematics And Computer Science
Dr. GE Simons	Dean of Science	Mathematics And Computer Science
Dr. I Zaguia	Assistant Professor	Mathematics And Computer Science
Dr. J Gai	Assistant Professor	Mathematics And Computer Science
Dr. J. Brimberg	Professor	Mathematics And Computer Science
Dr. J.P.L. Massey	Assistant Professor	Mathematics And Computer Science
Dr. L Haddad	Professor	Mathematics And Computer Science

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Dr. MA Labbe	Professor Emeritus	Mathematics And Computer Science
Dr. ML Chaudhry	Professor	Mathematics And Computer Science
Dr. R Benesch	Professor Emeritus	Mathematics And Computer Science
Dr. R Gervais	Professor Emeritus	Mathematics And Computer Science
Dr. R Godard	Professor Emeritus	Mathematics And Computer Science
Dr. R Shoucri	Professor	Mathematics And Computer Science
Dr. RE Johnson	Professor	Mathematics And Computer Science
Dr. S Jog	Professor Emeritus	Mathematics And Computer Science
Dr. Y Liang	Associate Professor	Mathematics And Computer Science
LCol(Ret'd) RP Sturgeon	Lecturer	Mathematics And Computer Science
Maj J.D. de Boer	Assistant Professor	Mathematics And Computer Science
Maj W.C. Deck	Lecturer	Mathematics And Computer Science
Mr. C Courtois	Assistant Professor	Mathematics And Computer Science
Mr. G. Danialou	Assistant Professor	Mathematics And Computer Science
Mr. X Yang	Lecturer	Mathematics And Computer Science
Mr. Y Wang	Assistant Professor	Mathematics And Computer Science
Ms. N. Amadou Boukary	Lecturer	Mathematics And Computer Science
Capt SG Leithead	Assistant Professor	Mechanical and Aerospace Engineering
Dr. A Asghar	Associate Professor	Mechanical and Aerospace Engineering
Dr. A Benaissa	Professor	Mechanical and Aerospace Engineering
Dr. AM Jnifene	Associate Dean of Engineering	Mechanical and Aerospace Engineering
Dr. C. Marsden	Assistant Professor	Mechanical and Aerospace Engineering
Dr. D. Wowk	Associate Professor	Mechanical and Aerospace Engineering
Dr. DCM Poirel	Professor	Mechanical and Aerospace Engineering
Dr. DL DuQuesnay	Professor	Mechanical and Aerospace Engineering
Dr. H.J. Kowal	Principal	Mechanical and Aerospace Engineering
Dr. IE Boros	Associate Professor	Mechanical and Aerospace Engineering
Dr. K Goni Boulama	Associate Professor	Mechanical and Aerospace Engineering
Dr. K Khayati	Associate Professor	Mechanical and Aerospace Engineering
Dr. K Moglo	Associate Professor	Mechanical and Aerospace Engineering
Dr. M Ferchichi	Associate Dean of Graduate Studies	Mechanical and Aerospace Engineering
Dr. M Jugroot	Professor	Mechanical and Aerospace Engineering
Dr. MA LaViolette	Associate Professor	Mechanical and Aerospace Engineering
Dr. MF Bardon	Professor Emeritus	Mechanical and Aerospace Engineering
Dr. P Bussieres	Professor Emeritus	Mechanical and Aerospace Engineering
Dr. P Jansen	Assistant Professor	Mechanical and Aerospace Engineering
Dr. R Perez	Associate Professor	Mechanical and Aerospace Engineering
Dr. SH Benabdallah	Professor	Mechanical and Aerospace Engineering
Dr. WC Moffatt	Professor Emeritus	Mechanical and Aerospace Engineering
Dr. WDE Allan	Dept Head: Mechanical and Aerospace Engineering	Mechanical and Aerospace Engineering
Dr. X Wu	Professor	Mechanical and Aerospace Engineering
LCdr LE Mooney	Assistant Professor	Mechanical and Aerospace Engineering
Maj DI Holsworth	Lecturer	Mechanical and Aerospace Engineering
Maj S Graveline	Assistant Professor	Mechanical and Aerospace Engineering
Maj TR Connerty	Assistant Professor	Mechanical and Aerospace Engineering
Maj(Ret'd) TR Chalovich	Assistant Professor	Mechanical and Aerospace Engineering

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Mr. A.R. Fitzgerald	Lecturer	Mechanical and Aerospace Engineering
Mr. GR Pucher	Lecturer	Mechanical and Aerospace Engineering
Mr. T Davies	Assistant Professor	Mechanical and Aerospace Engineering
Capt S Dill	Lecturer	Military Psychology And Leadership
Dr. AM Nicol	Associate Professor	Military Psychology And Leadership
Dr. AT MacIntyre	Professor	Military Psychology And Leadership
Dr. D Charbonneau	Associate Professor	Military Psychology And Leadership
Dr. D Lagace-Roy	Dept Head: Military Psychology And Leadership	Military Psychology And Leadership
Dr. J Johnston	Contractual - Assistant Professor	Military Psychology And Leadership
Dr. JP Bradley	Professor Emeritus	Military Psychology And Leadership
Dr. L Chérif	Assistant Professor	Military Psychology And Leadership
Dr. M Imbeault	Associate Professor	Military Psychology And Leadership
Dr. RC St John	Professor	Military Psychology And Leadership
Dr. SA Hill	Associate Professor	Military Psychology And Leadership
Dr. Y Pichette	Contractual - Assistant Professor	Military Psychology And Leadership
LCdr(Ret'd) DS Crooks	Special Projects Manager & Lecturer	Military Psychology And Leadership
LCol S Owens	CO PG & Mil Fac & Lecturer	Military Psychology And Leadership
LCol(Ret'd) S Tymchuk	Lecturer	Military Psychology And Leadership
Maj C Eastwood	Lecturer	Military Psychology And Leadership
Mr. F Imtiaz	Assistant Professor	Military Psychology And Leadership
Mr. F Kuschnereit	Contractual - Lecturer	Military Psychology And Leadership
Mr. Y Simard	Contractual - Lecturer	Military Psychology And Leadership
Mrs. V Wood	Lecturer	Military Psychology And Leadership
Capt BB Nasmith	Lecturer	Physics
Capt D.P.R. Desjardins	Lecturer	Physics
Capt JW Leibold	Lecturer	Physics
Dr. A Shore	Associate Professor	Physics
Dr. ARJ Lachaine	Professor Emeritus	Physics
Dr. BK Mukherjee	Professor Emeritus	Physics
Dr. DC Baird	Professor Emeritus	Physics
Dr. GA Wade	Dept Head: Physics	Physics
Dr. J.R. Gosselin	Professor Emeritus	Physics
Dr. JM Noel	Professor	Physics
Dr. JR Buckley	Professor Emeritus	Physics
Dr. K Kabin	Associate Professor	Physics
Dr. K Spekkens	Associate Professor	Physics
Dr. L Sangalli	Assistant Professor	Physics
Dr. LL Levesque	Associate Professor	Physics
Dr. MW Stacey	Professor	Physics
Dr. N Gauthier	Professor Emeritus	Physics
Dr. P Weetman	Contractual - Assistant Professor	Physics
Dr. PJ Schurer	Professor Emeritus	Physics
Dr. PL Rochon	Professor Emeritus	Physics
Dr. R.F. Vincent	Assistant Professor	Physics
Dr. R.G. Sabat	Associate Professor	Physics
Dr. RF Favreau	Professor Emeritus	Physics

NAME	POSITION	DEPARTMENT
Dr. RF Harris-Lowe	Professor Emeritus	Physics
Dr. RF Marsden	Professor Emeritus	Physics
Dr. S Ranganathan	Professor Emeritus	Physics
Dr. TJ Racey	Professor Emeritus	Physics
Dr. TW Krause	Professor	Physics
LCdr S.A. Semenuk	Lecturer	Physics
Maj D Bedard	Assistant Professor	Physics
Maj R.W. Van Der Pryt	Assistant Professor	Physics
Mr. M.A. Earl	Lecturer	Physics
Mr. R Keou	Assistant Professor	Physics
Cdr(Ret'd) G Phillips	Assistant Professor	Political Science
Dr. A Fitz-Gerald	Contractual - Associate Professor	Political Science
Dr. A Ghanbarpour-Dizboni	Acting Dept Head: Political Science	Political Science
Dr. Al Parenteau	Assistant Professor	Political Science
Dr. AJ Whitehorn	Professor Emeritus	Political Science
Dr. AO Ousman	Chair: Master of Public Administration	Political Science
Dr. C Leuprecht	Professor	Political Science
Dr. DC Emelifeonwu	Associate Professor	Political Science
Dr. DM Last	Associate Professor	Political Science
Dr. FD Parenteau	Professor	Political Science
Dr. G Yamb	Contractual - Assistant Professor	Political Science
Dr. H Binhammer	Professor Emeritus	Political Science
Dr. H Hassan-Yari	Professor Emeritus	Political Science
Dr. J Boulden	Professor	Political Science
Dr. JD Young	Associate Professor	Political Science
Dr. JGB Labrecque	Professor Emeritus	Political Science
Dr. JJ Sokolsky	Professor	Political Science
Dr. JPF Lepine	Assistant Professor	Political Science
Dr. JR Mckay	Associate Dean of Arts (Faculty)	Political Science
Dr. K Hulme	Assistant Professor	Political Science
Dr. LY Luciuk	Professor	Political Science
Dr. M.A. Rostek	Contractual - Assistant Professor	Political Science
Dr. N Schwartz-Morgan	Professor Emeritus	Political Science
Dr. P Constantineau	Professor	Political Science
Dr. P Jolicoeur	Dept Head: Political Science	Political Science
Dr. P Kasurak	Contractual - Assistant Professor	Political Science
Dr. PJS Dunnett	Professor Emeritus	Political Science
Dr. S Chouinard	Assistant Professor	Political Science
LCol PJ O'Halloran	Assistant Professor	Political Science
LCol(Ret'd) D.A. La Carte	Assistant Professor	Political Science
Maj H.C. Breede	Lecturer	Political Science
Mr. P Levesque	Lecturer	Political Science
Mr. P Roseberry	Lecturer	Political Science
Dr. A Iarocci	Contractual - Assistant Professor	War Studies
Dr. JS Finan	Professor Emeritus	War Studies