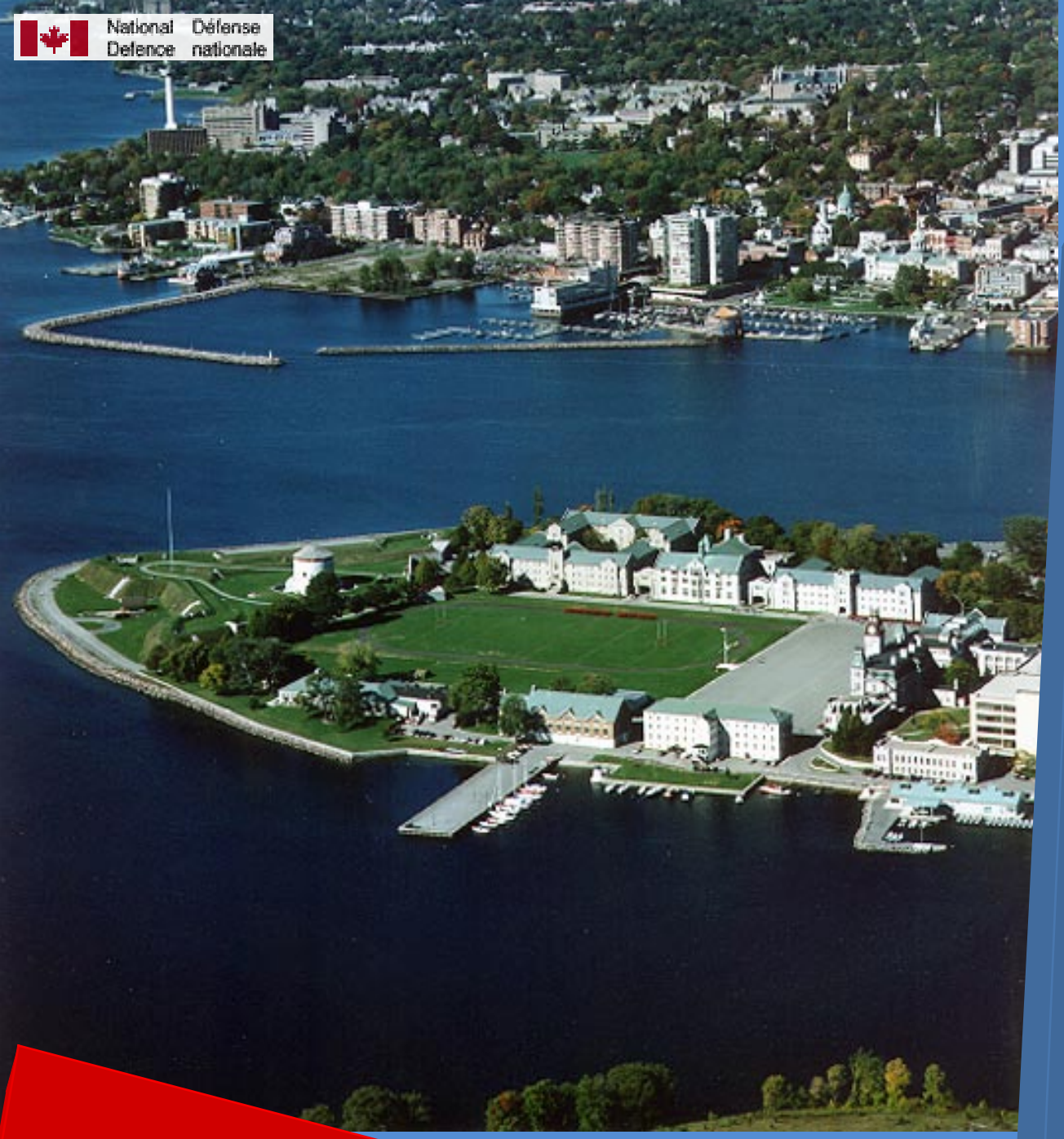
National Defence / Défense nationale

Canada



2009 / 2010

ROYAL MILITARY COLLEGE OF CANADA

UNDERGRADUATE CALENDAR

[*INTERNAL DISTRIBUTION ONLY*]

Preface

Important Dates

FALL TERM - September 2009	
8 Sep	Classes start (Undergraduate)
2 Oct	Obstacle Course
3 - 4 Oct	Reunion Weekend
12 Oct	Thanksgiving (statutory holiday)
13 - 20 Oct	Mid-term Exams
11 Nov	Remembrance Day (no classes)
13 Nov	Fall Convocation
4 Dec	End of classes
7 - 18 Dec	Examinations
18 Dec	End of Fall Term
WINTER TERM - January 2010	
11 Jan	Classes start
16 - 17 Jan	Supplemental exams
22 - 26 Feb	Reading Week
2 - 5 Apr	Easter Weekend (statutory holiday)
16 Apr	End of classes
19 - 30 Apr	Examinations
30 Apr	End of Winter Term
10 - 11 May	Supplemental exams IV yr
17 - 18 May	Supplemental exams II, III yr
20 May	Convocation
21 May	Commissioning Parade
SUMMER TERM - May 2010	
25 May	Classes start (Engineering Decompression)
30 Jul	End of classes
3 - 6 Aug	Examinations (Engineering Decompression)
6 Aug	End of Summer Term

Notices

1. The course listings and academic programs 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 program choices available to students as compared with those listed herein or in other College publications. 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 programs to complete their degree requirements in a satisfactory manner. 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. 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.
2. 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.
3. Both men and women may apply for admission to the Royal Military College of Canada.
4. 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.
5. If there is a divergence between the information in the printed version of the Undergraduate Calendar or any of the departmental web pages within the RMC website and, that in the Undergraduate Calendar web pages, the information in the Undergraduate Calendar web pages will prevail, since it is recognized as the official Calendar.
6. Additional information may be found on the Internet at: http://www.forces.ca

General Information

RMC History and Museum

Historical Sketch

In l874, the Canadian Parliament passed an Act providing for the establishment of an institution "for the purpose of imparting a complete education in all branches of military tactics, fortification, engineering, and general scientific knowledge in subjects connected with and necessary to a thorough knowledge of the military profession, to be known as the Military College, and to be located in one of the garrison towns of Canada". Kingston, with its historical, military, and naval associations, was selected as the site of the proposed College. On l June l876, the Military College of Canada opened its doors to its first class of eighteen gentlemen cadets, soon to be known as the "The Old Eighteen". Two years later, in l878, Her Majesty, Queen Victoria, granted the College the right to use the prefix "Royal".

The College is located on Point Frederick, a small peninsula immediately east of downtown Kingston and a site of considerable historic interest. In 1789 a naval depot was established on the Point and during the War of 1812 this depot was expanded into the most important military and naval base in Upper Canada. The first College buildings included some of those, from the old naval dockyard. Among them was one known as, the "Stone Frigate", which had been built to store naval gear from warships laid up following the War of 1812. Affectionately known as the Stone Boat by the current generation of cadets, this venerable structure has been in continuous use as a dormitory since the College was opened. The first academic facility was completed in 1878, and is now named the Mackenzie Building, in honour of the founder of the College and Canada's Prime Minister of the day, Alexander Mackenzie. Today it continues in use as the administrative hub of the institution, accommodating the offices of the Commandant, the Principal and the Director of Cadets. Modern buildings now complement those of the earlier period, housing students, faculty, libraries, classrooms, and laboratories.

Since 1880, when the first class of cadets graduated, ex-cadets of the Royal Military College have distinguished themselves in Canada and in many other areas of the British Commonwealth. As early as 1879 the British Government undertook to grant limited number of commissions in the British Regular Army to cadets of the Royal Military College. The first ex-cadet to be killed in action fell at Tambi West Africa in 1892. Ex-cadets have seen service in the North-West Rebellion, in the South African War, on the North West Frontier of India, in the First World War, in the Second World War and in Korea. More recently graduates of the College have participated prominently in Canada's military commitments worldwide - serving in the navy, army, or air force in the Middle East, Asia, Central America, Africa, Eastern and Central Europe and Afghanistan.

"The Royal Military College of Canada Degrees Act, 1959," passed by the 25th Ontario Legislature and given Royal Assent on 26 March 1959, empowers the College to confer degrees and honorary degrees in Arts, Science and Engineering. RMC became institutionally bilingual in the mid-1970's. Co-educational status was achieved in 1980. Between 1948 and 1995, RMC shared with Royal Roads Military College and later with Collège militaire royal de Saint-Jean the responsibility of educating officer cadets for the Canadian Forces. In 1995 our sister colleges, Collège militaire royal de Saint-Jean and Royal Roads Military College were closed, leaving RMC as the only Canadian military college.

Museum

The RMC museum, which was created in its present form in 1962, is housed in the Fort Frederick Martello Tower on the College grounds. Displays are also located throughout the College buildings. The Tower is one of four constructed between 1846 and 1848 to augment the Kingston defences. The museum's holdings include artefacts and records relating to the history of the College and of its graduates as well as to naval dockyard which once occupied Point Frederick, the peninsula upon which the College stands. Amongst the museum's most treasured possession is the superb Douglas Arms Collection.

The museum is open daily to the public in July and August and during the remainder of the year to school and other group visits by special arrangement.

Museum Conservator - J.R. McKenzie, CD, rmc, plsc, BA, MA (RMC)

Role and Objectives

The Royal Military College of Canada

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

For Officer Cadets of the Regular Officer Training Plan, the Reserve Entry Training Plan or the University Training Plan - Non-Commissioned Members, the RMC 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 programme.

For members of the Canadian Forces who undertake their undergraduate studies at RMC through correspondence, on site at a distance or, at the RMC Campus, the RMC 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 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 Forces 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 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 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 EDUCATION

Academics

The Academics Component fosters the critical intellectual skills required to understand the complexities of living in the 21st century. The academic program emphasizes the practical applications of what has been learned to military settings and daily operational demands. All degree programs offered at RMC 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 experience will help students, as they begin their studies at RMC 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 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 program 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 Forces will require you to lead young Canadians that are primarily Anglophone or Francophone. RMC has been training Officers to communicate effectively in both French and English for well over 30 years. RMC helps make this learning process an interesting one with class time as well as integration into daily life at RMC.

Note: Students who successfully complete the four interlocking components of the RMC Degree earn the "*rmc*" - post nominal.

General Structure of the University

Officers of Administration

Chancellor and President

The Minister of National Defence
The Honourable Peter Gordon MacKay, PC, QC, MP

Commandant

Brigadier-General Tom Lawson O.M.M., C.D.

Principal

Dr Joel Sokolsky, BA, MA, PhD

Director of Cadets

Lieutenant-Colonel Anthony J. O'Keeffe, MMM, CD, MA

The Board of Governors

The RMC 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.

Chairman

Dr. James Downey, OC, PhD, DHL, DLitt, LLD
President of the Higher Education Quality Council of Ontario

Vice-Chairman

Major-General Daniel Gosselin, OMM, CD
Commander, Canadian Defence Academy

Members

Mrs. Sonja Bata, OC
Bata International, Toronto

Dr. David Bercuson, OC, LLD, FRSC, CME, PhD
Center for Military and Strategic Studies, University of Calgary

Lieutenant-General Marc Caron (retd), CMM, MSM, CD
Former Assistant Chief of Land Staff

Captain (Navy) Paul Catsburg, OMM, MSM, CD
Director Maritime Personnel

Colonel Peter Davies, BSc, CD
Director Air Personnel Production and Development

The Honourable Joseph Day, LLM, PEng, Senator
Alumni Representative

Brigadier-General Charles Émond (retd), BSc, MBA, CD
Consultant

Dr. Gérard S. Hervouet, PhD
Director International Peace and Security Program, Université Laval

Dr. Anne Irwin, CD, MCSC, PhD
Canadian Defence and Foreign Affairs Institute, Chair in Civil-Military Relations, University of Calgary

Brigadier-General Tom Lawson O.M.M., C.D.
Commandant Royal Military College of Canada

Brigadier-General Donald Macnamara (retd), OMM, CD, BA, MA, DMilSc
Queen's Centre for International Studies

Vice-Admiral Lynn Mason (retd), CMM, CD
Dalhousie University Centre for Foreign Policy Studies

Colonel Dean Milner, BA (Hons), CD
Director Army Training

Dr Joel Sokolsky, BA, MA, PhD
Principal, Royal Military College of Canada

Dr. Janice Gross Stein, BA, MA, PhD, FRSC
Director, Munk Centre for International Studies

Denise Kerr
Executive Secretary

The Senate

The Senate was created by the Royal Military College of Canada Degrees Act, 1959, and is composed of the President, the Commandant, the Principal, the Deans of the Academic Faculties, the Director of Cadets, and the Registrar. Its function is to grant degrees and honorary degrees.

Chancellor and President
The Minister of National Defence,
The Honourable Peter Gordon MacKay, PC, QC, MP

Secretary
The Registrar
Lieutenant-Colonel Rod R. McDonald, CD

Members

Commandant RMC
Brigadier-General Tom Lawson O.M.M., CD

Principal
Dr Joel Sokolsky, BA, MA, PhD

Dean of Faculty of Arts
Dr Jane Errington, PhD

Dean of Faculty of Science
Dr Thomas Racey, PhD

Dean of Faculty of Engineering and Vice-Principal Academic
Dr Allen Stewart, CD, rmc, PhD

Dean of Graduate Studies and Research Division and Vice-Principal Research
Dr Jean Fugère, PhD

Dean of Continuing Studies
Dr Michael Hennessy, PhD

Director of Cadets
Lieutenant-Colonel Anthony O'Keeffe MMM, CD, MA

Academic Director, RMC St-Jean
Lieutenant General (retd) J.O.M. Maisonneuve, CD

A Faculty Representative

The 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.

Chair
Principal
Dr Joel Sokolsky, PhD.

Secretary
Registrar
Lieutenant-Colonel Rod McDonald, CD

Members

Associate Vice-Principal
Ms. Maggie Shepherd

Dean of the Faculty of Arts
Dr Jane Errington, PhD

Dean of the Faculty of Science
Dr Subramanian Ranganathan, PhD

Dean of the Faculty of Engineering and Vice Principal Academic
Dr Allen Stewart, CD, rmc, PhD

Dean of the Division of Graduate Studies and Research and Vice-Principal Research
Dr Jean Fugère, PhD

Dean of the Division of Continuing Studies
Dr Michael Hennessy, PhD

Head of the Department of Business Administration
Dr William Graham, PhD

Head of the Department of English
Dr Steve Lukits, PhD

Head of the Department of French Studies
Dr Marc Benson, PhD

Head of the Department of History
Dr Roch Legault, PhD

Head of the Department of Military Psychology and Leadership
Dr Danielle Charbonneau, PhD

Head of the Department of Politics and Economics
Lieutenant-Colonel Don La Carte, CD

Head of the Department of Mathematics and Computer Science
Dr Gordon Simons, PhD

Head of the Department of Chemistry and Chemical Engineering
Dr Phillip Bates, PhD

Head of the Department of Physics
Dr Thomas Racey, PhD

Head of the Department of Civil Engineering
Dr Gordon Wight, PhD

Head of the Department of Electrical and Computer Engineering
Dr Derrick Bouchard, PhD

Head of the Department of Mechanical Engineering
Dr Habib Benabdallah, PhD

Associate Dean Faculty of Science
Dr Robert Johnson, PhD

Associate Dean of the Division of Graduate Studies and Research
Dr Hughes Bonin, PhD

Associate Dean of the Division of Graduate Studies and Research
Dr François-Emmanuel Boucher, PhD

Associate Dean of the Division of Continuing Studies
Dr Thomas Dececchi, PhD

Associate Dean of the Division of Continuing Studies
Dr Pierre Roberge, PhD

Head of the Applied Military Science Programme
Colonel Robert Gunn, CD

Chair of the Programme War Studies
Dr Jane Boulden, PhD

Director of Cadets
Lieutenant-Colonel Anthony O'Keeffe, MMM, CD

Director of the Language Centre
Lieutenant-Colonel Jean Lord, CD

Director of the Department of Physical Education and Athletics
Darren Cates

Chief Librarian
Sarah Toomey

Director of Academic Studies, Canadian Forces College
Dr Craig Stone, PhD

Director of Academics, RMC St-Jean
Lieutenant-General (ret) Michel Maisonneuve, CD

Vice-Dean, Pre-University Studies, RMC St-Jean
Dr Bernard Mongeau, PhD

Associate Director, Defence Research Institute
Dr Ronald Weir, PhD

College Information Officer
Lieutenant-Colonel Rene Sturgeon, CD

The 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

The Registrar
Lieutenant-Colonel Rod R. McDonald, CD

Associate Registrar (Undergraduate Studies)
Ms. Naomi Ballance, BA

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

Associate Registrar (Admissions)
Mr. Roch Hau, CD, MA

Liaison
Mr. Marc Merizzi, BA

MILITARY STRUCTURE OF THE COLLEGE

General

All officer cadets who enter the Royal Military College of Canada are enrolled either in the Regular Force (under the ROTP or the UTPNCM) or in the Reserve Component (under the RETP).

All officer cadets enrolled in the Canadian Forces are consequently subject to a code of service discipline. Their life is regulated through orders and instructions which they follow and apply intelligently. Each cadet has access to a copy of the instructions which outline the policy and the procedures governing Cadet Wing activities.

Cadet Wing

The Director of Cadets (DCdts) is the Commanding Officer of the Cadet Wing and is responsible to the Commandant for the overall conduct, supervision, discipline, and performance of the Cadet Wing. This responsibility is discharged by the various officers and senior non-commissioned officers of the Cadet Wing and civilian staff. The Division Commanders and Squadron Commanders of the Cadet Wing advise, guide, counsel, and evaluate cadets. The Cadet Wing staff are responsible for military training programs for all officer cadets including physical fitness, drill, and officer development. They are available to answer cadet inquiries and give advice on military matters.

Cadet Organization

The cadets are organized into a Cadet Wing composed of a headquarters and a number of divisions and squadrons, which in turn are subdivided into flights and sections. A separate squadron is comprised solely of students enrolled under the University Training Plan -Non- commissioned Members (UTPNCM). Under the guidance of commissioned officers (the Squadron Commanders) and civilian staff (athletics), this organization controls cadet life at the College within limits laid down by the Commandant.

Senior officer cadets of Third and Fourth year hold the majority of staff and command appointments in the Cadet Wing and receive practical training in leadership by being responsible for the discipline, progress, and efficiency of their squadron, flight or section. Cadets also organize and run an intramural sports program and carry out typical service duties such as Block Duty Cadet (BDC) and Cadet Duty Officer (CDO).

Every committee at the College handling cadet affairs has strong cadet representation. This gives the representatives insight into the problems of organizing and administering sports and entertainment, including the budgeting of funds.

Cadet Life at RMC

The life of an officer cadet during the vigorous years at the College is dominated by a program made up of four interlocking components of achievement: academics, military, athletic and bilingualism.

Academics, the most demanding part of this program, are discussed further on in the calendar.

Cadet Military Training

The College is fully residential; the cadets (other than UTPNCM) live together in a military environment. Cadets are responsible for the administration of many of the activities in their life at RMC. This situation gives all cadets the chance to observe the leadership of others and helps them to learn this art by accepting such responsibilities themselves.

All cadets are required to take part in a demanding routine designed to raise them to a sound standard in physical fitness, drill, and deportment and to develop in them a ready sense of duty, self-discipline, self-confidence and integrity. They are also required to meet the demands for cooperation and teamwork with their fellow cadets.

The officer cadets play an important part in this training and are learning much by the experience. Although physically and mentally demanding, this training does not involve personal indignity, illegal punishment, harassment, or "hazing" in any form.

Each cadet entering the college, with the exception of UTPNCM, must pass a number of milestones before being accepted as a full-fledged member of the Cadet Wing. The most significant one, the obstacle course, which is normally run at the end of First Year Orientation Period (FYOP), is designed to prove to the First Year cadet that obstacles which seem insurmountable may, in fact, be overcome through cooperation with others, combined with high level of fitness, individual stamina and determination.

Drill

The Royal Military College of Canada is renowned for the quality and diversity of its ceremonial drill. Reaching this high standard is gained through the hard work and dedication of each cadet.

Cadets are expected to reach and maintain a high standard of personal drill with the service rifle, colours, and the sword. A practical test is administered to verify that the standard has been maintained. At many times during the year, the Royal Military College of Canada is called upon to provide formations of cadets for ceremonial occasions. Time is found to prepare for these tasks usually during the after duty hours.

Daily Routine

Once classes start, the typical daily routine is as follows:

Time	Monday	Tuesday	Wednesday	Thursday	Friday
0600-0630	Reveille / Ablutions Breakfast (1) (2)	Reveille / Ablutions Breakfast	Reveille / Ablutions Breakfast	Reveille / Ablutions Breakfast	Reveille / Ablutions Breakfast
0630-0720	Band	Squadron Commander Time (3)	0630-0705 Squadron Muster Parade	Band	Band
0730-0750	Cadet Wing Parade		0715-0950 Professional Military Training (PMT)	Squadron Muster Parade	Squadron Muster Parade
0800-0850	Period 1	Period 1		Period 1	Period 1
0900-0950	Period 2	Period 2		Period 2	Period 2
1000-1050	Period 3	Period 3	Period 3	Period 3	Period 3
1100-1150	Period 4	Period 4	Period 4	Period 4	Period 4
1200-1230	First Lunch				
1200-1250	Period 5	Period 5	Period 5	Period 5	Period 5
1240-1330	Period 6	Period 6	Period 6	Period 6	Period 6
1300-1330	Second Lunch				
1340-1430	Period 7	Period 7	Period 7	Period 7	Period 7
1440-1530	Period 8	Period 8	Period 8	Period 8	Period 8
1540-1630	Period 9	Period 9	Period 9	Period 9	Period 9
1845-2045	Varsity (5)	Varsity	Varsity	Varsity	Varsity (5)
1700-2140	Academic Tutorials (4)	Intramural Sports 1700-1830 1835-2005 (2010-2140) (6)		Intramural Sports 1700-1830 1835-2005 (2010-2140) (6)	Recreation Clubs 1700-2100
1800		Intramural Waterpolo 1800-2025		Intramural Waterpolo 1800-1935	
1900		Intramural Hockey 1900-2215		Intramural Hockey 1900-2400	
1900-2300	Study Time				
2300-0600	Sleep Time				

Notes:

1. 06:00 is the earliest time that Cadets may be awakened for organized activities.
2. On Monday, Thursday and Friday there are to be no Squadron activities. The sole activity on these days is band. Non-band members may arise at their discretion in time for 07:30 muster parade.
3. If Squadron Commanders plan to do Physical (PT), then they must allow for ablutions and breakfast.
4. Academic tutorials have priority on this evening. No varsity practices or players will attempt to adjust academic schedules or attendance on this evening for the benefit of varsity requirements.
5. Late varsity practice (1845-2045) for volleyball and basketball teams only.
6. This third time period only applies to the winter Term.

Leave

Weekend leave and evening passes to which an ROTP/RETP officer cadet is entitled may be restricted depending on performance and the demands of training and other duties. New first year officer cadets normally are not permitted leave until Thanksgiving Weekend in October.

Christmas leave for periods of up to three weeks is granted each year.

Varsity Sports

The College is a member of the Ontario Universities Athletic (OUA), one of the four regional associations that make up the Canadian Interuniversity Sports (CIS). RMC currently competes in the following OUA sports:

- basketball (men and women),
- fencing (men and women),
- hockey (men),
- running team (men and women),
- rugby (men),
- soccer (men and women),
- taekwondo (men and women), and
- volleyball (men and women).

These teams also take part in a number of tournaments, as well as the traditional international exchange with West Point (United States Military Academy). RMC also has a varsity level team in Tae Kwon Do.

Royal Military College Band

The Royal Military College Band provides a recreational outlet for cadets with musical interests. The Band performs at parades at the College and at Environment Mess Dinners. The Band also participates in a wide range of events such as the Kitchener-Waterloo Oktoberfest Parade, International Highland Games, the local Celtic festival, high school tours, military tattoos, the Spring Concert in Scarlet and numerous other local parades and concerts. The RMC Band is composed of five sections: the Pipes, the Drums, the Brass and Reed, the Highland Dancers and the Choir.

Pipes and Drums section

The Pipes and Drums section is comprised of about 35 pipers and 35 drummers. Basic instruction on bagpipes and drums is provided by two professional Canadian Forces musicians.

Brass and Reed section

The Brass and Reed Band has a membership of about 50 musicians. Instruments are supplied and include flute, clarinet, saxophone, trumpet, trombone, french horn, euphonium, tuba keyboard and percussion. Rehearsals are directed by a professional Canadian Forces musician.

Highland Dancers

The Highland Dance section performs with the Pipes and Drums at Mess Dinners, high school tours and other College functions. Previous experience, although welcome, is not necessary, as novice instruction is available. There are approximately 20 dancers in the section.

Choir

The RMC Choir also performs at Mess Dinners and other College functions including the famous Concert in Scarlet. There are about 40 members in the section

Residence

Single rooms are normally provided for Fourth Year officer cadets. Other senior cadets are allocated single rooms on a space available basis. In the First Year, officer cadets are placed in doubled rooms. All residences are co-educational. On-campus dining is provided. Full recreational facilities, including an indoor swimming pool, are available in close proximity to the residences. Cadets of the UTPNCM program do not live in residence. Cadets who are married or have common law status may be authorized by their chain of command to live out. Other cadets who want to rent civilian accommodation must ask permission to live out.

RMC Cadet Mess

The RMC Cadet Mess provides facilities for the training of the Cadet Wing in the customs and practices of a Service Mess, and has facilities for social and recreational activities which are an integral part of College life.

The general administration is carried out by a Cadet Mess Committee with cadet representation from all years assisted by a staff advisor from the Cadet Wing. The Mess is conducted in the form of a Service Officers Mess with cadets filling the responsible positions. The RMC Cadet Mess has its own constitution and by-laws where the responsibilities and privileges of its cadet members are explained.

Recreation Clubs

Note: Subject to change depending on interest.

Arts, astronomy, broomball, cheer leading, climbing, cycling, debating, drama, fish & game, flying, golf, judo, juggling, outdoors, paintball, photography, rowing, social dance, stage band, video editing, war games, water polo, windsurfing, woman's rugby and yachting.

Chaplain Services

The Chaplains - Protestant and Roman Catholic - conduct regular Sunday Services of Divine Worship. Officer Cadets and other College personnel and their families are invited to attend all regularly scheduled activities.

Officer Cadets will find during Bible Study groups, padre's hours and at other occasions, opportunities for valuable interchange with the Chaplains and each other on ethical, moral and religious issues. The Chaplains are always available for individual counselling.

Chaplain (Protestant) - Major S. Moore

Chaplain (Roman Catholic) - Major J.R.D. Bujold

Canex

The CANEX is a small store for personal articles, souvenirs, snacks and dry cleaning.

SUMMER TRAINING

General

A major part of an RMC cadet's military development takes place during the summer. Every summer, all officer cadets participate in up to eleven weeks of military training designed to prepare them to assume specific duties as officers of the Canadian Forces after graduation from the College. While summer training is not the responsibility of the College, the results are closely monitored and form part of a cadet's College training record.

Leave

Every effort is made to grant 14 consecutive working days of annual leave during the summer months before or after the summer training period.

Pay

During this summer period all cadets (ROTP, RETP and UTPNCM) receive pay and allowances as prescribed.

Basic Military Officer Qualification (BMOQ)

This training is common for all cadets and is taken in three parts. The first part, the Recruit Camp Orientation, is done during a two week period at RMC prior to the start of the first year academic term. The second part, is done at various times throughout the academic year, normally on Wednesday mornings as part of the Primary Military Training (PMT). The Basic Military Officer Qualification (BMOQ), includes further military training conducted in Saint Jean at the end of the first academic year. The aim of Basic Officer Training is to develop in the officer cadets essential officer-like qualities and to provide an introduction to those common military subjects essential to the employment of all officers in the Forces. During BMOQ, cadets receive instruction in weapons, map using, leadership theory and exercise, first aid, general service knowledge, and military writing.

Phases II, III and IV

During summers following the Second, Third, and Fourth Years, officer cadets receive further formal military training in the form of Phase training, Second Language training (SLT), or on-the-job training (OJT). The training undertaken in Phase II, III, and IV summers is designed to prepare the cadet for a specialized military occupation.

PHYSICAL EDUCATION AND ATHLETICS

Introduction

The RMC Physical Education programme provides opportunities for officer-cadets to participate in activities that are physically and mentally stimulating and socially sound. Cadets develop their athletic skills through practice and learn self-control by following the written and implied rules of sportsmanship. As a vehicle to build and exercise the qualities of leadership conducive to officers of the Canadian Forces, the programme includes learning the organizational tasks and duties of officials for selected activities.

Athletics

The athletics program is pursued on two levels: varsity and intramural sports.

Varsity Sports

Varsity sports are designed for those with greater athletic abilities. Suitability for continued involvement by cadets is predicated upon academic performance. Cadets who do not maintain satisfactory academic and/or military progress may be restricted from regular participation in varsity teams.

First party athletic awards are not offered by RMC to prospective students, nor are benefits or allowances offered as partial or full subsidization for participation as members of intercollegiate teams. As a member in good standing of the CIS and the OUA, RMC is committed to supporting intercollegiate teams that meet the needs of the student body, the college, and the Canadian Forces.

Intramural Sports

The RMC Competitive Intramural Sports Program is an important part of the overall athletic component. It allows students the opportunity for competition in a wide variety of team sports. Intramural participation is compulsory for those cadets who are not part of a varsity team.

Physical Education

The four-year Physical Education Program in which officer cadets take part includes a myriad of activities designed to achieve and maintain a high level of fitness. In addition, the students learn the fundamentals of fitness training in a wide variety of team and individual sports, and military skills. The RMC Physical Performance Test (RMCPPT), administered two times annually, evaluates five fitness components, which are: endurance, speed, power, agility and strength. At the end of every school year OCdts must meet the Canadian Forces Minimum Physical Fitness Standard (MPFS) with the CF EXPRES test. The CF EXPRES test is a physical test that measures muscular strength and endurance and aerobic conditioning. To complete the athletic program all cadets must attain the RMC minimum physical fitness standard and the CF MPFS. Moreover, they must also achieve the Canadian Forces Basic Military Swim Standard (BMSS) prior to graduation.

Conclusion

The main interdependent segments of the total RMC programme are academics, military training, physical education and second language learning. Academics have always been and will continue to be the most important component of each cadet's education, a process which, at RMC, is built on a foundation of self-discipline and integrity, the basis for the college motto - "Truth - Duty - Valour".

SECOND LANGUAGE TRAINING

The Language Centre is responsible to deliver all second language training for the Officer Cadets.

One of the objectives at RMC is to develop in all Officer Cadets the ability to communicate in both official languages, English and French. An officer must be able to understand, communicate and give orders in both languages. Consequently, second language training is mandatory for all students who do not meet the standards set by the College to the classification tests of the Public Commission.

The Second Language Evaluation System measures three language skills: reading, writing and oral interaction. Each skill is assessed at five levels of language proficiency: X, A, B, C and E. Upon arrival at RMC, students are tested in order to place them in a class appropriate for their level and ability. Small, homogeneous classes, usually composed of an average of eight students are created to give students the opportunity to progress according to their abilities, to interact and enhance their learning. Five 50-minute periods of instruction are given every week as part of the regular study program.

Once they have achieved the BBB level or better, the required standard for graduation, students are exempted from Second Language Training. However, they are strongly encouraged to maintain and improve their language skills, by engaging in further formal training in their second language. RMC, being a bilingual institution, allows students to register in courses in the language of their choice.

Students who do not achieve the BBB level by the end of the first academic year will take an intensive ten-week summer course of about 250 hours.

To increase exposure to the second language and to underline the bilingual nature of RMC activities at the college are conducted in both official languages. There are, for example, English weeks and French weeks during which students have the opportunity and are encouraged to work in their second language. As well, students are expected to spend a reasonable amount of time studying outside classroom hours. All publications, orders and routines are given in the language of the week to encourage practice to the extent permitted. First year Anglophone students and first year Francophone students share rooms in order to facilitate communication in both languages.

LIBRARY

Staff

S.J. Toomey, BA, MLS, BDes - Chief Librarian

C. Olsen, BA, MLS - Head Access Services

General Information

Mission:

The Library's primary mission is to contribute to the achievement of the College Academic Wing's stated mission to carry out university level education at the undergraduate and graduate levels, in both official languages, and to support the pursuit of learning through scholarly research, teaching and study in a spirit of intellectual freedom. The Library's secondary mission is to be a repository of specialised information sources and items of national heritage in partnership with other federal and academic libraries.

Collections:

Massey Library is located in the Massey building (#26 on the Campus map). The book stacks are open to the public but borrowing privileges are restricted to authorized users. The RMC Library being a constituent member of a bilingual institution is committed to collect and to offer all library services in both official languages.

The Library houses a substantial collection of books, government documents, journals, technical reports, microforms, video/audio cassettes, CDs and DVDs and special collections. The collection includes approximately 250,000 books and 1,200 journals, over 3,000 electronic journal subscriptions (CRKN), plus 2000 audio-visual items, in both English and French. More than 60 indexes and databases are available online. The special collections consist of monographs, prints, photographs and archival material, including the RMC Archives.

The Leadership Library Collection, presented to RMC by the Class of 1956, has a prominent place on the main floor. This floor also houses the library's regular collection of science and engineering books (call nos. TJ-Z); as well as the library's reference and journal collections. Recent issues of journals and daily newspapers are available in the reading area. The collection of newspapers on microfilm, plus the microfiche collection, is found in room 103. The microfiche collection covers mainly military and history topics, including Canadian history.

On the second floor there is the John W. Spurr Military Collection, an extensive collection of books, which cover all aspects of military studies, including an extensive collection of Canadian, British, French and German military history.

This floor also has the library's regular collection of politics, history, religion, philosophy, economics, sociology and psychology books (call nos.: A-JL 197). In the basement there is the rest of the library's collection, which covers subjects such as political science, law, music, art, literature, science and engineering (call nos.: JL 198-TH). On this floor there is also the microfilm collection of primary sources . This includes government reports and documents from Great Britain and the U.S. concerning countries and time periods of historical interest, plus the papers of some U.S. presidents and other persons of note. In room 30 there is the government documents collection, which has mainly Canadian federal government publications and some provincial publications.

Facilities:

The main floor of the library has 4 look-up stations (for quick access to the internet), as well as 6 computer stations. Patrons can read the latest journals and newspapers in the Reading Area. Two photocopiers and three printers are available. In room 103 there are 2 microform reader/printers.

On the second floor there is a computer lab with 20 laptops, as well as a multipurpose room with space for reading/studying and group work. All computers and laptops offer access to the web and are equipped with standard software such as MS Office and Acrobat Reader. The Writing Centre is also on this floor, and offers tutorials and workshops to assist students with the writing process. In the basement there are study carrels and 2 computers, as well as one quick look-up station.

THE WRITING CENTRE

Mandate

The Writing Centre is a bilingual resource for graduate or undergraduate students at the Royal Military College of Canada.

The Centre assists students with their reports, essays and theses. In general, the Centre helps students organize their ideas, construct a solid thesis statement, and communicate clearly and correctly. It offers one-on-one tutorials tailored to individual writing needs, short modules focused on problems in grammar and organization, and workshops on areas of identified difficulty.

The Writing Centre at the Royal Military College is a member of the Canadian Writing Centres Association.

Computing Facilities

General Information

A number of up-to-date micro computer and work station laboratories managed by Computing Services support scheduled teaching activity and individual study. These laboratories are integrated into local area networks. Access to various network services, including information services available through the Internet, is granted through a system of accounts. Services provided by the Library computer are accessible via the local area networks. Users of the various computing systems are subject to the guidelines established by Faculty Council in the Code of Ethics.

A student may be required to purchase and maintain a personal computer, associated peripherals, and software which satisfy the specifications established for the programme in which the student is enrolled. Several departments provide micro computer laboratories dedicated to their own programs of study.

Slowpoke-2 Nuclear Reactor And Facility

General Information

The "SLOWPOKE-2" nuclear reactor and facility is located in Module 5 of the Sawyer Building. Installed in 1985, this research reactor is operated by the Department of Chemistry and Chemical Engineering for the Department of National Defence. The reactor and the associated laboratory equipment are used for the education of undergraduate and postgraduate students, for research and analytical applications, and for training and support of DND personnel. Specific capabilities include neutron activation analysis, neutron radiography, liquid scintillation counting, and low-level and transportable gamma spectrometry.

Agreement Between RMC and Queen's University

General Information

Long-standing co-operative ventures with Queen's have now been extended to undergraduate courses. Cadets at RMC 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.

Explanation of Course Codes

Course Identification Codes

Each course is identified by a six- or seven-character code.

Example: EEE341B

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).
341	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.
A or B	The seventh character, if present, indicates that the course is a one-term course. The letter A indicates that it is given in the Fall Term and the letter B indicates a course given in the Winter Term. A code of only six characters represents a full-year course. Some courses have an "A/B" as the seventh and eight characters. This indicates that the course may be given in the fall or winter.
Other Codes used in conjunction with course descriptions	
DL	**Distance Learning** This course provides paper documents for students to learn at a distance.
DL + web	**Web-based Distance Learning** This course includes some paper documents but uses the Internet in its delivery.
DL + SP	**Self-paced Distance Learning** This paper-based course is not tied to the university semester system, and students may register and submit assignments at any time.
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.
3-1-6	The estimated number of weekly working hours the course requires The first number is estimated classroom hours; the second estimated laboratory hours; the third estimated at-home study hours.

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.

Department Identification Codes

AEE	Aeronautical Engineering	**GAF**	Génie aéronautique
BAE	Business Administration	**AAF**	Administration des affaires
CEE	Civil Engineering	**GCF**	Génie civil
CCE	Chemistry and Chemical Engineering	**CCF**	Chimie et génie chimique
CSE	Computer Science	**INF**	Informatique
ECE	Economics	**ECF**	Économie politique
EEE	Electrical Engineering	**GEF**	Génie électrique
ENE	English*	**FRF**	Français
GEE	General Engineering	**IGF**	Ingénierie générale
GOE	Geography	**GOF**	Géographie
HIE	History	**HIF**	Histoire
MAE	Mathematics	**MAF**	Mathématiques
MEE	Mechanical Engineering	**GMF**	Génie mécanique
MSE	Military and Strategic Studies	**EMF**	Études militaires et stratégiques
PHE	Physics	**PHF**	Physique
POE	Politics	**POF**	Politique
PSE	Military Psychology and Leadership	**PSF**	Psychologie militaire et leadership
SCE	Science	**SCF**	Sciences
SLE	Second Language*	**LSF**	Langue seconde*
SPE	Spanish*	**ESF**	Espagnol

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

ATH	Athletic Component	**ATH**	Composante athlétique
PMT	Professional Military Training	**FPM**	Formation professionnelle militaire

Scholarships Prizes and Awards

General Information

Scholarship websites

http://www.aucc.ca - Association of Universities & Colleges of Canada

http://www.cbie.ca - Canadian Bureau for International Education

(**Note:** It also applies to Canadians studying in Canada)

http://www.ccab.com - Foundation for the Advancement of Aboriginal Youth

http://www.clwalkerton.org - Community Living Walkerton & District

http://www.kavliprize.no - Outstanding Scientific Contributions to the fields of Nanoscience, Neuroscience and Astrophysics

http://www.soroptimistfoundation.ca/application.html - The Soroptimist Foundation of Canada

http://www.trudeaufoundation.ca - Trudeau Fellows and Trudeau Doctoral

http://www.cemf.ca - Canadian Engineering Memorial Foundation

http://www.eg.org - EG Scholarship - Sustainable Energy Development

http://www.studentawards.com - Student Awards.com

http://www.scholarshipscanada.com - Scholarships Canada.com

Regular Officer Training Plan (ROTP)

Officer cadets who are members of the Regular Officer Training Plan have their fees for the entire course paid by the Department of National Defence and, in addition, are entitled to pay and allowances prescribed by the Department. For more details, see the section on Admission Plans.

Scholarships awarded in recognition of academic merit may be retained under the Regular Officer Training Plan.

Reserve Entry Training Plan (RETP)

Officer Cadets who are members of the Reserve Entry Training Plan are required to pay fees to defray part of the costs of the academic year. See the section on Admission Plans. Applicants under the Reserve Entry Training Plan may be eligible to apply for some scholarships and bursaries that are available to students at Canadian universities

Provincial Student Awards Programmes

Awards may be available under the terms of the above Programmes to those under the Reserve Entry Training Plan and, in some particular circumstances, under the Regular Officer Training Plan.

Information may be obtained from the Registrar's office.

Financial Assistance

Student Assistance Programs

To apply to the Ontario Student Assistance Program (OSAP), you must fill out and submit an OSAP Application for Full-Time Students online available from the OSAP website (http://osap.gov.on.ca)

OSAP is distributed twice a year. The first time (September) you will receive 60% of your entitlement. You will be receiving either a telephone call or an email to pick it up. The second time (January) you will receive he remaining 40%. It will normally be mailed to your permanent address during the winter break. If you forget to pick up your first loan or drop courses and neglect to tell OSAP, the second loan is not going to arrive! If it does not arrive, check with the Loan Office in January to find out why. If you don't take your loan document to the post office then you won't get any money. If you process your loan at the post office and after 2 weeks you still don't have any money, call the NSLC at: 1-888-815-4514.

Processing is handled by the National Student Loan representative who is on campus.

You can access most of your OSAP information, online, at http://osap.gov.on.ca.

OSAP Application Process

VERIFICATION

Information you provide in connection with your OSAP applications is subject to verification and audit by the ministry.

- Income is verified with the Canada Revenue Agency (CRA) (If there is a discrepancy between the income you report to OSAP and the information received from the CRA, OSAP will reassess your application).

THIRD PARTY APPLICATION CHECKS

Vehicles:

- All vehicle and driver's licence information is verified with the Ministry of Transportation

Social Insurance Number and personal identification information:

- Basic personal information is verified with the Social Insurance registry at Human Resources and Social Development (HRSD)

Credit history:

- If you did not receive OSAP assistance last year, OSAP will perform a credit check

Continuation of Interest Free Status

If you have previous student loans and you plan to continue your studies but do not play on applying for additional student assistance for the upcoming school year, you must ensure your previous loans are placed in interest-free status so that you do not have to repay the loans and interest while you are in school.

To maintain interest free status on your loans, you must complete the Continuation of Interest-Free Status/Confirmation of Enrolment form for both the Canada and Ontario portions of your loans.

The forms are available from the OSAP website (http://osap.gov.on.ca) and Financial Aid Offices of postsecondary institutions.

OSAP Appeal Board Process

Should your review request be denied by the Financial Aid Administrator you may appeal it to the OSAP Appeal Board.

You must make the appeal in writing and provide all necessary documentation to your Financial Aid Office.

Appeals are normally considered within 30 days of the Board receiving all required information.

You will be notified of the Board's decision in writing.

Requesting a Refund

Important note for OSAP students If you have withdrawn from courses since receiving your OSAP funding, and this has resulted in a credit on your student account, RMC is required to send all/part of the refund to the National Student Loan Centre where it will be applied to your outstanding student loans.

Contacts:

Your Financial Aid Officer at RMC:

email: sophie.pépin@rmc.ca

Telephone: 1-613-541-6000 ext 6013

The National Student Loans Service Centre:

web: www.canlearn.ca or

Telephone: 1-888-815-4514

Student Assistance Programs (by Province)

Ontario - osap.gov.on.ca

British Columbia - www.aved.gov.bc.ca/studentaidbc

Alberta - alis.gov.ab.ca

Saskatchewan - sasked.gov.sk.ca

Manitoba - studentaid.gov.mb.ca

Quebec - afe.gouv.qc.ca

New Brunswick - studentaid.gnb.ca

Newfoundland - edu.gov.nf.ca/studentaid

Nova Scotia - studentloans.ednet.ns.ca

Prince Edward Island - studentloan.pe.ca

Northwest Territories - nwtsfa.gov.nt.ca

Yukon - education.gov.yk.ca

Nunavut Territories gov.nu.ca

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.

a. The value of a Dominion Cadetship encompasses:
    1. the annual college fee for the First Year;
    2. the cost of single quarters and rations for the First and subsequent years; and
    3. the annual Recreation Club fee for the First and subsequent years.
b. Not more than fifteen Dominion Cadetships may be granted in a college year.
c. 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.
d. 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.
e. 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.
f. A Dominion Cadetship is forfeited on failure of an academic year.

Professional Engineers of Ontario Scholarships

Awarded to eligible students; (Fall)

a. **Entrance Scholarship**

The Professional Engineers of Ontario Foundation for Education provides two entrance awards to Grade 12 graduates entering an accredited RMC engineering programme. Based upon high Grade 12 standing, one of the awards is made to an eligible female student and one to an eligible male student.

b. **Undergraduate Scholarship**

The Professional Engineers of Ontario Foundation for Education provides two awards to undergraduate students in either, Second or Third Year of an engineering programme:

a. one to the student who obtained the highest academic standing; and
b. one to the student who exhibited exceptional role model qualities through participation in non-academic activities while maintaining above average marks

The Dr. P.F. Fisher Memorial Trophy and Scholarship

This scholarship is awarded to the Third Year ROTP/RETP cadet considered most deserving by reason of academic standing, qualities of leadership and sportsmanship. (Fall)

The Duncan Sayre MacInnes Memorial Scholarship

This scholarship is awarded to the Fourth Year cadet who is considered the most deserving of those who accept a regular commission in the military occupation of Aerospace Controller by reason of academic standing, character, and in occupational training where applicable.

This award was first instituted in 1951 by Colonel C.S. MacInnes in memory of his brother the late Brigadier-General Duncan Sayre MacInnes, CMG,DSO, Royal Engineers, who graduated with honours from RMC in 1897. (Spring)

The C. Raymond Grandy Memorial Scholarship

This scholarship is awarded to the best cadet entering Second Year at RMC as determined by academic standing, leadership potential, and overall performance in the First Year. (Fall)

RCAF Women's Division Scholarships

The RCAF Women's Division Scholarships are 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)

Army, Navy and Air Force Veterans in Canada - United States Unit Scholarship

The ANAVICUS Scholarship is awarded to the best cadet of Third Year on the basis of personal qualities, academic performance and leadership potential. (Fall)

The W.M. Carleton Monk Memorial Scholarship

This scholarship is awarded to the Reserve Entry applicant in the Fourth Year who obtains the highest marks in academic subjects in the graduating year, provided attendance at a university following graduation. (Spring)

Jack C. Sargant Memorial Scholarship

No. 3091 Jack C. Sargant played intercollegiate hockey for the RMC Redmen throughout his four years at the College. In his memory a scholarship valued at $1000 is awarded annually to a varsity athlete who demonstrates combined proficiency in academic standing, sportsmanship, leadership and athletic ability. (Fall)

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 Program (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 programme. (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 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 Senior in their graduating 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 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 Senior (CSS) of the Squadron winning the Commandant's Competition. The sword will be carried by the CSS of the Squadron until the next graduation parade. The fall and winter term CSSs of the

winning squadron will receive a commemorative plaque for personal retention. The College Number of the Honour Slate CSS 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 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, (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 programme. The winner of the Wilkinson Sword of Honour is excluded from consideration for this award. (Spring)

The Toronto Branch RMC Club Prize

The Toronto Branch RMC 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. (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 . 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 Society of Chemical Industry Award, Canadian Section

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

Professional Engineers of Ontario Gold Medal

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 Military Engineering Prize

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

The Royal Canadian Artillery Association Prize

The Royal Canadian Artillery Association Prize is awarded to the best Land Operations cadet (Armoured, Artillery, Infantry) in the graduating class, based on high standards of proficiency in each of the four components of the RMC 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 cadet in the graduating class, based on high standards of proficiency in each of the four components of the RMC 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 cadet in the graduating class, based on high standards of proficiency in each of the four components of the RMC programme of the RMC 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 programme. (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 Physical Fitness Test. (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 program, provided this average is above 80%. (Spring)

CMR St-Jean Ex-Cadet Prize

CMR St-Jean Ex-Cadet Prize is awarded to the ROTP/RETP Fourth Year Cadet with the most improved second language since entry in the Military College while attaining a superior performance in the other components of the programme. (Spring)

Departmental Medals - Fourth Year

A medal is awarded annually in each academic programme to the cadet standing highest in the programme in the Fourth Year 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 Third Year of study. (Spring)

The MPL Departmental Prize

The MPL Departmental Prize is awarded annually to the cadet in the Fourth Year who obtains the highest aggregate mark over four years in the required courses of study in the Department of Military Psychology and Leadership for a minor in military psychology and leadership. The recipient must have a minimum mark of A- in the required Fourth Year MPL courses. (Spring)

The Squadron Leader McAlpine Cadet Trust Fund

The Squadron Leader McAlpine Cadet Trust Fund is awarded to Air Force cadets in the 4th year, with achievement in one of the following areas: military, athletic, academic and bilingualism. (Spring)

The A.C. Leonard Award

The A.C. Leonard Award is awarded annually by the Department of Mechanical Engineering to the student judged by the faculty to have presented the best fourth year project in MEE/GMF471.

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, on completion of an Honours or Engineering degree programme with "First Class Distinction" or with "Distinction", provided that a four-year programme of study has been completed and that an overall average of "First Class Distinction" or "with Distinction" has been recorded in Third Year. (Spring)

Third Year

The Royal Military College of Canada Award for Academic Excellence

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

The Chemical Institute of Canada Undergraduate Prize

The Governor General's Silver Medal is awarded to the student who obtains the highest standing in Third Year Chemistry and Chemical Engineering. (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)

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 Physical Fitness Test. (Fall)

The Howard B. Ripstein Award of Excellence

The Howard B. Ripstein Award of Excellence is awarded to a cadet of each of the Air, Army, and Navy 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)

Programme Prizes - Third Year

A prize is awarded annually to the cadet standing highest in each academic programme in the Third Year, providing the year has been passed without condition and an overall average of A- or above has been attained. (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)

Second Year

The Royal Military College of Canada Award for Academic Excellence

The Royal Military College of Canada Award for Academic Excellence is awarded annually to the cadet 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 Grant Prize

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

Canadian Military Engineers Association Award

Canadian Military Engineers Association Award is presented to the highest standing Second Year Officer Cadet in Engineering whose classification are either in Engineer (MOC 24) or Airfield Engineer (MOC 46). (Fall)

Departmental Prizes - First and Second Year

A departmental prize is awarded annually to the cadets in First and Second 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)

First Year

The Royal Military College of Canada Award for Academic Excellence

The Royal Military College of Canada Award for Academic Excellence is awarded annually to the cadet who has obtained the highest academic standing 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 Fulton Award

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

The Hope Medallion

The Hope Medallion is awarded to the recruit showing best potential of leadership during the Recruit Camp. This is awarded to the First Year Class Senior. (Fall)

The Howard B. Ripstein Award of Excellence

The Howard B. Ripstein Award of Excellence is awarded to a cadet of each of the Air, Army, and Navy 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 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. It is given in conjunction with the Captain John Bart Leadership Award, which is awarded to the best leader in each Squadron during the Obstacle Race. (Fall)

The Colonel The Honourable John Matheson Sword

The Colonel The Honourable John Matheson Sword is presented to the top cadet of Richelieu Squadron in the first year at the Royal Military College of Canada. (Fall)

Departmental Prizes - First and Second Year

A departmental prize is awarded annually to the cadets in First and Second 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)

Not Year Specific

The Lieutenant-Colonel Leroy Fraser Grant Memorial Prize

The Lieutenant-Colonel Leroy Fraser Grant Memorial Prize will be presented to the student of any year who, in open

competition, submits the best essay on other than a Canadian or Commonwealth topic. (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)

Military Leadership Excellence Award (Gold Medal, Third Year; Silver Medal, Second Year; Bronze Medal, First Year)

This medal is awarded to the ROTP/RETP cadet attaining the highest standards of proficiency in each of the four components in the Third, Second and First Year of the RMC programme. (Fall)

The Squadron Leader McAlpine Cadet Trust Fund

The Squadron Leader McAlpine Cadet Trust Fund is awarded to the Air Force cadets in the third, second and first year, with achievement in one of the following areas: military, athletic, academic and bilingualism. (Fall)

Canadian Forces Military College Medals and Prizes

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 programme. (Spring)

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

The 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 as determined by a Secret ballot of the Members of the UTPNCM squadron.

The UTPNCM Honour Shield is co-sponsored by the UTPNCM graduating Class of 1978 and by Mrs. W.S. Avis in memory of Dr. Walter S. Avis who was Dean of the Canadian Forces Military College during 1974-80 and a strong supporter of the squadron. (Spring)

Canadian Forces Military College Academic Awards (graduating student)

A medal is awarded annually in each of Honours Arts, Honours Science, and Engineering to the graduating student entering CFMC with Advanced Standing who, having First Class Distinction, stands highest in the course of study, provided that an overall average of Second Class Distinction without failures or conditions was maintained in the Third Year. (Spring)

Prizes will be awarded annually to those students entering CFMC with Advanced Standing who stand highest among the Advanced Standing CFMC students 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 (Spring):

a. Second Year of a three-year (Pass) programme;
b. Third Year of three-year (Pass) programme; and
c. Third Year of a four-year programme in each of Arts, Science, and Engineering.

UTPNCM Drill and Physical Education Departmental Prize

Prizes are awarded:

a. To the graduating UTPNCM who has maintained throughout the complete course of study the highest standard in drill and physical education among those graduating (Spring); and
b. To the UTPNCM not in the graduating year who achieves the highest standard in drill and physical education in the year. (Fall)

Admission

ADMISSION GUIDELINES

General Qualifications

Individuals interested in applying for admission to undergraduate programs and courses of study offered by the Royal Military College of Canada (RMC) must meet the following Admission conditions:

1. Be a Canadian citizen;
2. Possess the necessary academic qualifications for the academic program being applied for or meet the conditions of admission for mature student status; and,
3. Must meet one of the following conditions:
    - Be an applicant for the Regular Officer Training Plan (ROTP) or the Reserve Entry Training Plan (RETP); or,
    - Be a qualified member of the Regular or Reserve Forces according to their assigned MOSID (Military Occupational Structure Identification Code). Non-qualified members may apply with the written recommendation of their Unit of Formation Commanding Officer; or,
    - Be a former member of the Regular or Reserve Forces and be honourably released; or,
    - Be an employee of the Department of National Defence (DND) or other Federal government department; or,
    - Be the spouse of a member of the Regular Forces or the Primary Reserves.

Individuals who do not meet the eligibility requirements for admission to RMC as specified above and who wish to pursue RMC's Certificate Programmes or specific individual courses offered by RMC may apply as 'interest only' students and may be accepted, on an exceptional basis, provided there is space available and their admission serves the aims established for RMC, the CF and the Government of Canada.

Individuals currently attending another institution and who are interested in pursuing specific courses offered by RMC may apply as 'Visiting Students' with the permission of their home institution.

ADMISSION OPTIONS

Students interested in pursuing their Undergraduate studies at RMC have the following admission options:

- Apply for full time admission under the Regular Officer Training Plan (ROTP);
- Apply for full time admission under the Reserve Entry Training Plan (RETP);
- Apply for full time admission under the University Training Plan - Non Commissioned Members (UTPNCM);
- Apply for full time admission under the Initial Baccalaureate Degree Program (IBDP); or
- Apply for full time or part time admission through the Division of Continuing Studies (DCS).

ROTP and RETP

Civilian students wishing to pursue full time undergraduate studies and a career as an officer in the Canadian Forces may do so under the auspices of the Regular Officer Training Plan (ROTP) or the Reserve Entry Training Plan (RETP). The purpose of either program is to develop selected civilian candidates for service in the Regular and Reserve Forces. Students therefore apply for enrolment into the Canadian Forces at a Canadian Forces Recruiting Center and apply for the ROTP or RETP as part of the enrolment process.

Regular Officer Training Plan (ROTP)

The ROTP gives young Canadians the opportunity to obtain both a commission as an officer in the Canadian Forces and a university degree. Applicants who have been accepted for entry at RMC enrol as officer cadets in the Canadian Forces.

Under ROTP, the costs of tuition, uniforms, books, instruments and other essential fees are born by the Department of National Defence for the duration of a candidate's education at RMC. In addition, an officer cadet is paid a monthly salary, less deductions for income tax, pension plan, supplementary death benefit, and, room and board. Medical and dental care are provided free of charge throughout the entire academic year including summer training periods. Annual vacation leave with full pay is granted according to CF regulations and policies.

An Officer Cadet is obliged to maintain a satisfactory academic and military standard throughout the entire programme. Officer Cadets who fail to meet these standards may be permitted to "repeat" one year of studies at their own expense and, if successful, be reinstated to full pay and allowances.

Upon successful completion of their undergraduate studies, ROTP Officer Cadets are awarded a university degree and granted a commission as officers in the Canadian Forces. Graduates of the ROTP are obliged to serve three to five years (depending on the number of

years of subsidized education) in a regular component of the Canadian Forces.

An Officer Cadet who is enrolled under the ROTP may apply for release without any obligation after the 1st of November of the first academic year and prior to the commencement of classes in their second year of studies. Thereafter, an Officer Cadet who seeks release shall undertake to reimburse the Crown for all expenses incurred by reason of attendance at RMC.

Reserve Entry Training Plan (RETP)

The purpose of the Reserve Entry Training Plan is to educate and train selected Primary Reserve candidates at the Royal Military College of Canada. Successful candidates will become officers in the Reserve Force or may be considered for transfer into the Regular Force. Up to 15 students may be accepted each year as "Reserve Entry" cadets. Reserve Entry cadets receive the same education and training as ROTP cadets. However, RETP academic training is not subsidized and candidates are required to pay tuition and other academic fees and room and board. RETP candidates are required to take summer training for which they receive pay and allowances at the same rate as a Second Lieutenant on "Class B" reserve service. (refer to any Canadian Forces Recruiting Center for the current rate of pay and allowances)

ROTP and RETP Eligibility Requirements

The eligibility requirements for students pursuing admission to RMC under the ROTP or RETP are as follows:

1. Must be a Canadian citizen at the time of application;
2. Must be 16 years of age on or before 1 Jan of the year of enrolment;
3. Must meet the medical standards for the Canadian Forces;
4. Must obtain an acceptable standard in a series of tests as prescribed the National Defence Headquarters; and,
5. Must possess the necessary academic qualifications for RMC as specified in the admission pre-requisites outlined further below.

Tuition and Fees (RETP Candidates)

- an annual tuition
- Room and board and;
- Annual Mess and other recreational fee;

Information concerning these fees can be found at: Fees Table

Payment of fees and costs can be arranged in two instalments, the first upon registration and the second by the following 31 January.

University Training Plan NCMs (UTPNCM)

The University Training Plan Non-Commissioned Members (UTPNCM) is a CF sponsored subsidization plan open to non-commissioned members of the Canadian Forces who meet the academic requirements for admission to RMC as candidates for a baccalaureate degree. Depending on their level of academic standing UTPNCM candidates may enter at the First Year level or with 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-training requirements as those in the ROTP and RETP. On graduation, both groups of Officer Candidates are commissioned and promoted. The conditions governing, eligibility, application, selection procedures are set forth in Canadian Forces Administrative Orders 9-13 and may be amended or modified by subsequent orders.

Initial Baccalaureate Degree Program (IBDP)

The IBDP is a CF sponsored subsidization plan open to commissioned officers serving the Canadian Forces who are within two years of meeting the course requirements for a baccalaureate degree at RMC. Thus, all students admitted under this plan must enter as candidates with advanced standing. The conditions governing eligibility, application and selection procedures are set forth in Canadian Forces Administrative Order 9-40, and may be amended or modified by subsequent orders.

Continuing Studies

ADMISSION

Individuals who wish to be considered for admission into an Undergraduate Programme of Study must complete and submit an Application for Admission, along with supporting documentation, to the Associate Registrar - Admissions.

Every applicant must include the following documentation:

- Official transcripts of all high school, college, CEGEP, or university courses completed;
- If a Regular CF member, a Military Personnel Record Resume (MPRR) (formerly CF490A);
- If a Reserve CF member, a CF 1007 Record of Service;
- If a spouse of a Regular CF member, a copy of your spouse's MPRR;
- If a full time civilian employee of DND, a copy of the letter of offer; and
- Payment of the administrative fee for the processing of an application for admission.

VISITING STUDENT

Students already enrolled in another university programme may apply for admission and register for courses at RMC as 'Visiting Students'. Application for Admission and Course Registration must be submitted prior to the course registration deadline.

Visiting students must ensure that they get permission from their home institution so that credits earned from RMC can be transferred to their home institution.

INTEREST ONLY STUDENT

Interest Only Students are students who enrol in a course without being admitted into a Programme of Study at RMC. Interest Only Students must meet the academic prerequisites specified for the courses they wish to study at RMC.

Interest Only students must apply for admission to RMC and submit the required documentation (i.e., application for admission form, college and university transcripts) and fee payment to RMC.

The current RMC academic regulations limit to three in any given term the number of courses an Interest Only Student may enrol in, and to six in total the number of undergraduate credits an Interest Only Student may obtain at RMC. If an Interest Only Student has obtained the maximum of six credits at RMC, the student will be required to seek admission into a programme of study before being allowed to register in another course at RMC.

Individuals who do not meet the eligibility requirements for admission to RMC as specified above and who wish to pursue RMC's Certificate Programmes or specific individual courses offered by RMC may apply as 'interest only' students and may be accepted, on an exceptional basis, provided there is space available and their admission serves the aims established for RMC, the CF and the Government of Canada.

MATURE STUDENT

Individuals of 21 years of age and who have been out of formal schooling for a minimum of 2 years and who do not meet the normal academic prerequisites for admission may qualify for admission as 'mature' students.

Admission of mature students is limited to the Faculty of Arts. Mature students who intend to eventually pursue baccalaureate degrees in Science or Engineering, may only be admitted to these faculties once they have successfully completed 2 full university courses or, have been accredited with the equivalent of 2 full university courses, and meet the academic pre-requisites of the programme of interest.

ACADEMIC PREREQUISITES

General Prerequisites

There are four programme options are offered at the Royal Military College:

1. The Arts option which leads to degrees in Arts;
2. The Science option which leads to degrees in Science;
3. The Engineering option which leads to degrees in Engineering and;
4. The Bachelor of Military Arts and Science, a unique degree programme for the Canadian Forces offered through RMC's Division of Continuing Studies and specifically designed for the serving military member recognizing university-level achievement appropriate to the profession of arms.

An applicant for admission to one of these options must be completing or have completed:

- High school (Grade 12) at a pre-university level satisfactory to RMC with credits acceptable and sufficient for regular admission to a university in the province in which the student is completing secondary education.
- Quebec students must be completing or have completed the first year of a two-year pre-university program (College of General and Vocational Education - CEGEP) and will normally be expected to offer 14 credit courses.
- The equivalent to grade 12 high school or CEGEP 1;
- Possess academic standards higher than those specified above; or,
- Meet the conditions for admission as a mature student.

Candidates should be aware that all programmes are of four-year duration, and are broadly based; Engineering and Science programmes include several courses in the Humanities, while student in Arts are required to successfully undertake university level courses in mathematics and the sciences. The requirements for admission to each of the programmes are summarized below.

The Bachelor of Military Arts and Science is a unique undergraduate degree programme for the CF, is thoroughly grounded in the military profession and integrates in-service training with special and standard university courses. It is designed for the serving military member, and recognizes university-level achievement appropriate to the profession of arms.

Academic Prerequisites by Programme

Bachelor of Arts

In addition to the general academic qualifications applicants for admission to the Arts programme must have completed a university preparatory English or French course at the High School leaving level (normally the Grade 12 or the provincial equivalent). A grade 12 university preparatory course in mathematics (preferably Calculus) is strongly recommended. Students must have completed a Grade 11 mathematics at the university preparatory level. Students who have not completed a Grade 12 Chemistry and Physics will be required to complete makeup courses as part of their RMC programme. Students who do not meet these minimum pre-requisites may be admitted as mature students.

Bachelor of Science

In addition to the general academic qualifications, applicants for the Science programme must have completed a university preparatory course at the High School leaving level (normally Grade 12 provincial equivalent) in the following subjects: English, Mathematics, (Algebra or Calculus) and two of: a second Mathematics course in Algebra or Calculus, Chemistry, Physics or Biology. (Note: a. two high school leaving mathematics courses are recommended and b. Chemistry is required for a major concentration in Chemistry and Physics is required for a major concentration in Physics and Space Science.)

Bachelor of Engineering

In additions to the general academic qualifications applicants for the Engineering programme must have completed a university preparatory course at the High School leaving level (normally Grade 12 provincial equivalent) in the following subjects: English, Mathematics, (Algebra/Geometry/Trigonometry and Calculus if available within the provincial system), Chemistry and Physics.

Bachelor of Military Arts and Science

In addition to the general academic qualifications applicants for admission to the Bachelor of Military Arts and Science programme must have completed a university preparatory English or French course at the High School leaving level (normally the Grade 12 or the provincial equivalent). Students who do not meet these minimum pre-requisites may be admitted as mature students.

REQUIRED ACADEMIC SUBJECTS BY PROVINCE

BC and Yukon	
ARTS	English 12; Mathematics 11 - Principles or Applications; or Mathematics 12 - Principles; or Calculus 12
SCIENCE	English 12; Mathematics 12 - Principles; and any two of the following: Calculus 12 - (where available); Chemistry 12; Physics 12; Biology 12
ENGINEERING	English 12; Mathematics 12 - Principles; Calculus 12 - (where available); Chemistry 12; Physics 12

Alberta, Northwest Territories and Nunavut	
ARTS	English 30-1; Pure Mathematics 20 or 30 or 31;
SCIENCE	English 30-1; Pure Mathematics 30; and any two of the following: Pure Mathematics 31; Chemistry 30; Physics 30; Biology 30
ENGINEERING	English 30-1; Pure Mathematics 30; Pure Mathematics 31; Chemistry 30; Physics 30

Saskatchewan	
ARTS	English A30 and B30; Mathematics 20 or A30 or B30 or C30
SCIENCE	English A30 and B30; Mathematics 30; and any two of the following: Calculus 30; Chemistry 30; Physics 30; Biology 30
ENGINEERING	English A30 and B30; Mathematics 30 Calculus 30; Chemistry 30; Physics 30

Manitoba	
ARTS	English 40S; Mathematics Pre-Calculus 30S; or Mathematics Pre-Calculus 40S
SCIENCE	English 40; Mathematics Pre-Calculus 40S; and any one of the following Chemistry 40S; Physics 40S; Biology 40S
ENGINEERING	English 40; Mathematics Pre-Calculus 40S; Chemistry 40S; Physics 40S

Ontario	
ARTS	English (ENG4U); Functions (MCF3M); or Functions and Relations (MCR3U); or Advanced Functions (MHF4U)
SCIENCE	English (ENG4U); Advanced Functions (MHF4U); and any two of the following: Calculus and Vectors (MCV4U); Chemistry (SCH4U); Physics (SPH4U); Biology (SBI4U)
ENGINEERING	English (ENG4U); Advanced Functions (MHF4U); Calculus and Vectors (MCV4U); Chemistry (SCH4U); Physics SPH4U)

New Brunswick	
English Sector	
ARTS	English 121/122; Functions and Relations 111/112; or Trigonometry and 3-Space 121/122; or Advanced Mathematics with Calculus 120
SCIENCE	English 121/122; Advanced Mathematics with Calculus 120; and any two of the following: Trigonometry and 3-Space 121/122; Physics 121/122; Chemistry 121/122; Biology 122
ENGINEERING	English 121/122; Advanced Mathematics with Calculus 120; Trigonometry and 3-Space 121/122; Physics 121/122; Chemistry 121/122
French Sector	
ARTS	French 10411 or English 22311 or 21311/112; Mathematics 30311/112; or 30411/120/121/122
SCIENCE	French 10411 or English 22311 or 21311/112; Mathematics 30311/112; and any two of the following: Mathematics 30411/120/121/122; Physics 51411; Chemistry 52411; Biology 53411
ENGINEERING	French 10411 or English 22311 or 21311/112; Mathematics 30311/112; Mathematics 30411/120/121/122; Physics 51411; Chemistry 54211

Nova Scotia	
ARTS	English 12; Advanced Mathematics 11 or 12; or Academic Mathematics 11 or 12
SCIENCE	English 12; Advanced Mathematics 12; and any two of the following: Pre-Calculus 12; Chemistry 12; Physics 12; Biology 12
ENGINEERING	English 12; Pre-Calculus 12; Advanced Mathematics 12; Chemistry 12; Physics 12

Prince Edward Island	
ARTS	English 621A; Mathematics 521A or 521B; or Mathematics 621A or 621B
SCIENCE	English 621A; Mathematics 621A, and any two of the following: Mathematics 621B; Chemistry 621; Physics 621; Biology 621
ENGINEERING	English 621A; Mathematics 621A and 621B; Chemistry 621; Physics 621

Newfoundland	
ARTS	English 3201; Mathematics 2205 or 3205 or 3207
SCIENCE	English 3201; Mathematics 3205; and any two of the following: Mathematics 3207; Chemistry 3202; Physics 3204; Biology 3201
ENGINEERING	English 3201; Mathematics 3205; Mathematics 3207; Chemistry 3202; Physics 3204

Province of Quebec

There are two admission entry options for students from the province of Quebec.

1. Students can be admitted to First Year RMC if they have successfully completed the first year of a two-year DEC Diploma from an accredited CEGEP.
2. Students who have completed their two-year DEC Diploma may be admitted with advance standing. The admission criteria for CEGEP students are as follows:

ARTS	English (French)- 2 core courses; Mathematics - Secondary V 536 or 526; or CEGEP 1 level Mathematics in Calculus; or Algebra
SCIENCE	English (French) 2 core courses; Mathematics - two of: 201-GGF-05, NYA-05, 201-NYC-05, 201-NYB-05; Chemistry 202-NYA-05; or Physics 203-NYA-05; or Biology 101-NYA-05
ENGINEERING	English (French)- 2 core courses; Mathematics - two of: 201-GGF-05, NYA-05, 201-NYC-05, 201-NYB-05; Chemistry 02-NYA-05; Physics 203-NYA-05; Biology 101-NYA-05

Quebec students applying for admission with a SEC V Quebec must request admission to the College militaire royal St-Jean (CMRStJ).

Non Canadian Education Systems

Students who complete secondary school through education systems outside of Canada or through "home" schooling will be considered individually but will be required to meet the equivalent standards to those indicated above. All applicants must possess the equivalent of a high school diploma. Additionally, students must offer acceptable results in the Scholastic Aptitude Tests (SATs) as follows:

For a diploma in Arts

The SAT Reasoning Test and the SAT Subject Tests in English (Literature) and Mathematics Level 1.

For a diploma in Science

The SAT Reasoning Test and the SAT Subject Tests in English (Literature), Mathematics Level 1 and 2, and one Science Subject Test in either, Biology E/M, Chemistry or Physics.

For a diploma in Engineering

The SAT Reasoning Test and the SAT Subject Tests in English, Mathematics Level 1 and 2, Physics and Chemistry.

International Baccalaureate Programme (IB):

Students who have earned the IB diploma must still have completed a high school diploma in a university preparation program and meet the conditions outlined above. Candidates granted the IB Diploma may receive transfer credits on the basis of subjects completed with a grade of 5 or better.

Students who have not earned a high school diploma but have successfully earned the IB Diploma may be considered for admission as follows:

Arts Programme

Full-Diploma candidates who pass six subjects with at least three at the Higher Level, and who accumulate a grade total of 28, exclusive of bonus points, may be considered for admission. Higher level English must be taken at least at the Subsidiary Level.

Science/Engineering Programme

Full-Diploma students will with an overall total of 28 grade points or better, exclusive of bonus points, may be considered for admission. Mathematics, Chemistry and Physics taken at the Higher Level are preferred; however, one of the above may be taken at the Subsidiary Level. English must be taken at least at the Subsidiary Level.

Admissions Restriction

The Royal Military College of Canada reserves the right to reject applicants on the basis of their overall academic record, even where entrance requirements have technically been met. Normally a candidate who has been required to withdraw from another university or college for academic reasons will not be considered for admission until a full academic year has elapsed.

ADMISSION PROCEDURE

All Military and Civilian Applicants

All individuals interested in pursuing their undergraduate studies at the Royal Military College of Canada must apply for admission to the undergraduate degree of their choice. All military applicants, including those enrolled under the Continuing Education Officer Training Plan (CEOTP) and civilians wishing to be considered for admission into an Undergraduate programme of Study must complete and submit an Undergraduate Studies Application - along with supporting documentation to the Registrar's Office - Admissions.

Every applicant must include the following documentation:

- Official transcripts of all high school, college, CEGEP, or university courses completed;
- If a Regular CF member, a Military Personnel Record Resume (MPRR) (formerly CF490A);
- If a Reserve CF member, a CF 1007 Record of Service;
- If a spouse of a Regular CF member, a copy of your spouse's MPRR;
- If a full time civilian employee of DND, a copy of the letter of offer; and
- Payment of the administrative fee for the processing of an application for admission

ROTP and RETP Applicants

Civilian applicants wishing to pursue their undergraduate degrees at RMC through the subsidized programs:

- Regular Officer Training Plan (ROTP); or
- Reserve Entry Training Plan (RETP)

must apply in person to a **Canadian Forces Recruiting Center**.

Applications should be made as early as possible, and all documentation should be submitted without necessarily waiting for the results of the first set of examinations in the final year of high school. However, the Canadian Forces Recruiting Center will the require the applicant's

co-operation in furnishing high school transcripts and in arranging the earliest possible receipt of final marks for the present school year.

The deadline for application for admission under the ROTP or RETP is normally in early February of the academic year. Information concerning the application process may be obtained from any Canadian Forces Recruiting Center (CFRC) at 1-800-856-8488 or at: www.recruiting.forces.gc.ca

To be eligible for enrolment into the Canadian Forces and to be admitted to RMC ROTP/RETP applicants must meet the following conditions:

- Be a Canadian citizen;
- Be 16 years of age;
- Meet the minimum medical standard required for enrolment into the Canadian Forces;
- Pass pre-enrolment tests
- Pass the Initial Assessment and Basic Officer Training Period
- Possess the necessary academic qualifications outlined above.

Military Applicants

All military applicants wishing to pursue their undergraduate degrees at RMC through the:

- University Training Plan Non-Commissioned Member (UTPNCM);
- Initial Baccalaureate Degree Programme (IBDP);
- Army Officer Degree Programme (AODP); or
- Air Force Degree Completion Program (AFDCOMP);

must submit their candidacy for these programs to their chain-of-command in concurrence with the annual competition for these programs. For IBDP, AODP, AFDCOMP students requiring confirmation of current academic standing it is suggested that application for admission to RMC occurs well in advance of applying for the intended program.

PRIOR LEARNING ASSESSMENT

Introduction

The Royal Military College of Canada recognises that significant university level learning can take place outside of post secondary institutions and as such respects all forms of learning no matter how it is attained.

The aim of RMC Prior Learning Assessment & Recognition is to acknowledge the importance of this learning by providing an accessible, fair and academically rigorous process for assessing this learning to determine whether it meets the standards of university level learning.

The RMC PLAR process involves individual assessment of prior learning by faculty and the awarding of credit when this learning is of the expected range and depth for the particular academic credential requested by the individual.

The purpose of the PLAR process is to recognize all university level learning by ensuring that RMC policies are in line with other Canadian universities.

The goal is to enrich the learning experience of the student and help the student meet his/her academic potential while at the same time maintaining the academic integrity of the Royal Military College of Canada.

Prior Learning Assessment & Recognition (PLAR)

Students applying for admission into a programme of study who have completed programmes or courses at other universities, community colleges, or CEGEP or professional training courses taken either within the CF or through some other organization (whether in Canada or abroad), may seek to have their prior learning at a university level recognized by RMC.

For sponsored students, in order to ensure that prior learning is assessed in time to apply results to first year scheduling, a copy of student transcripts, course descriptions, and outlines for courses for which recognition is being requested must be forwarded to the RMC PLAR section immediately upon acceptance to RMC. Requests, therefore, should be forwarded before leaving for the Basic Officer Training Course.

University Transfer Credits

Credit for University courses taken at a recognized Canadian university may be granted one for one as unallocated credits in any RMC degree, however, in order for credit to be applied to a specific concentration or minor, or to replace specific courses listed as part of a programme, departmental approval is required.

College Transfer Credits

Up to a maximum of 10 transfer credits may be granted for College courses (unless otherwise approved for a specific diploma or programme) based on provincial college to university transfer guides and course reviews completed by faculty and approved by Deans. In order for any college course to be used to meet the requirements of a specific RMC course (equivalency) or to be applied as part of a minor or concentration, approval of the applicable department is required.

CEGEP Transfer Credits

Up to a maximum of 10 transfer credits may be granted for CEGEP courses based on the following PLAR policy:

- Students who have completed a 2-year CEGEP DEC will earn a total of 10 credits. These will consist of Science and Arts course equivalencies as recommended by faculty and approved by the Deans, and unallocated Arts credits.
- Students who have not completed a 2-year CEGEP DEC but have earned at least 12 CEGEP credits (excluding physical education credits) may earn a total of 10 credits. These will consist of unallocated Arts credit based on evidence that the given CEGEP course(s) earns credit at any Canadian University and Science credits as recommended by faculty and approved by the Deans.
- Students who have not completed a 2-year CEGEP DEC, nor a minimum of 12 CEGEP credits, may earn up to a total of 10 credits consisting of Science and Arts credits as recommended by faculty and approved by the Deans.
- Students who have successfully completed the Government of Québec Ministry of Education Examination of College English (épreuve uniforme) will be considered to have met their first year literature requirement. Students who have completed at least four CEGEP literature courses in English or French literature with a grade of C or higher in three of the four courses and a C- in the fourth course will earn one unallocated Arts credit. If they have earned a C or higher in all four courses, they will earn 2 unallocated Arts credits. These credits may be used to meet the literature requirements of the BMASc Honours, BMASc, and General three-year degrees. Students in any other Honours degree meeting these criteria may request to write a challenge exam to meet their first year literature requirement.

In order for any CEGEP course to be used to meet the requirements of a specific RMC course (equivalency) or to be applied as part of a minor or concentration, approval of the applicable department is required.

Credit Granted

The Faculty Council of RMC, on the recommendation of a department, the Continuing Studies Committee and the Faculty Board of RMC, may approve university credits based on university level prior learning obtained via any of the following:

- Military courses and qualifications, whether obtained within Canada or abroad, recognized as learning at a university level;
- Professional courses or programmes given by an organization other than a post-secondary institution recognized as learning at the university level;
- The combination of Military courses and RMC courses designated as "top-up" courses to be completed to augment specific military courses and experiential learning to the university-level.

A list of approved courses is found on the RMC Table of Credit Granted

Second Language Credits:

Credits granted based on students achieving the bilingual standard (BBB) and higher on official language tests.

Students completing 4-year degrees 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 forth year will be applied to that year.

Students completing 3-year degrees achieving the bilingual standard (BBB) on official language tests will be awarded an unallocated junior credit on their initial assessment. For comprehension, writing, and speaking, students will be awarded an additional credit 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.

Documentation Required for Transfer Credit Review

In order to complete a PLAR review for transfer credits the following documentation is required immediately upon acceptance to RMC for sponsored on site students and as part of the Admissions application for distance learning students:

- Official Transcripts from the post-secondary institutions, whether universities, colleges or CEGEP, at which programmes or courses have been completed;
- Course Outlines for CEGEP and College courses as requested;
- Course Descriptions for University courses to be reviewed.
- Request for Advanced Standing (Transfer Credits) Application Form

For PLAR review applicants who are not sponsored students please complete the Request for Transfer Credits section of the Request for Advanced Standing Form, including payment information, and FAX to the Admissions FAX number provided on the form.

For sponsored students, in order to ensure that prior learning is assessed in time to apply results to first year scheduling, a copy of student transcripts, course descriptions, and outlines for courses for which recognition is being requested must be forwarded to the RMC PLAR section immediately upon acceptance to RMC. Requests, therefore, should be forwarded before leaving for the Basic Officer Training Course.

Documentation Required for Credit Granted Review

In order to complete a PLAR review for credit granted the following documentation is required immediately upon acceptance to RMC for sponsored on site students and as part of the Admissions application for distance learning students:

- A Military personnel Record Resume (MPRR) for Regular Force Members;
- A Record of Service for Reserve Force Members;
- Course Training Reports for courses listed on the RMC Table of Credit Granted;
- Course Training Plan and Course Material for DND courses not on the RMC Table of Credit Granted;
- Certificate of Completion for Professional level courses;
- Course Manual and Course Material for non-DND Professional level courses not on the RMC Table of Credit Granted.
- Request for Advanced Standing (Credit Granted) Application Form

For PLAR review applicants who are not sponsored students please complete the Request for Credit Granted section of the Request for Advanced Standing Form, including payment information, and FAX to the Admissions FAX number provided on the form.

For sponsored students, in order to ensure that prior learning is assessed in time to apply results to first year scheduling, a copy of student transcripts, course descriptions, and outlines for courses for which recognition is being requested must be forwarded to the RMC PLAR section immediately upon acceptance to RMC. Requests, therefore, should be forwarded before leaving for the Basic Officer Training Course.

Prior Learning Assessment & Recognition (PLAR) - Undergraduate

Service	Standard
Completion of a student requested PLAR review toward an undergraduate degree at RMC	8 weeks
Completion of student requested PLAR review of a course or program of study not taken for credit at a Canadian post secondary institution such as DND courses and professional courses.	8 months

Academic Programmes

DEGREE PROGRAMMES OFFERED

The Royal Military College 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 and RETP entry plans.

Degree	*Programme*	*Academic Years (or equivalent) to complete*
Bachelor of Arts (Honours) BA (Honours)	• English • French • History • Politics • Economics • Military and Strategic Studies • Business Administration • Psychology	4
Bachelor of Arts (BA) with Major	• English • French • History • Politics • Economics • Military and Strategic Studies • Business Administration • Psychology	4
Bachelor of Arts (BA)[1]	No Major, Minor only	3
Bachelor of Science (Honours) BSc (Honours)	• Chemistry • Mathematics • Computer Science • Physics • Space Science	4
Bachelor of Science (BSc) with Major	• Chemistry • Computer Science • Mathematics • Physics • Space Science • Or two Majors	4
Bachelor of Science (BSc)[1]	No Major, Minor only	3
Bachelor of Engineering (BEng)	• Aeronautical Engineering • Chemical Engineering • Civil Engineering • Computer Engineering • Electrical Engineering • Mechanical Engineering	4
Bachelor of Military Arts and Science (Honours) BMASc (Honours)[2]	No Major	4
Bachelor of Military Arts and Science (BMASc)[2]	No Major	3

Notes:

1. The general BA and BSc programmes without a major are not normally open to ROTP and RETP cadets. Cadets may only transfer into these programmes with special permission from the Dean of the Faculty.
2. The BMASc (Honours) and BMASc degrees are offered through the Division of Continuing Studies and are not open to ROTP or RETP cadets. For more information on the specific requirements of these degrees consult the Continuing Studies Section.

General Requirements

The Core Curriculum represents the minimum content in certain areas which are required content of all RMC degrees. However, all students need not pass exactly the same pattern of courses in order to complete all core curriculum requirements.

The Core Curriculum contains within it two separate themes;

The first theme is the minimum standard for mathematics (which also includes logic and information technology) and sciences (chemistry and physics).
The second theme is the basic requirements in the Canadian history, language and culture, Politics, International relations and leadership and ethics.

The Physical Education programme is divided into three areas:

1. Intercollegiate sports,
2. Intramural sports, and
3. Physical Training.

All cadets must take part in both the Physical Training programme and one of the sports programmes.

Professional Military Training is required of all cadets in all four years.

Second Language training is mandatory for all students who do not meet the standards set by the College to the classification tests of the Public Commission.

4-Year Degree

Introduction

For ROTP and RETP cadets, the normal duration of the programme of studies at RMC is four years, no matter which degree is sought. However, permission may be granted for a student to repeat not more than one failed year, provided performance in all other areas is satisfactory.

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 College year is divided into two terms, the Fall Term and the Winter Term. The academic year normally extends from late August until May.

First Year

First Year may be completed in either:

- 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.

Arts Programmes

Students in the Arts will normally select a major in Second Year. The major will consist of a set of courses required by the programme, together with required Arts and Science Core Curriculum courses, and electives.

The following fields of study in Arts are available, for both BA (Honours) and BA programmes:

- Business Administration
- English
- French Studies
- History
- Politics
- Economics
- Military And Strategic Studies
- Psychology

Students wishing to obtain an Honours degree in a major will be required to complete additional courses and requirements as specified by the department of study. Application for entry into Honours programmes will be made to the department and will normally be done during Third Year (or at the beginning of Third Year in the case of Business Administration.)

In addition to the honours or major, students may also develop a minor in one subject (History, English, French Studies, Politics, Economics, Business Administration, Military Strategic Studies or Psychology) which is not an integral part of their major.

Arts students will continue in their major and minor programmes in Third and Fourth Year. Specified course requirements from Second Year will complement the selected programme. Application to an Honours programme in the major in the second term of Third Year (or at the beginning of Third Year in the case of Business Administration.)

In addition to requirements of Second Language Training, Physical Education, and Professional Military Training, students will continue with their required courses for their major. The mandatory courses in Military Psychology and

Leadership and other core curriculum requirements must also be satisfied.

The actual courses which will be taken in each of the Third and Fourth Year will be dependent upon specific degree requirements (i.e., whether the student has entered an Honours programme in their major -- see course outlines section) and timetable limitations

Note: All HIE 400 level courses are designed as seminar courses and that if enrolment exceeds 18 priority will be given to those students who require them to fulfil mandatory degree requirements first. Authority to authorize exceeding this cap rests with the History Department Head.

Science Programs

Students will normally select a discipline in the Second Year. The Faculty of Science offers BSc degrees at the Honours or Major in:

- Chemistry
- Mathematics
- Computer Science
- Physics
- Space Science

or a Double Major in a combination of two disciplines listed above.

With the permission of the Deans of Arts and Science, a Combined Major BSc degree in:

- Chemistry and Psychology;
- Space Science and Military and Strategic Studies; or
- Computer Science and Business Administration

will be awarded if the majors requirements are met in each of the respective Science and Arts disciplines.

The discipline selected in the Second Year will normally be continued in the Third and Fourth Years.

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.

The general regulations for each program are given below and detailed descriptions can be found in the appropriate departmental calendar entry.

Honours

A BSc (Honours) degree is normally a four-year degree program and has a total of 42 credits.

A BSc (Honours) degree will be awarded if the following conditions are completed:

- The Core Curriculum (10 credits);
- The First Year

Science Core Requirement (SCR) (8 credits);

20 program credits (includes 4 SCR credits):
A senior project (2 credits);
Electives (6 credits) - normally 50% from science or engineering, subject to Department approval.

Students entering an Honours program require the permission of the appropriate department.

Normally a student must obtain a 70% average in first year to be eligible for entry into an honours program in second year. A student with a 70% average in second year may be eligible to enter an Honours program in third year. A student with an average of 70% in second and third years combined, may be eligible to enter an Honours program in 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 program of study or may be required to withdraw from the BSc (Honours) program and continue in a BSc program with a major. A student who has been required to withdraw from an Honours program may apply to the Dean for reinstatement after two academic terms.

Major

A BSc with a major is normally a four-year programme and has a total of 42 credits.

A BSc degree with a Major will be awarded upon successful completion of:

- the Core Curriculum (10 credits);
- the first year

Science Core Requirement (SCR) (8 credits);

16 program credits (includes 4 SCR credits);
electives (12 credits) - at least 50% from science or engineering, subject to Department approval.

Double Major

With the permission of the Dean of Science, a candidate who successfully completes the 16 program credit

requirements in Major programs for two disciplines will be awarded a Double Major BSc.

Minor

A minor course of study in the Faculty of Science consists of 8 credits in the minor discipline as specified by departmental regulations.

Candidates for a degree in science may undertake a minor from the Faculty of Science or the Faculty of Arts with the permission of the appropriate Dean.

The Arts minor will conform to requirements specified by the Faculty of Arts.

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

Note: Interested candidates should consult the Dean of Science for details.

General Science

A BSc degree without a major will be awarded upon successful completion of:

1. the Core Curriculum (10 credits);
2. the First Year

Science Core Requirement (SCR) (8 credits);

30 total credits of which 11 must be in science beyond SCR.
Course approval and the permission of the Dean of Science are required to enter this program.

Note: ROTP / RETP / UTPNCM candidates will follow the standard RMC undergraduate common core. All others will follow the common core as specified by the Division of Continuing Studies.

Engineering Programmes

In Second Year, students completing First Year Engineering may proceed in an engineering programme for which they have qualified.
The available engineering programmes are:

- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Computer Engineering
- Mechanical Engineering
- Aeronautical Engineering

Admission to an engineering programme requires the approval of the Head of the Department.

There is sufficient commonality in all programmes to allow students to change their specialization without the need to take additional courses up until the end of the first semester of second year.

Students wishing to change their specialization during the first semester will require the approval of the Heads of both affected departments. Students may also change their specialization at any time in the second term, but may be required to make up specific courses in order to satisfy the requirements of their chosen degree. Changes at this time will require the approval of the Dean of Engineering and the Heads of both departments.

A student admitted to a Third Year Engineering programme will normally remain in that programme in Fourth Year.

With the approval of the Dean of Engineering, exceptional students who complete Second Year of a science programme may be permitted to enter Third Year Engineering with some additional courses.

With the approval of the Dean of Science, exceptional students who complete Second Year Engineering may be permitted to enter any Third Year Science programme.

3-Year Degree

The 3-year BA and BSc programs are not open to ROTP and RETP cadets.

See appropriate section under the Faculty of Arts, Faculty of Science, and Division of Continuing Studies.

Academic Regulations

DEFINITIONS

Academic Year: For full-time students, the period from September to May. The academic year is divided into two terms, Fall Term and Winter 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. 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.

Challenge Examination: An examination to test the knowledge of candidates in the subject matter of a particular course, the purpose of which 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. Course credits earned through successful passing of a Challenge Examination will be annotated as "CG" (Credit Granted) on the transcript.

Concentration: A field of study within a Programme of Study. A concentration will be either Major or Minor depending on the number of courses completed in the field of study.

Core Curriculum of RMC: Courses RMC students are required to take in order to prepare them to take on positions of leadership within the Canadian Forces.

Course: A unit of study designated by a code and number in the 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, non-university courses or other types of experience which is assessed as duplicating RMC academic requirements. Credits granted on this basis are annotated on the transcript with the code "CG".

Elective: A course belonging to another concentration a student may take to complete the minimum requirements of a Programme of Study.

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

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. 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".

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. 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 concentration, the grade obtained in that course is taken into account with respect to the award of distinctions.

Failure of a Course: A student is deemed to have failed a course if the student fails the normal requirements for a course and either does not successfully pass the supplemental examination for that course, is not permitted or chooses not to write the supplemental examination.

Full Time Undergraduate Students: Those students registered in at least 80% of the credits of the full year programme for their Programme of Study once the deadline for course withdrawals has expired. 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.

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 Students: Students who enrol in courses without being admitted into a Programme of Study at RMC or another university. Normally "Interest Only" students may enrol in a maximum of three credits in a given term, and may not complete more than a total of six credits

before being required to seek admission into a Programme of Study.

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 concentration that are not Mandatory Courses.

Part-Time Undergraduate Students: Students who are registered in less than 80% of the credits of the full year programme for their Programme of Study. 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.

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.

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

Second Language Credits: 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 code 'SL'.

Supplemental Examination: An examination or other form of academic evaluation taken by students who have not passed a course, in order to receive credit for the course.

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.

Transfer Credits: Credits for work done at an accredited post-secondary institution, transfer credits may be granted for university courses that are assessed as satisfying RMC 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 RMC 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.

Visiting Students: Students enrolled in a degree programme at another university who are authorized by their home university to take courses at RMC. Except where a formal exchange agreement exists, a Visiting Student must provide a letter of permission from the home university in order to be approved for registration in an RMC course.

1. DEGREES

1.1 A degree of Bachelor of Arts (Honours), Bachelor of Arts (Concentration) or a Bachelor of Arts, Bachelor of Science (Honours), Bachelor of Science (Concentration) or a Bachelor of Science, a Bachelor of Engineering, a Bachelor of Military Arts and Science (Honours) or a Bachelor of Military Arts and Science, as appropriate, shall be granted by the Royal Military College of Canada to a student who has successfully completed the requirements of the College. The requirements for each of these degrees are specified in the appropriate sections and tables of the Undergraduate Calendar of RMC.

1.2 A degree of Master of Arts (MA), Master of Science (MSc), Master of Applied Science (MASc), Master of Engineering (MEng), Master of Applied Military Science (MAMSc), Master of Business Administration (MBA), Master of Defence Studies (MDS) or Doctor of Philosophy (PhD) shall be granted by the Royal Military College of Canada to those who successfully complete the requirements of the College. The requirements for each of these degrees are specified in the appropriate sections of the Postgraduate Calendar of RMC.

1.3 The degree Doctor of Laws (LLD) honoris causa, Doctor of Science (DSc) honoris causa, Doctor of Military Science (DScMil) honoris causa, or Doctor of Engineering (DEng) honoris causa may be granted by the Royal Military College of Canada to those who are worthy of the honour.

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

1.5 In order to be granted a degree from RMC, 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 RMC to be restored.

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 RMC.

3. Honours Programmes of Study

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.

3.2 To earn an Honours Bachelor of Science 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 an Honours Bachelor of Military Arts and Science 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 RMC or from another university may complete a second Undergraduate Degree at RMC, 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 or from another university may not apply to obtain from RMC a general degree in the same concentration;
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 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 RMC or from another university, must complete at least half of the credits required by the chosen Programme of Study through RMC and meet all the requirements of the chosen Programme of Study as specified in the RMC Undergraduate Calendar.

5. Upgraded Degree

5.1 The holder of a General Degree from RMC may apply to complete an Honours Programme at RMC, 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 Faculties and/or departments concerned.

5.2 To obtain an Upgraded Degree, the holder of a General Degree from RMC must meet all the requirements of the chosen Honours Programme of Study as specified in the RMC Undergraduate Calendar.

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 Co-ordinator 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. 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 For courses offered at a distance (correspondence or internet) through the Division of Continuing Studies, the elements to be used in determining the final grade and the weightings of these elements will be decided by the department from which the course emanates. Normally, a proctored examination will be required.

7.4 For each course a student must complete term work and all assignments to the satisfaction of the department concerned.

7.5 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.

7.6 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 Forces operational requirements, the student is encouraged to apply to withdraw without penalty.)

8. Transcript Notations

8.1 In addition to numeric and letter grades, the Royal Military College 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)

9. 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 function of the contact time.

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 Royal Military College of Canada is shown in Table 11-1.

Table 11-1 Conversion Table of Academic Standing

	Letter Grade	Percentage Grade Relationship
First Class Distinction	A+	94-100
	A	87-93
	A-	80-86
Distinction	B+	76-79
	B	73-75
	B-	70-72
Pass	C+	66-69
	C	63-65
	C-	60-62
	D+	56-59
	D	53-55
	D-	50-52
Failure	E	40-49
Serious Failure	F	0-39

12. Academic Distinctions

12.1 Students graduating with a Bachelor of Arts (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 who have attained at least a B- average in the 300 and 400 level honours courses will have their transcripts annotated "with Distinction".

12.2 Students graduating with 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 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 all their 300 and 400 level RMC 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 300 and 400 level RMC courses, based on a minimum of five courses, will have their transcripts annotated "with Distinction".

13. Aegrotat Standing

13.1 Aegrotat Standing in a course may be granted by the 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 not be included in the calculation of overall average.

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 if at the end of any term:

a. The student fails one or more courses resulting in a total of less than 2 failed credits; and

b. The student's term average is greater than 50 percent.

15.2 A Full Time student will be removed from Warning if the student passes all completed courses taken in the subsequent two academic terms.

15.3 A Part Time student shall be placed on Warning if, after taking courses in any given Programme of Study, the student has failed courses totalling more than four credits.

15.4 A Part Time student must pass all subsequent courses taken totalling no less than 8 credits to be removed from Warning.

16. PROBATION

16.1 A Full Time student shall be placed on Probation if:

a. The student fails a course while on Warning; or
b. The term average is less than 50 per cent but greater than or equal to 45 percent; or
c. The student fails courses whose total credit value is greater than or equal to 2 but less than or equal to 4; or
d. The student fails one or more Supplemental Examinations.

16.2 A student will be removed from Probation if all courses taken in the subsequent two terms are passed and if the student's cumulative average is equal to or greater than 50 percent.

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 credits.

16.4 A Part Time student must pass all subsequent courses taken totalling no less than 8 credits to be removed from Probation.

17. FAILED YEAR

17.1 If at the end of a normal academic year an ROTP or UTPNCM students academic performance is such that the Dean responsible for the student's programme of study determines that with a normal academic course load it will be impossible for the student to complete the programme of study in a total of four academic years, Faculty Council upon recommendation from Faculty Board may declare that the student has failed the year. At the discretion of the Commandant, a student who has failed a year may be permitted to repeat the year. If a student is not permitted to repeat a failed year he/she will be required to withdraw from his/her Programme of Study.

17.2 ROTP or UTPNCM students who are repeating a year will not be required to maintain a full course load as described in Table D-1 of the Academic Regulations. Only those courses that were failed must be repeated. With the permission of the Dean responsible for the student's programme of study, a student may be allowed to take additional courses up to but not exceeding the normal course load as defined in Table D-1.

17.3 No ROTP or UTPNCM student will be permitted to repeat more than one year unless exceptional mitigating circumstances are present.

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 is failed for a second time; or
b. The term average is less than 45 per cent; or
c. The student fails Mandatory Courses totalling more than 4 credits in any term; or
d. The student has failed courses totalling more than eight credits.
e. An ROTP or UTPNCM student has failed a year and is not permitted to repeat the year
f. An ROTP or UTPNCM student fails a year having previously failed a year.

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 on Probation fails a course that the student has previously failed; or
b. The student on Probation has a cumulative average of less than 45 per cent; or
c. The student has failed courses totalling more than twelve credits.

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 Examinations

20.1 Supplemental Examinations at the Royal Military College of Canada will be held at dates and times specified in the Supplemental Examination timetables.

20.2 Both the original mark and the mark for any supplemental examinations will be shown on the student's transcript.

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

a. the student's mark in the course is less than 50% but greater than or equal to 40%; and
b. 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 Supplemental Examinations in any term.

20.5 No full-time student will be allowed to write more than four Supplemental Examinations during the student's entire period of undergraduate study at the Royal Military College of Canada.

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

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 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 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 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 21 calendar days after the student was informed of the instructor's decision. The student should attach to the Appeal copies of all relevant documents in order to provide the correct information, 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 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 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 in order to provide the correct information. 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 working days before the scheduled meeting of Faculty Council. The Registrar will inform the student in writing of the decision about the Appeal that was made by Faculty Council.

22.5 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 determine 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 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.

22.6 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 delays as prescribed above which apply to the other types of complaints or grievances.

23. ACADEMIC MISCONDUCT

23.1 Academic Misconduct is defined as Cheating, Plagiarism or other violations of academic ethics

a. Cheating includes:

1. An act or attempt to give, receive, share or utilize unauthorized information or assistance before or during a test or examination;
2. Failure to follow rules on assignments, presentations, exercises, tests, or examination;
3. Tampering with official documents, including electronic records;
4. Falsifying research or experimental data;
5. The inclusion of sources that were not used in the writing of the paper or report; and
6. The impersonation of a candidate at an examination.

b. Plagiarism includes:

1. 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; and
2. Failure to acknowledge adequately collaboration or outside assistance.

c Other violations of academic ethics include:

1. Not following ethical norms or guidelines in research;
2. Failure to acknowledge that work has been submitted for credit elsewhere; and
3. Misleading or false statements regarding work completed.

23.2 All cases of suspected Academic Misconduct must be reported to the Department Head responsible for the course in which the alleged misconduct took place. The Department Head must in turn inform the appropriate Dean of the suspected misconduct. The Dean determines the manner in which the suspected misconduct is to be investigated. The results of all such investigations are reviewed at a regular meeting of the Dean's Council. The Dean's council has the authority to award Academic Sanctions if, in their opinion, Academic Misconduct has taken place. Any Academic Sanctions that are awarded will be reported at a regular meeting of the Faculty Council and will be published without names on a periodic basis.

23.3 Academic Sanctions imposed upon students found guilty of academic misconduct may 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. Expulsion

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

23.4 In cases of repeated or aggravated academic misconduct, when the student is a member of the Canadian Forces, the student's Commanding Officer shall be notified by the Commandant of the Royal Military College of Canada of the infractions. In any instance of academic misconduct by a Canadian 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 misconduct and, as a consequence, are expelled from RMC will not be considered for admission or readmission to any degree programme or course offered by or through RMC. 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 Misconduct, and upon specific direction by the Dean's Council, a student's Official Transcript may be annotated so as to indicate that academic misconduct took place and that an Academic Sanction was awarded.

23.7 The Royal Military College 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 an RMCC 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.

ADDITIONAL REGULATIONS OF THE ROYAL MILITARY COLLEGE OF CANADA

The Academic Regulations for the RMC 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 attending RMC under the ROTP, RETP and UTPNCM programmes until officially amended or rescinded.

29. To be granted pass standing a cadet must:

- achieve a satisfactory standard in Physical Education and in Military Training;
- achieve a satisfactory standard in Second Language Training; and
- 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.

TABLE D-1

Minimum and Maximum Course Loads For Full-Time Status

Programme	Minimum number of credits	Normal Course Load	Maximum number of credits
Arts: 1st Year	4 per term/ 10 per academic year	6 credits per term/ 12 per academic year	7 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/Engineering: 1st Year	4 per term/ 10 per academic year	6 credits per term/ 12.5 per academic year	7 per term
Science: 2nd, 3rd or 4th Year	3 per term/ 8 per academic year	5 credits per term/ 10 per academic year	6 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

FACULTY OF ARTS

TEACHING STAFF

The Dean of Arts

E.J. Errington, BA, BEd, MA, PhD

Business Administration

Head of the Department:

Associate Professor - W.J. Graham, BA, LLB, MBA, PhD

Professor

M. Amami, BSc, Lic.Sc.Eco., PhD, Ing

J. Brimberg, BEng, MEng, PEng, MBA, PhD

W.J. Hurley, BSc, MBA, PhD

A. St-Pierre, BSc (informatique), BSc (comptables), MBA, EdD, CMA, CGA

B.W. Simms, CD, rmc, BEng, MASc, PhD, PEng (cross appointed to the Mechanical Engineering Department)

Professor (Adjunct)

J.S. Cowan, BSc (Math & Physics), MSc (Physiology), PhD (Physiology)

Associate Professor

T. Dececchi, BEng, MBA, PhD, PEng

N. Essaddam, BAdm, MBA, PhD

P. Roman, CD, rmc, BEng, PEng, PhD

Adjunct Associate Professor

F.P. Wilson, CD, BSc, MEd, PhD

Assistant Professor

B. Dececchi, BA, B.Ed., M.Ed., D.Ed.

Major J.M Karagianis, CD, BBA, MBA, Plog

F. Yousoffzai, BA, MSc (Economics), PhD

K. Schobel, BA, MBA

M.B.K. Shepherd, BA, MA

Lecturer

Major J. Denford, BEng, MBA

Major J. Szumlanski, BEng, MBA, CD

English

Head of the Department

Associate Professor - S. Lukits, BA, MA, PhD

Professor Emeritus

G. Parker, BA, MA, PhD

T.B. Vincent, BA, MA, PhD

Professor

S.R. Bonnycastle, BA, PhD

M. Hurley, BA, MA, PhD

L. Shirinian, BA, MA, PhD

P.S. Sri, BSc, MA, MA, PhD

Associate Professor

L.M. Robinson, BA, MA, PhD

I. Streight, BA, MA, PhD

Assistant Professor

Capt. A. Belyea, BA, MA, PhD

S. Berg, BA, prof. dipl. ed., MA, PhD

Assistant Professor (Adjunct)

M. McKeown, BA, MA, PhD

French Studies

Head of the Department

Associate Professor - M. Benson, BA, BEd, MA, PhD

Professor

G. Quillard, BA, MA (Litt), MA (Lit), PhD

Associate Professor

F-E. Boucher, BA, MA (Litt), PhD

G.J.A. Monette, BA, MA(Ens), MA(Litt), PhD

Assistant Professor

S. Bastien, BA, MA, PhD

P.A. Lagueux, BA, MA, PhD

J. Le Ber, BAH, MA, PhD

C. Trudeau, BA, MA, PhD

History

Head of the Department

Professor and - M.A. Hennessy, BA, MA, PhD

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N.F. Dreisziger, BA, MA, DipREES, PhD

H.P. Klepak, CD, BA, MA, PhD

D.M. Schurman, BA, MA, PhD

Professor

E.J. Errington, BA, BEd, MA, PhD (Dean of the Faculty of Arts)

F. Gendron, BA, MA, PhD

R.G. Haycock, BA, MA, PhD

A.H. Ion, BA, MA, PhD

B.C.J. McKercher, BA, MA, PhD, FRHistS

K.E. Neilson, Bsc, BA, MA, PhD

R.A. Prete, BA, MA, PhD

Associate Professor

Major D.E. Delaney, CD, BA, MA, PhD

J. Lamarre, BA, MA, PhD

R. Legault, BA, MA, PhD

S. Maloney, BA, MA, PhD

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Major A. Godefroy, BA, MA, PhD

Col B. Horn, BA, MA, PhD

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Major G.M. Boire, CD, BA, MA, bems ESG

K. Brushett, BA, MA, PhD

M. Deleuze, BA, MA, PhD

Major J.R. Grodzinski, CD, BA, MA

J.L. Kenny, BA, MA, PhD

LCol T.W. Loveridge, CD, plsc, pcsc, BA, MA

B. Richard, BA, MA, PhD

R. Stouffer, CD, BA, MA, PhD

D. Varey, BA, MA, PhD

Military and Strategic Studies Programme

Assistant Professor of History and Chairman - Major D.E. Delaney, CD, BA, MA, PhD

Military Psychology and Leadership

Head of the Department

Associate Professor - D. Charbonneau, BEng, MA, PhD

Associate Professor

P. Bradley, CD, BA, MA, PhD

S. Hill, BA (Honours), MA, PhD

Lieutenant-Colonel J. Knackstedt, CD, BComm, MASc, PhD

A. MacIntyre, CD, BA, MA, PhD

A. Nicol, BSc, MA, PhD

R. St. John, BA, MA, PhD

R. Tiessen, BA, MA, PhD

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L. Cherif, BA, MA, PhD

R. Dickenson, CD, BA, MA

D. Lagacé-Roy, BA, MA, PhD

Assistant Professor (Adjunct)

D. Crooks, CD, BA, BA (Honours), MBA, MA (Psych.), CHRP

Lecturer

Major J. Belanger, CD, BA, MA

Captain J. Labrecque, BA, MSc

Politics and Economics

Head of the Department

Assistant Professor of Politics - Lieutenant Colonel D.A. La Carte, rmc, CD, BA, MA, PhD (ABD)

Professor Emeritus

H.H. Binhammer, ndc, BA, MA, PhD

J.P. Cairns, ndc, BA, MA, PhD

M.D. Chaudhry, BA, MA, PhD

J.S. Finan, BA, MA, PhD

Professor of Politics

P. Constantineau, BA, MA, PhD

H. Hassan-Yari, BA, MA, PhD

N. Schwartz-Morgan, BA, MA, MA, PhD

J.J. Sokolsky, BA, MA, PhD (Principal of the College

A.J. Whitehorn, BA, MA, PhD

Professor of Economics

P.J.S. Dunnett, BSc, MA, PhD (cross appointed to the Business Administration Department) and Chair of Defence & Security Management

L.C. McDonough, rmc, BA, MA, PhD

P.J. Paquette, BCom, MA, PhD

Professor of Geography & International Law

G. Labrecque, BA, LLL, MA, PhD

Professor of Geography

L.Y. Luciuk, BSc, MA, PhD

Associate Professor of Politics

J. Boulden, BAH, MA, LLM, PhD (Chair of War Studies Programme and Canada Research Chair)

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C. Leuprecht, BA, DÉA, MA, MA, PhD

A. Ousman, BA, MA, PhD

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LCdr A. Russell, LLB, LLM

Cdr G. Phillips, CD, BA, LLB, LLM

A. Livingstone, BA, MA, PhD

J.C. Stone, BA, MA, PhD

Assistant Professor of Economics

U.G. Berkok, BA, MA, PhD

M. Douch, BA, MA, PhD

A. Khazri, BA, MA, PhD

B. Paterson, BA, MA

Assistant Professor

Major Bernard Brister, CD, BComm, MA, plsc

DEPARTMENTS

Faculty of Arts

The Faculty of Arts has six (6) departments.

Business Administration

English

French Studies

History

Military Psychology and Leadership

Politics and Economics

The Faculty of Arts is also responsible for the:

Military Strategic Studies Programme

Programme Outlines_By Year

ARTS - YR 1_TABLE A1

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
ENE110: Introduction to Literary Studies and University Writing Skills	2	3	-	3	6	3	-	3	6	
HIE102: Canada	2	3	-	3	6	3	-	3	6	
PSE112: Introduction to Psychology	2	3	-	3	6	3	-	3	6	
ECE102: Elements of Economics	2	3	-	3	6	3	-	3	6	
POE106: Canadian Civics and Society	2	3	-	3	6	3	-	3	6	
MAE103A: Precalculus Mathematics	(1)	(3)	-	(3)	(6)	-	-	-	-	**A**
MAE106A: Discrete Mathematics with Probability	1	3	-	3	6	-	-	-	-	
MAE108B: Elements of Differential Calculus	1	-	-	-	-	3	1	4	4	
SLEFR1:	-	-	5	5	2	-	5	5	2	
ATH101:	-	-	2	2	-	-	2	2	-	
PMT 100 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**12**	**18**	**9**	**27**	**38**	**18**	**10**	**28**	**36**	

Notes:

A. Students who do not have high school leaving mathematics must also take MAE103A in the fall term.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* Numbers in brackets () are not used in the calculation of the totals

ARTS - YR 2_TABLE A2

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
ENE200: Cross currents of Thought in 20th Century Literature	2	3	-	3	6	3	-	3	6	
HIE202: Introduction to Canadian Military History	2	3	-	3	6	3	-	3	6	
MAE208A: Elements of integral Calculus and Linear Algebra	1	3	1	4	4	-	-	-	-	
Arts Electives: 4 term courses to be taken over Fall and Winter terms.	4	6	-	6	12	6	-	6	12	**A,B,C**
CCE106A: Basic Chemistry	(1)	(3)	(2)	(5)	(5)	-	-	-	-	**D**
PHE102B: Elementary Physics	(1)	-	-	-	-	(3)	-	(3)	(6)	**D**
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**E**
Total:	**9**	**15**	**10**	**25**	**30**	**12**	**9**	**21**	**26**	

Notes:

A. No more than the equivalent of 4 credits can be taken from the same department (not including core courses in English and History)

B. Students wishing to obtain a minor should do so starting in Second Year. Minors are available in Psychology, English, French, History, Politics or Economics. Consult the Department responsible for the Minor for more details.

C. For details on individual programmes and course descriptions see the entries under the respective Departments. Student should consult the yearly listing of courses offered provided by the Registrar's Office. Students wishing to obtain a minor must include course selections in this count and obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Arts.

D. Students who do not have high school leaving Chemistry must also take CCE106A in the fall term. Students who do not have high school leaving Physics must also take PHE102B in the winter term.

E. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* Numbers in brackets () are not used in the calculation of the totals

ARTS - YR 3_TABLE A3

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	**A**
Arts Electives: 6 term courses to be taken over Fall and Winter Terms.	6	9	-	9	18	9	-	9	18	**B**
Science Core	2	3	-	3	6	3	-	3	6	**C**
SLEFR3:	-	-	5	5	2	-	5	5	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**D**
Total	**10**	**15**	**9**	**24**	**29**	**15**	**9**	**24**	**32**	

Notes:

A. All students in 3rd year must take HIE271B. However, students in History or in Military and Strategic Studies must take HIE270 in its place.

B. For details on individual programmes and course descriptions see the entries under the respective departments. Student should consult the yearly listing of courses offered provided by the Registrar's Office. Students wishing to obtain a minor must include course selections in this count and obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Arts.

C. See Table A8 concerning Science Core requirements. These courses can be taken in either Fall or winter term. A list of courses offered is available from the Registrar's Office.

D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

ARTS - YR 4_TABLE A4

			Fall Term				Winter Term				
			Periods/Week				Periods/Week				
		Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics		1	-	-	-	-	3	-	3	6	
POE316A: Introduction to International Relations		1	3	-	3	6	-	-	-	-	**A**
Arts Electives: courses to be taken over Fall and Winter Terms.	Honours:	7	9	-	9	18	12	-	12	24	**B**
	Major:	5	6	-	6	12	9	-	9	18	**B**
Science Core		1	3	-	3	6	(3)	-	(3)	(6)	**C**
SLEFR4			-	5	5	2	-	5	5	2	
ATH401:			-	2	2	-	-	2	2	-	
PMT 400 Series:		-	-	2	2	-	-	2	2	-	**D**
Total	**Honours:**	**10**	**15**	**9**	**24**	**32**	**15**	**9**	**24**	**32**	
	Major:	**8**	**12**	**9**	**21**	**26**	**12**	**9**	**21**	**26**	

Notes:

A. All students in 4th year must take POE316A. However, students who have already taken the course must replace it with another elective.

B. For details on individual programme requirements and course descriptions see the entries under the respective Departments. Students should consult the yearly listing of courses offered provide by the Registrar's Office. Students wishing to obtain a minor must include course selections in this count and obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Arts.

C. See Table A8 concerning Science Core requirements. These courses can be taken in either Fall or Winter term. A list of courses offered is available from the Registrar's Office.

D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* The numbers in brackets () are not used in the calculation of the totals

BUSINESS ADMINISTRATION - YR 2_TABLE A5

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
ENE200: Cross-currents of Thought in 20-th Century Literature	2	3	-	3	6	3	-	3	6	
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	6	
MAE208A: Elements of integral Calculus and Linear Algebra	1	3	1	4	4	-	-	-	-	
BAE202A: Financial Accounting I	1	3	-	3	6	-	-	-	-	
BAE208B: Management Accounting	1	-	-	-	-	3	-	3	6	
BAE260: Principles of Management	1	-	-	-	-	3	-	3	6	
BAE242A: Quantitative Methods I	1	3	-	3	6	-	-	-	-	
ECE206A: Macroeconomic Theory and Policy I	1	3	-	3	6	-	-	-	-	**A**
ECE224A: Microeconomics I	1	3	-	3	6	-	-	-	-	
Elective (Arts or Science)	1	-	-	-	-	3	-	3	6	**B**
CCE106A: Basic Chemistry	(1)	(3)	(2)	(5)	(5)	-	-	-	-	**C**
PHE102B: Elementary Physics	(1)	-	-	-	-	(3)	-	(3)	(6)	**C**
SLEFR2	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**D**
Total Honours:	**11**	**18**	**10**	**28**	**36**	**18**	**9**	**27**	**38**	
Total Major:	**10**	**15**	**10**	**25**	**30**	**18**	**9**	**27**	**38**	

Notes:

A. Required for Honours; recommended for Major.

B. A list of courses for the major and electives can be obtained from the Registrar's Office. The list includes courses for minors.

C. Students who do not have high school leaving Chemistry must also take CCE106A in the fall term. Students who do not have high school leaving Physics must also take PHE102B in the winter term.

D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* Numbers in brackets () are not used in the calculation of the totals

1st Year Business Administration

First year, Business Administration will follow the Arts Programme - Table A1

BUSINESS ADMINISTRATION - YR 3_TABLE A6

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271A: Introduction to Military History and Thought	1	3	-	3	6	-	-	-	-	
BAE300B: Finance	1	-	-	-	-	3	-	3	6	
BAE302B: Financial Accounting II	1	-	-	-	-	3	-	3	6	
BAE314A: Marketing Fundamentals	1	3	-	3	6	-	-	-	-	
BAE326B: Human Resources Management	1	-	-	-	-	3	-	3	6	
BAE330A/B: Organizational Theory	1	3	-	3	6	-	-	-	-	
BAE342A: Quantitative Methods II	1	3	-	3	6	-	-	-	-	
BAE344B: Operations Management	1	-	-	-	-	3	-	3	6	
Elective (Arts or Science)	1	-	-	-	-	3	-	3	6	**A**
Science Core	1	(3)	-	(3)	(6)	3	-	3	6	**B**
SLEFR3:	-		5	5	2	-	5	5	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**C**
Total	**11**	**12**	**9**	**21**	**23**	**21**	**9**	**30**	**44**	

Notes:

A. A list of courses for the major and electives can be obtained from the Registrar's Office. The list includes courses for minors.

B. See Table A8 concerning Science Core requirements. These courses can be taken in either Fall or Winter term. A list of courses offered is available from the Registrar's Office.

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

BUSINESS ADMINISTRATION - YR 4_TABLE A7

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
POE316A: Introduction to International Relations	1	3	-	3	6	-	-	-	-	
BAE410A: Information Systems	1	3	-	3	6	-	-	-	-	
BAE420B: Business Law	1	-	-	-	-	3	-	3	6	
BAE426B: Labour Relations	1	-	-	-	-	3	-	3	6	**A**
BAE432A: Organizational Theory	1	3	-	3	6	-	-	-	-	
BAE440A: International Management	1	3	-	3	6	-	-	-	-	**B**
BAE450B: Advanced Topics in Management	(1)	-	-	-	-	(3)	-	(3)	(6)	**A,B,C,**
BAE452: Business Policy	2	3	-	3	6	3	-	3	6	
Elective (Arts or Science)	1	3	-	3	6	-	-	-	-	**D**
Science Core	1	(3)	-	(3)	(6)	3	-	3	6	**E**
SLEFR4	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	**F**
Total Honours:	**11**	**18**	**9**	**27**	**38**	**15**	**9**	**24**	**32**	
Total Major:	**10**	**15**	**9**	**24**	**32**	**15**	**9**	**24**	**32**	

Notes:

A. Students will have the option of taking either BAE450B or BAE426B

B. Students with an average of at least A- in 3rd year Business Administration courses may substitute BAE490: Thesis, in place of BAE450B and BAE440B (with permission of the department).

C. Only required for Honours programme.

D. A list of courses for the major and electives can be obtained from the Registrar's Office. The list includes courses for minors.

E. See Table A8 concerning Science Core requirements. These courses can be taken in either Fall or Winter term. A list of courses offered is available from the Registrar's Office.

F. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* The numbers in brackets () are not used in the calculation of the totals

SCIENCE REQUIREMENTS FOR ARTS PROGRAMMES_TABLE A8

The minimum six (6) competencies required for the College Common Core Curriculum (CCCC) are:

Course	Title	Prerequisite	Notes
MAE106A:	Discrete Mathematics with Probability		
MAE108B	Elements of Differential Calculus	High School leaving mathematics	**A**
MAE208A	Elements of Integral Calculus and Linear Algebra	MAE108B	
One (1) Course in Chemistry or Biology		High School leaving Chemistry	**A**
One (1) Course in Physics		High School leaving Physics	**A**
One (1) Course in Information Technology from the following:			
CSE101A/B	Introduction to Algorithms and Computing		
CSE260A/B	Introduction to Computer Concepts		
BAE220A/B	Introduction to Information Technology		
BAE410A/B	Information Systems		

Notes:

A. In the case that one or more prerequisites have not been met, the following RMC courses are equivalent to High Hchool leaving prerequisites and must be taken prior to registration in the common core curriculum course:

- High School leaving Mathematics is equivalent to **MAE103A**.
- High School leaving Chemistry is equivalent to **CCE106A**.
- High School leaving Physics is equivalent to **PHE102B**.

These courses will not be counted towards the six courses required for the common core curriculum. The appropriate dean will determine whether credit may be allocated towards the BA, BSc, BEng or BMASc degree.

Comments:

Substitutions may be made with the permission of the Dean of Science.

College Common Core Requirements may vary for 3-yr BA's. Continuing Studies regulations apply in these cases.

Business Administration

PROGRAMME OBJECTIVES AND STRUCTURES

General Information

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 relies on mathematics and statistics, operations management also relies 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, and marketing. Finally, it will include courses such as Business Policy, which require integration of the functional areas. The emphasis will be on providing the student with a broad, well-grounded education in business administration.

4 year (Honours or Major)

First Year:

All courses are common for all students in the Arts Programme.

Second Year:

Students will enrol in the Business Administration programme at the beginning of the Second Year.

Third Year:

The programme of studies begins to be specialized in the area of Business Administration. Students will enrol in the Honours or Major program as they register for their 3 rd Year courses.

Fourth Year:

The programme of studies is intended to give Business Administration students a well-rounded education in Business Administration rather than being specialized in any one discipline or field. Hence, in the Fourth Year the student will be exposed to advanced material integrated in the programme.

3 year BA (Concentration in Business Admin)

Note: This degree is not open to ROTP/RETP Cadets

The Faculty of Arts offers, through the auspices of the Division of Continuing Studies, a 3-Year General Bachelor of Arts with a concentration in Business Administration.

The program emphasizes a breadth of exposure and is grounded in the elements of the military profession. This is represented through a core of courses that must be taken regardless of discipline. 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.

The BA Program includes a compulsory core. Of the 30 credits required 11 credits are mandatory.

Please note that those who have registered in the BA programme offered through DCS prior to Sept. 2003 have the option of completing their studies following an earlier description of the degree and of its core credits or the new one, which integrates the new description and the university level courses of OPME or their equivalent.

PROGRAMME REQUIREMENTS

General Information

4-Year Honours or Major in Business Administration: (for students who entered Business Administration in September 2002 or later).

Students from First Year Arts, with at least a D average, may take either the Honours or Major in Business Administration programme starting in Second Year. The programme of courses for both the Honours and Major is shown below. The requirements for Second Year only are shown in Table A5.

To earn an Bachelor of Arts (Honours Business Administration) degree, a student must:

1. successfully complete the Honours programme, and
2. must maintain a minimum B average in 300 and 400 level Business Administration courses, and
3. must attain a minimum overall B- average in their 4th Year.
4. must maintain at least an overall B- average in each year of the programme to remain in the Honours programme.

Students graduating with a Bachelor of Arts (Major Business Administration) who attain at least an A- average in their 300 and 400 level courses will have their transcripts annotated *"with First Class Distinction"*.

Students graduating with a Bachelor of Arts (Major Business Administration) who attain at least a B- average in their 300 and 400 level courses will have their transcripts annotated *"with Distinction"*.

All other students will be granted a Bachelor of Arts (Major Business Administration) degree.

Programme Outline Tables

The tables listed below outline the Business Administration Programme, by year.

First Year	Table A1
Second Year	Table A5
Third Year	Table A6
Fourth Year	Table A7
Science Requirements for Arts	Table A8

Honours

The requirements for students entering the programme before the 2009-2010 academic year are:

Business Administration (18 credits)

- BAE202A/B: Financial Accounting I
- BAE208B: Management Accounting I
- BAE220A/B: Intro to Information Technology
- BAE242A/B: Quantitative Methods I
- BAE300B: Finance
- BAE302A/B: Financial Accounting II
- BAE314A: Marketing Fundamentals
- BAE326B: Human Resources Management
- BAE330A/B: Organizational Theory
- BAE342A/B: Quantitative Methods II
- BAE344B: Operations Management
- BAE410A/B: Information Systems
- BAE418A/B: Intermediate Marketing
- BAE420A/B: Business Law
- BAE426A/B: Labour Relations *
- BAE440A/B: International Management
- BAE450A/B: Advanced Topics in Management *
- BAE452: Business Policy

* Students will have the option of taking either BAE426A/B or BAE450A/B. (Both courses will not be offered every year)

Economics (2 credits)

- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I

Electives (3 credits)

- POE332A: Public Administration in Canada, (is strongly recommended as an elective).

Total: 45 credits (includes 22 credits in the Common Arts Core)

The requirements for students entering the programme in 2009-2010 and in subsequent years are:

Business Administration Required Courses (12 credits):

- BAE260: Principles of Management
- BAE202A/B: Financial Accounting
- BAE208B: Management Accounting
- BAE220A/B: Introduction to Information Technology
- BAE242A/B: Quantitative Methods I
- BAE300B: Finance
- BAE314A/B: Marketing Fundamentals
- BAE326B: Human Resources Management
- BAE330A/B: Organizational Theory
- BAE344B: Operations Management
- BAE438A/B: Strategic Management
- BAE440A/B: International Management

Business Administration Elective Courses (6 credits required):

- BAE302A/B: Financial Accounting II
- BAE342A/B: Quantitative Methods II
- BAE340A/B: Business Analysis and Reporting
- BAE410A/B: Information Systems
- BAE418A/B: Intermediate Marketing
- BAE420A/B: Business Law
- BAE426A/B: Labour Relations
- BAE400A/B: Advanced Finance
- BAE454A/B: Seminar in Entrepreneurship
- BAE422A/B: Business Ethics
- BAE442A/B: Project Management
- BAE444A/B: Supply Chain Management
- BAE448A/B: Selected Readings in Management

Economics (2 credits)

- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I

Electives (3 credits)

- POE332A: Public Administration in Canada, (is strongly recommended as an elective).

Total: 45 credits (includes 22 credits in the Common Arts Core)

Major

Students entering the programme before the 2009/2010 academic year, must complete the same programme as Honours, except BAE440A/B and ECE206A are not required.

Students entering the programme in the 2009-2010 academic year or subsequently, must complete the same programme as Honours except only five (5) Business Administration electives are required and ECE206A is not required.

Minor

The minor is open to students from all faculties.

Note: Students, who entered the minor in academic year 2003/2004 or 2004/2005, please see the program as outlined in the 2003/2004 RMC Undergraduate Course Calendar. There may be some changes in course codes, but the program content will not change.

For students who started the minor in academic year 2005/2006:

Mandatory Courses

- BAE202A: Financial Accounting I
- BAE208B: Management Accounting I
- BAE220A/B: Introduction to Information Technology
- BAE300B: Finance
- BAE314A: Marketing Fundamentals
- BAE344B: Operations Management

Electives: (2 credits)

- Any other Business Administration 200, 300 or 400 level courses

Note: Science students taking a Minor in Business Administration will be able to count MAE209A/B: Probability and Statistics, as an elective credit

Economics and Business Administration

Requirements for a Joint Economics and Business Administration Degree:

Economics Requirements = (14 credits)

- MAE108B: Elements of Calculus
- MAE208A: Elements of Integral Calculus
- ECE102: Elements of Economics
- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I
- ECE270A: Statistical Analysis I (BAE242A)
- ECE308B: Macroeconomics Theory and Policy II

OR

- ECE326B: Microeconomics II
- ECE424A/B: Economics of Defence
- ECE450A/B: Topics in Microeconomics

OR

- ECE452A/B: Topics in Macroeconomics
- ECE492B: Economics Seminar

Elective courses:

Minimum of 3 credits in 300 or 400 level economics courses.

Business Administration Requirements = (15 credits)

- BAE202A: Financial Accounting
- BAE208B: Managerial Accounting
- BAE220A/B; Information Technology
- BAE242A/B: Quantitative Methods I
- BAE300B: Finance
- BAE302B: Financial Accounting II
- BAE314A: Marketing Fundamentals
- BAE326A/B: Human Resources Management
- BAE342A/B: Quantitative Methods II
- BAE344B: Operations Management
- BAE452: Business Policy

Plus:

3 additional, Business Administration, credits at the 300 and 400 level.

Notes:

1. Students will use BAE220A/B as their Information Technology (Science elective) credit, as students in the Business Administration program do.
2. All students will complete a total of 46 credits, which is one more than Honours Business Administration students and 3 more than Honours Economics students.

Psychology and Business Administration

Requirements for a Joint Psychology and Business Administration Degree:

Psychology Requirements = (14 credits)

- PSE112: Introduction to Psychology
- PSE205A/B: Social Psychology
- PSE214A/B: Research Methodology in Psychology
- PSE236A/B: Cognition and Learning
- PSE301A: Organizational Behaviour and Leadership
- PSE306 / BAE326B: Human Resource Management*****
- PSE328A: Group Dynamics
- PSE352A: Advanced Statistical Analysis for the Behavioural Sciences
- PSE401B: Military Professionalism and Ethics
- PSE454A/B: Advanced Leadership

Plus:

- Three (3) additional Psychology credits at the 300 or 400 level

or

- PSE452A: Advanced Research Methods in Psychology and PSE424: Thesis or BAE490: Thesis******

***** If PSE306 / BAE326B is counted as a business credit another senior credit in psychology must be taken.

****** The topic of a Business Administration Thesis must contain much Psychology and be approved by the department head.

Business Administration Requirements = (15 credits)

- BAE202A: Financial Accounting
- BAE208B: Managerial Accounting
- BAE220A/B: Information Technology
- BAE242A/B: Quantitative Methods I
- ECE224A: Microeconomics I
- BAE300B: Finance
- BAE314A: Marketing Fundamentals
- BAE326 / PSE306B: Human Resources Management*****
- BAE330A/B: Organizational Theory
- BAE344B: Operations Management
- BAE452: Business Policy

Plus:

- Three (3) additional Business Administration credits at the 300 or 400 level.

* If BAE326 / PSE306B is counted as a psychology credit another senior credit in business must be taken.

Notes:

1. PSE213A/B may be substituted for BAE242A/B
2. BAE326 / PSE306 counts as EITHER a Business Administration or Psychology credit, not both.
3. All students must take the Arts core including ECE102 and MAE208.
4. Students will use BAE220A/B as their Information Technology (Science elective) credit, as students in the Business Administration program do.
5. All students will complete a total of 47 credits, which is two more than Honours Business Administration students currently take.

Computer Science and Business Administration

Requirements for a Joint Computer Science and Business Administration Degree:

Computer Science Requirements = (15 credits)

- MAE209A: Probability and Statistics
- MAE229A: Linear Algebra
- EEE245A: Logic Design
- CSE321A/B: Algorithm Analysis
- CSE350A: Data Structure and Algorithms
- CSE362A/B: Software Development and Professional Practice
- CSE341B: Introduction to Database Systems
- CSE390A/B: Multiprocessing, user interfaces, graphics systems and e-commerce
- EEE321B: Object Oriented Techniques
- EEE351A: Computer Organization and Assembly
- MAE333A: Discrete Mathematics
- CSE453A/B: Modelling and Simulation*****
- CSE451A/B: Special Topics in Computer Science
- EEE435A: Principals of Operating Systems
- EEE466A: Distributed Systems

***** Optional for students wishing CIPS accreditation

Business Administration Requirements = (14 credits)

- BAE202A: Financial Accounting
- BAE208B: Managerial Accounting
- ECE224A: Microeconomics I
- BAE300B: Finance
- BAE314A: Marketing Fundamentals
- BAE326B: Human Resource Management
- BAE330A/B: Organizational Theory
- BAE344B: Operations Management
- BAE410A/B: Management Information Systems
- BAE452: Business Policy

Plus:

3 additional Business Administration credits at the 300 or 400 level

Notes:

1. Students would be registered in the BSc programme, and would take the first year Science programme with ECE102.
2. All students will complete 46 credits, which is one more than Honours Business Administration students or Honours BSc. students.

Mathematics and Business Administration

Requirements for a Joint Mathematics and Business Administration Degree:

Mathematics Requirements = (14 credits)

- MAE226A: Engineering Calculus: Multivariable Functions
- MAE227B: Engineering Calculus: Differential Equations and Infinite Series

OR

- MAE222A: Intermediate Calculus: Multivariable Functions
- MAE223B: Intermediate Calculus: Differential Equations and Infinite Series

All of:

- MAE209A/B: Probability and Statistics
- MAE229A/B: Linear Algebra
- MAE304A Modern Algebra
- MAE305: Differential equations, Boundary Value Problems and Complex Variables
- MAE310A: Statistics
- CSE350A: Data Structures and Algorithms
- MAE451A/B: Topics in Mathematics
- MAE 456A/B: Mathematical Modelling

Three credits from:

- MAE234A/B: Introduction to Cryptography
- MAE236A/B: Introduction to Game Theory
- MAE331A/B: Mathematics of Signal Processing
- MAE333A/B: Introduction to Discrete Mathematics
- MAE340A/B: Foundations of Probability
- MAE352A/B: Non Linear Optimization
- MAE354A/B: Non Linear Dynamical Systems
- MAE374A/B: Conflict Analysis
- MAE413A/B: Mathematical Physics
- MAE404 (A and B): Advanced Mathematical Analysis

Note:

1. Students who want the CORS/SCRO diploma would need to take CSE341B and CSE453 in addition to their programme

Business Administration Requirements = (14 credits)

- BAE202A: Financial Accounting
- BAE208B: Managerial Accounting
- ECE224A: Microeconomics I
- BAE300B: Finance I
- BAE314A: Marketing Fundamentals
- BAE326B: Human Resources Management
- BAE330A/B: Organizational Theory
- BAE344B: Operations Management
- BAE410A/B: Management Information Systems
- BAE452: Business Policy

Plus:

3 additional Business Administration credits at the 300 or 400 level

Notes:

1. Students will take the first year BSc programme with ECE102.
2. All students will complete a total of 46 credits, which is one more than Honours Business Administration students and 1 more than Honours Science Students.

3-Year BA (Concentration in Business Admin)

The degree is not open to ROTP/RETP Cadets.

30 credits must be completed, and of these 30:

- At least 15 must be earned through RMC, (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 6 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

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. The BA Program includes a compulsory core.

Mandatory Courses

- HIE208: Canadian Military History: A study in War and Military History, 1867 to Present (or another course in Military History, such as HIE205:) (1 credit)

- POE206: The Canadian Forces and Modern Society, Civics, Politics and International Relations (or POE205, or POE316: Introduction to International Relations) (1 credit)

- HIE475: Technology, Society and Warfare (1 credit)
- PSE402: Leadership and Ethics (1 credit)
- BAE101: Introduction to Defence Management and Decision Making (or BAE100 Principles of management in a Defence Setting) (1 credit)
- At least two credits in English Literature and Grammar (2 credits)
- At least one credit in Canadian History (1 credit)
- At least one more credit in Military Psychology and Leadership (PSE123 for example) (1 credit)
- At least two credits in Mathematics, Computer Science, Chemistry or Physics (For the concentration in Business Administration, students must take MAE106 and MAE108) (2 credits)

Business Administration Concentration

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

- BAE202: Financial Accounting I (1 credit)
- BAE208: Management Accounting (1 credit)
- BAE220: Introduction to Information Technology (1 credit)
- BAE242: Quantitative Methods I (1 credit)
- BAE300: Finance (1 credit)
- BAE314: Marketing Fundamentals (1 credit)
- BAE326: Human Resources Management (1 credit)
- BAE330: Organizational Theory (1 credit)
- BAE344: Operations Management (1 credit)
- BAE438: Strategic Management (1 credit)

Students will also be required to take:

- 1 elective in Business Administration (1 credit)
- ECE103 and ECE104 (at a distance) (1 credit and 1 credit), or
- ECE102 (on-site at RMC) (2 credits)

Electives

Six additional credits of electives in Arts, Science or Technology are also required (6 credits)

Note:

Students who registered in this programme prior to May 2007 have the option of completing their programme of study following these requirements or the requirements that existed when they entered the programme.

100 COURSES

BAE101 Introduction to Defence Management and Decision Making

Only offered through the Division of Continuing Studies

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 CF 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: Distance Learning computer requirements

Note(s): Students may not take both BAE/AAF100 and BAE/AAF101 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

200 COURSES

BAE202A Financial Accounting I

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE208B Managerial Accounting

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: BAE202A, or equivalent course in financial accounting.
Note(s): Offered in Winter Semester. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE220A/B Introduction to Information Technology

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: (MAE106, ENE110 and ECE102 (or their equivalents)) OR (MAE106, BAE100 or BAE101).
Note(s): Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE242A/B Quantitative Methods I

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: MAE106 and MAE108 or an equivalent course in Mathematics.
Note(s): Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE260 Principles of Management

This course provides a broad introduction to management, including its principles and practises. Management is both an art and a science. To be practised effectively, it requires a broad-based understanding of the discipline's various functions, the underlying theoretical disciplines and the broader context within which the field of study is practised. This course is integrative, and offers students a foundation from which to pursue further management study.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

300 COURSES

BAE300B 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: MAE106, MAE108 and BAE202A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE302A/B 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: BAE202A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE314A Marketing Fundamentals

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: MAE108 and ENE110.
Note(s): Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 6
Credit(s): 1

BAE326B Human Resources Management

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: (PSE301 or ([BAE100 or BAE101] and ENE110)) and (PSE112 or PSE123).
Note(s): Also offered through the department of Military Psychology and Leadership as PSE306. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE330A/B 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.

Prerequisite: ENE110.
Note(s): This course was previously called BAE432A/B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE340 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.

Prerequisite: BAE202, BAE208, BAE242.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE342A/B 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: BAE242A/B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE344B Operations Management

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: BAE242A/B.
Note(s): Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

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: BAE300 and BAE302.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE410A/B 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: BAE220A/B, PSE301, BAE344B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: BAE314.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE420A/B 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.

Prerequisite: ENE110.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: BAE208 and BAE330.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE426A/B 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: BAE326B / PSE306B.
Note(s): Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE438 Strategic Management

Also offered through the Division of Continuing Studies

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).

Note: Distance Learning computer requirements

Prerequisite: BAE202; BAE208; BAE220; BAE300; BAE314; BAE326; BAE344; and BAE330, or their equivalents from a recognized university.
Note(s): Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE440A/B 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.

Prerequisite: PSE301, BAE314.
Note(s): For students in Fourth Year Business Administration and others with the permission of the Department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: BAE242, BAE300, and BAE326.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: BAE242, BAE314, and BAE220.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

BAE450A/B 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.

Prerequisite: BAE300B, BAE344B.
Co-requisite: BAE410A/B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: BAE202A, BAE208B, BAE220A/B, BAE242A/B, BAE302A/B, BAE314A, BAE316B, BAE326B, BAE342A/B, BAE344B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: BAE208, BAE314, BAE300, BAE330.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 BAE450 and BAE440. 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 BAE452 - Business Policy.

Prerequisite: Permission from the Head of the Department.
Co-requisite: BAE330A/B, BAE410A/B, BAE452.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

English

Programme Objectives and Structure

Objectives

The primary purpose of the English Studies programme at RMC 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 General stream 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. Every attempt is made to keep section size to 20 - 25 students, in order to permit individual attention in writing instruction, and to maintain a group dynamic which allows for constructive class discussion.

Second Year

The second year course, ENE200, provides more specific literary and intellectual foundations for advanced studies. They are mandatory for all students in Arts. They explore significant aspects of modern thought and cultural issues in order to provide a broad foundation for students entering Humanities, Social Sciences, and Business Administration programs. An important element of ENE200 is instruction in writing skills. Students planning to major in English will also take ENE226 and ENE 228 in their second year, which will create a more comprehensive theoretical, historical, and cultural foundation for their studies in third and fourth year.

Senior Course Structure

In their third and fourth years, students enrolled in a Major or Minor in English can take courses at both the 300 level and the 400 level. Most senior courses are offered in alternate years. Students are urged to plan ahead and to discuss their whole program with the Department Head when they apply to enter the English degree programme.

Courses in the 300 range

Courses with a 300 number are designed to provide students with general period and national coverage. They fall into two categories.

British Literary Heritage: These courses deal with the works of major British writers from the medieval period to 1900, including such authors as Chaucer, Spenser, Shakespeare, Milton, Swift Wordsworth, Dickens, and Tennyson. These authors collectively represent the intellectual foundation for the literatures of the contemporary English-speaking world, and transmit the major aspects of European social and cultural values from the Renaissance, the Enlightenment, and the nineteenth century to the present.

National and Ethnic Literature of the Contemporary World: These courses focus on the literatures of various national and ethnic groups in the contemporary world. They are designed to offer insights into the complex spectrum of social and cultural values in the modern world. Among the courses in this group are those dealing with Canadian literature, American literature, and modern British literature?

Courses in the 400 range

Courses with a 400 number are designed to allow the student to study specific topics in literary studies in depth. They include courses dedicated to Shakespeare, the war film, world literature, and literature and ethics.

PROGRAMME REQUIREMENTS

General Information

Students normally apply for entry into the English degree programme in their Second Year.

They are encouraged to take at least ENE226 and ENE228 in addition to ENE210 in their second year.

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 may offer 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 the degree or minor.

The Department offers three levels of standing in its degree stream:

- Honours
- Major
- Minor

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

Students apply for entry into the Honours programme during their Third Year.

Students wishing to apply to Honours standing must achieve at least a B- in their second year courses, although individual cases may be accepted on a probationary basis at the discretion of the Department Head.

The Honours requires 20 credits:

Students must successfully complete the following courses:

- ENE110 (2 credits)
- ENE210 (2 credits)
- ENE226 (1 credit)
- ENE228 (1 credit)
- ENE300 or ENE302 (1 credit)
- ENE303A or ENE305B (1 credit)
- ENE307A (1 credit)
- ENE309B (1 credit)
- ENE351A or ENE353B (1 credit)
- ENE427A or ENE429B (1 credit)
- Plus, 8 Credits in English at the 300 or 400 level

Students must also fulfil the following requirements:

- They must maintain a B average in all of the accumulated senior (300 and 400 level) English courses.
- They must maintain a B- average in all of their 400 level academic courses.

FAQ:

When do the new requirements come into effect for the Honours and Major students?

1. Students currently in first year and entering second year in September 2009 will be bound by the new requirements.
2. Students currently in second year and entering third year in September 2009 may follow either the new or the old requirements.

3. Students currently in third year and entering fourth year in September 2009 will be bound by the old requirements.

Major

A Major requires 16 Credits.

Students must successfully complete the following courses.

- ENE110 (2 credits)
- ENE210 (2 credits)
- ENE226 (1 credit)
- ENE228 (1 credit)
- ENE351A or ENE353B (1 credit)
- ENE427A or ENE429B (1 credit)
- One 300-level Course in British Literature prior to 1900 (1 credit)
- Plus, 7 Credits in English at the 300 or 400 level

FAQ:

When do the new requirements come into effect for the Honours and Major students?

1. Students currently in first year and entering second year in September 2009 will be bound by the new requirements.
2. Students currently in second year and entering third year in September 2009 may follow either the new or the old requirements.
3. Students currently in third year and entering fourth year in September 2009 will be bound by the old requirements.

Minor

A Minor requires 8 Credits:

- ENE110 or ENE100 (2 credits)
- ENE210 (2 credits)
- Plus, 4 Credits in English at the 300 or 400 level

Note: Students must have a combined average equal to or greater than B- in these courses.

100 COURSES

ENE100 Introduction to Literary Studies and University Writing Skills

This course has two main objectives: to provide instruction in the techniques of expository writing and to foster an understanding and enjoyment of literature. The first term in particular will concentrate on correcting grammar and punctuation, organizing ideas, formulating persuasive arguments, and preparing research papers. Approximately one-quarter of the periods involves writing skills. The literary texts are spread through both terms and provide a sampling of different genres (the essay, the short story, lyric and narrative poetry, the novel, and the drama). Students are encouraged to develop an awareness of how the creative imagination expresses itself in literature as well as of how language shapes our perceptions of ourselves, society, and the universe.

The classes are divided into small sections for tutorials and discussions. There is a common core of texts consisting of narrative poetry, short stories, two novels, one Shakespeare play, and one modern play.

Note(s): Mandatory for all Anglophone students of the First Year in the General Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

ENE101 Introduction to Literary Studies: Fiction

Only offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

ENE102 Introduction to Literary Studies: Poetry and Drama

Only offered through the Division of Continuing Studies

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 addresses complex human situations. In the second part of the course, students will study two plays: Shakespeare's Henry V, a multifaceted representation of a warrior king, and Perfect Pie by contemporary Canadian dramatist, Judith Thompson. 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: Distance Learning computer requirements

Prerequisite: No prerequisite is required, but students are encouraged to first complete ENE101 or its equivalent.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

ENE110 Introduction to Literary Studies and University Writing Skills

This course has two main objectives: to provide instruction in the techniques of expository writing and to foster an understanding and enjoyment of literature. The first term in particular will concentrate on correcting grammar and punctuation, organizing ideas, formulating persuasive arguments, and preparing research papers. Approximately one-quarter of the periods involves writing skills. The literary texts are spread through both terms and provide a sampling of different genres (the essay, the short story, lyric and narrative poetry, the novel, and the drama). Students are encouraged to develop an awareness of how the creative imagination expresses itself in literature as well as of how language shapes our perceptions of ourselves, society, and the universe.

The classes are divided into small sections for tutorials and discussions. There is a common core of texts consisting of narrative poetry, short stories, two novels, one Shakespeare play, and one modern play.

Note(s): Mandatory for all Anglophone students of the First Year in the Arts Entry Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

ENE150 University Writing Skills

Only offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: None, though students with pronounced problems in basic grammar and sentence structure are encouraged first to complete DCE050: Essential Writing Skills, a self-paced, modular course that is non-credit.
Note(s): This course has been approved for a military credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

200 COURSES

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

Only offered through the Division of Continuing Studies

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 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 will contribute frequently to the online discussion forum.

Note: Distance Learning computer requirements

Prerequisite: ENE100 or ENE110 or (ENE101 and ENE102) or equivalent.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

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

Only offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: ENE100 or ENE110 or (ENE101 and ENE102) or their equivalent.
Note(s): Although it is preferred that students have taken ENE202 before enrolling in ENE203, it is not required.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

ENE210 Reading the Contemporary World: 1900 to the Present

This course introduces students to major literary and cultural trends from the early 1900s on, through selected works of Canadian, American, British, French, and German literature of the period. Special attention will be given to the varied pattern of social and psychological concepts, the continuous shifting of moral norms, and the search for an authentic set of cultural and spiritual values. Texts studied include novels, short stories, plays, and poetry; together, they offer both regional and global perspectives on humanity, allowing us to consider variations in national and personal "takes" on such topics as heroism, leadership, sexuality and gender issues, "thinking outside the box," social and individual responsibility, the environment, and coping with "The Five Cs": change, complexity, conflict, crisis, catastrophe. Instruction in writing skills is an important part of this course. Essays will be required in both the Fall and Winter Terms.

Prerequisite: ENE100 or ENE110 (or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 also learn how to apply these theories in commenting on literature. Emphasis will also be placed on effective essay-writing.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

300 COURSES

ENE300A Restoration and Eighteenth-Century Literature

It is difficult to understate the scope of influence that eighteenth-century English literature and culture have had on the modern Western world. An era characterized as an "Age of Reason," a "Neo-Classical Age," and as, simply, "The Enlightenment," the "long" 18th century saw an explosion in literature and a radical redefinition of its possibilities, aims, and purposes in shaping individual--as well as collective--minds, morals, and manners. Students will analyze poetry, essays, newspaper articles, plays, and novels. This literature will be explored with an eye to understanding the central concerns of the period: the idea of a rational universe, the threat of disorder, social mobility, and increasingly conflicting opinions about whether reason or emotion best shapes human society.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE302B Literature of the European Enlightenment

This course will explore 18th-century Europe's fascinating desire for and belief in personal and collective human "enlightenment," a lingering idea that continues to shape the human experience to this day. The 18th-century German philosopher, Immanuel Kant, described the principal motto of enlightenment thus: "Sapere aude! Have the courage to use your own reason." Students will investigate the meaning of the term "enlightenment" and try to ascertain how it has participated in shaping the literary tradition. They will examine how it has influenced real and imaginary private and public spaces, prompted secular, religious, and philosophical debates over morality and ethics, and inspired "globalization"--the spread of culture and values--in its varied historical, and current, forms.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE303A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE305B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE307A 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, 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE309B British Literature of the Victorian Period

The purpose of this course is to make students conversant with the literature of the Victorian period (1830 - 1901). We will read novels, poetry, and non-fictional prose. One theme of the course will be the role of this period as a transition between the romantic period and the beginnings of modernism in the 1890s. Some of the intellectual currents we will study are the spread of evangelical Christianity, the influence of utilitarianism, and the effects of scientific reasoning on the interpretation of the Bible. Special attention will be paid to the new roles and freedoms which developed for women during this period, and the way in which issues of social classes enter into the literature of the period.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE311A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE313B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE351A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE353B 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 ENE351A, it is helpful but not necessary to take both courses. Throughout this course and ENE351A, 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE361A 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 ENE 464B, the course traces two predominant themes in American literature: Puritanism and primitivism.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE363B 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 and 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

ENE403A Gender and Literature I

Also offered through the Division of Continuing Studies

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.

Note: Distance Learning computer requirements.

Note(s): ENE200 must be taken as either a prerequisite or corequisite. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE405B 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.

Prerequisite: A 1st year English course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Note(s): For students in Fourth Year Honours English at the discretion of the Department Head.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

ENE427A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE429B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE442A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE444B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE446A/B Art of Extremity

This course is an examination of the way writers, artists, and filmmakers have reacted to a variety of extreme situations since the early 20th century, such as love, war, alienation, and genocide. Through critical analysis and a comparative approach, students will evaluate the way such works of art become provocative chronicles and the conscience of their times.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE448B Literature and Ethics

This course seeks to introduce to the students a specific way of reading a text; that is, it will develop a notion of ethical criticism, which will allow them to analyze the encounter between the writer's ethos with their own. This kind of reading places a responsibility, not only on the readers toward the text and the author, but also on the ethical quality of their own readings. The ethical value of the texts and stories we tell each other, therefore, is highlighted. The course will be developed through an introduction to the concept of ethics and how various periods of history have developed their own ideologies, values and ethics, and how these are manifested in literature and the other arts. A study of a wide variety of texts from the ancient Greeks to contemporary cinema will offer the students ample opportunity to exercise their critical faculties.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Note(s): Offered in 2007/2008 and alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE451A 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 Britain, and Hemingway's fiction will focus analysis on how the unforgettable experience of war becomes realized in various literary forms.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE453B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE469A The War Film

This course is an exploration of the development of the war film in North America and Europe since the beginning of the 20th century. Through critical analysis and a comparative approach, students will evaluate how this film genre represents the First World War, the Second World War, the Korean War, and the Vietnam War. The films from each conflict will be analyzed in the social and political climate of the times as well as in relation to the economics of the film industry in Hollywood.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 stream. Topics will vary with the interests and research of the faculty.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE481A 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.

Prerequisite: ENE200
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE483B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE484A 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 vs. science, the abuse of science, individuality and freedom, power and the state.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Note(s): Offered in alternate years
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ENE486B 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.

Prerequisite: ENE200 (completed, concurrent, or equivalent).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

French Studies

Programme Objectives and Structure

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 an Honours Bachelor of Arts (French Studies) and a Bachelor of Arts (French Studies). In order to be admitted to these programmes, students must have taken FRF152 and FRF262 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.

The Department also offers courses in Spanish. For students completing an Honours or a Major programme, these courses are considered as courses taken outside the Department.

Programme Objectives

The French Studies programme is intended to provide students with 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 First and Second Year courses, these skills are also stressed in the Third and Fourth Year courses, particularly for students doing an Honours or a Major in French Studies. 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

First Year

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

Second Year

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.

Third and Fourth Years

Courses designed mainly for students doing a Major or an Honours 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.

Structure of the 3rd and 4th Year Courses

Most of the courses offered in the Third and Fourth Years are divided into two half-courses lasting one semester each (part A is given in the fall; part B in the winter) and 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.

PROGRAMME REQUIREMENTS

General Information

The Department offers three levels of "standing" in its degree streams:

- Honours
- Major
- Minor

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

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.

The Honours French Studies stream requires:

Completion of the four-year Humanities degree programme.

At least 20 credits selected from the offerings of the French Studies Department (excluding courses in Spanish). Included in these courses must be:

- FRF152 (2 credits)
- FRF262 (2 credits)
- FRF344A (1 credit)
- FRF346B (1 credit)
- 2 Credits in French literature, and
- 2 Credits in French-Canadian literature.

Major

The Major French Studies Stream requires:

Completion of the four-year Humanities degree programme.

At least 16 Credits selected from the offerings of the French Studies Department (excluding courses in Spanish). Included in these courses must be:

- FRF152 (2 credits)
- FRF262 (2 credits)
- FRF344A (1 credit)
- FRF346B (1 credit)
- 2 Credits in French literature, and
- 2 Credits in French-Canadian literature.

Minor

Arts students may take a minor in French Studies. The requirements for the minor are 8 Credits in French Studies with at least a B- average for the courses.

100 COURSES

FRF150 Communication écrite

Only offered through the Division of Continuing Studies

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 (résumé, critical review, and essay) and to explore strategies that facilitate writing across disciplines and genres.

Note: Distance Learning computer requirements

Prerequisite: None, though 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.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

FRF151 Cours de composition et d'introduction aux études littéraires

The course is aimed at providing specialized training in oral and written French so that students become familiar with the main cultural and artistic expressions of the Francophone world. During this course, students will progress from the study of grammar and composition techniques to the study of French literature and culture.

Note(s): Offered annually. Compulsory course for French-speaking First Year Science/Engineering Programme students.
Lecture (/wk): 4 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

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

The course is aimed at providing specialized training in oral and written French so that students become familiar with the main cultural and artistic expressions of the Francophone world. During this course, students will progress from the study of grammar and composition techniques to the study of French literature and culture.

Note(s): Offered annually. Compulsory course for French speaking First Year Arts students.
Lecture (/wk): 4 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

FRF160 Introduction à la littérature canadienne-française

Only offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: FRF150, or its equivalent.
Note(s): This is a Web-based course and is offered in French only.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1

FRF161 Cours de composition et d'introduction à la littérature française

Only offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: FRF160, or its equivalent, must successfully be completed before FRF161 may be taken.
Note(s): This course is offered in French only.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

200 COURSES

FRF201 L'image des Canadiens français à travers la littérature canadienne-française du XX e siècle

Literary works (novels, poems, plays) will be used to study the major themes of French-Canadian literature and the way in which the French-Canadian community portrays itself. The main stages in the evolution of this self-portrayal will be studied. Students will also examine the main aesthetic and critical trends in French Canada in the 20th century.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Engineering or Science who speak and write French fluently.
Lecture (/wk): 1.5 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FRF202A L'image des Canadiens français à travers la littérature canadienne-française du XXe siècle I

Literary works written before 1960 (novels, poetry, plays) will be used to illustrate the main themes of French-Canadian literature and the way in which the French-Canadian community portrays itself. The main stages in the evolution of this portrayal will be studied. Students will also be introduced to the main aesthetic and critical trends in French Canada prior to 1960.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts who speak and write French fluently.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF204B L'image des Canadiens français à travers la littérature canadienne-françaises du XXe siècle II

This course continues FRF202A, looking at literary works written after 1960.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts who speak and write French fluently.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF262 Cours de composition et d'introduction aux études littéraires II

This course teaches advanced writing techniques and provides an introduction to the main trends of French literature in the 19th and 20th centuries and to the authors most representative of that period.

Prerequisite: FRF152 or equivalent.
Note(s): Offered annually. Compulsory course for French-speaking Second Year Arts students. FRF262, or its equivalent, must successfully be completed before a senior course (300 and 400 level) may be taken, or it may be taken concurrently with a senior course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

FRF264 Cours de composition et d'introduction à la littérature canadienne-française I

Only offered through the Division of Continuing Studies.

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: Distance Learning computer requirements

Prerequisite: FRF160 and FRF161, or FRF151 (a two-term in-class course), or FRF152 (a two-term in-class course).
Note(s): This course is offered in French only.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

FRF265 Cours de composition et d'introduction à la littérature canadienne-française II

Only offered through the Division of Continuing Studies.

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: Distance Learning computer requirements

Prerequisite: FRF264 - Cours de composition et d'introduction à la littérature canadienne-française I.
Note(s): FRF264 and FRF265 are the equivalent of FRF262, a two-term, in-class course.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

300 COURSES

FRF306A Littérature et civilisation canadiennes-françaises I

This course provides an overview of the cultural evolution and the main literary trends in French Canada from 19th century to the Second World War.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF308B Littérature et civilisation canadiennes-françaises II

This course provides an overview of the cultural evolution and the main literary trends in French Canada from the Second World War to the present day.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF309 Littérature et civilisation canadiennes-françaises

The course provides an overview of the cultural evolution and the main literary trends in French Canada from the 19th century to the present.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year Engineering and Science students.
Lecture (/wk): 1.5 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FRF316A Introduction à la traduction I

The course examines the linguistic differences between the two languages, focusing mainly on interference (Anglicisms). The translation exercises are taken from general and military texts.

Note(s): Offered in alternate years. This course is intended for French-speaking Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF318B Introduction à la traduction II

The course examines the linguistic differences between the two languages, focusing mainly on interference (Anglicisms). The translation exercises are taken from general and military texts.

Prerequisite: FRF316A or equivalent.
Note(s): Offer in alternate years. This course is intended for French-speaking Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF324A La littérature francophone subsaharienne des Indépendances 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 Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF326B 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 alterenate years. This course is intended for Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF330A La guerre et la condition militaire dans la littérature d'expression française I

The course examines the portrayal of war and military life in French literature, from the Middle Ages to the present day. The works covered in the course include novels, short stories, memoirs and poetry. Students will be required to take part in seminar discussions, write a dissertation and make an oral presentation.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF332B La guerre et la condition militaire dans la littérature d'expression française II

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): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF340A Variétés linguistiques canadienne-française et française

The aim of this course is to compare the characteristics of spoken French in Canada by analyzing the historical, political, economic and social contexts underlying linguistic variants. Students will be asked to describe the nature of "joual" and its influence in literature and in everyday speech. They will be able to recognize the potential of anglicisms to pose a danger to the language while offering possible enrichments. Lastly, importance will be placed on the necessity of establishing norms specific to French spoken in Canada, and on the usefulness of a Quebec French descriptive dictionary.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF344A Stylistique française I

This course is intended for Third and Fourth Year students in Arts. Students will acquire the knowledge necessary to appreciate and analyze stylistic effects and to improve their writing style. A wide range of documents (newspaper articles, speeches, advertising, literary texts, etc.) will be analyzed. Writing exercises will teach the student to adopt the style best suited to the function of the texts they produce.

Prerequisite: FRF262 or equivalent.
Note(s): Offered annually Compulsory course for third year students in the French Studies programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF346B Stylistique française II

Students will acquire the knowledge necessary to analyze stylistic effects, especially word play; to analyze the

structure of literary texts; and to improve their writing style. Literary texts, especially short stories, will be analyzed. In this course, students will be required to finish short stories by illustrating different narrative points of view and different styles. As well, they will be expected to compose a short story.

Prerequisite: FRF344A or equivalent.
Note(s): Offered annually. Compulsory course for third year students in the French Studies programme. This course is intended for Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF348A Approche historique et linguistique de la lange française I

This course introduces the student to historical linguistics and the classification of languages, and goes on to explore the origins of the French spoken in France and the French spoken in Canada. Then, with the aid of the major twentieth-century linguistic theories (structuralism, functionalism, generative grammar), the student will become familiar with the terminology and the nature of descriptive linguistics and French grammar.

Note(s): Offered in alternate years. This course is intended for Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF350B Approche historique et linguistique de la lange française II

This course will examine the major fields of modern linguistics: phonology and phonetics, derivational and inflexional morphology, semantics, lexicography, and syntax.

Prerequisite: FRF348A.
Note(s): Offered in alternate years. This course is intended for Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF352A Le roman français au XIX e siècle et ses antécédents

The course is a study of the evolution of the novelistic genre from the Middle Ages to the present day, with emphasis on the 19th century. The main trends and notable works will be examined in relation to the art and thinking associated with each period.

In addition to the readings, students will be required to write in-depth compositions.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF354B Le roman français au XXe siècle et ses antécédents

The course is a study of the evolution of the novelistic genre, with emphasis on the 20th century. The main trends and notable works will be examined in relation to the art and thinking associated with each period.

In addition to the readings, students will be required to write in-depth compositions.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF366A Étude de l'histoire et des formes de la poésie française du Moyen Âge à Baudelaire

The course is a study of the evolution of French poetry in Europe from the Middle Ages to Baudelaire, with emphasis on the 19th Century. The main trends and notable works will be examined in relation to the art and thinking associated with each period.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FRF368B Étude de l'histoire et des formes de la poésie française de Baudelaire à nos jours

The course is a study of the evolution of French poetry in Europe from Baudelaire to the present day. The main trends and notable works will be examined in relation to the art and thinking associated with each period.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FRF372A Théâtre médiéval et classique

This course will study medieval theatre, including farces and mystery, miracle and morality plays, French Renaissance theatre and classical theatre.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF373B Théâtre post-classique: XVIIIe et XIXe siècles

This course will study post-classical drama in France.At the end of the term, students will be able to identify the different esthetical and ideological trends in French dramatic literature of the XVIIIthand XIXth centuries.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF375A 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.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF376A La littérature française du Moyen Âge I

After a brief consideration of important social and historical elements and an overview of the principles of medieval French, this course will provide an intensive study of French medieval literature from its origins (Serments de Strasbourg) until the 13th century, dealing principally with the epic form (Chanson de Roland), the novel of courtly love and knightly quest (Romans de la table ronde, Roman du Graal) and with the beginnings of a new form of literature, that of the emerging classe bourgeoise. Various aspects of medieval life and customs (society, pastimes, food, war, clothing, etc.) will complement our studies.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF378B La littérature française du Moyen Âge II

This course follows FRF376A 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 maître 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.

Prerequisite: FRF376A.
Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF381A 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students. Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF383B 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 honnête 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF386A 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF388B 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF392A Le roman comique au XVI e siècle

This course attempts to determine the social function of comedy, parody and satire. It begins with a study of the works of François Rabelais. These works will be examined as analysed by one of the greatest theoreticians of carnivalesque comedy, Mikhail Bakhtine.

Bakhtine characterizes the works of Rabelais as grotesque or carnivalesque. These works will be used to study the history and forms of comedy, the vocabulary of the public arena, festivals and grotesque portrayals of the human body.

Note(s): Offered occasionnally. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF394B Le roman comique au XVII e siècle

This course attempts to determine the social function of comedy, parody and satire. In the late 16th century, the carnivalesque style of Rabelais was continued by Michel de Cervantes and his Don Quichotte de la Manche and by Noël du Fail and his Treize Propos rustiques. The Roman comique and Satyre Ménippée by Scarron will also be studied. They are of a genre which Bakhtine calls grotesque or carnivalesque. These works will be used to study the history and forms of comedy, the vocabulary of the public arena, festivals and grotesque portrayals of the human body.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

FRF405 Civilisation canadienne-française

The major currents of thought in French Canada are studied through an analysis of literary works.

Note(s): Offered occasionally This course is intended for Second, Third and Fourth Year Engineering and Science students.
Lecture (/wk): 1.5 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FRF416A Traduction avancée I

The course studies the linguistic, stylistic and cultural codes of the two languages, using translations of texts in the military field.

Note(s): Offered in alternate years. This course is intended for French-speaking Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF418B Traduction avancée II

The course studies the linguistic, stylistic and cultural codes of the two languages, using translations of texts in the military field.

Prerequisite: FRF416A or equivalent.
Note(s): Offered in alternate years. This course is intended for French-speaking Third and Fourth Year Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF426 Études dirigées avancées

The course given on a tutorial basis by one member of the department involves the writing of a thesis.

Note(s): Offered annually. This course is intended for students in Fourth Year Honours French Studies. It must be approved by the Department Head.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

FRF440A/B Vie et mort des grands héros de l'Antiquité

A study of the ways in which Greek and Roman writers of antiquity represent great heroes. At the end of this course, students will be able to compare different antique models in relation to well-known myths. They will recognize and analyze the parameters by which wartime heroism is justified in the epics of Homer and Virgil, in the tragedies of Sophocles, Aeschylus and Euripides, as well as in the works of Plutarch, Lucan and Apuleius.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF452A Le roman canadien d'expression française avant 1940

After its first tentative steps in the 19th century, the French-Canadian novel won acclaim in the 20th Century. This course provides an overview of this evolution.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF454B Le roman canadien d'expression française après 1940

The course provides an overview of the evolution of the French-Canadian novel after 1960.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF462B Pratiques littéraires des femmes

Study of women writers in France and Quebec, taking into account theories of production and reception, formal characteristics of the works and critical thought stemming from these practices. Students will be expected to place major authors and works in the context of literary history, to describe and analyze formal and aesthetic forces at work in these writings, and to formulate a personal critical reflection on women writers.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF466A Poésie canadienne-française I

This course will study the poetic works written in French Canada before 1937. It will show that the French-Canadian poetic tradition slowly distinguished itself from the literature of France and will study the characteristics of this new tradition. The works of the early 20th century will receive particular attention.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF468B Poésie canadienne-française II

This course will study the works of Saint-Denys Garneau, Grandbois, Hébert et Lasnier.It will show that the works of these four poets have launched a new poetic language that will become a beacon for contemporary French-Canadian poetry.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF470A 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.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF472B 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.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.). Moveover, 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF482A Civilisation canadienne-française de 1605 à 1900

The major currents of thought in French Canada are studied through an analysis of literary works.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF484B Civilisation canadienne-française de 1880 à nos jours

The major currents of thought in French Canada are studied through an analysis of literary works.

Note(s): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF486A Émergence d'une autonomie littéraire I

This course will show that, from 1534 to the end of the 18th century, French-Canadian literature gradually laid the groundwork for the attainment of full literary autonomy in the 20th century.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF488B Émergence d'une autonomie littéraire II

This course will show that, at the end of the 19th century and the beginning of the 20th, French-Canadian literature is trying to find solutions to fundamental problems of formal and thematic natures. The solutions arrived at will afterwards allow it to gain its full autonomy.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF493A 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF495B 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): Offered in alternate years. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF496A La sociolinguistique et la francophonie I

After presenting the various sociolinguistic trends, this course will focus mainly on the studies done on the standards, taboos and myths governing the different varieties of French.

Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

FRF498B La sociolinguistique et la francophonie II

The course will focus mainly on the most recent works in sociolinguistics and deals in particular with the different variants of French in specific areas (for example: the relationships between language and power and between language and social organization).

Prerequisite: FRF496A or equivalent.
Note(s): Offered occasionally. This course is intended for Second, Third and Fourth Year students in Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ESF302A Introduction à l'espagnol I

This course is given in Spanish and French and requires a linguistic profile of BBB in French as a Second Language.

This course will introduce students to Hispanic culture, particularly that of Latin America. The course presents the basics of Spanish grammar, including the uses of verbs in the present, the present continuous and the immediate future tenses and builds an elementary vocabulary for written and oral skills. The course makes use of multimedia resources, including audio and visual files, films, documentaries and the like.

Note(s): Offered annually. Intended normally for Second, Third and Fourth Year students in Arts. The Spanish courses may not be used to satisfy the requirements of the French Studies Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ESF304B Introduction à l'espagnol II

This course is given in Spanish and French and requires a linguistic profile of BBB in French as a Second Language.

A continuation of ESF302A.

This course is designed to provide students with the essential tools of the Spanish language in order to be able to read, to write and to communicate in Spanish in common everyday situations. The present, the present continuous and the immediate future tenses of verbs are reviewed. This course presents the past participle, the present perfect, the past simple and the imperative forms of verbs. Students will refine their capabilities in the Spanish language through the playing of roles, the writing of dialogues and the reading of short stories. The course makes use of multimedia resources including audio and visual files, films and documentaries and the like.

Prerequisite: ESF302A or equivalent.
Note(s): Offered annually. Intended normally for Second, Third and Fourth Year students in Arts. The Spanish courses may not be used to satisfy the requirements of the French Studies Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ESF402A Espagnol intermédiaire I

This course is given in Spanish and French and requires a linguistic profile of BBB in French as a Second Language.

A continuation of ESF304A.

This course is designed to provide students with the expanded knowledge of the Spanish language necessary to read short novels, to write summaries, to translate and to communicate in Spanish in everyday situations. The course will build an expanded vocabulary, review the past participle, the present perfect, the past simple and the imperative of verbs and will present the complements, the imperfect and the future forms of verbs. The course makes use of multimedia resources including audio and visual files, films and documentaries and the like.

Prerequisite: ESF304B or equivalent.
Note(s): Offered annually. Intended normally for Second, Third and Fourth Year students in Arts. The Spanish courses may not be used to satisfy the requirements of the French Studies Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ESF404B Espagnol intermédiaire II

This course is given in Spanish and French and requires a linguistic profile of BBB in French as a Second Language.

This course is designed to provide students with the expanded knowledge of the Spanish language necessary to read short literary novels, to write novel summaries, to translate and to communicate in Spanish. The course will build an expanded vocabulary, review the complements, the imperfect and the future forms of verbs and will present the subjunctive and the conditional forms of verbs. The course makes use of multimedia resources including audio and visual files, films and documentaries and the like.

Prerequisite: ESF402A or equivalent.
Note(s): Offered annually. Intended normally for Second, Third and Fourth Year students in Arts. The Spanish courses may not be used to satisfy the requirements of the French Studies Programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

History

Programme Objectives and Structure

The Goals

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 and divisions who have an interest in the discipline.

The Department of History has three primary goals:

1. to teach the essential elements of the craft of historical analysis, including the ability to think in historical terms, to research various issues and to present information and analysis in sound historiographical arguments both verbally and in writing;
2. to impart the story of the past in both survey and specialist courses that cover national and regional histories (like Canada, France, the Far East, and modern Europe), thematic histories (social, economic, and intellectual) and topical histories (modern international relations, strategic thought, and the military); and
3. to explain and utilise the different historiographic methodologies (economic determinism, realism, corporatism, gender, etc.).

Structure

The Department introduced a new degree in 2002 and has revised the requirements for degrees in History for students commencing studies in 2002/03. All students pursuing a degree in History are required to complete the Core Curriculum.

Note:

All HIE 400 level courses are designed as seminar courses and that if enrolment exceeds 18 priority will be given to those students who require them to fulfil mandatory degree requirements first. Authority to authorize exceeding this cap rests with the History Department Head.

Programme Requirements

General Information

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 degree or minor in History.

Core history courses for students in the **arts**

- HIE/F102 - Canada
- HIE/F202 - Introduction to Canadian Military History (For students in Business Administration HIE/F203B replaces HIE/F202. It is highly recommended that those wishing a minor in History, or who wish to maintain flexibility to change degree programs take HIE/F202.)
- HIE/F270 for students in history, military and strategic studies (For all other arts students HIE/F271A/B replaces HIE/F270. It is highly recommended that those wishing a minor in History take HIE/F270)

Core history courses for students in **science and engineering.**

- HIE/F207A - Canada
- HIE/F203B - Introduction to Canadian Military History
- HIE/F271A/B - Introduction to Military History and Thought
- HIE/F289A- The Impact of Science and Technology on Society and the Environment (an engineering degree requirement only).

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

Students Majoring, in History, who wishes to pursue an Honours degree, will apply to the Department in the second term of their 3rd year.

Eligibility to enter the Honours programme includes; a B-average in 3rd 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.

Course Requirements:

Completion of a 42 credit program in the Humanities, including the core curriculum.

A minimum of 20 credits in History, approved by the department, including:

- HIE/F102 - Canada
- HIE/F202 - Introduction to Canadian Military History
- HIE/F270 - An Introduction to Military History
- HIE/F384 - Modern Europe*
- HIE/F424 or HIE/F426 - Thesis or Advanced Directed Studies
- completion of at least four other history credits at the 400 level

* It is highly recommended that students take HIE384 in the 2nd Year

Major

Course Requirements:

Completion of a 40 credit program in the Arts, including the core curriculum

A minimum of 16 credits in History, approved by the department, including:

- HIE/F102 - Canada
- HIE/F202 - Introduction to Canadian Military History
- HIE/F270 - An Introduction to Military History
- HIE/F384 - Modern Europe *
- completion of at least four other history credits at the 400 level

* it is highly recommended that students take HIE384 in 2nd year.

Double Major

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

Open to students in any program at RMC

Course Requirements:

- 8 credits in History
- maintain at least a B- average in all History courses.

Optional Cross-Listed Courses

The following is a list of optional cross-listed courses from the Politics and Economics Department.

ECE316: Canadian Economic History

POE289: Sociopolitical Analysis of Science and Technology

POE312: Classical Political Philosophy

POE314: Modern Political Philosophy

POE412: Contemporary American Foreign and Defence Policy

POE416: Contemporary Canadian External Relations and Defence Policy

100 COURSES

HIE102 Canada

An introduction to the history of Canada which traces some of the political, economic, social and cultural development and interactions which helped to create the modern nation of today.

Note(s): For students in the First year Arts. Students taking this course cannot also take HIE207A or HIE104 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE104 Survey of Post-Confederation Canada

Only offered through the Division of Continuing Studies.

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.

Note: Distance Learning computer requirements

Note(s): Students taking this course cannot also take HIE 102 or HIF102 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

200 COURSES

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.

Note(s): For students in the Second Year taking Arts. Students taking this course cannot also take HIE/HIF203B or HIE/HIF208 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE203B 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.

Note(s): Mandatory for students in Science, Engineering and Business Administration. Students taking this course cannot also take HIE/HIF202 or HIE/HIF208 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE205 Canadian Military History: Origins to 1870

Only offered through the Division of Continuing Studies.

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.

Note: Distance Learning computer requirements

Note(s): Students taking this course may take HIE/HIF204 for credit but cannot also take HIE/HIF202, HIE/HIF203 or HIE/HIF208 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

HIE207A Canada

A survey of Canadian history from the pre-Contact era to the 1980s. Key themes will include the diversity of the Canadian experience, Canada's place in the North Atlantic World, the development of the Canadian economy, and the evolution of the state as a force in the economic and social life of colonial and post-colonial Canada. The course will also explore how Canada's past has been presented in popular culture and public history.

Note(s): Mandatory for students in Science and Engineering. Students taking this course cannot also take HIE/F102 or HIE/F104 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE208 Canadian Military History: A Study of War and Military History, 1867 to the Present

Only offered through the Division of Continuing Studies.

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.

Note: Distance Learning computer requirements

Note(s): Students taking this course cannot also take HIE/HIF202, HIE/HIF203 or HIE/HIF204
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

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 siegecraft; theorists of seapower 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.

Note(s): Mandatory for students taking Honours or a Major History. Students taking this course cannot also take HIE271A/B for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE271A/B 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.

Note(s): Mandatory for all students who do not take HIE270.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE272 A Brief History of Air Warfare

The aim of this course is to assist students in gaining knowledge, understanding and appreciation of the roles the aeroplane has increasingly come to play in warfare in the twentieth century. The development of aircraft and the utilization as part of, and in support of, a nation's armed forces will be considered in a broad historical context. Consequently, for students with a prior knowledge of the major conflicts of this century, the course will also provide an opportunity for review and reassessment from an air power perspective. Students who have not previously studied twentieth century wars will have the opportunity to learn about them, albeit from an airforce perspective.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

HIE275A/B 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.

Note(s): Students taking this course cannot take HIE475 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE289A 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.
Lecture (/wk): 2 Lab (/wk): 0 Study (/wk): 4
Credit(s): 0.5

300 COURSES

HIE301 Aboriginal Peoples in Canada: A History

Only offered through the Division of Continuing Studies.

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.

Note: Distance Learning computer requirements

Prerequisite: A junior history course.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

HIE310 A 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE312A The United States, 1750 - 1877

A study of the political, social and economic development of the United States from the mid-18th century to Reconstruction.

Note(s): Offered in alternate years
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE314B The United States, 1865 to the present

A study of the political, economic and social development of the United States from the American Civil War to the Reagan years.

Note(s): Offered in alternate years
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE326 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 will only be available in exceptional circumstances and requires the recommendation of a supervisor and the permission of the chair of the department.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE332A/B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE336A 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE340A Military 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): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE342B Military History of the Second World War

Also offered through the Division of Continuing Studies

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: Distance Learning computer requirements

Prerequisite: A junior history course.
Note(s): Offered in alternate years. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE345 The Canadian Way of War

This one semester course will examine the "Canadian" way of War in the colonial and early national period, by focusing on one particular campaign: the French Indian Wars, 1754-1760; the War of 1812; or the North West Rebellion of 1885. Students will examine the tactical, operational and strategic dynamics of a particular conflict through a combination of classroom lectures, presentations, discussions and an actual battlefield tour.

Note(s): Offered only periodically and with the permission of the Department. This special battlefield course is intended for officer professional development. It will be taught by a member of the faculty of RMC and by a field grade officer capable of applying current doctrine, terrain analysis and operational art to the historical study.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE346A/B 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 CF conducted overseas operations, including policies and strategies for waging the Cold War, to UN peacekeeping and the era of intervention era in the early 1990s and the current Al Qaeda War.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE356A War and Tradition in the Islamic World

A study of the rise of Islam and its enduring impact on Europe, Asia and Africa. Special attention will be paid to the roots of conflict in the Middle East, the Gulf and Indian Ocean states from the emergence of Islam to proclamation of the Turkish Republic in 1922.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE358B War and Peace in the Modern Islamic World

A study of war and peace in the modern Islamic World from the beginning of the Turkish Republic to the present. Attention will be paid to the political, military, economic and religious development of the Middle East, the Gulf and Indian Ocean states.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE369A 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE371 Introduction to War and Strategy

Only offered through the Division of Continuing Studies

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."

Note: Distance Learning computer requirements

Prerequisite: A junior history course.
Note(s): Students cannot take both HIE/F371 and either HIE/F270 or HIE/F271.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

HIE372B 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE374A 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.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE377A/B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE379B Cold War, Limited War, and Diplomacy: International History, 1945 - 1991

A lecture course concentrating on the major political, economic, and social developments in international history after 1945. Emphasis will be placed upon the settlements following the Second World War, the reconstruction of Europe and the Far East, and the formation of NATO and the Warsaw Pact. The origins of the Cold War, the rise of the global Super Powers, the end of European hegemony overseas, the trend towards European integration, and the emergence of the Third World as an effective factor in international politics will also be discussed.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6

Credit(s): 1

HIE380 Peacekeeping and Peacemaking

A study of peacekeeping and peacemaking operations in the 20th century from the Boxer Intervention of 1900 to the present. Operations taken under the auspices of the League of Nations and the United Nations will be analyzed as well as those endeavours involving cooperation between alliance or coalition partners. Special attention will be paid to the roles and the missions undertaken by the Canadian Armed Forces in the post-1945 era.

Prerequisite: Students must have completed HIE202 (or equivalent) and HIE270 (or equivalent) before taking HIE380.
Note(s): HIE380: Peacekeeping and Peacemaking is equal to the combination of both POE210: Introduction to Peacekeeping and POE324: International Organizations.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE382 An Introduction to Issues in Peacekeeping and Peacemaking

A survey of selected issues in the history of peacekeeping and peacemaking in the late 20th Century. The issues covered will include: the evolving theory od peacemaking, humanity and warfare, disarmament, war crime trials and international law, the United Nations, civil-military co-operation in peacekeeping, international alliances and peacemaking. attention will be paid to Canadian military, diplomatic and civilian contributions to the development of peacekeeping.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

HIE384 Modern Europe

A survey of European history from 1500 to the present. This course examines the political, social and economic history of Europe over the past five hundred years. Special attention will be paid to such wider phenomena as the Renaissance, the Reformation, the Enlightenment, the Industrial Revolution, colonialism and the impact of war.

Prerequisite: A junior history course.
Note(s): Mandatory for students taking Honours or a Major in History. Students majoring in history are strongly encouraged to take this course in their second year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

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. (It is recommended that HIEF384: Modern Europe, be taken prior to this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE386A Eastern Europe to 1918

A study of the history of East Central and Eastern Europe - the lands between the German and Russian realms - from medieval times to the end of the First World War. Aside from examining the evolution of the major national groups of the region, the course will cover such themes as international conflict in the region, the struggles for national liberation, the impact of industrialization, the rise of nationalism.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE387A Russia to 1917

A survey of Russia from 1861 to the Revolution of 1917. Particular attention will be paid to the emancipation of the serfs, the industrialization of Russia, the modernization of government and the Bolshevik revolution. (It is recommended that HIE384: Modern Europe, be taken prior to this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE388B Eastern Europe from 1919 to 1989

The evolution of Eastern Europe from the post-World War I peace settlements to the collapse of the Soviet Empire. The course will survey the newly emerged independent states after 1918; internal problems and foreign interference in the region; social, ethnic, and intra-regional conflicts; the impact of World War II; the rise and demise of Soviet-style communism. (It is recommended

that HIE386A: Eastern Europe, be taken prior to taking this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE389B The History of the USSR

A survey of the USSR from 1917 to the present. Particular attention will be paid to the Stalinist system, the role of the USSR as a great power, the Second World War and the collapse of Communism. (It is recommended that HIE486A: Russia to 1917, be taken prior to this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE390A 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE392B 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. (It is recommended that HIE390A: European Imperialism, be taken prior to or coincident with this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

HIF400 L'héritage militaire du Canada français

Course is currently offered in "French Only"

A study of the relationship between French Canadian society, the Armed Forces and war. Themes discussed will include Pierre Lemoyne d'Iberville, the "compagnies franches de la Marine", Charles-Michel de Salaberry, the Van Doos, the 425th Squadron, the implementation of bilinguism in the Canadian Forces and other aspects of 350 years of French Canadians and Quebecers soldiering.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIF401A/B Histoire du Québec de 1945 à nos jours

Course is currently offered in "French Only"

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.¿

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE403B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6

Credit(s): 1

HIE405A 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE406A Canadian External Relations

A study of selected aspects of the history of Canadian foreign policy, including studies of Canada's role within the Empire-Commonwealth, North America, Europe, Asia and the Third World.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE408B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE416A The United States as an Emerging World Power to 1919

A thematic study of the United States and its relations with foreign powers from the early national period to the end of World War I. Issues that will be considered will include the development of a continental nation, the foreign policy consequences of industrialization and America's growing involvement in international affairs.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE418B The United States as a World Power, 1919 to the Present

This course will consider, through a combination of lectures and seminars the actions of the United States as a World Power. Themes and topics discussed will include the tension between isolationism and international commitments and the interplay of foreign policy and domestic developments. (It is recommended that HIE416A: The US as an Emerging World Power to 1919, be taken prior to this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE420 Making a New World: Colonial Societies in North America

A study of the development of French and English colonial societies in North America from the 16th century to about 1840. Class discussions will consider, among other things the development of New France, Acadia and the English colonies on the continent before 1776 and the changing face of British North America.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE421 Canadian Naval History

This seminar course examines the history of the Canadian navy since 1910. The course is divided into three periods:

the formative years (1910-1945); the Cold War era (1945-1990), during which the Canadian navy came of age; and the post-Cold War period (1990-present). In exploring these periods, students will reflect on 1) how Canadian naval policy has changed over time; 2) the development and application of new technologies within the Canadian navy; 3) and Canadian naval operations in wartime and peacetime

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

HIE422A 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE423B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.)

Lab (/wk): Study (/wk):
Credit(s): 2

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.)

Lab (/wk): Study (/wk):
Credit(s): 2

HIE448 The Rise of Modern Communism and Fascism

A thematic examination of the emergence and triumph of radical leftist or right-wing movements in Russia, Italy, and Germany. The intellectual and populist origins of communism, fascism and Nazism, the national and international context of the evolution of these movements, and other related themes will also be studied. (It is recommended that HIE/F384, Modern Europe, be taken prior to or coincident with this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIF455A Les origines historiques des crises de notre temps

Course is currently offered in "French Only"

This seminar examines the historical background of selected world crises. Relying on a combination of primary and secondary sources, it will analyse how economic, ethnic, social, cultural, military and diplomatic factors have shaped over time the policies of the nations involved in these crises.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

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): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIF460A La Révolution française

Course is currently offered in "French Only"

A study of causes and the main events of the French Revolution through the popular days: 14 July, 5 and 6 October, 10 August, 31 May etc.. The course will also consider the dialectic between the popular movement and the bourgeois reaction and concerns over human rights. The students will give presentations and critique primary documents of the revolution.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF462B Napoléon et le Premier Empire

Course is currently offered in "French Only"

This course will consider the first empire and the rise of imperialism. It will consider the seven coalitions raised by England and the grand battles of the regime: Aboukir, Trafalgar, Austertitz, Wagram and Waterloo. Students will analyse the continental blockade, the war in Spain, the Russian campaign, the campaign in France and the congress of Vienna, and its attempts to stop the emperor and the destruction of the French Revolution.

Note(s): Offered in alternate years
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 guerilla 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
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE471B History of Air Warfare

This seminar course will explore air power and air warfare from the earliest days of powered flight to the present. It will focus primarily on the development of the idea of air power and on the organization and employment of air power and aerospace power in war and peace. The major themes that will be explored will include: the unique attributes of air power; the importance of air superiority; the contrast between offence and defense in air warfare; the role of "auxiliary aviation"; the command relationship between air and surface forces; and the morality and legality of air warfare.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE474A 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.

Note(s): Students taking this course cannot also take HIE475 for credit.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE475 Technology, Society and Warfare

Only offered through the Division of Continuing Studies

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.

Note: Distance Learning computer requirements

Prerequisite: A junior history course.
Note(s): Students taking this course cannot also take HIE474 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

HIE476B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE477B 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".

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF479 La guerre d'Algérie

Course is currently offered in "French Only"

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): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIE480 War, Revolution and the Rise of Modern China

A study of the transformation of China from cultural Empire to a modern state. Particular attention will be given to the indigenous response of China to the impact of the West. Emphasis will be given to the influence of war and revolution on the development of China from the early 19th century to the present.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

HIE482 War and the Emergence of Modern Japan

A study of the impact of war and the military ethos on the emergence of Japan as a world power. Attention will be paid to bushido and the samurai, the evolution of modern armed forces, military education, the general staff, the military-industrial complex, civil-military relations, the military and colonial policy, and alliance diplomacy.

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF491A Les crises internationales et le droit

Course is currently offered in "French Only"

An historical examination of origins, development and resolution of a number of major international crises, including the Falklands War (1982), flight KE007 (1983), the taking of American hostages in Tehran (1979), the Rainbow Warrior bombing (1985), the Achille Lauro hijacking (1985), the Iraq-Kuwait War (1990) and the Palestinian issue (2000). In particular, students will consider and analyse the legal positions of the parties involved, their actions during the crisis and the contribution of the law to solving the problem.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF492B Crimes et criminels de guerre : Droit pénal international

Course is currently offered in "French Only"

A study of war crimes, crimes against humanity, and of the reactions of the international community. This will include a review of the principles developed from the Nuremburg, Tokyo, The Hague and Arusha Tribunals; a study of the Goering, Yamashita, Eichmann, Barbie, Lischka, Calley, Finta, Demjanjuk, Papon and Blaskic trials; and an examination of the international penal court project.

Note(s): Offered in alternate years
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF494A La France moderne jusqu'à 1848

Course is currently offered in "French Only"

Political, economic, social and cultural developments in France from the Middle Ages to 1848, with emphasis on the growth of royal absolutism, the French Revolution and the subsequent quest for political stability to 1848. The role of France in the European context will be explored, as well as its military institutions. (It is recommended that HIE/F384, Modern Europe, be taken prior to or coincident with this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

HIF496B La France contemporaine

Course is currently offered in "French Only"

A study of the political, economic, social and cultural developments in France from 1848 to the present. Among other things, the course will consider the political, military and cultural development in France since the second Republic and the repercussion of the great wars of the 20th century. (It is recommended that HIF494A, La France moderne jusqu'à 1848, be taken prior to this course.)

Note(s): Offered in alternate years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

Military and Strategic Studies Programme

Programme Objectives and Requirements

Programme Objectives

This interdisciplinary 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.

Officer Cadets 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, Officer Cadets 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 Requirements

To earn a degree in Military and Strategic Studies students must pursue one of two patterns of study:

1. Military and Strategic Studies; or,
2. Military and Strategic Studies, with a Minor in Military Psychology and Leadership (MPL), Business Administration, Economics, English, or French Studies.

Honours

The following are requirements for an Honours Degree in MSS, a 42-credit degree including the core courses in Arts and Science:

15 credits comprised of the following mandatory courses:

- 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)
- POE316A: Introduction to International Relations (1 credit)
- POE317B: Introduction to Contemporary Strategic Studies (1 credit)
- POE460A: International Conflict Analysis (1 credit)
- POE462B: Current Strategic Issues (1 credit)
- PSE312A: Military Psychology and Combat (1 credit)
- MSE424 or MSE426: Thesis or Research Project (2 credits)
- A minimum of 5 other credits for subject-field courses, of which 2 must be at the 400 level, approved by the PIC MSS.

Note:

Maintain a B average in all mandatory Honours courses identified above and maintain a B- average in all academic courses in fourth year.

MSE424/MSE426:

Special research on an approved subject, under the direction of a designated supervisor, resulting in the submission of a:

- Thesis (MSE424) or;
- Research Project in Military Strategic Studies (MSE426).

Students will be provided with guidance on topics and methods before submitting a research proposal for approval.

Theses must follow RMC 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 thesis (MSE424) to research project (MSE426) must do so no later than the add-course deadline of the winter term.

Major

The following are requirements for a Major in MSS, a 40-credit degree including the core courses in Arts and Science:

13 credits comprised of the following mandatory courses:

- 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)
- POE316A: Introduction to International Relations (1 credit)
- POE317B: Introduction to Contemporary Strategic Studies (1 credit)
- POE460A: International Conflict Analysis (1 credit)|
- POE462B: Current Strategic Issues (1 credit)
- PSE312A: Military Psychology and Combat (1 credit)
- A minimum of 3 other credits for subject-field courses, of which 1 must be at the 400 level, approved by the Professor in charge of MSS.

The MSS Major may not be earned as a double major with History or Politics.

Minor

There is no Minor in MSS.

Minors in MPL, Business Administration, Economics, English, or French Studies may be earned together with an Honours or a Major MSS Degree. Students pursuing one or more of these Minors will complete 8 credits in their Minor program, in addition to the core courses in Arts and Science.

Military Psychology and Leadership

Programme Objectives and Mandatory Courses

Programme Objectives

The Military Psychology and Leadership department serves two purposes. First, the degree programme in psychology provides a university level education that will meet the needs of those majoring in 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:

1. to provide a theory-based understanding of human behaviour and mental processes;
2. to teach critical thinking and the scientific method as they apply to psychology; and
3. 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 provides an excellent grounding for professional development and represents an exceptional way to develop the leadership abilities of graduates.

Mandatory 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 in First, Third, and Fourth Years of study. The focus and scope of each is described below.

First Year

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 separate 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. More on the First Year courses is provided in the Course Description section under Course Number s PSE123A and PSE105B for Arts students and PSE123A for Science and Engineering students.

Third Year

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 ability is developed in Third Year by Course Number 301 which has been designed to help students understand leadership theory, human motivation, power and politics, organizational culture, and managing resistance to change. More on this Third Year course is provided in the Course Description section (see Course Number PSE301).

Fourth Year

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 in Course Number 401 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. More on this Fourth Year course is provided in the Course Description section. (see Course Number PSE401).

Table of Mandatory Courses by Year

The following table lists the Military Psychology and Leadership Department courses included in the core curriculum for Arts and Engineering and Science students:

	Arts Students	Engineering or Science Students
100 Level	PSE123A: Fundamentals of Human Psychology PSE105B: Social Psychology	PSE123A: Fundamentals of Human Psychology
200 Level	No requirement	No requirement
300 Level	PSE301A: Organizational Behaviour and Leadership	PSE301A: Organizational Behaviour and Leadership
400 Level	PSE401B: Military Professionalism and Ethics	PSE401B: Military Professionalism and Ethics

PROGRAMME REQUIREMENTS

General Information

Students successfully completing their First Year in Arts are eligible for entry into the programme leading to a Honours degree, a Major Degree, or a Minor in Military Psychology and Leadership.

Students are normally admitted to these programmes after first year with permission of the Department Head.

Students normally apply for Honours at the beginning of third year.

Students in the Honours programme are required to complete a thesis in fourth year.

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

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.

Minimum of 42 credits, including core curriculum courses.

Minimum of 20 credits in Military Psychology and Leadership approved by the department, including:

Core curriculum courses (4 credits):

- PSE105B: Social Psychology
- PSE123A: Fundamentals of Human Psychology
- PSE301A: Organizational Leadership and Behaviour
- PSE401B: Military Professionalism and Ethics

Mandatory Programme courses (11 credits):

- PSE205A/B: Social Psychology (or PSE240A/B: Personality)
- PSE213A/B: Statistics for the Behavioural Sciences
- PSE214A/B: Research Methodology in Psychology
- PSE236A/B: Cognition and Learning
- PSE312A/B: Applied Military Psychology
- PSE352A/B: Advanced Statistical Analysis for the Behavioural Sciences
- PSE354A/B: Advanced Experimental Research and Data Analysis
- PSE424: Thesis
- PSE452A/B: Advanced Research Methods in the Behavioural Sciences
- PSE454A/B: Advanced Leadership

Optional Programme Courses (5 credits)

A minimum of 1 should be at the 400 level:

- PSE302A/B: Brain and Behaviour
- PSE306A/B: Human Resource Management
- PSE320A/B: Sociology of the Armed Forces
- PSE324A/B: Cross-Cultural Psychology
- PSE328A/B: Group Dynamics
- PSE330A/B: Introduction to Abnormal Psychology
- PSE332A/B: Introduction to Interviewing and Counselling
- PSE346A/B: Persuasion and Influence
- PSE370A/B: Introduction to Industrial Psychology
- PSE380A/B: Psychology and Philosophy of Religious Conflicts
- PSE410A/B: Psychology, Moral, and Ethics
- PSE415A/B: Tests and Measures
- PSE420A/B: Introduction to International Development Studies

- PSE426A/B: Advanced Cognitive Psychology
- PSE430A/B: Stress
- PSE444A/B: Sports Psychology
- PSE450A/B: Advanced Social Psychology
- PSE462A/B: Human Factors in Applied Military Science
- PSE464A/B: Directed Studies in Military Psychology
- PSE465A/B: Directed Studies in Military Leadership
- PSE466A/B: Directed Studies in Sociology of the Armed Forces

Note:

Students may take up to two credits as optional program courses from St-Lawrence College or Queen's University, with the approval of the Department Head.

Major

Minimum of 40 credits, including curriculum courses.

Minimum of 16 credits in Military Psychology and Leadership approved by the department, including:

Core curriculum courses (4 credits)

- PSE105B: Social Psychology
- PSE123A: Fundamentals of Human Psychology
- PSE301A: Organizational Leadership and Behaviour
- PSE401B: Military Professionalism and Ethics

Mandatory Programme courses (6 credits)

- PSE205A/B: Social Psychology (or PSE240A/B: Personality)
- PSE213A/B: Statistics for the Behavioural Sciences
- PSE214A/B: Research Methodology in Psychology
- PSE236A/B: Cognition and Learning
- PSE312A/B: Applied Military Psychology
- PSE454A/B: Advanced Leadership

Optional Programme courses: (6 credits)

A minimum of 1 should be at the 400 level.

- PSE302A/B: Brain and Behaviour
- PSE306A/B: Human Resource Management
- PSE320A/B: Sociology of the Armed Forces
- PSE324A/B: Cross-Cultural Psychology
- PSE328A/B: Group Dynamics
- PSE330A/B: Introduction to Abnormal Psychology
- PSE332A/B: Introduction to Interviewing and Counselling
- PSE346A/B: Persuasion and Influence
- PSE352A/B: Advanced Statistical Analysis for the Behavioural Sciences
- PSE370A/B: Introduction to Industrial Psychology
- PSE380A/B: Psychology and Philosophy of Religious Conflicts
- PSE410A/B: Psychology, Moral, and Ethics
- PSE415A/B: Tests and Measures
- PSE420A/B: Introduction to International Development Studies
- PSE426A/B: Advanced Cognitive Psychology
- PSE430A/B: Stress
- PSE444A/B: Sports Psychology
- PSE450A/B: Advanced Social Psychology
- PSE462A/B: Human Factors in Applied Military Science
- PSE464A/B: Directed Studies in Military Psychology
- PSE465A/B: Directed Studies in Military Leadership
- PSE466A/B: Directed Studies in Sociology of the Armed Forces

Note:

Students may take up to two credits as optional program courses from St-Lawrence College or Queen's University, with the approval of the Department Head.

Minor

Minimum 8 credits in Psychology, including core curriculum courses.

Core curriculum courses (4 credits):

- PSE105B: Social Psychology
- PSE123A: Fundamentals of Human Psychology
- PSE301A: Organizational Leadership and Behaviour
- PSE401B: Military Professionalism and Ethics

Mandatory Programme courses (1credit)

- PSE214A/B: Research Methodology in Psychology

Optional Programme courses (3 credits)

- Any course offered by the department, with the permission of the Department Head.

Notes:

Students may take up to two credits as optional program courses from St-Lawrence College or Queen's University, with the approval of the Department Head.

100 COURSES

PSE105B 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: PSE123 or equivalent.
Note(s): A required course for all students in First Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: Canadian political, treaty and legal 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 militaries including the Canadian Forces; and, consideration of Aboriginal and military images, beliefs and practices of the warrior and the leader.

Prerequisite: Students should normally be enrolled in the Aboriginal preparatory programme.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE123A Fundamentals of Human Psychology

Also offered through the Division of Continuing Studies

This course is designed to provide the student with an understanding of people as psychological beings. The essentials of the scientific method and its application to psychology will be presented. Concepts such as development, learning, memory, motivation, personality, intelligence, stress and health, psychological disorders, and social psychology will be discussed.

Note: Distance Learning computer system requirements

Note(s): Compulsory for all First Year students. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE192 Directed Readings in Psychology

The content of this course is more advanced than that of PSE112, and is related to the studies already completed by the student.

Directed Reading Only

Note(s): Available upon permission of the department head to 1st year arts students repeating 1st year without previous failure in PSE112. Lab (/wk): Study (/wk):
Credit(s): 2

200 COURSES

PSE205A/B Social Psychology

This course will be offered for the last time during the academic year 2009-2010

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 judgments, 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: PSE/F112 or PSE/F123B.
Note(s): For students in Second, Third or Fourth Year. A required course for the students electing a BA in Psychology.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE213A/B Statistics for the Behavioural Sciences

This course applies statistical concepts to the behavioural sciences. Students will peruse and understand such concepts as measures of central tendency, measures of dispersion, and the normal distribution. They will determine relationship between data and apply models related to prediction. Hypothesis testing involving dependent and independent data will be introduced and will lead to simple two-way analysis of variance. The

course will conclude with an introduction to non-parametric statistics.

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): A required course for the students electing a BA in Psychology
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE214A/B 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 design simple research projects.

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): For students in Second and Third Year Arts. A required course for the students electing a BA in Psychology
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE236A/B 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. Students will use concepts of decision-making to analyze military situations.

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): For students in Second, Third or Fourth Year. A required course for the students electing a BA in Psychology
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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. In addition, there will be a focus on important current developments in the understanding of personality, such as the widely accepted "Big Five" approach. 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.

Prerequisite: PSE123 or equivalent.
Note(s): For students in Second, Third or Fourth Year. A required course for the students electing a BA in Psychology
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

300 COURSES

PSE301A Organizational Behaviour and Leadership

Also offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): Compulsory for all students in the Third Year. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
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: PSE123 or equivalent.
Note(s): For students in Second, Third or Fourth Year
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE306A/B Human Resource 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. Extensive reference is made to the Canadian Forces personnel system to illustrate points of discussion. Representative topics include: demographics and personnel supply; human rights legislation and employment equity; human resource planning; recruiting and selection; training and development; quality of working life; occupational stress; and assessing the utility of HRM activities.. Students will be expected to demonstrate their comprehension of relevant HRM issues by completing projects in these areas.

Prerequisite: Either PSE301 or (BAE101 and ENE100 (or Equivalent) and PSE123 or Equivalent).
Note(s): Also offered through the department of Business Administration as BAE326B For students in the Third or Fourth Year. Not available for credit for students who also claim credit for PSE370.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE312A/B Applied Military Psychology

Also offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): A required course for students electing a BA in Psychology. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE320A/B 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.

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): Not offered every year. For students in the Third or Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE324A/B 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.

Prerequisite: PSE/F112 or PSE/F123B.
Note(s): Not offered every year. For students in Second, Third, or Fourth-Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE328A/B Group Dynamics

Also offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Prerequisite: PSE/F112 or PSE/F123B.
Co-requisite: Not offered every year.
Note(s): For students in Second Year, Third Year, and Fourth Year Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE330A/B 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.

Prerequisite: PSE/F112 or PSE/F123A/B.
Note(s): Not offered every year. For students in Second, Third, or Fourth-Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE332A/B 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: PSE112 or PSE123A.
Co-requisite: Not offered every year.
Note(s): For students in the Third or Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE346A/B 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: PSE/F112 or PSE/F123B.
Note(s): Not offered every year. For students in the Third or Fourth Year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE352A/B Advanced Statistical Analysis for the Behavioural Sciences

This course follows Statistical Analysis for Social Scientists I (PSE213A). This course addresses the theoretical concepts and applications of multivariate statistical techniques in the behavioural sciences. Statistical analyses covered include factorial analysis of variance, multiple regression and correlational techniques. Students will be introduced to the use of statistical tools, data manipulation and the interpretation of results in representative behavioural science research topics.

Prerequisite: PSE/F213 and PSE/F214 or Equivalent.
Co-requisite: A required course for students electing a BA Honours in Psychology.
Note(s): For students in Third or Fourth Year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE354 Advanced Experimental Research and Data Analysis

This course will provide students with the opportunity to carry out various types of short psychological research projects and to further develop their data analytic skills using the software Statistical Package for the Social Sciences (SPSS). The students will learn to select the proper statistical analysis for various experimental designs; to follow the data cleaning procedures; to use SPSS for analyzing data; to read and interpret results from computer outputs; and to describe and report the results in APA format. This course will cover the most common statistical procedures used in psychological research, including the t-test, various forms of analysis of variance, chi-square, correlations, multiple regression, and multivariate analysis of variance.

Prerequisite: PSE213 or equivalent.
Co-requisite: PSE352.
Note(s): A required course for the students selecting a BA Honours in Psychology or by permission of the Head of the Department.
Lecture (/wk): 1 Lab (/wk): 2 Study (/wk): 6
Credit(s): 1

PSE370A/B Introduction to Industrial Psychology

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: PSE301.
Co-requisite: For students in the Third or Fourth year.
Exclusion: Not available for credit for students who also claim credit for PSE306 or BAE326.
Note(s): Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE380A/B Psychology and Philosophy of Religious Conflicts

The objective of this course is to look at the role of religion in contemporary world conflicts. The aim is to study, using such disciplines as psychology and philosophy, the religious phenomenon in the development of religious conflicts. This course will allow students to discover an existing reality and analyse the extent to which religion has a specific influence on conflicts, such as the one in Afghanistan. More precisely, this course will address the characteristics of a religious discourse with an emphasis on the following themes: 1) making war in the name of God; 2) religious structure identity; 3) bewitchment of beliefs; 4) religious fanaticism; 5) the concept of intolerance; 6) ethnocentrism and relativism; 7) just and unjust wars; and 8) war against terrorism.

Prerequisite: PSE/F112 or PSE/F123.
Exclusion: For students in Third, or Fourth-Year Arts or with the permission of the professor.
Note(s): Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

PSE401B 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's 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.

Prerequisite: PSE/F112 or PSE/F123, PSE/F301.
Note(s): Compulsory for all students in the Fourth Year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE402 Leadership and Ethics

Only offered through the Division of Continuing Studies

This course discusses the professional, ethical, and leadership issues associated with commissioning. It is designed to introduce students to the ethical dimensions of the profession of arms and the underlying theoretical leadership theories that enhance individual and group performance, and to models of effective decision-making. The course includes readings and discussions on the major ethical theories and decision frameworks distinguishing right from wrong, the nature of military professionalism and the ethical obligations, the foundations of professional military ethics, individual difference factors in moral development, situational factors that foster or undermine ethical behaviour, psychological models of ethical decision-making and action, motivation theories and applications, power and influence, group dynamics and team building, leadership theories and applications, and decision-making models. Students are encouraged to demonstrate their understanding and integration of the material through assigned readings and case study analyses.

Note: Distance Learning computer system requirements

Exclusion: Students taking this course cannot take PSE/PSF401 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

PSE410A/B Psychology, moral 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 course introduces a theoretical component where themes such as personality types, identity development, moral cognition, empathy and character development are examined, and a practical component in which ethical cases such as the sexual differences in the practice of ethics, cognitive dissonance in the ethical discourse, and the conflict of values in the ethical decision making are analysed.

Prerequisite: PSE/F112 or PSE/F123A/B.
Exclusion: For students in Third or Fourth-Year Arts or with the permission of the professor.
Note(s): Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE415A/B 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.

Prerequisite: PSE/F213 and PSE/F214.
Note(s): Not offered every year. For students in Third or Fourth-Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE420A/B Introduction to International Development

This course is designed to help students answer the following questions: What is international development? Where does development take place? Why do we provide development assistance (diverse motivations)? What are the key trends in international development over time? Who are the different actors in development around the world? Students will learn about the ethical imperatives and implications of development assistance; identity formation and image manufacturing; and the challenges of - and opportunities for - capacity building, leadership training, sustainability and cross-cultural awareness. Case studies for this course will focus on international and Canadian responses of development assistance to countries engaged in conflict including Afghanistan, Haiti, Sri Lanka and Sudan. Students will learn about the relevance of international development agencies, development strategies and development assistance to military operations in conflict and post-conflict areas.

Exclusion: For students in the Third or Fourth year.
Note(s): May not be offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE424 Thesis

Special research on an approved subject that, usually, includes statistical analyses and results interpretation. This thesis will be examined by a committee constituted for the purpose. (Taken only with permission of the Department).

Note(s): Requires permission of the Department. A required course for the students electing a BA Honours in Psychology Lab (/wk): Study (/wk):
Credit(s): 2

PSE426A/B 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.

Prerequisite: PSE/F236 and PSE/F214.
Exclusion: For students in Third or Fourth-Year Arts.
Note(s): Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 1
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.

Prerequisite: PSE301 and PSE312.
Note(s): For students in Third or Fourth Year
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE444A/B 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.

Prerequisite: PSE/F112 or PSE/F123B, PSE/F301A.
Note(s): Not offered every year. For students in Third or Fourth-Year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE450A/B 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; intrapersonal 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: PSE/F205 and PSE/F 214.
Note(s): Not offered every year. For students in Third or Fourth-Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE452A/B Advanced Research Methods in the Behavioural Sciences

This course provides detailed coverage of key concepts and practices related to conducting applied behavioural science research in an institutional setting. Four sections are presented. The first addresses the development and definition of a research proposal to ensure that research is based on sound theoretical and conceptual bases. The second involves the ethical and administrative considerations for data collection to ensure that research will generate valid, relevant results in accordance with ethical standards and institutional requirements. The third covers the collection, coding and statistical treatment of data with particular attention to maintaining confidentiality. The final section focuses on the interpretation and presentation of results with an emphasis on consideration of the differences between academic and organizational audiences.

Prerequisite: PSE/F352A/B.
Note(s): Available only to students electing a BA (Honours) in Psychology. Required Course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE454A/B Advanced Leadership

Also offered through the Division of Continuing Studies

The general objective of this course is to explore leadership theory and practice in depth, building on the concepts introduced in PSE301A, 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: Distance Learning computer system requirements

Prerequisite: PSE/F112 or PSE/F123B, PSE/F301A.
Note(s): A required course for students electing a BA in Psychology. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE462A/B 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.

Prerequisite: PSE/F112 or PSE/F123B, PSE/F214B, PSE/F301A.
Note(s): Not offered every year. For students in the Third or Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PSE464A/B Directed Studies in Military 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.

Prerequisite: PSE/F214A/B, PSE/F301A.
Note(s): For students in Third or Fourth Year. Lab (/wk): Study (/wk):
Credit(s): 1

PSE465A/B Directed Studies in Military Leadership

For students in Third or Fourth Year. 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.

Prerequisite: PSE/F214A/B and PSE/F301A. Lab (/wk): Study (/wk):
Credit(s): 1

PSE466A/B Directed Studies in Sociology of the Armed Forces

With permission of the department head, Specialized study on an approved subject in one of the areas studies in Sociology of the Armed Forces, 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.

Prerequisite: PSE/F214, PSE/F301A.
Note(s): For Students in 3rd and 4th year Lab (/wk): Study (/wk):
Credit(s): 1

Politics and Economics

PROGRAMME OBJECTIVES

Introduction

The primary purpose of the Politics 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 - economics and politics. 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 the doors of every graduate school will be opened to the best of these students.

Social scientists seek to understand and to analyse 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 judgements 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.

Political Science

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 the following fields of study:

The study 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 closely scrutinized. While POE328A and POE330B provide an overview of all aspects of Canadian politics, POE416A concentrates on defence and foreign affairs.

In POE316A students are introduced to the theory and practice of international relations, while in POE317B contemporary strategic studies are covered. This is followed by POE412 which focus on contemporary foreign and defence policies of the United States. POE460/POE462 deals with international conflict analysis from the political, economic, social and military perspectives. All aspects of terrorism are discussed in POE458, while POE413 analysis the nuclear issues.

Each country in the world has adopted a somewhat different system of government that reflects its particular history, development, culture, values and resources. The study of comparative politics examines the diversity of political systems and approaches. In POE320A and POE322B students are introduced to theories of comparative politics and their application. POE424A focuses on the theories of modernization and political development in the Third World, while POE426B involves case studies of selected countries.

Political theory studies the methods of inquiry of political analysis and considers the tenants of the political philosophers over the centuries. Every course in politics is founded on political theory, especially POE106, 312A, 314B, 328A, and POE418A and POE420B which deals with political "isms" (i.e. socialism, liberalism, capitalism, etc).

Modern governments are large organizations or bureaucracies faced with problems of leadership and authority, communication and accountability, policy formulation and delivery, and many others. How governments organize themselves to solve these problems is the study of public administration. In POE332A students study organization theory and its application to the practice of public administration in Canada. POE334B studies theories of public policy-making and their application in the federal government of Canada.

Geography courses survey the evolution of regions, geopolitical patterns and processes including disintegration of empires, geostrategic theories, spacial patterns, migration, demographics, and the ecological consequences of resource exploitation. In GOE202, students study basic concepts of political geography. Four major regions of the world are studied in GOE305A and GOE307B while GOE418B analyses different approaches to cultural and historical geography. Seminar courses address urban-economic and cultural geography of North America, geopolitical aspects of international law and maritime boundaries. The - Distinguished Speakers Series in Political Geography- addresses contemporary geopolitical issues.

Economics

Economics is a social science in that it studies social problems of choice from the scientific viewpoint, which means that it is built on a systematic explanation of problems of choice where resources to satisfy unlimited human wants are scarce. This systematic explanation involves both the formation of theories and the examination of data. Unlike the approach generally used by political scientists, economists commonly construct models of the economy using varying degrees of mathematical sophistication to depict particular features of the economy with which they are concerned.

Students are introduced to economics in the First Year course, ECE102- Introduction to Economics. This course which familiarizes students to the methods of economics is divided into 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 looks at the behaviour of the economy as a whole, in particular the behaviour of such aggregate measures as overall rates of unemployment, inflation, economic growth and the balance of trade. Separate courses taken by all students, ECE206A, ECE308B, ECE224A and ECE326B, concentrate on macroeconomics and microeconomics, respectively, in much greater depth with respect to both theory and policy issues.

In addition to the above courses in economics all student are required to take a one-term course in Statistical Analysis for Social Scientists. To complete the number of courses in economics required in the two senior years, students may select the appropriate number from the following courses:

- ECE300B - Money, Financial Institutions and Markets
- ECE312B - The Development of Economic Ideas
- ECE316A - Canadian Economic History
- ECE318B - International Economic Problems
- ECE320A - Industrial Organization
- ECE342B - Introduction to Econometrics
- ECE411A/B - Public Finance
- ECE417A/B - International Economics
- ECE424B - Economics of Defence
- ECE428B - Economics of National Security
- ECE442A - Economics of the Environment
- ECE448B - Cost Benefit Analysis
- ECE450A - Topics in Microeconomics
- ECE452B - Topics in Macroeconomics
- ECE492B - Directed Readings in Economics Seminar

Students who contemplate later on pursuing postgraduate degrees in economics are strongly urged to include the two courses in quantitative analysis in their undergraduate studies. They also are encouraged to take as many courses in economics as are allowed in the economics degree programme at the College.

Political Science Programme Requirements

General Information

Students successfully completing their First Year in Arts are eligible for entry into the programme leading to an Honours or Major Degree in 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 which are best suited to student interest.

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

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.

Minimum of 42 credits, 17 of them being mandatory

Minimum of 20 credits in Politics

Mandatory Courses:

- POE106: Canadian Civics and Society
- GOE202A/B: Introduction to Political Geography
- POE312A: Classical Political Philosophy
- POE314B: Modern Political Philosophy
- POE316A: Introduction to International Relations
- POE317B: Introduction to Contemporary Strategic Studies
- POE320A: Comparative Politics I (Theory and Method)
- POE322B: Comparative Politics II (Country Case Studies)

- POE328A: The Canadian Constitution, Federalism and Regionalism
- POE332A: Public Administration in Canada
- POE416A/B: Contemporary Canadian External Relations and Defence Policy

At least 8 other Politics credits of which 4 at the 400 level (in addition to POE416A/B).

Optional Courses

To take at least 5 credits amongst the following:

- POE330B: Canadian Political Parties and Public Opinion
- POE334B: Canadian Public Policy Making
- POE412B: Contemporary American Foreign & Defence Policy
- POE413: Nuclear Weapons & International Relations
- POE418A: Major Political Ideologies
- POE420B: Contemporary Political Ideologies
- POE422: International Conflict Analysis
- POE423A: Middle Eastern Issues
- POE424A: Theories of Modernization and Political Development
- POE426B: Selected Case Studies of Third World Countries
- POF428A: Théorie politique contemporaine
- POF430A/B: Théorie politique avancée
- POE450B: Space Policy
- POE458A: Post-Cold War Terrorism
- POE460A: Contemporary Analysis of International Conflicts
- POE462B: Current Strategic Issues
- POE488A/B: The Law of Armed Conflict
- Canadian Geography
- GOE305A: World Regional Geography: Europe and /or the Americas
- GOE307B: World Regional Geography: Asia and /or Africa
- GOE404B: Issues in Contemporary Geopolitics
- GOE418A/B: Approaches to Cultural and Historical Geography
- GOF420A/B: Fondements géopolitiques du droit international (french only)
- GOF422A/B: Géographie politique du Canada (french only
- GOE490: Directed Readings in Geography

Optional Cross-listed Courses

Maximum of 2 credits selected from amongst the following:

- ECE206A: Macroeconomic Theory and Policy I
- ECE208B: Macroeconomic Theory and Policy II
- ECE224A: Microeconomic Theory and Policy I
- ECE226B: Microeconomic Theory and Policy II
- ECE270A: Statistical Analysis for Social Science I
- ECE272B: Statistical Analysis for Social Science II
- ECE312B: The Development of Economic Ideas
- ECE316A: Canadian Economic History
- ECE411A/B: Public Finances
- PSE301A: Organisational Behaviour and Leadership (mandatory for all 3rd year students)
- BAE330A: Organizational Theory (optional because of PSE301A)
- HIE380: Peacekeeping & Peacemaking
- HIE406A: Canadian External Relations
- HIE408B: Canadian Defence Policy
- HIE417: US Foreign Policy
- HIF432: Histoire diplomatique et militaire de l'Amérique latine (french only)

Major

Requires 40 credits.

16 credits in Politics, the following of which are mandatory courses:

Mandatory Courses

- POE106: Canadian Civics and Society
- GOE202A/B: Introduction to Political Geography
- POE312A: Classical Political Philosophy
- POE314B: Modern Political Philosophy
- POE316A: Introduction to International Relations
- POE320A: Comparative Politics I
- POE328A: The Canadian Constitution, Federalism and Regionalism
- POE416A/B: Contemporary Canadian External Relations and Defence Policy

Optional Courses

Minimum of 8 other Politics credits of which 4 should be at the 400 level.

- POE317B: Introduction to Contemporary Strategic Studies
- POE322B: Comparative Politics II (Country Case Studies)
- POE330B: Canadian Political Parties and Public Opinion
- POE332A: Public Administration in Canada
- POE334B: Canadian Public Policy Making, Theory and Practice
- POE412B: Contemporary American Foreign and Defence Policy

POE413A: Nuclear Weapons and International Relations

- POE418A: Major Political Ideologies
- POE420B: Contemporary Political Ideologies
- POE423A: Middle Eastern Issues/Problèmes du Moyen-Orient
- POE424A: Theories of Modernization and Political Development
- POE426B: Selected Case Studies of Third World Countries
- POF428A: Théorie politique contemporaine (french only)

- POF430B: Théorie politique avancée (french only)
- POE450B: Space Policy
- POE458A: Post-Cold War Terrorism
- POF460A: Analysis of Contemporary Strategy and Conflict (french only)
- POF462B: Actualité stratégique (french only)
- POE488A/B: The Law of Armed Conflict
- POE490: Directed Readings

Minor

All students may take a Minor in Political Science. The requirements for the Minor are 8 credits in the discipline.

The First Year course in Political Science POE106 can count toward the Minor.

Students choosing to minor in Political Science must maintain a minimum of a B- average in their three best courses of the Minor.

Economics Programme Requirements

General Information

Students successfully completing their First Year in Arts are eligible for entry into the programme leading to an Honours or Major Degree in 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 which are best suited to student interest.

Programme Outline Tables

The tables listed below outline the Arts Programme, by year.

First Year	Table A1
Second Year	Table A2
Third Year	Table A3
Fourth Year	Table A4
Science Requirements for Arts	Table A8

Honours

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.

Requires 42 credits

Minimum of 20 credits in Economics:

Mandatory Courses

- MAE108B: Elements of Differential Calculus
- MAE208A: Elements of Integral Calculus (Linear Algebra)
- ECE102: Elements of Economics
- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I
- ECE270A: Statistical analysis for Social Scientists I
- ECE308B: Macroeconomic Theory and Policy II
- ECE326B: Microeconomics II
- ECE342B: Introduction to Econometrics
- ECE424B: The Economics of Defence

One of the following two:

- ECE454A/B: Topics in Microeconomic Analysis
- ECE456A/B: Topics in Macroeconomic Analysis

Optional Courses

A minimum of 6 credits, from the following:

- ECE300A/B: Money, Financial Institutions and Markets
- ECE312A/B: The Development of Economic Ideas
- ECE316A/B: Canadian Economic History
- ECE318B: International Economic Problems
- ECE320A/B: Industrial Organization
- ECE411: Public Finances
- ECE417: International Economics
- ECE428A/B: Economics of National Security
- ECE444A: Economics of the Environment
- ECE448B: Cost Benefit Analysis
- ECE490: Direct Reading in Economics / Études dirigées en économie

A maximum of 1 credit chosen from the following:

- BAE300B: Finance
- BAE342A: Quantitative Methods II
- BAE430B: Labour Relations and Topics in Human Resources Management
- POE332A/B: Public Administration in Canada.

Any other course approved by the Department

Joint Honours Degree

For details see the Business Administration Department or follow this link:

Joint Economics and Business Administration Honours Degree

Major

Requires 40 credits

Minimum 16 credits in Economics

Mandatory Courses (11 credits)

- MAE108B: Elements of Differential Calculus
- MAE208A: Elements of Integral Calculus (Linear Algebra)
- ECE102: Elements of Economics
- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I
- ECE270A: Statistical analysis for Social Scientists I

One of the following two:

- ECE308B: Macroeconomic Theory and Policy II
- ECE326B: Microeconomics II

And one of the following two:

- ECE454A/B: Topics in Microeconomic Analysis
- ECE456A/B: Topics in Macroeconomic Analysis

Plus:

- ECE424B: The Economics of Defence
- ECE492B: Economics Seminars

Any other course approved by the department

Optional Courses

Minimum of 4 credits from the following:

- ECE300A/B: Money; Financial Institutions and Markets
- ECE312A/B: The Development of Economic Ideas
- ECE316A/B: Canadian Economic History
- ECE318A/B: International Economic Problems
- ECE320A/B: Industrial Organization
- ECE342A/B Introduction to Econometrics
- ECE411: Public Finances
- ECE417: International Economics
- ECE442A: Economics of the Environment
- ECE448B: Cost Benefit Analysis
- ECE490: Direct Readings in Economics

Maximum of one credit from the following

- BAE300B: Finance
- BAE342A: Quantitative Methods II
- BAE430B: Labour Relations and Topics in Human Resources Management
- POE332A/B: Public Administration in Canada

Any other course approved by the Department

Double Major

Minimum of 16 credits in Economics. The 16 credits are the same as per a Major. The requirements of the other Major to be defined by the department.

Minor

All students may take a Minor in Economics. The requirements for the Minor are 8 courses in the discipline. The First Year course 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

- ECE102: Elements of Economics
- ECE206A: Macroeconomic Theory and Policy I
- ECE224A: Microeconomics I
- ECE270A: Statistical analysis for Social Scientists I

At least one of:

- ECE308B: Macroeconomic Theory and Policy II
- ECE326B: Microeconomics II

Optional Courses

- 2 Other credits in Economics at the 300-400 level.

100 COURSES

ECE102 Introduction to Economics

This course is designed as an introduction to the fundamental building blocks of economic 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

public policies, 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. National income accounting and the terminology used in macroeconomics are presented together with actual data for the Canadian Economy. The way in which fiscal and monetary policies can be implemented and their potential effects on the macro economy are discussed.

Note(s): For students of the First Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

ECE103 Elements of Microeconomics

Only offered through the Division of Continuing Studies

This course is an introduction to the methods of economics, the central problems of every economic society, the elements of supply and demand, the functions of the price system, the theory of production, and the firm.

Note: Distance Learning computer system requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

ECE104 Elements of Macroeconomics

Only offered through the Division of Continuing Studies

This course is an introduction to Macroeconomics: national income accounting and the terminology used in macroeconomics are presented together with actual data from the Canadian economy. The way in which fiscal and monetary policies can be implemented and their potential effects on the macroeconomy are also discussed.

Note: Distance Learning computer system requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

POE103 Maritime Political Geography

Only offered through the Division of Continuing Studies

This course provides an introduction to the field of maritime political geography and deals with maritime affairs from the perspective of the international law of the sea and the practice of states. It introduces students to the oceanic geographical environment, looks at the historical relationship between humanity and the sea, examines the important issues of the property of marine resources and maritime spaces, and presents the United Nations Convention on the Law of the Sea. Further topics that are explored include the contemporary territorialisation of maritime spaces, resources and environment management, the specific issues of geographically disadvantaged and land-locked states, the concept of "maritime region," and maritime conflicts. An introduction to naval applications in a Canadian maritime context permits studies of specific issues in relation to national security.

Note: Distance Learning computer system requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

POE106 Canadian Politics and Society

An introduction to the main trends of political thought, the elements of political analysis, and the concepts used in the study of political science as found in Canada.

Note: Students who have successfully taken POE106 or an equivalent may not take POE205 or POE206 for credit.

Note(s): Core Course for students of the First Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

200 COURSES

ECE206A 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: ECE/F102(A+B) or ECE/F103 or ECE/F104.
Note(s): For students of the Second and Third Year taking Arts and other students with the permission of the Department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE224A 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: ECE/F102(A) or ECE/F103.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE242A 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: MAE/F106 or MAE/F108.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE205 Canadian Civics and Society

An introduction to the main trends of political thought, the elements of political analysis, and the concepts used in the study of political science as found in Canada.

Note: Students who have successfully taken POE205 or an equivalent may not take POE106 or POE206 for credit.

Note(s): Core course for students in Engineering and Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

POE206 The Canadian Forces and Modern Society: Civics, Politics and International Relations

Only offered through the Division of Continuing Studies

This course addresses Canadian government and politics within a global context, discusses the impact of political culture and socialization on understandings of the nature of politics, examines the changing role of the nation-state in the context of regional integration and globalization, assesses the nature and accountability of government processes and institutions, and considers the effectiveness of institutions linking state and society. The course also examines the influence of changes within Canadian society and within the international system on the organization and operation of the Canadian military.

Note: Distance Learning computer system requirements

Exclusion: Students who have successfully taken POE206 or an equivalent may not take POE106 or POE205 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

POE210 Introduction to Peacekeeping

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

POE289 Sociopolitical Analysis of Science and Technology

This course examines the complex relationship between science and society and undertakes a sociopolitical

analysis of the process through which scientific knowledge is constructed. Moreover, instead of seeing science and technology as distant specialized fields, the course aims to increase student's awareness of how our everyday lives are shaped and transformed by our scientific and technological environment. In doing so, it helps students to reflect on the extent to which this scientific and technological environment is an autonomous system or subject to conscious human control. Students are also encouraged to think about the relations of power and the systems of value and meaning embedded in the technological systems with which we interact.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE202A/B Introduction to Political Geography

Also offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Note(s): Mandatory course for Second Year students in Political Science, open to students in Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

300 COURSES

ECE300A/B 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: ECE/F102 (A+B) or a combination of ECE/F104 and ECE/F206 or with the permission of the Department.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE308B 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: ECE/F206.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE312A/B 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: ECE/F206 and ECE/F224 or with the permission of the Department.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE316A/B Canadian Economic History

For students of the Second, Third or Fourth Year taking Arts. The development of the Canadian economy with special reference to capital, population, and technology, in the light of modern growth theories.

Prerequisite: ECE/F102 or a combination of ECE/F103

and ECE/F104.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE318A/B International Economic Problems

This course studies the economic conjuncture of the international economy and its principal regions. The post-war period is analyzed in order to provide the historical prospect for the contemporaneous economic activities and the driving force behind the economic growth, the inequalities among countries and economic instabilities.

The course examines some questions of international scale following the concerns and the debates that they cause. For example, these last years, the course proposed the analysis of international instabilities due to the displacement of the centre of gravity of the international economy towards the Eastern economies as well as the study of the consequences of the cycle of trade negotiations of

Prerequisite: A combination of ECE/F206 and ECE/F224 or with the permission of the Department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE320A/B 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: ECE/F224.
Note(s): For students of the Third and Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE326B 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: ECE/F224.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE342B Introduction to Econometrics

This course follows ECE/F242A. 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: ECE/F242A or AAF242A.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE312A Classical Political Philosophy

For students of the Second, Third or Fourth Year taking Arts. This course is a critical examination of the major political theorists ascribed to Classical Political Philosophy. The works studied include Thucydides' Peloponnesian War, Xenophon's Memorabilia, Plato's Republic, Aristotle's Politics, Machiavelli's The Prince and Discorsi.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE314B Modern Political Philosophy

A sequel to POE312A. It is strongly recommended that it be taken before POE314B, but it is not required. This course is a critical examination of the main works of the major political theorists ascribed to Modern Political Philosophy. The works studied include 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 On the Genealogy of Morals.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE316A Introduction to International Relations

Also offered through the Division of Continuing Studies

This course is designed to introduce students to the field of international relations. It will permit students to understand the basic concepts in the field needed to analyse developments in international politics. At the same time, the main analytical approaches in the discipline will be offered in such a way that students will be able to evaluate various approaches and to assess their utility in explaining events, processes and institutions in international politics. Concepts of security will be addressed.

Note: Distance Learning computer system requirements

Exclusion: Contact hours for Distance Learning: 0-0-9
Note(s): For students of the Second, Third or Fourth Year, taking Arts. A core course for all students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE317B 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.

Prerequisite: POE/F106, POE/F316 or equivalent.
Note(s): For students in Third and Fourth Year in Arts. Mandatory for student's in Political Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE319 Terrorism: Theories and Strategies

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Prerequisite: POE316 or equivalent.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

POE320A Comparative Politics I (Theory and Method)

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.

Prerequisite: POE/F106 or equivalent.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE322B Comparative Politics II (Country Case Studies)

Building upon the first semester course POE320A which reviewed the many theoretical frameworks available for analysis in comparative politics, the winter semester course utilizes a country by country case study approach. Amongst the countries to be covered in depth are the United States, the United Kingdom, Russia (the former Soviet Union), Canada and Mexico.

Prerequisite: POE320A.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE324A/B 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.

Prerequisite: POE316 (May be taken concurrently).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE328A The Canadian Constitution, Federalism and Regionalism

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.

Prerequisite: POE/F106 or equivalent.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE330B 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: POE/F106 or equivalent.
Note(s): For students of the Second, Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE332A/B Public Administration in Canada

A study of organization theory and its application to the practice of public administration in the Canadian bureaucracy and government.

Prerequisite: POE/F106 or equivalent.
Note(s): For students of the Third of Fourth year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE334B Canadian Public Policy-Making, Theory and Practice

A study of many theories of public policy and their application in the federal government of Canada. The consequences of the choice of these theories on the public policies is also analyzed.

Note(s): For students of the Third or Fourth year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE302A/B 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.

Note(s): For students in Second, Third, and Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE305A 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.

Note(s): For students in Second, Third, and Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE307B 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.

Note(s): For students in Second, Third, and Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

ECE411A/B 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, healthcare, security and infrastructure. Finally, fiscal federalism is analyzed.

Prerequisite: ECE/F224A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE417A/B 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: ECE/F206A or ECE/F224.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE424A/B Economics of Defence

This course in security covers the economics of the defence 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, defence 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), defence industrial base, personnel (recruitment and retention) and leadership.

Prerequisite: ECE/F206 and ECE/F224 or with the permission of the Department.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE428A/B 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: ECE/F206A or ECE/ECF224A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE444A 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: ECE/F102.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE448B 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: ECE/F224.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE454A/B 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, noncooperative, evolutionary, behavioural), economics of information, welfare economics, public choice and political economy.

Prerequisite: ECE/F326B.
Note(s): For students of the Third and Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 generation's models and endogenous growth nodels. 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: ECE/F308B.
Note(s): For students of the Third and Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

ECE490 Directed Readings in Economics

Note(s): For students of the Fourth Year taking Arts, with the permission of the head of the Department.
Lecture (/wk): 1 Lab (/wk): 0 Study (/wk): 9
Credit(s): 2

ECE492B 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: ECE/F308B or ECE/F326B.
Note(s): For students of the Fourth Year taking Arts
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE410 Advanced studies in the Evolution and Theory of International Peacekeeping

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.

Prerequisite: POE/F316 or equivalent.
Exclusion: Students who have successfully completed HIE380 may not take POE410 for credit.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

POE412A/B Contemporary American Foreign and Defence 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: POE/F316 or equivalent.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE413A Nuclear Weapons & International Relations

Course available in English only

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

Prerequisite: POE/F317 or equivalent.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE416A/B Contemporary Canadian External Relations and Defence Policy

Also offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements

Prerequisite: POE/F316 or equivalent.
Note(s): For students of the Third or Fourth Year taking Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE418A Major Political Ideologies

This course will focus upon the major political ideologies and belief systems. The class will discuss in-depth the major classic ideologies of the nineteenth and twentieth centuries, commencing with the oldest two, conservatism and liberalism, and then proceeding to include socialism, communism, nationalism, fascism and anarchism. Emphasis throughout the course will be on reading materials from spokespersons of each doctrine. Amongst the authors to be discussed are Burke, Locke, Mill, Marx, Lenin, Mao Tse-tung, Hitler, Mussolini, Tolstoy and Gandhi. The political dialogue amongst the various ideologues is a basis for understanding the different political systems of the world and conflict in the modern era. This course is an ideal background to taking POE420B.

Prerequisite: POE/F106 or equivalent.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE420B Contemporary Political Ideologies

Building upon the fall semester course on major classical ideologies (POE418A), this course will focus on

contemporary doctrines and ideologies advocated during the second half of the twentieth century. These will involve recent variants of the seven classic ideologies and will include the New Left, neo-conservatism, neo-liberalism, neo fascism, contemporary nationalism, feminism, environmentalism and the future of ideology. Emphasis throughout the course will be on reading materials from spokespersons of each doctrine. The political debate and dialogue amongst the various ideologues are a basis for understanding the different political systems of the world and conflict in the modern era.

Prerequisite: POE418A.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE423A Middle-Eastern Issues

The course will study major trends in the political history of the Middle East, its people and Empires. Included are ethnic groups; religions and ideologies; religious and secular nationalism, colonialism, imperialism and national liberation movements; unfinished creation of modern States; political and economic development; water, oil and natural resources; civil society, social forces and agents of change; revolution, coup, conflicts and transfer of arms. This is an alternate to POE426. It is recommended that students take POE424 before or concurrently.

Prerequisite: POE320 and POE322.
Note(s): For students of the Third and Fourth year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE424A Modernization and Political 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. It is expected that this course will be followed by case studies in POE426 or POE423.

Prerequisite: POE320 and POE322.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE426B Selected Case Studies of Third World Countries

The course will draw upon the first semester course POE424A which provided an introduction to theories of modernization and political development. The winter term course will focus on regional and country case studies from the third world. It is expected that the countries studied in depth will vary to some degree from one year to the next. Amongst the countries usually to be studied in detail may be: China, India, Indonesia, Iran, Turkey, Egypt, Nigeria, South Africa, Argentina, Brazil, Mexico and Cuba.

Prerequisite: POE320, POE322.
Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POF428A/B Théorie politique contemporaine

Available in "French Only"

Designed as the sequel to POF312A and POF314B - Philosophie politique classique et moderne (Classical and Modern Political Philosophy) - , this course offers an introduction to the main issues currently in the discussion in the field of political theory. To this end, an approach that blends the introduction to some of the most influential authors (M. Weber, C. Schmitt, R. Aron, F. A. von Hayek, H. Arendt, L. Strauss, C. Lefort, J. Habermas, J. Rawls, C. Taylor) with a discussion of the main currents in 20th Century political theory (liberalism vs. communitarianism, positivism vs. normativism etc.) will be adopted.

Prerequisite: POE/F312, POE/F314.
Note(s): For students in Third and Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POF430A/B Théorie politique avancée

Available in "French Only"

Designed as a sequel to POF428A. Though it is not required, it is strongly recommended that students take this course before taking POF430B. In this course a thematic approach is taken. The major contributions to the problems and issues which are currently uppermost in

the discussion in political theory are reviewed, for instance: globalization, nationalism, multiculturalism, democracy, legality and legitimacy, identity, citizenship, feminism, the social problem etc.

Prerequisite: POE/F312, POE/F314.
Note(s): For students in Third and Fourth Year Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Prerequisite: Normally a designated 300 level politics course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Prerequisite: Normally a designated 300 level politics course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Prerequisite: Normally a designated 300 level politics course.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Prerequisite: POE/F312 or POE/F314.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Prerequisite: POE/F332 or POE/F334.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE458A/B Post Cold War Terrorism

Post Cold War Terrorism is a course designed to acquaint students with the phenomenon of terrorism and to provide a broad understanding of why terrorism exists in the contemporary international system. Students will consider among other topics, the philosophy of terrorism, the political context of terrorism and the technology of terrorism.

Prerequisite: POE/F316, POE/F317.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE460A 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: POE316, POE/F317.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE462B Current Strategic Issues

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: POE/F316, POE/F317, POE/F460.
Note(s): For Third and Fourth Year students taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE486B Air and Space Law

Only offered through the Division of Continuing Studies

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.

Note: Distance Learning computer system requirements

Note(s): For students of the Fourth Year taking Arts.
Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE488A/B The Law of Armed Conflict

Also offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements

Exclusion: Contact hours for Distance Learning: 0-0-9
Note(s): This course may count as a Military Arts credit within the BMASc programme. For students of the Fourth Year taking Arts or Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

POE490 Directed Readings in Politics

For students of the Fourth Year taking Arts, with permission of the head of the Department.

Prerequisites: At least a B average and completion of or enrolment in all required 300 level politics courses (312, 314, 316, 317, 320, 322, 328, 332)

Lecture (/wk): 1 Lab (/wk): 0 Study (/wk): 9
Credit(s): 2

GOE404B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE418A/B 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.

Note(s): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOF420A/B Fondements géopolitiques du droit international

Available in "French Only".

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): For students of the Third or Fourth Year taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOF422A/B Géographie politique du Canada

Available in "French Only"

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.

Prerequisite: GOF304A or GOF306B.
Note(s): For Third and Fourth Year students taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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 homepage for further details.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

GOE472A/B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

GOE490 Directed Readings in Geography

For students of the Fourth Year taking Arts, with the permission of the head of the Department.

Lecture (/wk): 1 Lab (/wk): 0 Study (/wk): 9
Credit(s): 2

Language Centre

General Information

Aim

As stated under "Second Language Training" in the general information section of this calendar where the policy concerning second language training is explained, all students who do not achieve the "exemption" level of bilingualism on initial testing are required to take second language training.

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, usually composed of eight 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 visual aids, including video recordings. Classroom activities are designed to promote a high level of participation by the student. Students who have not reached the "exemption" level by the end of their second year take an intensive summer course of 250 hours.

Students who have not reached the "exemption" level are tested at the end of each academic year and the summer course to determine whether they have achieved a satisfactory rate of progress and to indicate their actual level.

Teaching Staff

Language Centre Director

Lieutenant-Colonel J.E.J. LORD, CD, plsc, pcsc, BSc (CMR), MSc (Cranfield) - Assistant Professor of Chemistry and Chemical Engineering

Senior Teachers

E. Bédrossian - BA, MA (Ottawa)

G. Toussaint - BASpéc(Soc), BA (Esp) (Ottawa), Cert Ant (Haiti)

Language Teachers

S.E. Abbott - BComm, DipEd , DEF, DSEF (Paris), DDMA (McGill), BA, MA (Waterloo), MA (RMC), MTS (Queen's), ThD,

R.L.G. Charette - BA, BEd (Ottawa), MEd (Queen's)

D. Cléroux - BA (Queen's)

R. Cormier - BA (Concordia), B.En. (UQAM), MEd (Montreal)

T. Kang - Bac (Avesne), BA (Lille)

E. Labonté - BA (Queen's)

D. Lauzon.

R. Paquet - BA, MA (Laval) - .

J. Roux - BA, Spéc (Lettres) (Algiers), LèsL (Montreal)

M. Séguin - BA (Concordia) - .

N. Shirinian - BA (Carleton), BEd (Toronto), MA (Queen's)

L. Trahan - BA SpecL (Montreal)

E. Ward - LèsL (Damas), MA (Queen's)

Resource Coordinator

K. Doyle - BA (WLU), BEd (Toronto)

FACULTY OF SCIENCE

TEACHING STAFF

The Dean of Science

S. Ranganathan, ndc, BSc, MSc, MTech, PhD

Mathematics and Computer Science

Head of the Department

Associate Professor - G.E. Simons, BMath, MSc, PhD

Associate Head of the Department

Assistant Professor - A. Gosselin, CD, cmr, BSc, MSc, PhD

Professor Emeritus

A.J. Barrett, CD, rmc, BSc, MSc, PhD

R. Benesch, BSc, MSc, PhD

R. Gervais, ndc, BA, BSc, MSc, PhD

S.D. Jog, BSc, MSc, MSc, PhD

M. A. Labbé, BSc, MSc, PhD

Professor

M.L. Chaudhry, BA, MA, PhD

B.J. Fugère, BSc, MSc, PhD - Vice Principal (Research), Dean of Graduate Studies and Research

R. Godard, Lic ès Sci, Dr 3rd Cycle, PhD

P. Gravel, ndc, BMath, MMath, PhD

L.E. Haddad, Lic ès Sci, MSc, PhD

R.E. Johnson, BSc, MS, PhD

G. Labonté, BSc, MS, PhD

R.M. Shoucri, BSc, MSc, MSc, PhD, PEng

D.L. Wehlau, BSc, MA, PhD

Professor (Adjunct)

M. Krajecki, PhD

L.E. Magee, BSc, MA, PhD

D.B. Skillicorn, BSc, PhD

R. Tremblay, BSc, PhD

Associate Professor

G.S. Knight, CD, rmc, BEng, MEng, PhD, PEng (cross-appointed from Electrical & Computer Engineering)

Y. Liang, BSc, MSc, PhD

S. Mainville, PhD (cross-appointed from CMR St-Jean)

C. Tardif, BSc, MSc, PhD

Associate Professor (Adjunct)

B. Antliff, BSc, MA, PhD

Assistant Professor

P. Baille, Lic ès Sci, Dr 3rd Cycle, PhD

Major L. Cordeau, CD, rmc, BEng, MSc(Eng)

D. Kelly, BSc, BEd, MEng, PhD

L. Massey, BSc, MSc, PhD

B.G. Ong, BSc, SM, PhD, PEng

D. Rinfret, BMath, PhD

Assistant Professor (Adjunct)

G. Fusina, BASc, PhD

F. Jetzer (CMR St-Jean)

D. Lavigne (CMR St-Jean)

R. Saad (CMR St-Jean)

C. Selkirk, BEng, MEng, PhD, PEng

Physics

Head of the Department

Professor - T.J. Racey, BSc, BEd, MSc, PhD

Professor Emeritus

D.C. Baird, BSc, PhD

M.H. Edwards, ndc, BA, MA, PhD

R. Favreau, BSc, MSc, PhD

N. Gauthier, BA, BSc, MSc, PhD

R.F. Harris-Lowe, rmc, BSc, PhD

R.F. Marsden, rmc, BSc, PhD

S.L. McBride, BSc, PhD

B.K. Mukherjee, BSc, PhD

S. Ranganathan, ndc, BSc, MSc, MTech, PhD - Dean of The Faculty of Science

D.H. Rogers, BSc, MSc, PhD

P.J. Schurer, BSc, MSc, PhD

D.E. Tilley, BSc, PhD

R.R. Turkington, BSc, MSc, PhD

L.S. Wright, BSc, MAT, PhD

Professor

J.R. Buckley, BSc, PhD

T. Krause, BSc, MSc, PhD

A.R. Lachaîne, BSc, MSc, PhD

P.L. Rochon, BSc, PhD, PEng

M.W. Stacey, BSc, PhD

G. Akhras, DipIng, MScA, PhD, PEng, FCSCE, FASCE, FEIC - (cross appointed from Civil Engineering)

Professor (Adjunct)

J.J. Grodski, BASc, MSc, PEng, PhD

J.K.E. Tunaley, BSc, PhD

Associate Professor

Captain A. Mac Giolla Chainnigh, CD, rmc, BEng, MSc, PhD

J-M.A. Noël, BSc, MSc, PhD - Director of the Centre of Space Research

G. Wade, BSc, MSc, PhD

D. McGaughey, BSc, MSc, PEng, PhD - (cross appointed from Electrical and Computer Engineering)

Associate Professor (Adjunct)

A. Crawford, BSc, MSc, PhD

J.R. Gosselin, BScA, PhD

R. Zee, BASc, MASc, PhD

Assistant Professor

Major M. Labrecque, BSc, MSc

L. Levesque, BSc, MSc, PhD

Captain G. Sabat, BSc, MSc

J. Shore, BMath, PhD

K. Spekkens, BSc, MSc, PhD

Captain R. Vincent, BSc, MSc, PhD

Assistant Professor (Adjunct)

Lieutenant Commander (Ret'd) D. Burrell, CD, BSc, MSc, PhD

Captain (Ret'd) S. Dubois, rmc, BEng, MASc, PhD

Lieutenant-Colonel (Ret'd) P.W. Somers, BSc, MSc

Research Associate

V. Babbar, PhD, PEng

P. Chandra, BSc, MSc, PhD

A. Russell, BSc, MSc, PhD

Y. Shao, PhD

Research Assistant

J. Grunhut, BSc, MSc

A. Rogers, BSc

J. Silvester, BSc, MSc

Chemistry and Chemical Engineering

Head of the Department

Professor - K.A.M. Creber, BSc, MSc, PhD

Professor Emeritus

J.C. Amphlett, BSc, PhD

M.J.B. Evans, BSc, PhD, CChem, FRSC

J.P. Laplante, BSc, MSc, PhD

R.F. Mann, rmc, BSc, MSc, PhD, FCIC, PEng

R.H. Pottier, BSc, PhD, CChem

Professor

W.S. Andrews, CD, rmc, BEng, MEng, PhD, PEng

P. Bates, BSc, MEng, PhD, PEng - Associate Head and Canada Research Chair

L.G.I. Bennett, CD, rmc, BEng, MASc, PhD, PEng

H.W. Bonin, BA, BSc, BScA, MIng, PhD, ing, PEng, FCIC, FCNS

V.T. Bui, BScA, MScA, PhD, ing

B.J. Lewis, BSc, MEng, PhD, PEng - Canada Research Chair

K.J. Reimer, BSc, MSc, PhD, FCIC

P.R. Roberge, BA, BSc, MChA, PhD, PEng - Associate Dean of Continuing Studies

W.T. Thompson, BASc, MASc, PhD, PEng

G.M. Torrie, BSc, MSc, PhD

R.D. Weir, CD, BSc, DIC, PhD, FCIC, FEIC, FIUPAC, FRSC, CChem, PEng

Professor (Adjunct)

W.R. Cullen, MSc, PhD

Associate Professor

J.Y.S.D. Pagé, CD, rmc, BEng, MEng, PEng, PhD

B.A. Zeeb, BSc, PhD - Canada Research Chair

Associate Professor (Adjunct)

Colonel W.J. Lewis, CD, rmc, BEng, MBA, MEng, BEd, MEd, PhD

E.J. Waller, BSc, MScE, PhD

D. Wilkinson, BSc, PhD

Assistant Professor

E. Corcoran, BSc, PhD

M. Greenwood, BSc, MSc, PhD

O. Lebel, BSc, PhD

G.L.P. Lord, BA, BSc, MSc, PhD

C. Malardier-Jugroot, BSc, PhD

J.L. Scott, BSc, PhD

C.P. Thurgood, BSc, MSc, PhD, PEng

Assistant Professor (Adjunct)

Lieutenant Commander C.J.P. Cole, CD, rmc, BEng, MSc, MEng, PhD

N. Cunningham, BEng, MSc, PhD

K.M. Jaansalu, CD, rmc, BEng, MEng, PhD

I. Koch, BSc, PhD

L. Knopper, BSc, MSc, PhD

T.E. Laing, BScH, PhD

C. Ollson, BSc, MSc, PhD

A. Rutter, BSc, MSc, PhD

J. Wojtyk, BSc, PhD

Lecturer

Captain P.C. Hungler, BEng, MASc, rmc

Captain K.D. Topping, BEng, MASc, rmc

Defence Scientist

Associate Professor (Adjunct) - E.F.G. Dickson, BSc, PhD

Assistant Professor (Adjunct) - D.G. Kelly, BSc, PhD

Director Slowpoke Facility

K. Nielsen, BSc, MSc

ESG Program Manager

D.A. Reimer, BScH

Radiation Safety Officer

D. Ferguson, Chem Eng Tech

Chemical Engineering Committee

Chair

P.J. Bates, BSc, MSc, PhD, PEng - Professor, Associate Head of the Department and Canada Research Chair

Members

B.J. Lewis, BSc, MEng, PhD, Eng - Professor and Canada Research Chair

Capitain K.D. Topping, BEng, MASc, rmc. - Lecturer

R.D. Weir, CD, BSc, DIC, PhD, FCIC, CChem, FRSC, PEng - Professor

The Chemical Engineering Committee is responsible to the Dean of Engineering for the curriculum of the Chemical Engineering programme, for its engineering accreditation, and for representing and protecting the interests of the students enrolled in the programme. It reports, through the Head of Department, to the Dean of Engineering.

DEPARTMENTS

Faculty of Science

The Faculty of Science has three (3) departments.

Mathematics and Computer Science

Physics

Chemistry and Chemical Engineering

Programme Outlines_By Year

SCIENCE - YR 1_TABLE S1

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
ENE100: Introduction to Literary Studies and University Writing Skills	2	3	-	3	6	3	-	3	6	
PSE123A: Fundamentals of Human Psychology	1	3	-	3	3	-	-	-	-	
Science Core Requirement (SCR)	8	9	6	15	10	15	8	23	15	**A**
SLEFR1:	-	-	6	6	2	-	6	6	2	
ATH101:	-	-	2	2	-	-	2	2	-	
PMT 100 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**11**	**15**	**16**	**31**	**21**	**18**	**18**	**36**	**23**	

Notes:

A. The basic first year Science Core Requirement (SCR) is eight (8) credits:

- CSE101B: Introduction to Algorithms and Computing (1 credit),
- MAE101: Introductory Calculus (2 credits),
- MAE129B: Introduction to Algebra (1 credit),
- CCE101: Introductory Chemistry (2 credits),
- PHE104: General Physics (2 credits).

Comments

Students must ensure that the first year courses selected meet the departmental prerequisite requirements for the proposed upper year major programme.

Students may select CCE240A to replace CCE101(2) for one (1) credit, with permission from the Dean of Science.

MAE119B may be substituted for MAE129B.

Students, who have completed first year science courses at other universities that have no equivalence in the above list, may have the course credited by the Dean of Science. The student must submit such requests through the college Prior Learning Assessment Review (PLAR) section.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

SCIENCE - YR 2_TABLE S2

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	3	
HIE207A: Canada	1	3	-	3	3	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
Science Courses: These numbers are approximate. For details on individual programmes (Honours, Major) and course descriptions see the entries under the respective Departments.	7	12	(?)	12(+)	12	9	(?)	9(+)	9	**A**
SLEFR2	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**10**	**15**	**9(+)**	**24(+)**	**17**	**15**	**9(+)**	**24**	**17**	

Notes:

A. Students should consult the yearly listing of courses offered provided by the Registrar's Office. Students wishing to obtain a minor must obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Science.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

SCIENCE - YR 3_TABLE S3

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A:Organizational Behaviour and Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	3	
Science and Elective Courses: These numbers are approximate. For details on individual programmes (Honours, Major) and course descriptions see the entries under the respective Departments.	9	15	(?)	15(+)	12	12	(?)	12(+)	12	**A**
SLEFR2	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**11**	**18**	**9(+)**	**27(+)**	**17**	**15**	**9(+)**	**24(+)**	**17**	

Notes:

A. Students should consult the yearly listing of courses offered provided by the Registrar's Office. Students wishing to obtain a minor must obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Science.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

SCIENCE - YR 4_TABLE S4

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B:Military Professionalism and Ethics	1	-	-	-	-	3	-	3	3	
POE316A:Introduction to International Relations	1	3	-	3	3	-	-	-	-	
Science and Elective Courses: These numbers are approximate. For details on individual programmes (Honours, Major) and course descriptions see the entries under the respective Departments.	8	12	(?)	12(+)	12	12	(?)	12(+)	12	**A**
SLEFR2	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**10**	**15**	**9(+)**	**24(+)**	**17**	**15**	**9(+)**	**24(+)**	**17**	

Notes:

A. Students should consult the yearly listing of courses offered provided by the Registrar's Office. Students wishing to obtain a minor must obtain the Department Head's approval for the minor. Extra courses are permitted but require the approval of the Dean of Science.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

Mathematics and Computer Science

PROGRAMMES OF STUDY

Programmes

The Department of Mathematics and Computer Science offers the following undergraduate degrees:

- Honours Mathematics
- Honours Computer Science
- Double Major in Mathematics and Computer Science
- Major in Mathematics
- Major in Computer Science

Double Majors with other Science disciplines are possible. Also, Combined Majors with Arts disciplines may be possible. Please consult one of the department's undergraduate advisors for details.

See the description of the Science degree programmes for general information about the degree requirements.

All degrees require 42 credits.

Honours and Major in Mathematics

ACADEMIC YEAR	1		2		3		4	
	Fall	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**
College Core Curriculum	ENE100		HIE207	HIE203	PSE301	HIE271	POE316	PSE401
	PSE123			POE205				
Mandatory and Programme Courses	PHE104 *							
	CCE101 *							
	MAE101 *		MAE222	MAE223	MAE305	*MAE406*		*one of* *MAE407* *MAE429* *MAE452*
		MAE129	MAE229	MAE209	*MAE340*	MAE329		
		CSE101 *			*One 300/400 level Computer Science credit*			*MAE420*
Mathematics Electives			MAE234		MAE334	MAE310	MAE413	MAE456
			MAE236			MAE333	MAE415	MAE451
						MAE352		
						MAE354		
						MAE374		

Notes

1. Major in Mathematics requires the courses shown **IN BOLD**, plus 5 credits from the Mathematics courses shown above.
2. Honours Mathematics requires the courses shown **IN BOLD**, the courses shown *in italics*, plus 5 credits from the Mathematics Electives shown above.
3. Mathematics Elective courses offered may vary from year to year and may not be given in the term shown.
4. With the permission of the Department, MAE222 can be replaced by MAE226 and MAE223 can be replaced by MAE227.
5. CCE101 may be replaced by CCE101(1) and CCE240.
6. * Science Core Requirements - See Table S1 for details.

Consult the Science degree programme description for additional requirements.

Honours and Major in Computer Science

ACADEMIC YEAR	1		2		3		4	
	Fall	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**
College Core Curriculum	ENE100		HIE207	HIE203	PSE301	HIE271	POE316	PSE401
	PSE123			POE205				
Mandatory and Programme Courses	PHE104 *							
	CCE101 *		**EEE245**		**EEE351**	**EEE321**		
		CSE101*	**CSE350**	*CSE390* §		**CSE321**	*CSE420*	
	MAE101*		*MAE222*	*MAE223*		**CSE341**	*EEE435* §	*CSE362* §
		MAE129*	*MAE229*	*MAE209* §		**MAE333**	*EEE466* §	*CSE472* §
Computer Science Electives			MAE234		MAE334	EEE307	CSE411	CSE451
					CSE301	EEE361	CSE444	CSE453
					CSE323		EEE459	CSE475
							EEE461	EEE431
							EEE469	EEE473
							EEE492	EEE499

Notes:

1. Major in Computer Science requires the courses shown **IN BOLD**, plus five credits:
   - 2 credits from the six courses marked §. One of these may be replaced by MAE229.
   - 3 additional credits from the combination of the six courses marked § and the elective courses shown.
2. Honours Computer Science requires the courses shown **IN BOLD** plus the courses shown *in italics*.
3. MAE222 can be replaced by MAE226 and MAE223 can be replaced by MAE227.
4. Computer Science Elective courses offered may vary from year to year and may not be given in the term shown.
5. CCE101 may be replaced by CCE101(1) and CCE240.
6. * = Science Core Requirements - See Table S1 for details.

Consult the Science degree programme description for additional requirements.

Double and Combined Majors

Double Major in Mathematics and Computer Science (42 credits)

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 (42 credits)

Double Majors in either Mathematics or Computer Science and one of Physics, Space Science, or Chemistry are possible. Course requirements for a Major in both disciplines must be met. See one of the department's undergraduate advisors for details.

Combined Major in Computer Science and Business Administration (42 credits)

Courses required by the Department of Mathematics and Computer Science

- MAE209B; EEE245A; CSE321A/B; EEE321B; MAE333B; CSE350A; CSE341B; EEE351A.

3 additional credits selected from the list of courses accepted for the Major in Computer Science.

In this programme, BAE410A/B is considered acceptable as a Computer Science course.

The courses required by the Department of Business Administration are all the courses in their Major in Administration except for BAE220A; BAE242A; and BAE450B; which are not required. The first term of ECE102 will be taken as a prerequisite to ECE224A/B.

Minors

Mathematics Minor

A minor in Mathematics is 8 credits including MAE101, MAE129, MAE229 and at least 3 credits from 300 or 400 level Mathematics courses (except MAE315 and MAE328).

Computer Science Minor

A minor in Computer Science is 8 credits from the list of courses acceptable for a Major or Honours Computer Science degree which has a CSE or EEE prefix. At least 5 of these credits must come from courses with the CSE prefix.

CORS Diploma

CORS - Canadian Operational Research Society

Together with their RMC diploma, students can obtain the Canadian Operational Research Society diploma if they fulfil the following conditions.

Successfully complete the following 8 credits:

- CSE101A; (MAE209B or BAE242A); MAE310A/B; BAE342A; BAE344B; CSE341B; CSE453A/B; (CSE472A/B or BAE410A).

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: http: //www.cors.ca.

100 COURSES

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 for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 2

MAE102 Introduction to Probability and Statistics

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Note(s): 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. It cannot be used for credit in support of a degree in Science or Engineering.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

MAE103A/B 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.

Exclusion: Contact hours for Distance Learning: 0-0-9
Note(s): For students who have not successfully completed a grade 12 or an equivalent university preparatory course in mathematics, in which case it is a prerequisite for MAE108. This course does not fulfill a core requirement for the BA or BMASc programme and may not count as a science credit in a science programme.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE106A Discrete Mathematics with Probability

Also offered through the Division of Continuing Studies

Elementary logic. Introduction to sets and operations on sets. Combinations and permutations. Discrete probability.

Note: Distance Learning computer system requirements

Note(s): For First Year students taking Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

MAE108B Elements of Differential Calculus

Also offered through the Division of Continuing Studies

Review of basic algebra including powers and logarithms. The real number system, open and closed intervals, solution of inequalities. Functions and their properties. Definition of the limit and continuity of a function at a point. Limits at infinity. The intermediate value theorem. Graphs of continuous and discontinuous functions. Exponential and logarithmic functions, their graphs, properties and applications. Definition of the derivative as a limit. The mean value theorem. Derivatives of sums, products and quotients of functions. Composite functions and the chain rule. Derivatives of second and higher order. Application of differential calculus to graph sketching, optimization problems, approximation of functions and marginal analysis.

Note: The Department reserves the right to administer a placement test to determine if students are adequately prepared to take this course.

Note: Distance Learning computer system requirements

Prerequisite: MAE103A or equivalent.
Note(s): For First Years taking Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE119B Linear Algebra for Engineers

Vectors in 2 and 3 dimensions. 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. Linear transformations. Dot products, orthogonality. Eigenvalues, eigenvectors, diagonalisation of matrices.

A second version of this course will be available (in English only) for students with a weaker background, in which there will be an additional lecture period. (Contact hours: 4 - 1 - 4)

Note(s): For First Year Students in Engineering
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE129B 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.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE131 Introductory Differential Calculus

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1

MAE133 Introductory Integral Calculus

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Prerequisite: MAE131 or equivalent.
Exclusion: Credit will not be given for both MAE133 and MAE101(2).
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1

CSE101A/B Introduction to Algorithms and Computing

Also offered through the Division of Continuing Studies

The subject of this course is the design, analysis and implementation of algorithms. It examines the relationship between problem solving and algorithms, the design of algorithms using pseudocode; sequence, selection and iteration; and abstraction (functions), and the correctness and efficiency of algorithms. Algorithms for tasks such as searching, sorting and pattern matching will be introduced and analyzed. Algorithms will be implemented in a high-level programming language as programs using appropriate data types, statements and methods. The use of compilers, interpreters and virtual machines in executing programs will be studied. An introduction to object-oriented programming, classes and objects will be given.

Note: Distance Learning computer system requirements

Note(s): For First Year students taking Engineering and Science. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

200 COURSES

MAE208A Elements of Integral Calculus and Linear Algebra

Also offered through the Division of Continuing Studies

Antiderivatives and indefinite integration. Rules of integration (substitution and integration by parts). Riemann sums, definite integrals and the Fundamental Theorem of Calculus. Numerical techniques for approximating definite integrals. Applications of definite integrals to problems in business and economics, and to the evaluation of probabilities and expected values. Improper integrals and their evaluation. Linear systems of equations and their solutions. Matrices and matrix operations. Matrix representation of linear systems and Gaussian elimination.

Note: Distance Learning computer system requirements

Prerequisite: MAE108B or equivalent.
Note(s): For Second Year students taking Arts. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE209A/B 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: MAE222A or MAE226A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

MAE222A Intermediate Calculus: Multivariable Functions

Vector-valued functions; curves. Functions of several variables; partial derivatives, Taylor's formula, extreme value problems. Vector fields, gradient, divergence, curl. Multiple integrals. Line and surface integrals. Green's, divergence and Stokes' theorems.

Prerequisite: MAE101, and MAE119B or MAE129B.
Note(s): For Second Year students in Science. Required for Honours Mathematics
Lecture (/wk): 4 Lab (/wk): 1 Study (/wk): 5
Credit(s): 1

MAE223B Intermediate Calculus: 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. Series of functions: uniform convergence, power series, Taylor polynomials and remainder, Taylor series and applications.

Prerequisite: MAE101.
Note(s): For Second Year students in Science. Required for Honours Mathematics
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE226A Engineering Calculus: Multivariable Functions

Vector-valued functions, curves. Functions of serveral variables. Partial derivatives. Extreme values. Scalar and vector fields. Gradient, divergence, curl. Line and surface integrals. Green's, divergence and Stokes' theorems.

Prerequisite: MAE101, and MAE119B or MAE129B.
Lecture (/wk): 4 Lab (/wk): 1 Study (/wk): 5
Credit(s): 1

MAE227B Engineering Calculus: 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: MAE101.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE229A/B 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.

Prerequisite: MAE129B or MAE119B.
Note(s): Mandatory in Mathematics programmes and for the Honours BSc in Computer Science.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE234A/B 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

MAE236A/B 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 equilbium, 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CSE260A/B Introduction to Computer Concepts

An elective course 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.

Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

300 COURSES

MAE305 Differential Equations, Fourier Analysis, Boundary Value Problems and Complex Variables

MAE305(1): Laplace Transforms, Fourier Analysis and Differential Equations

For Third Year Students taking Computer Engineering (refers to the Fall term of this course for 1 credit).

Fall Term

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.

Winter Term

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.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B.
Note(s): For Third Year Students taking Electrical Engineering or Science
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 2

MAE310A/B 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: MAE209A/B.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE315A 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.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B.
Note(s): For Third Year students taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

MAE328A 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.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B.
Note(s): For Third Year students taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MAE329A/B Group Theory

Groups, cyclic groups, subgroups and normal subgroups. Homomorphisms, quotient groups, isomorphism theorems and permutation groups. Sylow Theorems and applications to group theory.

Prerequisite: MAE229A/B.
Note(s): Mandatory in Mathematics programmes.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE331B 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: MAE305(1).
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

MAE333A/B 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.

Note(s): Mandatory in the Computer Science programmes.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE334A/B 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: CSE101B, MAE229A/B. MAE333A/B (also recommended).
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE340A/B Foundations of Probability

Probability; random variables and distributions; joint distributions; functions of random variables; conditional expectations; sequences of random variables; stochastic processes.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B, MAE209A/B.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE352A/B 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: MAE222A or MAE226A, MAE223B or MAE227B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

MAE354A/B 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: Having done two years at RMC or the equivalent in Mathematics and Computer Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

MAE374A/B 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: MAE222A or MAE226A, MAE223B or MAE227B, MAE229A/B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

CSE301A/B 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: MAE129B, MAE222A or MAE226A, MAE223B or MAE227B, CSE101B.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

CSE321A/B 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.

Prerequisite: CSE350A.
Note(s): Mandatory in the Computer Science programmes.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

CSE323A/B 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: CSE350A or permission of the department.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CSE341B 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.

Prerequisite: CSE101 and CSE350 or permission of the department.
Note(s): Mandatory in the Computer Science programmes.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CSE350A Data Structure and Algorithms

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.

Prerequisite: CSE101.
Note(s): Mandatory in the Computer Science programmes and for the Honours BSc in Mathematics. For Computer Science programmes, it should be taken in the 2nd year.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CSE362A/B 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.

Prerequisite: CSE350A.
Note(s): Mandatory for the Honours BSc in Computer Science.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CSE390A/B 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.

Prerequisite: CSE350A.
Note(s): Mandatory for the Honours BSc in Computer Science.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

400 COURSES

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: MAE222, MAE223, MAE229.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 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: MAE406.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE408A/B 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 optimisation; modern simulation techniques including Monte Carlo, pseudo-random number generation, and simplex applications; other advanced topics as appropriate.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B, CSE301A/B.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

MAE413A/B 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: MAE305.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

MAE415A/B Differential Geometry

Geometry is the basis for our present understanding of nature's fundamental laws at all scales from the very large (the whole Universe) to the very small (elementary particles). The goal of this course is to serve as an introduction to this unifying tool. The topics covered include: Review of the lagrangian formalism. Differentiable manifolds. Global and local groups of transformations and examples of their tensor representations. Fiber bundles. Connexions and curvatures. Metrics and metric connexions. Construction of lagrangians. Geodesics. Applications will correspond to the students' interest in topics in General Relativity (e.g. black holes and cosmic

strings) and models of fundamental particles. Examples and exercises will be given where the use of Maple's differential geometry tools is required.

Prerequisite: MAE129/MAE119, MAE222/MAE226.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
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.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 4
Credit(s): 2

MAE429A/B Rings and Fields

Rings, polynomial rings, homomorphisms. Euclidean and principal ideal domains. Unique factorization domains. Fields, extensions of fields, finite fields and applications.

Prerequisite: MAE329.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE451A/B 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: Permission of the instructor.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
Credit(s): 1

MAE452A/B 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: MAE340, MAE305(1).
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MAE456A/B 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: MAE305.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

CSE411A 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: CSE341B.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 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
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 4
Credit(s): 2

CSE444A/B 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.

Prerequisite: CSE350A.
Note(s): Each student must develop a project.
Lecture (/wk): 0 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CSE451A/B 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: Permission of the instructor.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
Credit(s): 1

CSE453A/B 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: CSE101B.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CSE472A/B 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.

Prerequisite: CSE350 or CSE321.
Note(s): Mandatory for the Honours BSc in Computer Science.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

CSE475A/B 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 perceptron, the adaline, the associative memories, error back-propagation, Kohonen's SOM, the radial basis functions networks, and many of their practical applications.

Prerequisite: MAE222A or MAE226A, MAE223B or MAE227B.
Note(s): This course includes two periods of laboratory per week. Students will use commercial software and will also write their own programs.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

Physics

PROGRAMMES OF STUDY

General Information

Physics and Space Science Programs are subject to the Faculty of Science regulations.

The Physics Department offers Honours Physics, Honours Space Science, Major in Physics, Major in Space Science and a Double Major in Physics and Space Science.

Other double Majors programs are possible. For details see the Undergraduate Advisor in the Physics Department.

The Honours and Major programs in Physics are shown in the Table along with optional courses which are selectively timetabled.

The Honours and Major programs in Space Science are shown in the Table along with optional courses which are selectively timetabled.

Honours or Major in Physics

Total credits required: 42 Credits

ACADEMIC YEAR	**1**		**2**		**3**		**4**	
	Fall	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**
CATEGORY								
College Core Curriculum	ENE100		HIE207	HIE203	PSE301	HIE271	POE316	PSE401
	PSE123			POE205				
Mandatory and Programme Courses		CSE101*			**MAE305(1)**	**PHE460**	*PHE420*	
	CCE101*		**MAE222 / MAE226**	**MAE223 / MAE227**	**PHE302**	**PHE305**	*2 senior physics credits*	*2 senior physics credits*
	MAE101*		**PHE205 (with Lab)**	**PHE217 (with Lab)**	**PHE304**	**PHE462**		
	PHE104*		**PHE225 (with Lab)**		**PHE332**			
		MAE129*						
Optional and Elective Courses (Normally taken in this Term, as available in Timetable)			CCE240	CCE242	PHE370	PHE307	PHE403	PHE413
			MAE229	MAE209	PHE352	PHE333	PHE412	PHE415
							PHE445	PHE442
							PHE452	PHE450
								PHE307
Typical Number of Credits in Term	**5**	**6**	**5**	**5**	**6**	**5**	**5**	**5**

Notes:

1. * = Science Core Requirements - See Table S1 for details

BOLD = Programme Requirements - Normally required for a Major: 16 credits.

ITALICS = Programme Requirements - Normally required for Honours in addition to Majors Programme (includes senior project): 22 Credits.

Optional and Elective Courses Normally Taken in This Term - some recommended optional and elective courses. Departmental approval is required.

Students enrolled in a Major normally take more optional/elective courses than those enrolled in Honours.

Honours or Major in Space Science

Total credits required: 42 Credits

ACADEMIC YEAR	1		2		3		4	
	Fall	Winter	Fall	Winter	Fall	Winter	Fall	Winter
CATEGORY								
College Core Curriculum	ENE100		HIE207	HIE203	PSE301	HIE271	POE316	PSE401
	PSE123			POE205				
Mandatory and Programme Courses		CSE101*			**MAE305(1)**	**PHE460**	*PHE448*	
	CCE101*		**MAE222 / MAE226**	**MAE223 / MAE227**	**PHE302**	**PHE350**	*PHE445*	*PHE450*
	MAE101*		**PHE205 (with Lab)**	**PHE217 (with Lab)**	**PHE354**	**1 senior Physics Credit**	*PHE452*	
	PHE104*		**PHE225 (with Lab)**		**PHE332**	*PHE462*		
		MAE129*						
Optional and Elective Courses (Normally taken in this Term, as available in Timetable)			CCE240	CCE242	PHE352	PHE307	PHE352	PHE442
			MAE229	MAE209	PHE370	PHE333	PHE412	PHE307
						PHE364		PHE364
Typical Number of Credits in Term	**5**	**6**	**5**	**5**	**6**	**5**	**5**	**5**

Notes:

1. * = Science Core Requirements - See Table S1 for details

BOLD = Programme Requirements - Normally required for a Major: 16 credits.

ITALICS = Programme Requirements - Normally required for Honours in addition to Majors Programme (includes senior project): 22 Credits.

Optional and Elective Courses Normally Taken in This Term - some recommended optional and elective courses. Departmental approval is required.

Students enrolled in a Major normally take more optional/elective courses than those enrolled in Honours.

Minors

Physics Minor

Students must complete PHE104, PHE205 and PHE217 and PHE225. Plus, 3 credits from the Physics Program at the 300, or 400 level.

Space Science Minor

Students must complete PHE104 and PHE205 and PHE217 and PHE225. Plus, 3 credits from the Space Science Program at the 300 or 400 level.

Double Majors

Double Majors programs may also be available in:

- Physics/Space Science
- Physics/Computer Science
- Physics/ Chemistry
- Physics/Mathematics
- Space Science/ Mathematics
- Space science/Computer Science
- Space Science/ Chemistry

Combined majors program may be available in:

- Space Science/Military and Strategic Studies

The Physics and the Joint department should be consulted for details.

Table of Co-Requisites / Prerequisites

Course	Co-Requisites	Prerequisites
PHE102 Elementary Physics		for students in Arts who have not taken senior High School physics credit
PHE104 General Physics	MAE101	
PHE205 Mechanics	MAE222 or MAE226	PHE104
PHE217 Electromagnetism		PHE104 and (MAE222 or MAE226)
PHE225 Modern Physics	MAE222 or MAE226	PHE104
PHE226 Modern Physics	MAE222 or MAE226	PHE104
PHE228 Electromagnetism (for electrical and computer engineering students)		PHE104 and MAE226
PHE302 Electromagnetic Waves	MAE305	PHE217 or PHE228
PHE304 Quantum Mechanics	MAE305	PHE225
PHE305 Classical Mechanics	MAE305	PHE205
PHE307 Optics		PHE302
PHE332 Instrumentation I		PHE217
PHE333 Instrumentation II		PHE332
PHE350 Orbital Mechanics		PHE104 and (MAE222 or MAE226)
PHE352 Astronomy	PHE104 and MAE101	
PHE354 Space Systems		PHE104
PHE360 Astronomy and the Evolving Universe (Arts elective)		PHE102 or equivalent
PHE364 Physics Laboratory		(PHE205 and PHE225) or PHE217
PHE370 Introductory Synoptic Oceanography		PHE102 or equivalent
PHE380 Physics of Armaments		PHE102 or equivalent
PHE390 Physics of Music		PHE102 or equivalent
PHE403 Solid State Physics	MAE305	PHE304
PHE412 Advanced Electromagnetic Theory	MAE305	PHE302
PHE413 Nuclear Physics	MAE305	PHE304
PHE415 Advanced Quantum Mechanics	MAE305	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	MAE305	PHE302
PHE460 Computational Physics		PHE302
PHE462 Statistical and Thermo Physics		PHE225
PHE470 Physical Oceanography		PHE104 and MAE305

100 COURSES

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.

Prerequisite: Only for Arts students who have not taken Senior High School Physics. Not for credit in Science program.
Note(s): For students taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

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.

Co-requisite: MAE101
Exclusion: PHE/F104(1) and PHE/F136 are equivalent courses. A student cannot receive credit for both PHE/F104(1) and PHE/F136. PHE/F104(2) and PHE/F131 are equivalent courses. A student cannot receive credit for both PHE/F104(2) and PHE/F131. The first year physics lab (which is taken as part of PHE/F104) and PHE/F135 are equivalent academic activities. A student cannot receive credit for both the "First year physics lab" and PHE/F135.
Note(s): For all students in the First Year of Science and Engineering.
Lecture (/wk): 3 Lab (/wk): 3 Study (/wk): 6
Credit(s): 2

PHE110 Elements of Electro-optics

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

PHE131 Mechanics

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements.

Exclusion: PHE/F104(2) and PHE/F131 are equivalent courses. A student cannot receive credit for both PHE/F104(2) and PHE/F131.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

PHE134 Elements of Physics

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Exclusion: Not for credit in Science program. Equivalent to PHE102. A student cannot receive credit for both PHE102 and PHE134.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

PHE135 Experimental Physics

Only offered through the Division of Continuing Studies

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.

Course only offered on-site in a two week time block. Contact Division of Continuing Studies for details.

Exclusion: Equivalent to first year laboratory in PHE104. A student cannot receive credit for both.
Note(s): For all students in the First Year of Science and Engineering.
Lecture (/wk): 0 Lab (/wk): 2 Study (/wk): 0
Credit(s): 0.5

PHE136 Optics and Electricity

Only offered through the Division of Continuing Studies

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 analysing 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: Distance Learning computer system requirements

Exclusion: PHE/F104(1) and PHE/F136 are equivalent courses. A student cannot receive credit for both PHE/F104(1) and PHE/F136.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

200 COURSES

PHE203 Introduction to Astronomy

Only offered through the Division of Continuing Studies

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: Distance Learning computer system requirements

Exclusion: Students cannot take this course and PHE360 (equivalent course) for credit.
Note(s): This course cannot be applied as a science credit in a Bachelor of Science
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

PHE205A/B 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.

There is a lab associated with this course. Students choose from a wide variety of experiments that have been selected to teach in the principles of experimental measurement and to illustrate some fundamental physical concepts.

Prerequisite: PHE104
Co-requisite: MAE222 or MAE226
Note(s): For students taking Second Year Science, Civil or Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 4 Study (/wk): 4
Credit(s): 1

PHE217B 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. Students choose from a wide variety of experiments that have been selected to teach the principles of experimental measurement and to illustrate some fundamental physical concepts.

Prerequisite: PHE104 and MAE222 (or MAE226).
Note(s): For students in Science and Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 4 Study (/wk): 4
Credit(s): 1

PHE225A/B 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.

There is a lab associated with this course. Students choose from a wide variety of experiments that have been selected to teach in the principles of experimental measurement and to illustrate some fundamental physical concepts.

Prerequisite: PHE104.
Co-requisite: MAE222 or MAE226.
Note(s): For students in Science, required for students in Physics or Space Science.
Lecture (/wk): 3 Lab (/wk): 4 Study (/wk): 4
Credit(s): 1

PHE226A/B Modern Physics

This course is identical to PHE225B except students do not take the experimental physics lab.

Prerequisite: PHE104.
Co-requisite: MAF222 or MAE226.
Note(s): For students in Chemistry or Science.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

PHE228B 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, Ampère'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: PHE104 and MAE226.
Note(s): For students taking second year Electrical Engineering or Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

PHE270 Introduction to Oceanography

Only offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements

Note(s): A student cannot receive credit for both PHE/F270 and PHE/F370.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

300 COURSES

PHE300A/B 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: PHE225.
Co-requisite: MAE305.
Note(s): For Third Year students taking Space Science. This course may not be taken by students registered in Physics.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE302A/B 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: PHE217 or PHE228.
Co-requisite: MAE305.
Note(s): For Third Year students taking Physics or Space Science. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 3
Credit(s): 1

PHE304A/B Quantum Mechanics

Postulates of quantum mechanics, the Schrödinger equation, operators, eigenfunctions and eigenvalues, superposition and stationary states, the one-dimensional square well, time independent perturbation theory, hhydrogen 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: PHE225.
Co-requisite: MAE305.
Note(s): For Third Year students taking Physics or Space Science. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE305A/B 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: PHE205.
Co-requisite: MAE305.
Note(s): For Third Year students taking Physics. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE307A/B 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: PHE302.
Note(s): For Third or Fourth Year students taking Space Science and/or Physics. An elective for other students taking Science.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

PHE332A/B 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: PHE217.
Note(s): For Third Year students taking Physics or Space Science. An elective course for other students taking Science.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

PHE333B 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: PHE332.
Note(s): For Third Year students taking Physics or Space Science. An elective course for other students taking Science.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

PHE350A/B 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: PHE104 and MAE222 (or MAE226).
Note(s): For Third Year students taking Space Science. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

PHE352A/B 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.

Co-requisite: MAE101 and PHE104.
Note(s): For Third Year students taking Space Science or Physics. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE354A/B Space Systems

Review of the history of space with emphasis on Canadian contributions. Typical satellite orbits: effects of the environment, satellite function considerations. 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: PHE104.
Note(s): For Third Year students taking Space Science. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 2
Credit(s): 1

PHE360A/B 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.

Prerequisite: PHE102 or equivalent.
Note(s): An elective for students taking Arts. A student cannot receive credit for both PHE/F360 and PHE/F203.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PHE362A/B 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: PHE102 or equivalent.
Note(s): An elective for students taking Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PHE364A/B 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: PHE205 and PHE225 or PHE217.
Note(s): For Third Year students taking Space Science. An elective for other students taking Science.
Lecture (/wk): 0 Lab (/wk): 4 Study (/wk): 1
Credit(s): 1

PHE370A/B 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: PHE102 or equivalent.
Exclusion: A student cannot receive credit for both PHE/F270 and PHE/F370
Note(s): An elective for students taking Science or Arts
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PHE380A/B 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.

Prerequisite: PHE102 or equivalent.
Note(s): An elective for students taking Science and Arts.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

PHE390A/B 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.

Prerequisite: PHE102 or equivalent.
Note(s): An elective course for students taking Arts or Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

400 COURSES

PHE403A/B 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: PHE304.
Co-requisite: MAE305.
Note(s): For students taking Honours Physics. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE412A/B 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 Ampère'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: PHE302.
Co-requisite: MAE305.
Note(s): For students taking Honours Physics. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE413A/B 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, qualititive aspects of particle physics and quark and lepton nomenclature.

Prerequisite: PHE304.
Co-requisite: MAE305.
Note(s): For students taking Honours Physics. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE415A/B Advanced Quantum Mechanics

The three dimensional square well, harmonic oscillator, zero point energy, Hermite polynomials, creation and annihilation operators, time dependent Schrödinger equation, time evolution of states and operators, Ehrenfests's principle, time dependent perturbation theory, transitions, selection rules, Fermi's golden rule, and scattering.

Prerequisite: PHE304.
Co-requisite: MAE305.
Note(s): For students taking Honours Physics. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: Honours Physics or permission of department.
Note(s): For Fourth Year students taking Physics.
Lecture (/wk): 0 Lab (/wk): 4 Study (/wk): 6
Credit(s): 2

PHE440A/B 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): An elective for students taking Honours Physics, with permission of department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE442A/B 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: PHE225.
Note(s): For students taking Space Science or Physics. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

PHE445A/B 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: PHE302.
Note(s): For students taking Honours Space Science. An elective for other students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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.

Prerequisite: Honours Space Science or permission of instructor. This course satisfies the Honours degree thesis requirement.
Lecture (/wk): 0 Lab (/wk): 4 Study (/wk): 6
Credit(s): 2

PHE450A/B 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: PHE302.
Note(s): For students taking Honours Space Science. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE451A/B Senior Physics Laboratory

A continuation of PHE364B including experiments in magnetism, Mössbauer spectroscopy, applied optics and nuclear science.

Prerequisite: PHE205 and PHE225 or PHE217.
Note(s): For students taking Physics or Space Science.
Lecture (/wk): 0 Lab (/wk): 4 Study (/wk): 2
Credit(s): 1

PHE452A/B 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: PHE302.
Co-requisite: MAE305.
Note(s): For students taking Honours Space Science. An elective for students taking Science.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

PHE460A/B 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: PHE302.
Note(s): Core course for students in Physics and Space Science or with the permission of the department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

PHE462A/B 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: PHE225.
Note(s): A required course for students taking Physics or Honours Space Science or with the permission of the department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 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: PHE104 and MAE305.
Note(s): For students in Sciences.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

Chemistry and Chemical Engineering

PROGRAMMES OF STUDY

Introduction

The Department of Chemistry and Chemical Engineering offers courses of study leading to the degrees of Bachelor of Engineering in Chemical Engineering, and Bachelor of Science Chemistry at the Honours, Major or General Levels.

The Chemical Engineering program 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 program emphasises 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.

Chemical Engineering

The prescribed course of study for Chemical Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E2
Third Year	Table E3
Fourth Year	Table E4

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.

Honours and Majors Chemistry

Total credits required = 42

ACADEMIC YEAR	1		2		3		4	
	Fall	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**	**Fall**	**Winter**
CATEGORY								
College Core Curriculum	ENE100		HIE207	HIE203	PSE301	HIE271	POE316	PSE401
	PSE123			POE205				
Mandatory and Programme Courses		CSE101*	**PHE226**		**CCE308**	*CCE309*	*CCE420*	
	PHE104*		**MAE222 / MAE226**	**MAE223 / MAE227**	**CCE323**	**CCE342**		
	MAE101*		**CCE241**			**CCE343**	**CCE441**	
	CCE101*		**CCE240**	**CCE218**				
		MAE129*						
Optional and Elective Courses (Normally taken in this Term, as available in Timetable)				see note 2	CCE245	CCE242	CCE425	CCE429
					CCE353	CCE246	CCE428	CCE440
					CCE385	CCE317	CCE451	CCE474
							CCE460	CCE485
							CCE245	CCE246
Electives	0	0	0	see note 2	2	2	3	4
Typical Number of Credits in Term	**5**	**6**	**5.5**	**5.5**	**5**	**5**	**5**	**5**

Notes:

1. A minimum of 3 Chemistry credits must be included beyond the required courses. The remaining electives must normally be 300 or 400 series science or engineering courses but with permission up to 3 Arts electives forming part of a Minor may be substituted.
2. Students with a clean academic record may apply to take MAE229 or CCE242 in the Second Semester of Second Year. The extra credit will be applied against the elective requirements in Third and Fourth Year.
3. Students wishing to obtain the Life Sciences Minor should take CCE242 in Second Year.
4. The italicized courses are required for the Honours program, (reduce the total number of electives accordingly).
5. * = Science Core Requirements - See Table S1.

Double and Combined Major Programs

Double Major programs are offered in

- Chemistry & Physics
- Chemistry & Space Science
- Chemistry & Mathematics
- Chemistry & Computer Science

Combined Major program is offered in

- Chemistry & Psychology

Information about the specific course requirements for each combination can be obtained from the departments concerned.

Chemistry Minor

- CCE101 (2 credits)
- CCE218B (1 credit)
- CCE240A (1 credit)
- 4 additional chemistry credits chosen from those in the Table of "Chemistry Program"

Life Science Minor

The Faculty of Science sponsors an interdisciplinary minor in Life Sciences available to any candidate with the necessary prerequisites.

The required eight credits are:

- CCE240A (1 credit)
- CCE241 (3 credits)
- CCE242B (1 credit)
- CCE245 (0.5 credit)
- CCE246 (0.5 credit)
- CCE385A or CCE460A (1 credit)
- 1 credit in a statistics course offered by either the Faculty of Science or Faculty of Arts.

Requirements for Students taking Arts

- CCE106A (See Table A8)

CCE200A, CCE360A, CCE362A, CCE364B, CCE366B (Electives)

Laboratories & 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 polarised-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 benchscale 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 scintillation 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 license)
- National Instruments Labview Professional Development System (department site license)
- Honeywell Unisim - Process Modeling 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

100 COURSES

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.

Prerequisite: High School Leaving Chemistry or equivalent.
Note(s): For students of the First Year of Science and Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 2

CCE106A 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.

Exclusion: CCE101.
Note(s): An introductory chemistry course for students with little or no previous background in chemistry, to prepare them for university level chemistry.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

200 COURSES

CCE200A 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): An elective course for students of the Second Year taking Arts, and other students with the permission of the Department. This is a core curriculum course for Arts students.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

CCE203A Introduction to Chemical Engineering

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- breaking a process down into its components, establishing the relations between known and unknown process variables, assembling the information needed to solve for the unknowns using a combination of experimentation, empiricism and the application of natural laws to obtain

the desired solution. 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.

Co-requisite: CCE220A.
Note(s): For students of the Second Year taking Chemical Engineering, Formerly Given in Third Year as CCE303B
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE218A 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

Prerequisite: CCE101.
Co-requisite: MAE226A or MAE222A.
Note(s): Offer to second year students in Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE220A Introduction to Materials Science and Engineering Materials

This introductory course in the chemical science and engineering of materials is focussed on liquids and solids. It begins with a review of thermodynamics and with phase equilibrium in one and two component systems to include thermodynamic table and charts. The Clausius and Clausius- Clapeyron equations are introduced. Raoult's and Henry's Laws are applied to liquid-vapour equilibrium. Phase diagrams for two and more component systems with liquid and solids are studied to include those for steel and other engineering alloys. 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. Ceramics are studied and phase diagrams used for applications to silicates and glasses. The properties and structures of polymers are introduced for thermoplastics, thermosets and elastomers with their engineering applications. Composite materials are examined. Askeland, The Science and Engineering of Materials

Prerequisite: CCE101.
Note(s): For students of the Second Year taking Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE240A 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 CCE465. 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. Efforts are made to present unifying biological and chemical concepts with examples to encourage student understanding rather than memorization.

Prerequisite: CCE101.
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 Programs.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
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.

Prerequisite: CCE101.
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 programs.
Lecture (/wk): 3 Lab (/wk): 3 Study (/wk): 6
Credit(s): 3

CCE242B 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: CCE240A.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE245A 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 CCE240A.

Prerequisite: CCE240A.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
Credit(s): 0.5

CCE246B 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 CCE242B.

Prerequisite: CCE242B.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
Credit(s): 0.5

CCE281 Corrosion: Impact, Principles, and Practical Solutions

Only offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL + web

CCE285 Introduction to Environmental Impact Assessment

Only offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements.

Prerequisite: None, although completion of CCE/CCF289 - Impact of Science and Technology on the Environment is recommended.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

CCE289 Environmental Sciences: Impact of Science and Technology on the Environment

Only offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

300 COURSES

CCE300A 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.

Prerequisite: PHE104, MAE227 or equivalent.
Note(s): For students of the Third Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE304 Military Chemistry: CBRN Defence

Also offered through the Division of Continuing Studies.

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 lassical biological agents, such as viruses, bacteria, fungi and ickettsia. Radiological weapons will be discussed from the perspective of the variety of options and the biological hazard osed. Also covered will be the effects of nuclear weapons on vehicles, structures and personnel. Specific radiological and uclear topics will include detection and dosimetry, and the distinct hazards posed by alpha, beta, and gamma and eutron radiation. Protective measures, both individual and collective, counter NBC agents, will also be discussed.

Prerequisite: CCE106A or CCE200A.
Exclusion: Not available for credit for students who also claim ATWOP, LFTSP, CCE364, CCE463 or CCE474.
Note(s): An elective course for students of the Second, Third or Fourth Year taking Arts. Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1
Method of Delivery: DL

CCE305B 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.

Prerequisite: CCE300A, PHE104, MAE227 or equivalent.
Note(s): For students of the Third Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE306 Hazardous Materials Management

Only offered through the Division of Continuing Studies.

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. CF/DND orders and directives and Canadian legislation relevant to hazardous materials are also examined.

Note: Distance Learning computer system requirements.

Prerequisite: CCE289.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

CCE308A 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 nonideal systems; Reaction kinetics: phenomenological rate laws, mechanisms, steady state treatments, linear and branched chain reactions; Surface chemistry: Langmiur adsorption and mechanisms of heterogeneous catalysis.

Prerequisite: CCE218A or CCE220A.
Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE309B 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 radiationless transitions. Infrared spectroscopy.

Prerequisite: PHE225B or PHE226B.
Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE312A 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.

Prerequisite: CCE220A.
Note(s): For students of the Third Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE313B 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.

Prerequisite: CCE312A.
Note(s): For students of the Third Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE315B 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.

Prerequisite: MAE315A.
Note(s): For students of the Third Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE317B 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.

Prerequisite: CCE101.
Note(s): For students of the Third Year taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE321 Engineering Laboratory

Part I: Microcomputers and Instrumentation

Introduction to the microcomputer, digital logic, data acquisition, IEEE bus, multiplexers, applications to measurement and control of temperature.

Part II: Engineering Laboratory

Experiments to illustrate and complement the engineering lecture courses of the Third Year. The experiments are designed to teach students to analyse a technical situation, to reach logical conclusions from observations and to communicate findings in the form of a technical report.

0 - 3 - 3 Credit : 0.5 (Fall Term)
0 - 4 - 4 Credit : 0.5 (Winter Term)

Prerequisite: CCE101, CCE203A, CCE300A, CSE201A, MAE209.
Co-requisite: CCE305B.
Note(s): For students of the Third Year taking Chemical Engineering. Lab (/wk): Study (/wk):
Credit(s): 1

CCE323A Physical Chemistry Laboratory

This course illustrates physico-chemical principles with selected experiments. The concepts presented will include: phase transitions in binary systems; structural analysis; 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 x-ray diffraction, scanning electron microscopy, thermogravimetric analysis and differential scanning calorimetry.

Prerequisite: CCE218A or CCE220A.
Lecture (/wk): 1 Lab (/wk): 3 Study (/wk): 3
Credit(s): 1

CCE337B 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 of the Third Year taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 0 Lab (/wk): 0.5 Study (/wk): 0
Credit(s): 0

CCE342B Inorganic Chemistry

The principles and applications of inorganic chemistry are discussed, including atomic structure, periodicity of chemical and physical properties with atomic number, molecular structure and valence bond theory. The concepts of Brønsted and Lewis acidity are developed in reference to polyprotic acids, hard and soft acidity, and hydrolysis of cations and oxo anions. Oxidation and reduction of chemical species are discussed in reference to the extraction of the elements, reduction potentials, redox stability of water and the diagrammatic representation of potential data (Frost and E-pH or Pourbaix diagrams). Aspects of the coordination chemistry of metal complexes are discussed with reference to structures and symmetries, crystal and ligand field theories, and reaction kinetics. This course is connected closely to a complementary laboratory course CCE343B

Prerequisite: CCE101.
Note(s): For Chemistry students in Honours and Majors Programs. other students may take the course with permission of the department.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE343B Inorganic Chemistry Laboratory

A laboratory course designed to illustrate the concepts of inorganic chemistry covered in CCE342A: redox chemistry, coordination complexes, and applications of inorganic chemistry to biochemistry, environmental science and solid state physics. Besides classical wet chemistry, the experiments require the use of various

analytical instruments to study the behavior of the chemicals involved: spectrophotometer, pH meter, optical and scanning electron microscopy, differential scanning calorimeter, thermal gravimetric analyzer, and x-ray diffractometer.

Prerequisite: CCE101.
Note(s): For students of the third year taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 1 Lab (/wk): 3 Study (/wk): 4
Credit(s): 1

CCE351A Nuclear Science

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.

Prerequisite: MAE226, MAE227.
Note(s): For students of the Third Year taking Chemical Engineering. An elective course for students of the Third Year taking Honours Science or a Major in Science.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE353A Materials Science

Topics included are mechanical testing, binary and ternary phase equilibrium (thermodynamic background and graphics), metallography and optical microscopy, X-ray diffraction of single crystals and polycrystalline metals, solidification and grain growth, dislocation theory and plastic deformation, recovery, recrystallization and grain growth, commercial heat treatment practices, carburization and nitriding of steel. Particular reference is made to the metallurgy of iron and carbon steel, stainless steels, aluminum, magnesium and copper-based alloys as well as superalloys intended for high temperature service in gas turbines. Common metal fabrication techniques and repair processes such as welding and brazing are presented. Important non-destructive testing techniques are covered and the principles of fracture mechanics are introduced.

Prerequisite: CCE220A.
Note(s): For students of the Third Year taking Chemical Engineering. An elective course for students taking other science programs.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE360A 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.

Prerequisite: CCE106A or CCE200A.
Exclusion: A core curriculum course.
Note(s): An elective course for students of the Third or Fourth Year taking Arts. Not offered every years.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

CCE362A 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.

Prerequisite: CCE106A or CCE200A.
Exclusion: A core curriculum course.
Note(s): An elective course for students of the Third or Fourth Year taking Arts. Not offered every year
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

CCE366B 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.

Prerequisite: CCE106A or CCE200A.
Exclusion: A core curriculum course.
Note(s): An elective course for students of the Third or Fourth Year taking Arts. Not offered every year
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 1

CCE385A 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 the design and analysis of bioreactors.

Prerequisite: CCE240, CCE241.
Note(s): For students of the Third Year taking Chemical Engineering or Honours Chemistry, or a Major in Chemistry. An elective course for students taking other Science programs.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE386 Introduction to Environmental Management Systems

Only offered through the Division of Continuing Studies.

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: Distance Learning computer system requirements.

Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 9
Credit(s): 1
Method of Delivery: DL

400 COURSES

CCE405A Mass Transfer Operations

This course in unit operation design concentrates primarily on materials separation and purification in fluid systems. Military applications are found in fuels processing, pollution abatement, undersea and space life support systems, chemical and biological defence, and other areas of ultimate defence significance. Environmental applications are found in air pollution abatement. The following topics in mass transfer are included: molecular and eddy diffusion, mass transfer coefficients, interphase mass transfer, and mixing. Phase equilibrium behaviour and correlations are reviewed and extended from an engineering point of view. Equipment design, performance, and efficiency are examined in both stagewise and continuous contacting. Generalized design equations are derived and applied. Individual separation techniques are studied, with gas absorption and fractional distillation emphasized because of their prime importance in fluid system separations. Other separation techniques, including adsorption, liquid-liquid and solvent extraction, and membrane separations are also covered.

Prerequisite: CCE203A, CCE241, CCE300A, CCE305B, CCE312A, CCE313B.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE407B Reaction Engineering

This course builds on the material of CCE317B 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.

Prerequisite: CCE203A, CCE241, CCE300A , CCE305B, CCE312A, CCE313B, CCE317B, CCE405A.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE409B Combustion and Explosion 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.

Prerequisite: CCE203A, CCE312A, CCE313B, CCE317B.
Note(s): Elective for students of the Third or Fourth Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE413B 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.

Prerequisite: CCE203A, CCE300A , CCE305B, MAE315A, CCE315B, CCE351A, CCE405A.
Co-requisite: CCE407B.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE415A 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.

Prerequisite: CCE203A, CCE300A, CCE305B, MAE315A, CCE315B, CCE351A.
Co-requisite: CCE405A.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
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.

Prerequisite: Successful completion of 3rd year chemical engineering or special permission from the department head.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
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 either Physics, Chemistry or 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 Science students.
Lecture (/wk): 0 Lab (/wk): 0 Study (/wk): 4
Credit(s): 2

CCE421 Engineering Laboratory

In this laboratory course, the student carries out experiments to illustrate and complement the engineering lecture courses of the Fourth Year. The experiments are designed to teach students to analyse a technical situation, to reach logical conclusions from observations and to communicate findings in the form of a technical report.

Prerequisite: CCE203A, CCE300A, CCE305B, CCE321.
Co-requisite: CCE405A, CCE407B.
Note(s): For students of the Fourth Year taking Chemical Engineering.
Lecture (/wk): 0 Lab (/wk): 3 Study (/wk): 3
Credit(s): 2

CCE425A 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.

Prerequisite: CCE241.
Note(s): For students of the Fourth Year taking Chemical Engineering. An elective course for students taking other Science programmes.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE428A 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.

Prerequisite: CCE220A, CCE353A.
Note(s): For students of the Fourth Year taking Chemical Engineering. An elective course for students taking other Science programs
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE429B 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.

Prerequisite: CCE220A, CCE353A.
Note(s): An elective course for students of the Third and Fourth Year taking Chemical Engineering or other Science Programs. Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE437B 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 of the Fourth Year taking Chemical Engineering, Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 0 Lab (/wk): 0.5 Study (/wk): 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 in the Fourth Year taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 6
Credit(s): 2

CCE441A Materials Analysis Laboratory

This is a laboratory course supported by introductory and experiment-specific lectures. Students review standard techniques associated with instrumental analysis, and become familiar with the operational structure of modern analytical laboratories. Theoretical skills are applied to laboratory experiments focusing on the analysis of soil, water, polymer and metal matrices using extraction, digestion and non-destructive analysis. A mix of conventionally structured and student-designed experiments are undertaken. Instrumentation used includes ion and gas chromatographs, mass spectrometers, and neutron activation equipment. Data interpretation considers results in the context of regulatory frameworks and decision-making processes. Students complete laboratory work and prepare reports individually and in small groups. They use several reporting formats, including briefing notes and traditional laboratory reports, to communicate their results.

Prerequisite: CCE220A.
Note(s): For students of the Fourth Year taking Chemical Engineering, Honours Chemistry, or a Major in Chemistry. An elective course for students taking other Science programs.
Lecture (/wk): 1 Lab (/wk): 3 Study (/wk): 5
Credit(s): 1

CCE445B 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.

Prerequisite: CCE218A or CCE220A.
Note(s): For students of the Fourth Year taking Space Science. An elective for students in the Fourth Year taking Honours Science or a Major in Science. Not offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE451A Topics in Physical Chemistry

Kinetic theory: Maxwell distribution, collison 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.

Prerequisite: CCE308A, CCE309B.
Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

CCE460A 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.

Prerequisite: CCE101, CCE240A.
Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 4
Credit(s): 1

CCE463B 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.

Prerequisite: CCE203A, CCE351A.
Note(s): Not available for credit for students who also claim ATWOP, LFTSP, CCE304, CCE364 or CCE474. An elective course for students of the Third or Fourth Year taking Chemical Engineering. This course will not be offered every year.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE474B 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.

Prerequisite: CCE218A, CCE240B, CCE241.
Note(s): For students taking Honours Chemistry or a Major in Chemistry.
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

CCE485B Environmental Engineering

Also offered through the

Division of Continuing Studies.

The objective of this course is to examine the sources, properties, fate and treatment of solid, liquid and gaseous wastes. 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. A unifying theme will be the fact that environmental engineering problems must be solved using a holistic approach that incorporates the role of ethics in decision-making and implements pollution prevention strategies to reduce waste streams. The importance of risk communication will be highlighted. Case studies and material from the current technical literature will be used to illustrate key points and applications.

Note: Distance Learning computer system requirements.

Prerequisite: CCE101.
Exclusion: An Elective course for students of the Fourth Year taking Chemical Engineering, Honours Science, or a Major in Science.
Note(s): Not offered every year. Contact hours for Distance Learning: 0-0-9
Lecture (/wk): 3 Lab (/wk): 0 Study (/wk): 3
Credit(s): 1

FACULTY OF ENGINEERING

TEACHING STAFF

The Dean of Engineering

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M.A. Erki, BASc, MASc, PhD, PEng, FIIFC, FIABSE, FCSCE

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R.K. Rowe, BSc, B.E., PhD, DEng, FRSC, FCAE, FEIC, PEng

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W.A. Take, BSc, MSc, PhD

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Head of the Department

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P.E. Allard, BSc, BASc, MSc, PhD, FEIC, PEng

Y.T. Chan, BSc, MSc, PhD, PEng

J. Plant, OMM, CD, mde, Phd(MIT), FEIC, FIEEE, PEng

C.N. Rozon, BSc, MSc, PhD, PEng

C.D. Shepard, BSc, MA, PhD, PEng

J.D. Wilson, BSc, PhD, PEng

Professor

D. Al-Khalili, BSc, MSc, PhD, PEng

S. Amari, DES, MSEE, PhD

Y.M.M. Antar, BSc, MSc, PhD

Professor (Adjunct)

Z. J. Ding, PhD

J. Shaker, PhD

Associate Professor

N. Chabini, BSc, MSc, PhD

F. Chan, BEng, MScA, PhD

G. Drolet, BSc, MSc, PhD, PEng

M. Hefnawi, BSc, MSc, PhD

G.S. Knight, CD, rmc, BEng, MEng, PhD, PEng

D. McGaughey, BSc, MSc, PEng, PhD

A.M. Noureldin, BSc, MSc, PhD

M.H. Rahman, BSc, MSc, PhD, PEng

M. Tarbouchi, BSc, MSc, PhD

Associate Professor (adjunct)

P. Langlois, BEng, MEng, PhD

Assistant Professor

A. Beaulieu, CD, BEng, MEng, PhD

J. Bray, BASc, MASc, PhD

J.P.S. Leblanc, CD, cmr, plsc, BSc, MEng, PEng

F.A. Okou, BIng, MIng, PhD

W.G. Phillips, CD, rmc, BEng, MEng, PEng

Assistant Professor (Adjunct)

T. Dean, BSc, MSc, PhD

A. Elnady, BSc, MSc, PhD

J. Morelli, PhD

Lecturer

Capt F. Allaire, CD, rmc, BEng, MASc

Capt S. Cayouette, CD, rmc, BEng, MASc

Maj J. Clark, CD, BSc, MASc

Maj M. Fricker, CD, rmc, BEng, MASc

Capt S Henault, BEng, MASc

Mechanical Engineering

Head of the Department

Professor - S.H. Benabdallah, BEng, MScA, PhD, PEng

Professor Emeritus

M.F. Bardon, rmc, BEng, PhD, PEng

P. Bussières, CD, rmc, BEng, MEng, PhD, PEng

W.E. Eder, Ing, MASc, PEng

W.C. Moffatt, rmc, ndc, BSc, MSc, ScD, PEng

J.G. Pike, rmc, BSc, MSc, PhD

Professor

D.L. DuQuesnay, BASc, MASc, PhD, PEng

Associate Professor

W.D.E. Allan, CD, rmc, BEng, MASc, DPhil, (oxon), QFTE, PEng

A. Benaïssa, BSc, MSc, PhD, PEng

I.E. Boros, Dipl Ing, MASc, PhD, PEng

M. Ferchichi, BASc, MASc, PhD, PEng

A. Jnifene, BASc, MASc, PhD, PEng

M. LaViolette, BScA, PhD, PEng

D.C.M. Poirel, CD, rmc, BEng, MEng, PhD, PEng

Assistant Professor

M. Arsenault, BScA, MScA, PhD, PEng

K. Goni Boulama, BEng, PhD

M. Jugroot, Lic ès Sci, Maîtrise/DEA, Doctorat

K. Khayati, Eng. Dipl., D.E.S.A., PhD, ing, jr,(OIQ)

K. Moglo, BScA, MScA, PhD, ing, jr

R.E. Perez, BEng, MScA, PhD

D.L. Wowk, BEng, MASc, PhD, PEng

X. Wu, BSc, PhD

P.R. Underhill, BSc, PhD (Adjunct)

Lecturer

Major T. Chalovich, CD, rmc, BEng, MEng, PEng

Captain C.E. Kotzer, CD, rmc, BEng, MASc, PEng

Lieutenant (N) T. Davies, CD, rmc, BEng, MASc, PEng

Lieutenant (N) S. Lachance, CD, BEng, MASc

DEPARTMENTS

Faculty of Engineering

The Faculty of Engineering has four (4) departments:

- Civil Engineering
- Electrical & Computer Engineering
- Mechanical Engineering
- Applied Military Science

The Faculty of Engineering offers six Bachelor of Engineering programmes in:

- Aeronautical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Mechanical Engineering

ENGINEERING DECOMPRESSION

Programme Outline

The engineering programme at RMC can be very difficult and time consuming. In order to maximize the chances of success for students who are struggling, they may be selected to participate in the Engineering Decompression Programme, which provides an additional instructional term, typically in the summer between third and fourth year. Students selected to be part of the programme have a lighter course load during the normal academic year, resulting from having the following courses removed from their schedules and taken during this summer term:

1. POE205 B (winter of second year)
2. PSE301A (fall of third year)
3. HIE271B (winter of third year)
4. HIE289A (fall of fourth year)
5. PSE401B (winter of fourth year)

Students in an engineering programme who fail one or more key courses in first or second year, or who have an overall average below 60% in those years, are normally nominated by the Dean of Engineering to participate in the Engineering Decompression Programme. Students who fail one or more non-key courses but whose averages are greater than 65% may also fall into this group. Finally, students who have not been identified as having academic difficulties may also apply to participate in the Programme. For ROTP, RETP and UTPNCM students, the final decision with respect to participation rests with the Managing Authority responsible for the MOSID of each student.

No student will be permitted to participate in more than one summer term. Once approval has been granted to participate in the Programme, students do not register in the applicable courses during the normal academic year, but instead will take those courses during the summer term. Additionally, once approved, students will normally not be permitted to voluntarily leave the programme.

All academic regulations apply to the summer term, including those related to supplemental exams. If required, supplemental exams will be held during the first weekend following the first week of the fall term

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 Enrolled in Course	Department Responsible for Delivery
GEE167B	Engineering Graphics - 1	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mechanical Engineering
GEE231B	Introduction to Mechanics of Material	Aeronautical, Chemical, Civil, Mechanical	Civil Engineering
GEE241B	Electrical Theory	Aeronautical, Mechanical, Chemical	Electrical & Computer Engineering
GEE267A	Engineering Graphics - 2	Aeronautical, Civil, Mechanical	Mechanical Engineering
GEE293A	Managing Engineering Projects	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Office of the Dean of Engineering

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 Enrolled in Course	Department Responsible for Delivery
CCE220A	Introduction to Material Science and Engineering Materials	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Chemistry and Chemical Engineering
MAE226A	Engineering Calculus: Multivariate Functions	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mathematics and Computer Science
MAE227B	Engineering Calculus: Differential Equations and Infinite Series	Aeronautical, Chemical, Civil, Computer, Electrical, Mechanical	Mathematics and Computer Science

Programme Outlines_By Year

ENGINEERING - YR 1_TABLE E1

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
ENE100: Introduction to Literary Studies and University Writing Skills	2	3	-	3	6	3	-	3	6	
PSE123A: Fundamentals of Human Psychology	1	3	-	3	3	-	-	-	-	
MAE101: Introductory Calculus	2	3	1	4	4	3	1	4	4	
MAE119B: Linear Algebra for Engineers	1	-	-	-	-	3	1	4	4	**A**
CSE101A: Introduction to Algorithms and Computing	1	3	1	4	4	-	-	-	-	
PHE104: General Physics	2	3	3	6	6	3	3	6	6	
CCE101: Engineering Chemistry	2	3	2	5	5	3	2	5	5	
GEE167B: Engineering Graphics - 1	1	-	-	-	-	1	2	3	3	
SLEFR1:	-	-	6	6	2	-	6	6	2	
ATH101:	-	-	2	2	-	-	2	2	-	
PMT 100 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**12**	**18**	**17**	**35**	**30**	**16**	**19**	**35**	**30**	

Notes:

A. A second version of this course will be available (in English only) for students with a weaker background, in which there will be an additional lecture period. (Contact hours: 4 - 1 - 4)

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

CHEMICAL ENGINEERING - YR 2-TABLE E2

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	3	
HIE207A: Canada	1	3	-	3	3	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
MAE209B: Probability and Statistics	1		-	-	-	3	-	3	4	
MAE226A: Engineering Calculus	1	4	1	5	4	-	-	-	-	
MAE227B: Engineering Calculus	1	-	-	-	-	3	1	4	4	
PHE207A: Electricity & Magnetism	1	3	4	7	4	-	-	-	-	
CCE203B: Introduction to Chemical Engineering	1	-	-	-	-	3	-	3	3	
CCE220A: Introduction to Materials Science and Engineering Materials	1	3	-	3	3	-	-	-	-	
CCE240A: Introduction to Biological Sciences	1	3	-	3	3	-	-	-	-	
CCE241: Organic Chemistry	3	3	3	6	5	3	3	6	5	
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	A
Total:	**13**	**19**	**17**	**36**	**24**	**18**	**13**	**31**	**24**	

Note:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

CHEMICAL ENGINEERING - YR 3_TABLE E3

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour and Leadership	1	3	-	3	3	-	-	-	-	
GEE231B:Introduction of Mechanics of Materials	1	-	-	-	-	2	2	4	4	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	
MAE315A: Applied Mathematics for Chemical and Materials Engineers	1	3	-	3	3	-	-	-	-	
CCE300A: Fluid Mechanics	1	3	-	3	3	-	-	-	-	
CCE303B: Introduction to Chemical Engineering	1	-	-	-	-	3	-	3	3	
CCE305B: Heat Transfer	1	-	-	-	-	3	-	3	3	
CCE312A: Applied Thermodynamics I	1	3	-	3	3	-	-	-	-	
CCE313B: Applied Thermodynamics II	1	-	-	-	-	3	-	3	3	
CCE315B: Chemical and Materials Engineering Computations	1	-	-	-	-	3	-	3	3	
CCE317B: Kinetics and Surface Science	1	-	-	-	-	3	-	3	3	
CCE321: Engineering Laboratory	1	-	3	3	3	-	4	4	4	
CCE337B: Seminar	-	-	-	-	-	-	0.5	0.5	-	
CCE351A: Nuclear Science	1	3	-	3	3	-	-	-	-	
CCE353A: Materials Science: Metallurgy	1	3	-	3	3	-	-	-	-	
CCE385A: Biotechnology	1	3	-	3	3	-	-	-	-	
Elective: Winter Semester	1	-	-	-	-	3	-	3	3	**A**
MEE321B: Heat Engines Laboratory	-	-	-	-	-	-	(2)	(2)	(2)	**B**
SLEFR3:	-	-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**C**
Total	**16.5**	**21**	**11**	**32**	**26**	**23**	**14.5**	**37.5**	**34**	

Notes:

A. Students can choose either; CCE409B: Combustion and Explosives Engineering, CCE429B: Corrosion, CCE463B: Chemical Engineering Applied to Nuclear-Biological-Chemical Defence or CCE465B: Environmental Engineering. These courses may be offered either in French or in English only depending on the academic year.

B. MEE321B is part of CCE321 part II. Marks will be combined and reported in CCE321.

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* The numbers in brackets () are not used in the calculation of the totals

CHEMICAL ENGINEERING - YR 4_TABLE E4

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	**A**
CCE405A: Mass Transfer Operations	1	3	-	3	3	-	-	-	-	
CCE407B: Reaction Engineering	1	-	-	-	-	3	-	3	3	
CCE413B: Systems Analysis: Modelling and Optimization	1	-	-	-	3	-	3	3	3	
CCE415A: Control Systems and Instrumentation	1	3	-	3	3	-	-	-	-	
CCE417: Design Project	2	-	3	3	3	-	3	3	3	
CCE421: Engineering Laboratory	2	-	3	3	3	-	3	3	3	
CCE425A: Polymers Engineering	1	3	-	3	3	-	-	-	-	
CCE428A: Electrochemistry	1	3	-	3	3	-	-	-	-	
CCE437B: Seminar	0	-	-	-	-	-	0.5	0.5	-	
CCE441A: Materials Engineering Laboratory	0.5	1	3	4	5	-	-	-	-	
Elective: Winter Semester	1	-	-	-	-	3	-	3	3	**B**
GEE241B: Electrical Technology	1	-	-	-	-	3	2	5	6	
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	**C**
Totals	**14**	**15**	**18**	**33**	**32**	**12**	**20.5**	**32.5**	**32**	

Notes:

A. POE289A can replace HIE289A.

B. One (1) elective course to be selected form; CCE409B-Combustion and Explosives Engineering, CCE429B-Corrosion, CCE463B-Chemical Engineering Applied to Nuclear-Biological-Chemical Defence or CCE465B-Environmental Engineering. These elective courses will only be offered in one of the two official languages.

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

CIVIL ENGINEERING - YR 2_TABLE E5

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	3	
HIE207A: Canada	1	3	-	3	3	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
MAE227B: Ordinary Differential Equations, Sequences and Series for Engineers	1	-	-	-	-	3	1	4	4	
MAE209B: Probability & Statistics	1	-	-	-	-	3	-	3	4	
MAE226A: Engineering Calculus	1	4	1	5	4	-	-	-	-	
PHE205A: Mechanics	1	3	4	7	4	-	-	-	-	
CCE220A: Introduction to Materials Science and Engineering Materials	1	3	-	3	3	-	-	-	-	
GEE231B: Introduction to Mechanics of Materials	1	-	-	-	-	2	2	4	4	
GEE235B: Introduction to Earth Sciences	1	-	-	-	-	3	2	5	5	
GEE267A: Engineering Graphics - II	1	1	2	3	3	-	-	-	-	
GEE293A: Managing Engineering Projects	1	3	1	4	6	-	-	-	-	
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**B**
Total:	**10**	**17**	**18**	**38**	**32**	**17**	**14**	**31**	**25**	

Notes:

A. Standing in Experimental Physics will be weighted equally into Physics lecture courses.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

CIVIL ENGINEERING - YR 3_TABLE E6

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
CEE303A: Strength of Materials	1	3	2	5	5	-	-	-	-	
CEE305B: Structural Theory	1	-	-	-	-	3	2	5	5	
CEE311B: Engineering Materials and Introduction to Steel and Timber Design	1	-	-	-	-	3	2	5	5	
CEE317A: Civil Engineering Analysis I	1	2	2	4	4	-	-	-	-	
CEE319B: Civil Engineering Analysis II	0.5	-	-	-	-	2	1	3	3	
CEE343A: Hydrology	1	2	1	3	3	-	-	-	-	
CEE355A: Soil Mechanics	1	3	2	5	5	-	-	-	-	
CEE360A: Geomatics I	1	2	2	4	4	-	-	-	-	
CEE362B: Geomatics II	1	-	-	-	-	2	2	4	4	
CEE363B: Survey Field School	1	-	-	-	-	-	-	-	-	**A**
CEE385A: Introduction to Environmental Engineering	1	3	1	4	4	-	-	-	-	
CEE387B: Highway Design	1	-	-	-	-	3	2	5	5	
MEE315B: Fluid Mechanics	1	-	-	-	-	3	2	5	5	
SLEFR3:		-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**B**
Total	**13.5**	**18**	**18**	**36**	**30**	**16**	**19**	**35**	**29**	

Notes:

A. 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.

B. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

CIVIL ENGINEERING - YR 4_TABLE E7

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	**A**
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	
CEE403A: Introduction to concrete and Reinforced Concrete Design	1	3	2	5	5	-	-	-	-	
CEE405A: Structural Analysis	1	3	2	5	5	-	-	-	-	
CEE417A: Steel Design	1	3	1	4	4	-	-	-	-	
CEE443A: Urban Hydraulics	1	2	1	3	3	-	-	-	-	
CEE457A: Foundations Earthworks and Slope Stability	1	3	2	5	5	-	-	-	-	
CEE485B: Sanitary and Environmental Engineering	1.5	-	-	-	-	4	2	6	6	
Elective: Winter Semester	1	-	-	-	-	3	2	5	5	**C**
Elective: Winter Semester	1	-	-	-	-	3	2	5	5	**C**
CEE493: Civil Engineering Project	2	1	2	3	3	1	3	4	4	
Field Study	-	-	(3)	(3)	(3)	-	(4)	(4)	(4)	**B**
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	**D**
Total	**13**	**17**	**19**	**36**	**31**	**17**	**18**	**35**	**34**	

Notes:

A. POE289A can replace HIE289A.

B. Part of CEE493 Civil Engineering Project.

C. Two (2) elective courses to be selected from; GCF415B-Dimensionnement des structures en béton armé, CEE419B-Advanced Military Engineering, GCF451B-Hydrogéologie appliquée, CEE/GCF459B-Geotechnical Engineering, or CEE489B-Transportation and Planning.

D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

* The numbers in brackets () are not used in the calculation of the totals

ELECTRICAL AND COMPUTER ENGINEERING - YR 2_TABLE E8

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	6	
HIE207A: Canada	1	3	-	3	6	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
MAE226A: Engineering Calculus	1	4	1	5	5	-	-	-	-	
MAE227B: Ordinary Differential Equations, Sequences and Series for Engineers	1	-	-	-	-	3	1	4	4	
MAE209B: Probability & Statistics	1	-	-	-	-	3	-	3	4	
PHE228B: Electromagnetism	1	-	-	-	-	3	2	5	5	
CCE220A: Introduction to Materials Science and Engineering Materials	1	3	-	3	3	-	-	-	-	
EEE203A: Electric Circuits I	1	3	2	5	5	-	-	-	-	
EEE243B: Applied Computer Programming	1	-	-	-	-	3	2	5	5	
EEE245A: Logic Design	1	3	2	5	5	-	-	-	-	
GEE293A: Managing Engineering Projects	1	3	1	4	6	-	-	-	-	
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**A**
Total:	**12**	**19**	**15**	**34**	**32**	**18**	**14**	**32**	**29**	

Note:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

ELECTRICAL ENGINEERING - YR 3_TABLE E9

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	
MAE305: Differential Equations, Boundary Value Problems and Complex Variables	1	3	1	4	4	3	1	4	4	
EEE301A: Applied Electromagnetics	1	3	2	5	5	-	-	-	-	
EEE303A: Electric Circuits II	1	3	2	5	5	-	-	-	-	
EEE307B: Computer Interfacing Techniques	1	-	-	-	-	3	2	5	5	
EEE309B: Control Systems I	1	-	-	-	-	3	2	5	5	
EEE311B: Signals and Systems	1	-	-	-	-	3	2	5	5	
EEE331A: Energy Conversion	1	3	2	5	5	-	-	-	-	
EEE341B: Electronic Devices and Circuits	1	-	-	-	-	3	2	5	5	
EEE351A: Computer Organization and Assembly Language	1	3	2	5	5	-	-	-	-	
SLEFR3:		-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**A**
Total	**11**	**18**	**17**	**35**	**29**	**18**	**17**	**35**	**32**	

Note:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

ELECTRICAL ENGINEERING - YR 4_TABLE E10

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	A
EEE403A: Electronic Circuits	1	3	2	5	5	-	-	-	-	
EEE411A: Communication Theory	1	3	2	5	5	-	-	-	-	
EEE417B: Electromagnetic Propagation and Radiation	1	-	-	-	-	3	2	5	5	C
EEE425B: Digital Control	1	-	-	-	-	3	2	5	5	C
EEE429B: Electric Machines and Power	1	-	-	-	-	3	2	5	5	C
EEE431B: DSP Hardware	1	-	-	-	-	3	2	5	5	
EEE433B: Satellite and Mobiles Communication	1	-	-	-	-	3	2	5	5	C
EEE441A: Microwave Circuits, Devices and Systems	1	3	2	5	5	-	-	-	-	
EEE447B: Robotics	1	-	-	-	-	3	2	5	5	C
EEE449A: Power Electronics	1	3	2	5	5	-	-	-	-	B
EEE453A: Digital VLSI Design	1	3	2	5	5	-	-	-	-	B
EEE455: Electrical Engineering Design Project	2	2	2	4	4	-	4	4	4	
EEE473B: Computer Communications	1	-	-	-	-	3	2	5	5	C
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	D
Total	**11.5**	**16**	**19**	**35**	**30**	**15**	**21**	**36**	**32**	

Notes:

A. POE289A can replace HIE289A.
B. One course to be selected.
C. Three courses to be selected.
D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

COMPUTER ENGINEERING - YR 3_TABLE E11

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	
MAE333B: Topics in Discrete Mathematics	1	-	-	-	-	3	1	4	4	
MAE305(1): Laplace Transforms, Fourier Analysis and Differential Equations	1	3	1	4	4	-	-	-	-	
CSE350A: Data Structures and Algorithms	1	3	2	5	5	-	-	-	-	
EEE303A: Electric Circuits II	1	3	2	5	5	-	-	-	-	
EEE307B: Computer Interfacing Techniques	1	-	-	-	-	3	2	5	5	
CSE341B: Databases	1	-	-	-	-	3	2	5	5	**A**
EEE311B: Signals and Systems	1	-	-	-	-	3	2	5	5	**B**
EEE321B: Object-Oriented Techniques	1	-	-	-	-	3	2	5	5	
EEE341B: Electronic Devices and Circuits	1	-	-	-	-	3	2	5	5	
EEE351A: Computer Organization and Assembly Language	1	3	2	5	5	-	-	-	-	
EEE361A: Digital Design and HDL Modelling	1	3	2	5	5	-	-	-	-	
SLEFR3:	-	-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**C**
Total	**12**	**18**	**17**	**35**	**29**	**18**	**17**	**35**	**32**	

Notes:

A. Students selecting Software option must take course marked 'A'

B. Students selecting Hardware option must take course marked 'B'

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

COMPUTER ENGINEERING - YR 4_TABLE E12

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	**A**
EEE403A: Electronic Circuits	1	3	2	5	5	-	-	-	-	**B**
EEE411A: Communication Theory	1	3	2	5	5	-	-	-	-	**B**
EEE431B: DSP Hardware	1	-	-	-	-	3	2	5	5	**B**, **E**
EEE435A: Principles of Operating Systems	1	3	2	5	5	-	-	-	-	
EEE447B: Robotics	1	-	-	-	-	3	2	5	5	**C, E**
EEE453A: Digital VLSI Design	1	3	2	5	5	-	-	-	-	**B**
EEE457: Computer Engineering Design Project	2	2	2	4	4	-	4	4	4	
EEE459A: Engineering Human-Computer Interaction	1	3	2	5	5	-	-	-	-	**C**
EEE466A: Distributed Applications	1	3	2	5	5	-	-	-	-	**C**
EEE469B: Computer Organization	1	-	-	-	-	3	2	5	5	
EEE473B: Computer Communications	1	-	-	-	-	3	2	5	5	
EEE492A: Software Processes and Work Products	1	3	2	5	5	-	-	-	-	**C**
EEE495B: Digital Systems Architecture	1	-	-	-	-	3	2	5	5	**B**
EEE499B: Real-Time Embedded System Design	1	-	-	-	-	3	2	5	5	**C**
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	**D**
Total	**11.5**	**16.0**	**19.0**	**35.0**	**30.0**	**15.0**	**21.0**	**36.0**	**32.0**	

Notes:

A. POE289A can replace HIE289A.

B. Students selecting Hardware option must take courses marked 'B'

C. Students selecting Software option must take the ones marked 'C'

D. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

E. Students selecting Hardware option, EEE447B may replace EEE431B with the permission of the department.

MECHANICAL ENGINEERING - YR 2_TABLE E13

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	3	
HIE207A: Canada	1	3	-	3	3	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
MAE209B: Probability & Statistics	1	-	-	-	-	3	-	3	4	
MAE226A: Engineering Calculus	1	4	1	5	5	-	-	-	-	
MAE227B: Ordinary Differential Equations, Sequences and Series for Engineers	1	-	-	-	-	3	1	4	4	
PHE205A: Mechanics	1	3	4	7	4	-	-	-	-	
CCE220A: Introduction to Materials Science and Engineering Materials	1	3	-	3	3	-	-	-	-	
GEE231B: Introduction to Mechanics of Materials	1	-	-	-	-	2	2	4	4	
MEE233B: Introduction to Manufacturing Processes	1	-	-	-	-	2	2	4	4	
GEE241B: Electrical Technology	1	-	-	-	-	3	2	5	5	
GEE267A: Engineering Graphics - II	1	1	2	3	3	-	-	-	-	
GEE293A: Managing Engineering Projects	1	3	1	4	6	-	-	-	-	
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	A
Total	**13**	**17**	**17**	**34**	**26**	**19**	**16**	**35**	**29**	

Notes:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

MECHANICAL ENGINEERING - YR 3_TABLE E14

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	
MAE328A: Differential Equations, Boundary Value Problems and Complex Variables	1	3	2	5	5					
MEE301B: Machine Design	1	-	-	-	-	3	1.5	4.5	4.5	
MEE303B: Engineering Design	1	-	-	-	-	3	1.5	4.5	4.5	
MEE311B: Fluid Mechanics - I	1	-	-	-	-	3	1.5	4.5	4.5	
MEE331A: Strength of Materials	1	3	1.5	4.5	4.5	-	-	-	-	
MEE333A: Metallurgy and Engineering Materials	1	3	1.5	4.5	4.5	-	-	-	-	
MEE345A: Applied Mechanics	1	3	1.5	4.5	4.5	-	-	-	-	
MEE346B: Modelling and Simulation of Dynamic Systems	1	-	-	-	-	3	1.5	4.5	4.5	
MEE351A: Thermodynamics I	1	3	1.5	4.5	4.5	-	-	-	-	
MEE353B: Thermodynamics II	1	-	-	-	-	3	1.5	4.5	4.5	
SLEFR3:		-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**A**
Total	**12**	**18**	**16**	**34**	**28**	**18**	**15.5**	**33.5**	**30.5**	

Note:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

MECHANICAL ENGINEERING - YR 4_TABLE E15

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	**A**
MEE407A: Finite Element Methods	1	3	2	5	5	-	-	-	-	
MEE411A: Fluid Mechanics II	1	3	2	5	5	-	-	-	-	
MEE421A: Heat Transfer	1	3	2	5	5	-	-	-	-	
MEE431B: Stress Analysis	1	-	-	-	-	3	2	5	5	
MEE443A: Feedback Control of Electro-Mechanical Systems	1	3	2	5	5	-	-	-	-	
MEE482B: Instrumentation	1	-	-	-	-	3	2	5	5	
MEE471: Engineering Project	1.5	-	3	3	3	-	4	4	4	
Elective: Fall Semester	1	3	1	4	4	-	-	-	-	**B**
Elective: Winter Semester	1	-	-	-	-	3	1	4	4	**B**
Elective: Winter Semester	1	-	-	-	-	3	1	4	4	**B**
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	**C**
Total	**12**	**17**	**21**	**38**	**33**	**15**	**19**	**34**	**30**	

Notes:

A. POE289A can replace HIE289A.

B. Three (3) elective courses to be selected from; MEE/GMF401, MEE/GMF417, MEE/GMF423, MEE/GMF433, MEE/GMF437, MEE/GMF451, MEE/GMF457, MEE/GMF469, AEE/GAF467, AEE/GAF491. One (1) in the Fall and two (2) in the Winter semester. These elective courses will only be offered in one of the two official languages.

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

AERONAUTICAL ENGINEERING - YR 2_TABLE E16

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
HIE203B: Canadian Military History	1	-	-	-	-	3	-	3	3	
HIE207A: Canada	1	3	-	3	3	-	-	-	-	
POE205B: Canadian Civics and Society	1	-	-	-	-	3	-	3	3	
MAE209B: Probability & Statistics	1	-	-	-	-	3	-	3	4	
MAE226A: Engineering Calculus	1	4	1	5	5	-	-	-	-	
MAE227B: Ordinary Differential Equations, Sequences and Series for Engineers	1	-	-	-	-	3	1	4	4	
PHE205A: Mechanics	1	3	4	7	4	-	-	-	-	
CCE220A: Introduction to Materials Science and Engineering Materials	1	3	-	3	3	-	-	-	-	
GEE231B: Introduction to Mechanics of Materials	1	-	-	-	-	2	2	4	4	
GEE241B: Electrical Technology	1	-	-	-	-	3	2	5	5	
GEE267A: Engineering Graphics - II	1	1	2	3	3	-	-	-	-	
GEE293A: Managing Engineering Projects	1	3	1	4	6	-	-	-	-	
AEE261B: Aircraft Performance	1	-	-	-	-	3	2	5	5	
SLEFR2:	-	-	5	5	2	-	5	5	2	
ATH201:	-	-	2	2	-	-	2	2	-	
PMT 200 Series:	-	-	2	2	-	-	2	2	-	**A**
Total	**13**	**17**	**17**	**34**	**26**	**20**	**16**	**36**	**30**	

Notes:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

AERONAUTICAL ENGINEERING - YR 3_TABLE E17

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE301A: Organizational Behaviour & Leadership	1	3	-	3	3	-	-	-	-	
HIE271B: Introduction to Military History and Thought	1	-	-	-	-	3	-	3	6	
MAE328A: Differential Equations, Boundary Value Problems and Complex Variables	1	3	2	5	5	-	-	-	-	
AEE301B: Design of Aircraft Components	1	-	-	-	-	3	1.5	4.5	4.5	
AEE333B: Aerospace Materials	1	-	-	-	-	3	1.5	4.5	4.5	
EEE381B: Avionic Systems	1	-	-	-	-	3	1.5	4.5	4.5	
MEE311B: Fluid Mechanics - I	1	-	-	-	-	3	1.5	4.5	4.5	
MEE331A: Strength of Materials	1	3	1.5	4.5	4.5	-	-	-	-	
MEE333A: Metallurgy and Engineering Materials	1	3	1.5	4.5	4.5	-	-	-	-	
MEE345A: Applied Mechanics	1	3	1.5	4.5	4.5	-	-	-	-	
MEE346B: Modelling and Simulation of Dynamic Systems	1	-	-	-	-	3	1.5	4.5	4.5	
MEE351A: Thermodynamics I	1	3	1.5	4.5	4.5	-	-	-	-	
MEE353B: Thermodynamics II	1	-	-	-	-	3	1.5	4.5	4.5	
SLEFR3:		-	4	4	2	-	4	4	2	
ATH301:	-	-	2	2	-	-	2	2	-	
PMT 300 Series:	-	-	2	2	-	-	2	2	-	**A**
Total	**13**	**18**	**16**	**34**	**28**	**21**	**17**	**38**	**35**	

Note:

A. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

AERONAUTICAL ENGINEERING - YR 4_TABLE E18

		Fall Term				Winter Term				
		Periods/Week				Periods/Week				
	Credit	Lecture	Lab./Tut.	Total	Study	Lecture	Lab./Tut.	Total	Study	Notes
PSE401B: Military Professionalism & Ethics	1	-	-	-	-	3	-	3	6	
HIE289A: The Impact of Science and Technology on Society and the Environment	0.5	2	-	2	4	-	-	-	-	A
MEE411A: Fluid Mechanics - II	1	3	2	5	5	-	-	-	-	
MEE421A: Heat Transfer	1	3	2	5	5	-	-	-	-	
AEE431A: Aerospace Structural Design and Stress Analysis	1	3	2	5	5	-	-	-	-	
AEE433B: Aerodynamics	1	-	-	-	-	3	2	5	5	
AEE461B: Aerospace and Space Propulsion	1	-	-	-	-	3	1	4	4	
AEE465A: Introduction to Aircraft Stability and Control	1	3	2	5	5	-	-	-	-	
AEE491B: Maintenance Management	1	-	-	-	-	3	1	4	4	
Elective: Fall Semester	1	3	1	4	4	-	-	-	-	B
Elective: Winter Semester	1	-	-	-	-	3	1	4	4	B
AEE471: Capstone Aeronautical Engineering Design Project	1.5	-	3	3	3	-	4	4	4	
SLEFR4:	-	-	5	5	2	-	5	5	2	
ATH401:	-	-	2	2	-	-	2	2	-	
PMT 400 Series:	-	-	2	2	-	-	2	2	-	C
Total	**12**	**17**	**21**	**38**	**33**	**15**	**18**	**33**	**29**	

Notes:

A. POE289A can replace HIE289A.

B. Two (2) elective courses to be selected from; MEE/GMF417, MEE/GMF423, MEE/GMF433, MEE/GMF451, AEE/GAF467. One (1) in the Fall and one (1) in the Winter semester. These elective courses will only be offered in one of the two official languages.

C. Professional Military Training (PMT) is delivered in a variety of formats, including two lecture/lab periods per week, on weekends, and on weeknights as appropriate. See PMT section for a detailed breakdown of PMT activity per year.

Civil Engineering

PROGRAMMES 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.

Civil Engineering

The prescribed course of study for Civil Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E5
Third Year	Table E6
Fourth Year	Table E7

Laboratories and Equipment

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 analyser; 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. A mobile laboratory equipped with a gas chromatograph with mass selective detector, a drying oven, a centrifuge, class "A" fume hoods and various field testing equipment.

Geomatics

Real-time and post-analytical differential GPS receiver equipment; total station, electronic and optical surveying equipment; photogrammetric stereoscopes and parallax measurement equipment.

200 COURSES

GEE231B 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: PHE/F104, PHE/F205A.
Note(s): For students of the Second Year taking Engineering.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

GEE235B 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.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

300 COURSES

CEE303A 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: GEE/IGF231B, MAE/F119B, 226A et 227B.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE305B 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: CEE/GCF303A, CEE/GCF317A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE311B 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: CEE/GCF303A.
Co-requisite: CEE/GCF305B.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE317A Civil Engineering Analysis I

Ordinary and partial differential equations that apply to Civil Engineering problems are derived. Analytical and numerical solutions of specific problems are developed. Problems studied include: structural vibration, beam deformation, groundwater flow, consolidation of soil and others developed in coordination with the needs of departmental courses.

Statistical analysis of data will also be studied.

The course is intended to develop the students' abilities in structured computer programming and in the application of the computer to Civil Engineering problems. A significant proportion of the course will entail computer use.

Prerequisite: GEE/IGF231B, MAE/F119B, 226A and 227B.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CEE319B Civil Engineering Analysis II

This course represents a direct continuation of course CEE/GCF317A and simply extends the range of problems considered, whilst following the same approach of mathematical formulation, numerical solution and computer applications.

Prerequisite: CEE/GCF317A, CEE/GCF355A, CEE/GCF303A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 1 Study (/wk): 3
Credit(s): 0.5

CEE343A Hydrology

Introduction to the hydrologic cycle. Study of rainfall-runoff relationship. Presentation of the unit hydrograph theory. Application of statistics in hydrology. Study of hydrologic and hydraulic routing techniques. Review of the principles of fluid mechanics. Presentation of ground water flow equations. Presentation of the principles of drinking water and wastewater flow rates estimation. Introduction to storm water management, and to urban flow simulation models.

At the end of the course, the student should be able to calculate and predict the flow rate that can be expected at specific locations of a watershed for given hydrologic conditions.

Prerequisite: MAE/F226A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 1 Study (/wk): 3
Credit(s): 1

CEE355A 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: GEE/IGF235B,GEE/IGF231B, MAE/F226A and 227B.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE360A Geomatics I

In this first geomatics course, topics include: surveying principles, error analysis, instrument checks and calibrations, measurements, trigonometric calculations, projections, coordinate systems, detail surveys, route construction surveys, and project planning. Equipment includes levels, theodolites, total stations, and GPS (Global Positioning System) receivers.

Upon completion of this course, students can plan and carry out surveying work for civil engineering projects.

Prerequisite: MAE/F119B, 209A ou B, 226A et 227B.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CEE362B Geomatics II

In this second geomatics course the emphasis is on the study of the mapping sciences and least squares analysis. Topics include: geographic information systems, remote sensing, digital image processing photogrammetry, cartography and the adjustment of survey observations.

Upon completion of this course, students can analyse survey network computations and use mapping science tools to support civil engineering projects.

Prerequisite: CEE360A, CEE317A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

CEE363B 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: CEE362B.
Note(s): For students of the Third Year taking Civil Engineering. Lab (/wk): Study (/wk):
Credit(s): 1

CEE385A Introduction to Environmental Engineering

Presentation of water quality parameters. Description of typical water and wastewater treatment plants. Presentation of dissolved oxygen sag curve. Introduction to soil degradation processes. Discussion of solid and hazardous wastes treatment and disposal options. Introduction to site environmental assessment. Study of environmental impact assessment methodologies. Discussion of air quality parameters. Description of typical air treatment units.

At the end of the course, the student should be able to identify water and air quality parameters, and select appropriate treatment or disposal options for air, water, or soil pollutants.

Prerequisite: CCE/F101, MAE/F226A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

CEE387B 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: CEE317A, CEE343A, CEE355A.
Note(s): For students of the Third Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

400 COURSES

CEE403A Introduction to Concrete and Reinforced Concrete Design

Topics include: concrete technology, introduction to limit states design for reinforced concrete structures, analysis and design of rectangular and T-beams for flexure and shear; an introduction to continuity in concrete construction for beam and one-way continuous slab design and development length of reinforcement.

Laboratory exercises include: mixing, admixtures, curing, aggregate tests, strength tests for concrete; fabrication and testing of a reinforced concrete beam.

Prerequisite: CEE/GCF303A.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE405A 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: CEE/GCF305B, CEE/GCF319.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

GCF415B Dimensionnement des structures en béton armé

Available in French Only

Topics include: Analysis of Loads, continuity in structures, continuous beams and girders; design of one-way and two-way slabs; columns, footings; and introduction to prestressed concrete. A major assignment will be an integrated complete design of a 10-storey office building.

Prerequisite: CEE/GCF403A, CEE/GCF405A.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE417A 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: CEE/GCF311B.
Co-requisite: CEE/GCF405A.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

GCF418B Gestion de la conception et de la construction d'ouvrages structuraux

Available in French Only

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: CEE/GCF403A, GCF/CEE405A, CEE/GCF417A.
Note(s): For students of the fourth year taking Civil Engineering
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE419B 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: CEE/GCF403A, CEE/GCF405A, CEE/GCF417A.
Note(s): For students of the fourth year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE443A 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: CEE/GCF343A, MEE/GMF315B.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 2 Lab (/wk): 1 Study (/wk): 3
Credit(s): 1

GCF451B Hydrogéologie appliquée

Available in French Only

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: GEE/IGF235B, CEE/GCF319B, CEE/GCF355.
Note(s): For students of the fourth year taking Civil Engineering
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE457A 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: CEE/GCF355A, CEE/GCF319B.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE459B 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 tunneling, slopes, culverts, geoenvironmental issues. The relationship between predicted and observed behaviour is explored.

Prerequisite: CEE/GCF457A.
Note(s): For students of the fourth year taking Civil Engineering
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

CEE485B Sanitary and Environmental Engineering

Review of relevant chemistry (basic, acid-base, organic) and biochemistry notions. Study of the ways to measure organic matter in water and wastewater. Presentation of relevant microbiology notions. Analysis of common reactor configurations and reaction rate equations. Study (including numerical analysis and design) of physico-chemical treatment processes (screening and sedimentation, aeration, coagulation and flocculation, filtration, disinfection) and of biological treatment processes (aerobic treatment, biological reactor design). Introduction to anaerobic treatment processes.

At the end of the course, the student should be able to design the main components of a water and of a wastewater treatment plant, and identify key design parameters and design issues.

Prerequisite: CEE/GCF385A.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 4 Lab (/wk): 2 Study (/wk): 6
Credit(s): 1.5

CEE489B 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: CEE/GCF319B.
Note(s): For students of the Fourth Year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 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.

Fieldwork: 0-4-4

Fall: 1-2-3

Winter: 1-3-4

Co-requisite: Appropriate 4th year courses. Topic depend on department approval.
Note(s): For students of the Fourth Year taking Civil Engineering. Lab (/wk): Study (/wk):
Credit(s): 2

Electrical and Computer Engineering

PROGRAMMES OF STUDY

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

The prescribed course of study for Electrical Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E8
Third Year	Table E9
Fourth Year	Table E10

Computer Engineering

The prescribed course of study for Computer Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E8
Third Year	Table E11
Fourth Year	Table E12

Laboratories & Equipment

The laboratories and offices of the department are located on the third, forth 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 microwaves, 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 Microwaves, 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.

200 COURSES

GEE241B Electrical Technology

For students in Mechanical and Chemical Engineering. This course introduces the students to the basic techniques of circuit analysis. Circuit elements and their volt-ampere relationship as phasors at steady-state. Circuit analysis techniques using nodes and meshes. Steady-state single phase and three-phase circuits. Single phase transformers. Introduction to DC and AC machines.

Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

GEE293A 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.

Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 6
Credit(s): 1

EEE203A Electric Circuits I

This course deals with the behaviour of circuits built from basic linear circuit elements (resistance, capacitance, inductance, ideal operational amplifiers, and independent and dependent voltage and current sources); DC circuit analysis; energy storage and time domain behaviour; sinusoidal steady state circuit analysis; ac power; three-phase systems; and, ideal transformers and mutual inductance.

Prerequisite: PHE104.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE243B Applied Computer programming

The objective of this course is to introduce the design of software programs and components in an applied context. Topics include: design of software components as part of larger systems including other software components and other electrical and computer subsystems; effective decomposition of the software components of a system into modules, and 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 the use of underlying operating system support; rudimentary control of physical systems through high-level interfaces to digital I/O channels, and A/D and D/A converters.

Prerequisite: CSE101A.
Note(s): For students of the Second Year taking Electrical or Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE245A Logic Design

Students completing this course will be able to analyze and design simple digital circuits. Review of number systems and introduction to digital codes. Basic combinational logic topics: Boolean Algebra, SSI logic gates, minimization techniques, and mixed logic theory. Detailed discussion of MSI logic functions: decoders, multiplexers, comparators and arithmetic logic units. Sequential logic and digital memory: latches, flip-flops and registers. Classical and Algorithmic State Machine design procedures for, and problems with synchronous, sequential machines. Introduction to hardware construction and computer aided simulation tools.

Note(s): For students of the Second Year taking Electrical or Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

300 COURSES

EEE301A Applied Electromagnetics

Students completing this course will be capable to apply the laws of electromagnetism to simple practical problems. It provides the basis for the program's microwave and antenna courses. Review of vector operations and coordinate systems; experimental basis for electromagnetic theory; electrostatics and magnetostatics. Laplace's and Poisson's equations; solutions to boundary-value problems. Maxwell's equations; wave equation and plane waves; transmission lines; shielding and hazards.

Prerequisite: PHE228B.
Note(s): For students of the Third Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE303A Electric Circuits II

At the end of this course, the student will be able to apply the laws of circuit analysis to practical electronics or power systems problems. Basic concepts of circuit theory; circuit analysis techniques; transient analysis of first and second order linear circuits; sinusoidal steady state analysis; transfer function and frequency response of networks and systems; application of Laplace transform to the solution of network and system equations; state variables, state equations.

Prerequisite: EEE203A, MAE227B.
Note(s): For students of the Third Year taking Electrical Engineering or Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE307B Computer Interfacing Techniques

After completing this course, students will be capable to design simple interfaces to modern microcomputers. Topics include: description of bus; timing analysis; serial and parallel interfacing; polling and interrupts; counters and interval timers; A/D and D/A conversion; interfacing to magnetic devices; Direct Memory Access (DMA) techniques.

Prerequisite: EEE351A.
Note(s): For students of the Third Year taking Computer or Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE309B Control Systems I

Students will know and understand the theoretical foundations of control systems. Techniques for the modelling of control system components, state variable models for linear systems, transfer functions, analysis of complete control systems; stability, root locus; performance criteria; design of single-input single-output linear feedback control systems via, state and output feedback, principles of sampled-data systems.

Prerequisite: MAE305(1).
Note(s): For students of the Third Year taking Electrical Engineering
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE311B Signals and Systems

At the end of this course, the student will be able to apply the basics of communications theory and the mathematical tools to simple analog and digital communications problems. Fourier analysis of signals, linear systems and filters, sampling theory, probability theory, random variables and random processes.

Prerequisite: MAE305(1), EEE303A.
Note(s): For students of the Third Year taking Electrical Engineering and Computer Engineering Hardware Option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE321B Object-Oriented Techniques

At the end of this course, the student will be able to apply the techniques of Object-Oriented Analysis (OOA) and Design (OOD). The course material covers managing complexity, using data and procedural abstraction, encapsulation, hierarchies, and decomposition of problems into classes and objects. The concepts of overloading, multiple inheritance and polymorphism are introduced. The analysis, design and implementation phases of software development are considered in the context of an iterative, use case driven object-oriented development methodology. Design patterns are introduced as context for higher-level reuse. Lecture material and course assignments will provide an introduction to the Unified Modelling Language (UML). Java will be used as an implementation language to illustrate object-oriented concepts.

Prerequisite: CSE350A.
Note(s): For students of the Third Year taking Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE331A Energy Conversion

The objective of this course is to provide the student with a basic understanding of the operation of electromechanical devices and a realistic expectation of their performance. An introduction to energy conversion processes with emphasis on electromechanical devices. Topics include: a survey of energy-conversion methods, properties of magnetic materials and analysis of magnetic circuits; transformers; analysis of electromechanical systems; polyphase systems; performance of a.c. and d.c. electrical machines; introduction to power semiconductor circuits; modelling of physical systems.

Prerequisite: EEE203A.
Note(s): For students of the Third Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE341B Electronic Devices and Circuits

For students of the Third Year taking Electrical or Computer Engineering. At the end of this course the student will be able to analyze and design simple electronic circuits. Description and operation of electronic components: diodes, bipolar and field effect transistors. Diode circuits and applications. Single stage amplifier: biasing, small signal models, configurations, analysis and design of amplifier circuits. Low frequency response of single stage amplifiers. Binary logic circuits.

Prerequisite: MAE305(1), EEE303A.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE351A Computer Organization and Assembly Language

The objective of this course is for the student to learn a modern assembly language and be able to program in that language. The microprocessor as a system building block; introduction to architecture. Microcomputer buses, address decoding, memory devices, simple input/output. Introduction to programming: instruction sets, addressing modes, assembly and machine-language programming, interrupts and vectors. Interfacing with peripherals: parallel and serial interface adapters, interrupt requests and handshakes.

Prerequisite: EEE245A.
Note(s): For students of the Third Year taking Electrical or Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE361A Digital Design and HDL Modelling

Students, after taking this course, will understand the process of designing digital systems and be able to use modern digital design tools to plan, develop and implement complex digital systems. Review of the analysis and design of synchronous sequential circuits: Moore networks, Mealy networks. Controller design using the Algorithmic State Machine approach (ASM): ASM chart notation; Standard methods for ASM implementation: multiplexer method, one-hot method, ROM method. Introduction to a hardware description language: VHDL. Presentation of the various VHDL constructs and their usage. Simulation of VHDL circuit descriptions. Register Transfer Logic (RTL): introduction of a simple language to describe register transfers; hardware implementation of

RTL statements; Application to the design of a simple computer.

Microsequencers and microcontrollers. Implementation of control algorithms using microsequencers: modification to ASM charts, microprogramming. Review of modern microcontrollers. Introduction to programmable logic: description of PLAs, PALs, CPLDs, FPGAs. Introduction to software tools for design with programmable logic.

Prerequisite: EEE245A.
Note(s): For Third Year students taking Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE381B 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: GEE241B or EEE203A.
Note(s): Winter. EEE381B - For students of the Third Year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

400 COURSES

EEE403A Electronic Circuits

Students are provided with an understanding of the principle of operations of analog circuits of medium complexity that are used as building blocks in larger circuits. High frequency small signal models of transistors; multistage amplifiers; cascade configuration. Non-ideal operational amplifier, use of negative feedback, effect of feedback on gain, input and output impedances, noise, distortion and parameter tolerances, applications. Positive feedback circuits: linear feedback oscillators, switching oscillators, multivibrators. Emitter coupled differential amplifier. Use of negative feedback with transistor amplifier. Current mirror, basic Opamp internal structure.

Prerequisite: EEE341B.
Note(s): For students of the Fourth Year taking Electrical or Computer Engineering Hardware option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE411A Communication Theory

The aim of this course is to provide the student with knowledge and understanding of the basics of communication theory. Modulation techniques, sampling theorem; AM, FM, PCM, signal-to-noise ratio; Hilbert transforms; digital communications: ASK, FSK, PSK, DPSK, probability of errors; pulse shaping and timing.

Prerequisite: EEE311B.
Note(s): For students of the Fourth Year taking Electrical Engineering and Computer Engineering Hardware
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE417B Electromagnetic Propagation and Radiation

Review of Maxwell's equations and boundary conditions. Waveguide structure models. Resonant cavities. Introduction to fibre-optics. Antenna theory for element and arrays. A study of earth propagation modes such as ground waves, space waves and ionospheric reflections.

Prerequisite: EEE441A.
Note(s): An elective for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE425B Digital Control Systems

Sampling, z-transforms and transfer functions; state-space representations; stability; root locus; compensator design; computer control of feedback systems.

Prerequisite: EEE309B.
Note(s): An elective course for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE429B Electric Machines and Power

Review and extension of polyphase circuit theory and analysis. Symmetrical components. Power, energy, maximum demand, frequency and phase measurements. Characteristics of power transformers, a.c. and d.c. rotating machines, including two-machine systems. Electrical power generation and distribution. Survey of the economics of power systems. Methods of analysis of power transmission. Faults in interconnected systems.

Prerequisite: EEE331A.
Note(s): An elective for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE431B DSP Hardware

Introduction to digital signal processing; sampling: Nyquist rate, sample and hold, D/A and A/D, delta modulation; digital signal processors; DSP hardware: multipliers and barrel shifters; hardware architectures; digital filters design and implementation: FIR and IIR; FFT algorithm and software implementations; multiprocessor systems. This course consists of lectures, demonstrations, exercises and laboratories.

Prerequisite: EEE411A, EEE351A.
Note(s): For students of the Fourth Year taking Electrical Engineering and Computer Engineering Hardware option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE433B Satellite and Mobile Communication

Spread Spectrum Systems, Fundamentals of Satellite Communications, Fundamentals of Cellular Mobile Communications. Error correction codes.

Prerequisite: EEE411A.
Note(s): An elective for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE435A Principles of Operating Systems

Introduction to the C language, concurrent processes, inter-process communication, deadlock, scheduling, input/output, file systems, file servers, memory management, virtual storage management.

Prerequisite: CSE350A.
Note(s): For students of the Fourth Year taking Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE441A Microwave Circuits, Devices and Systems

Microwave circuit analysis using impedance and scattering-matrix representations. Microwave sources, amplifiers and solid state devices. Microwave passive devices; filters, couplers, etc. Microwave integrated circuits (Microstrip) and CAD techniques. Microwaves receivers and transmitters. Overview of communication satellite systems with emphasis on RF components and link consideration. Introduction to radar basics, target cross-section, MTI and pulse doppler, weather radar, synthetic aperture radar and pulse compression techniques.

Prerequisite: EEE301A.
Note(s): For students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE447B Robotics

Survey of sensors and transducers for measuring physical quantities; measurement errors and calibration of analog and digital interfaces; sampling, quantization; actuators. Implementation of representative microprocessor-based closed-loop systems selected from the areas of motor drives and robotics. Software implementation of robot control systems. Types of robot arms. Path control and obstacle avoidance methods. Single processor and multi-processor distributed systems.

Prerequisite: EEE307B, EEE341B, EEE243B.
Exclusion: For students of the Fourth Year taking Computer Engineering Software.
Note(s): An elective for students of the Fourth Year taking Electrical Engineering. Also available as an elective for students of the Fourth Year taking Computer Engineering Hardware, with the permission of the department.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE449A Power Electronics

Characteristics of power semiconductor devices. Switching circuits; rectifiers, voltage controllers, converters, inverters and cycloconverters. Polyphase circuits, harmonics and modulation. Applications to control of DC machine, synchronous and induction motors. Energy conversion.

Prerequisite: EEE331A.
Note(s): An elective for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE453A Digital VLSI Design

IC technologies overview; MOS transistor: structure, operation, modelling; NMOS inverters: d.c. analysis and comparative analysis; CMOS inverter: d.c. and transient analysis, power dissipation; IC lithography and fabrication steps; layout and layout verification; Digital CMOS circuits: analysis and layout of combinational and sequential circuits; dynamic CMOS; I/O structures.

Prerequisite: EEE245A, EEE341B.
Note(s): For students of the Fourth Year taking Computer Engineering, Hardware option. An elective for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE455 Electrical Engineering Design Project

The design project allows the student to demonstrate that he is capable of applying the skills and techniques he has learned in program courses to deliver a working product. Under the supervision of a faculty member, groups of 2-4 students design and construct a prototype system to satisfy selected criteria against which its actual performance is evaluated. Oral progress reports are required along with a written final report and formal examination by a board of staff members.

2 - 2 - 4 (Fall Term)
0 - 4 - 4 (Winter Term)

Note(s): For students of the Fourth Year taking Electrical Engineering. Lab (/wk): Study (/wk):
Credit(s): 2

EEE457 Computer Engineering Design Project

See EEE455. Emphasis will be placed on software specification, documentation and management techniques.

2 - 2 - 4 (Fall Term)
0 - 4 - 4 (Winter Term)

Note(s): For students of the Fourth Year taking Computer Engineering. Lab (/wk): Study (/wk):
Credit(s): 2

EEE459A Engineering Human-Computer Interaction

Practical processes and techniques for the development of usable computer systems. Topics include: Foundations of usability. Users, user roles and context of use. Activity and task modeling. Abstract interface modeling. Interface navigation. Layout, visual communication, affordances and constraints. Supporting interface learning. Prototyping and prototype evaluation. Architectures and implementation techniques. Inspection and review methods. Usability metrics. Laboratory and field testing.

Prerequisite: EEE321B.
Note(s): For students of the Fourth Year taking Computer Engineering Software option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE466A Distributed Systems

Principles and characteristics of distributed systems, computer communication technologies and protocols, client/server systems, interprocess communication, distributed objects, time services and interprocess coordination, distributed transaction and replica which include concurrency control and two phases-commit-protocol, name services, security such as cryptographic key distribution, authentication and signature, web services, network-centric computing, and an overview of divers internet services and protocols (e.g. SMTP, NNTP, HTTP, FTP, Telnet, WWW, PPP).

Prerequisite: EEE321B.
Note(s): For students of the Fourth Year taking Computer Engineering Software option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE469B Computer Organization

A course to familiarize the student with some aspects of computer hardware. Topic include: computer design methodology, processor and control design, memory and system organization. Input/ Output.

Prerequisite: EEE307B, EEE361A.
Note(s): For students of the Fourth Year taking Computer Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE473B Computer Communications

Review of computer-communication techniques and networks; circuit and packet switching; network topology; queueing and its application to networks; capacity assignment; routing and flow control; multiple-access techniques; network protocols; security and cryptography.

Note(s): For students of the Fourth Year taking Computer Engineering. An elective course for students of the Fourth Year taking Electrical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE492A Software Processes and Work Products

Introduction to scale-related complexities inherent in software projects. Study of software development processes, and of work products associated with those processes. Specific topics include: Requirements Analysis, Software Metrics, Software Quality, Estimating Software Complexity, Estimating Software Projects, Testing & Inspection, and Software Project Management. Lectures may be supplemented with critical reading and discussion of published articles on software. The course is supported by a laboratory in which the students undertake a software development project.

Prerequisite: EEE321B.
Note(s): For students of the Fourth Year taking Computer Engineering Software option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE495B Digital Systems Architecture

Hardware components and technologies; digital systems design methodology; ASIC design methodology; synchronous systems: static timing analysis, performance analysis, synchronization and synchronization failures; clocked static and dynamic circuits; asynchronous circuits; arithmetic algorithms: architectural trade-offs and silicon realization; regular array architectures: PLA architectures and PLA generation for ICs, MOS memory architectures: RAM, DRAM, ROM and CAM. Students will learn to design digital systems or components of digital systems including physical realization using CAE tools.

Prerequisite: Prerequisites - EEE361A, EEE453A.
Note(s): For students of the Fourth Year taking Computer Engineering Hardware option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

EEE499B Real-Time Embedded System Design

Definition, structure, and properties of embedded real-time systems. Typical applications. Review of related concepts, including tasking models, context switching, interrupts, and the ADA rendez-vous. Specification and design methods for real-time systems and applicable CASE (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. Distributed systems.

Prerequisite: EEE321B, EEE435A.
Note(s): For students of the Fourth Year taking Computer Engineering Software option.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

Mechanical Engineering

PROGRAMMES OF STUDY

Accreditation

The baccalaureate degree programme in Mechanical Engineering is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers.

The baccalaureate degree programme in Aeronautical Engineering is currently under accreditation assessment by the CEAB because it is a new programme. The outcome of the CEAB accreditation for the BEng in Aeronautical Engineering will be announced in 2009, after the first class has graduated from the programme.

Mechanical Engineering

The prescribed course of study for Mechanical Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E13
Third Year	Table E14
Fourth Year	Table E15

Aeronautical Engineering

The prescribed course of study for Aeronautical Engineering is set out in the Programme Outline Tables listed below:

First Year	Table E1
Second Year	Table E16
Third Year	Table E17
Fourth Year	Table E18

Laboratories and Equipment

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.

100 COURSES

GEE167B 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.

Prerequisite: None.
Note(s): For students of the First Year taking Engineering.
Lecture (/wk): 1 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

200 COURSES

MEE233B 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, bonding and rapid prototyping. Emphasis is placed on understanding the strengths and limitations of each approach. Other topics include manufacturing standards, such as tolerances, intellectual property and safety.

Prerequisite: GEE/IGF167.
Note(s): For students of the second year taking Mechanical Engineering
Lecture (/wk): 2 Lab (/wk): 2 Study (/wk): 4
Credit(s): 1

GEE267A Engineering Graphics II

This course continues the study of engineering graphics and its use in engineering design and production. Conventional drawing standards are covered. Topics studied are: sections and assembly drawings, threads and

fasteners, fits and tolerance including geometric dimensioning and tolerance (GDT) methods, mapping and geographic information systems (GIS), structural drawing and welding, and working drawing packages. The use of SolidWorks is continued with emphasis on producing conventional engineering drawings to CSA standards from solid models of simple assemblies.

Prerequisite: GEE/IGF167.
Note(s): For students of the Second Year taking Aeronautical, Mechanical or Civil Engineering.
Lecture (/wk): 1 Lab (/wk): 2 Study (/wk): 3
Credit(s): 1

300 COURSES

MEE301B 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: MEE/GMF331, MEE/GMF333.
Note(s): For students of the third year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE303B Engineering Design

This course presents the processes of problem solving and engineering design. An integrated technical system provides the context within which to consider changing component characteristics. The design and/or redesign of sub-systems/components are then examined in isolation. At the component level, the tasks of establishing a design specification, considering alternative principles of operation and arrangement of functional elements, and selecting potential solutions 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: GEE/IGF267, MEE/GMF331.
Note(s): For students of the third year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE311B 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 by experiments conducted in the laboratory, including forces on submerged surfaces, velocity measurements in internal flows, and pumps.

Prerequisite: PHE/PHF205, MAE/MAF226.
Note(s): For students of the third year taking Mechanical Engineering or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE315B 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 fluids engineering industry continues to use imperial units, thus an introduction is required. 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 and associated duct hardware. 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: PHE/PHF205, MAE/MAF226.
Note(s): For students of the third year taking Civil Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE321B 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.

Prerequisite: CCE/CCF217, CCE/CCF311.
Note(s): For students of the third year taking Chemical Engineering.
Lecture (/wk): 0 Lab (/wk): 2 Study (/wk): 2

MEE331A 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: GEE/IGF231.
Note(s): For students of the third year taking Mechanical Engineering or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE333A 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: CCE/CCF220, GEE/IGF231.
Note(s): For students of the third year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE345A 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: PHE/PHF104, MAE/MAF226.
Note(s): For students of the third year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE346B 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: MAE/MAF328, MEE/GMF345.
Note(s): For students of the third year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE351A 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: CCE/CCF101, MAE/MAF226.
Note(s): For students of the third year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

MEE353B Thermodynamics II

This course continues the study of classical thermodynamics begun in MEE351A. Further applications in power producing devices and refrigeration systems, mixtures and solutions, and compressible flow 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: MEE/GMF351.
Note(s): For students of the third year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

400 COURSES

MEE401A/B 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: MEE/GMF301.
Note(s): An elective course for students of the fourth year taking Mechanical Engineering
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE407A 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 and the establishment of appropriate governing element differential equations, 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: MEE/GMF331.
Note(s): For students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE411A 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: MEE/GMF311, MAE/MAF328.
Note(s): For students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE417A/B 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: MEE/GMF345.
Note(s): An elective course for students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE421A 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: MEE/GMF311, MEE/GMF351.
Note(s): For students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE423A/B 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: MEE/GMF421.
Note(s): An elective course for students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE431B 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: MEE/GMF331.
Note(s): For students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE433A/B 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: MEE/GMF331, MEE/GMF333.
Note(s): An elective course for students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE437A/B 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: MEE/GMF346.
Note(s): An elective course for students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE443A 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: MEE/GMF346.
Note(s): For students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

MEE451A/B 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: MEE/GMF353.
Note(s): An elective course for students of the fourth year taking Mechanical or Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE457A/B Compressible Flow

This course continues the study of compressible flow that was introduced in MEE353 - Thermodynamics II. The topics include flow in subsonic and supersonic nozzles and diffusers, supersonic wind tunnels, normal and oblique shock waves, oblique shock wave reflections, Prandtl Meyer Flow, flow in constant area ducts with friction and heat exchange. The course emphasizes the application of the principles covered to practical engineering problems. The lectures are supplemented by assigned problems and laboratory experiments.

Prerequisite: MEE/GMF353.
Note(s): An elective course for students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

MEE469A/B 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: MEE/GMF311, MEE/GMF351.
Exclusion: An elective course for students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 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.

0 - 3 - 3 (Fall Term)

0 - 4 - 4 (Winter Term)

Prerequisite: 8 Third Year Mechanical Engineering credits.
Note(s): For students of the fourth year taking Mechanical Engineering. Lab (/wk): Study (/wk):
Credit(s): 1.5

MEE482B 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: GEE/IGF241, MEE/GMF346.
Exclusion: For students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

AERONAUTICAL ENGINEERING COURSES

200 COURSES

AEE261B 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: MAE/MAF101 and PHE/PHF104.
Note(s): Winter. AEE261B - For students of the second year taking Aeronautical Engineering
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

300 COURSES

AEE301B Design of Aircraft Components

Students are introduced to the general design process with emphasis on approach and phases specific to aircraft design with emphasis on design philosophies of Safe-Life, Fail-Safe and Damage Tolerance. Failure criteria are then presented. Emphasis is put on loads and flight envelope and aircraft weight prediction. The design of components includes fasteners, structural joints, landing gear and engine mounts.

Prerequisite: MEE/GMF331, MEE/GMF333.
Note(s): Winter. AEE301B - For students of the third year taking Aeronautical Engineering
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

AEE333B 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. 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: MEE/GMF331, MEE/GMF333.
Exclusion: For students of the third year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1.5 Study (/wk): 4.5
Credit(s): 1

400 COURSES

AEE431A Aerospace Structural Design and Stress Analysis

Topics covered include aircraft structural layout, histrorical aspects, principles of structural design and the stress analysis of its main component 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: AEE/GAF301, MEE/GMF331.
Exclusion: For students of the fourth year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

AEE433B 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 nondimensional numbers that dictate the behavior 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: MEE/GMF353, MEE/GMF411.
Exclusion: For students of the fourth year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

AEE461B 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: MEE/GMF311, MEE/GMF353.
Note(s): For students of the fourth year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

AEE465A 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: AEE/GAF261, MEE/GMF311.
Exclusion: For students of the fourth year taking Aeronautical Engineering.
Lecture (/wk): 3 Lab (/wk): 2 Study (/wk): 5
Credit(s): 1

AEE467A/B 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: MEE/GMF311, MEE/GMF346.
Exclusion: An Elective course for students of the fourth year taking Aeronautical or Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 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.

0 - 3 - 3 (Fall Term)

0 - 4 - 4 (Winter Term)

Prerequisite: 8 Credits at the third year level from Mechanical and/or Aeronautical Engineering.
Exclusion: For students of the fourth year taking Aeronautical Engineering. Lab (/wk): Study (/wk):
Credit(s): 1.5

AEE491B 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 lifing 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: MAE/MAF209, AEE/GAF301 or MEE/GMF301.
Exclusion: For students of the fourth year taking Aeronautical Engineering.
Note(s): An elective course for students of the fourth year taking Mechanical Engineering.
Lecture (/wk): 3 Lab (/wk): 1 Study (/wk): 4
Credit(s): 1

DIVISION OF CONTINUING STUDIES

DCS EXECUTIVE

Dean of the Division of Continuing Studies

M.A. Hennessy, BA (hon), MA, PhD (UNB)

Associate Dean (Academic Outreach)

P.R. Roberge, PhD, PEng

Associate Dean (Curriculum)

T. Dececchi, BEng, MBA, PhD

Chief of Staff

Col (Ret'd) J.G. Lindsay, OMM, CD, rmc, plsc, qtc, pcsc, ltsc, BEng

GENERAL INFORMATION

Mission

The mission of the Division of Continuing Studies is to make university education available to all members of the CF, spouses of Regular Force members and DND civilian employees.

Continuing Studies at RMC

The degree programmes offered through the Division of Continuing Studies at RMC 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 programme integrates 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.

Vision

To accomplish its mission, the Division of Continuing Studies will:

- identify and analyze the needs of continuing education
- direct the development and availability of distance learning courses in co-operation with the departments
- assist in the integration of new technologies and methodologies for distance learning educational systems
- manage, jointly with the departments, the progress of all candidates in their studies and to contribute to their supervision

Programme Principles

The Royal Military College of Canada is an academic institution that understands the operational commitments of CF members. The degree programmes are designed with flexibility in mind and emphasize maximum efficiency and minimum time for completion, through application of the following principles:

Accessibility:

- Attendance on College grounds is not required
- Many courses are offered in both official languages
- Many courses are offered at the student's location, using the most appropriate distance learning mode

Prior Learning Assessment:

- Full transferability of approved university level credits obtained elsewhere
- Credit is granted, as appropriate, for university level professional and DND courses
- Credit(s) for second language proficiency

Flexibility:

- Timetables accommodate interruptions due to operational commitments

Relevance:

- In-service related courses can make up a significant part of the content for some programmes
- Standard courses will be taught, where possible, within the defence context
- New courses specific to the defence context and unique to these programmes are designed and offered

Modes of Delivery

Continuing Studies courses are offered in two modes:

Classroom mode:

Courses are offered at a number of bases across Canada by instructors selected by the appropriate RMC academic department and under the guidance of that department. The courses are chosen to meet requirements of Continuing Studies degree programmes.

Distance learning mode:

Distance learning courses are offered to students who wish to take courses for which there is insufficient demand to justify a classroom course, who are in isolated locations, or who cannot commit to classroom courses due to military requirements or family commitments.

Other Programmes

In addition to part-time studies, the Division provides administrative support to some full-time studies degree programmes. Part-time studies can be a lead-in to these programmes.

Initial Baccalaureate Degree Programme (IBDP)

Education is an essential and integral part of officer professional development and the CF encourages officers to pursue continuing education on their own volition. The CF 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 CF 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 open to certain non-commissioned members of the CF who meet the academic requirements for admission to RMC 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.

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 the Division of Continuing Studies and the recognition of courses offered by other organizations.

The membership of the Continuing Studies Committee, chaired by the Associate Dean of Continuing Studies (Curriculum), consists of:

- a representative from each academic department
- the Registrar
- the Chair of the Syllabus Committee or delegate
- three members from the Division of Continuing Studies: the Manager of Course Design and Development, the Manager of Course Delivery and the Director of Prior Learning Assessment and Recognition

On behalf of Faculty Board, the Committee adjudicates the registration and Programme of Study for Continuing Studies students, acts as a marks committee for Continuing Studies courses, prepares and maintains the Continuing Studies *Calendar*, and schedules regular meetings thrice annually, holding special meetings as required.

ACADEMIC PROGRAMMES

Degree Programmes Offered

The following programmes are offered through the Division of Continuing Studies:

Undergraduate Degrees

- Bachelor of Military Arts and Science (BMASc)
- Bachelor of Military Arts and Science Honours (BMASc Hons)
- Bachelor of Arts (BA)
- Bachelor of Science (BSc)

Undergraduate Certificates

- Certificate in Management with Applications to Defence
- Certificate in Environmental Protection

Graduate Degrees

- Master of Business Administration
- Master of Arts in Security and Defence Management and Policy
- Master of Arts in War Studies
- Doctorate in War Studies

For information on Graduate Studies programmes offered through the Division of Continuing Studies, please refer to the *Graduate Studies and Research Division Calendar* or visit the Division of Continuing Studies website on the Internet at: Division of Continuing Studies

Bachelor of Military Arts and Science

The Bachelor of Military Arts and Science (BMASc) is a unique degree programme for the CF, is thoroughly grounded in the elements of the military profession, and integrates in-service training with special and standard university courses. It is designed for the serving military member, and recognizes university-level achievement appropriate to the profession of arms.

Though equivalent to a conventional three-year 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 BMASc degree is designed around a compulsory core, which includes credits for the university-level courses that are part of the Officer Professional Military Education (OPME) Programme that was launched in January 2002. The compulsory core for the BMASc programme includes the following 10 credits:

- BAE101 - Introduction to Defence Management and Decision Making
- 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
- HIE275 - Survey of Technology, Society and Warfare (HIE475 - Technology, Society, and Warfare is an acceptable alternative)
- POE206 - The Canadian Forces and Modern Society: Civics, Politics and International Relations, or POE205 - Canadian Civics and Society, or POE316 - Introduction to International Relations
- PSE402 - Leadership and Ethics
- Two credits in English Grammar and Literature
- One more credit in Military Psychology and Leadership (PSE123 - Fundamentals of Human Psychology, or its equivalent)
- Two credits in Science (Mathematics, Physics, Chemistry or Computer Science)

At least 15 of the minimum 30 required course credits must have military content, as determined by the Continuing Studies Committee, and at least 10 of the course credits must be taken through RMC. An appropriate number (at least 10) must be at the senior level (third or fourth-year, or 300 or 400-level courses), and among these at least 5 must be earned through RMC.

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., CCE304 - 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 completed an academic course which the Continuing Studies Committee deems to be directly relevant to the serving member's military career; and military training courses and proficiency that have been approved by the Continuing Studies Committee for academic credit

RMC/DCS Courses Meeting the Military Course Content Requirements of the BMASc

RMC Table of Credit Granted

BMASc Assessment / Summary Sheet

Please note that those who have registered in the BMASc Programme prior to 1 Sept 2004 have the option of completing their studies following an earlier description of the core credits or the new one, which integrates the university-level courses of OPME or their equivalent.

Bachelor of Military Arts and Science Honours

The Bachelor of Military Arts and Science Honours (BMASc Hons), though equivalent to a conventional four-year 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 42-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 will have completed the Honours Programme will have met one important requirement for admission into a Graduate Studies Programme.

Those interested in registering in the BMASc Honours Programme are required to file the Request to Change Degree Programme form once they have earned at least 20 university credits and maintained an average of not less than B- in their university courses. The application should also include a topic for the Directed Research Project (DRP - see below).

The BMASc (Hons) Programme has the same 10-credit core curriculum as the General Programme (see 2.1 above), plus a Directed Research Project (MAS400), which counts for two credits, for a total of 12 compulsory credits.

At least 20 of the minimum 42 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 DRP) of the course credits must be taken through RMC. An appropriate number (at least 20) must be at the senior level (third or fourth-year, or 300 or 400-level courses) of which 10 must be RMC senior credits. To ensure honours standing, students must achieve at least a B in the Directed Research Project (MAS400) and maintain at 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 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 analyse some element of his or her military experience. Students are required to submit a proposal to the Division of Continuing Studies, 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, the Division of Continuing Studies, 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. Two copies must be submitted to the Division of Continuing Studies for final approval of the Directed Research Project credits. 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 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. But because most DRPs are produced 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, the Associate Dean of Continuing Studies (Academic Outreach) or the Associate Dean of Continuing Studies (Curriculum), and only due to exceptional circumstances, such as illness or deployment, can be evidenced.

Bachelor of Arts (BA)

The Division of Arts offers, through the auspices of the Division of Continuing Studies, a three-year General BA. This degree is not open for direct entry to ROTP / RETP cadets. At least 30 credits must be completed. Of the 30 credits, at least 20 must be in Arts, at least 15 must be RMC credits, and at least 10 of the 20 credits in Arts must

be at the senior level. Electives may include credits earned as per the RMC Table of Credit Granted.

Interested students have the option of applying to a General BA programme without a chosen concentration, or to a General BA 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.

The BA Programme with a concentration, offered through the Division of Continuing Studies, incorporates, in much the same manner as the BMASc, a compulsory core. Of the 30 credits required, the following 11 credits are mandatory:

- BAE101 - Introduction to Defence Management and Decision Making
- 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: Origins to 1870
- HIE275 - Survey of Technology, Society and Warfare (HIE475 - Technology, Society, and Warfare is an acceptable alternative)
- POE206 - The Canadian Forces and Modern Society: Civics, Politics and International Relations, or POE205 - Canadian Civics and Society, or POE316 - Introduction to International Relations
- PSE402 - Leadership and Ethics
- At least two credits in English Grammar and Literature
- At least one credit in Canadian History
- At least one more credit in Military Psychology and Leadership (PSE123 - Fundamentals of Human Psychology, or its equivalent)
- At least two credits in Mathematics, Computer Science, Chemistry or Physics

The BA Programme without a concentration, offered through the Division of Continuing Studies, includes the same 11 core credits as those listed above for the BA Programme with a chosen concentration, offered through the Division of Continuing Studies, to which, however, the following credit must be added:

- ECE103 - Elements of Microeconomics, or ECE104 - Elements of Macroeconomics

The total number of mandatory credits in the BA Programme without a concentration, offered through the Division of Continuing Studies, is therefore 12.

The General Bachelor of Arts programme 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 General Arts programme with a concentration.

The General Bachelor of Arts programme 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 Arts Division 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 for the BA with a minor or a concentration are limited at this time and completion of such a degree may require attendance at RMC or the completion of some courses at other universities.

Bachelor of Science (BSc)

The Faculty Science offers, through the Division of Continuing Studies, a General BSc degree in a chosen minor in Science (Chemistry, Physics, Mathematics or Computer Science), or without a minor. At least 30 credits must be completed. Of the 30 credits, at least 20 must be in Science, and at least 15 must be earned through RMC.

Of the 20 credits in Science, 9 are either those of the First Year General Programme of RMC (listed below) or equivalent.

Of the remaining 11 credits, at least 8 must meet the requirements of a minor as defined by the relevant Department or by the Faculty of Science (listed in the RMC Undergraduate Calendar), if the student has opted to register in the General BSc programme with a minor.

The student who has opted for the General BSc programme without a minor may take any Science course that counts towards a Science degree, provided the prerequisites for the courses are met and the 9 following credits of the First Year General Programme or equivalent are completed:

- MAE101 - Introduction to Calculus (2 credits)
- MAE129 - Introduction to Algebra (1 credit)
- CSE101 - Introduction to Algorithms and Computing (1 credit)
- PHE131 - Mechanics, 136 - Optics and Electricity, and 135 - Experimental Physics, or PHE104 - General Physics (2 credits)
- CCE101 - Engineering Chemistry (2 credits)

The General Bachelor of Science programme without a concentration 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 General Science programme with a minor concentration, or in any other university programme requiring basic science courses.

The General Bachelor of Science programme with a minor is offered to students who already have an interest in a given field of study in Science. The minor concentrations 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.

The General BSc Degree Programme, offered through the Division of Continuing Studies, incorporates, in much the same manner as the BMASc, a required core curriculum.

Of the 30 credits required, the following 8 credits are mandatory:

- BAE101 - Introduction to Defence Management and Decision Making
- 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
- HIE275 - Survey of Technology, Society and Warfare (HIE475 - Technology, Society, and Warfare is an acceptable alternative)
- POE206 - The Canadian Forces and Modern Society: Civics, Politics and International Relations, or POE205 - Canadian Civics and Society, or POE316 - Introduction to International Relations
- PSE402 - Leadership and Ethics
- Two credits in English Grammar and Literature
- One more credit in Military Psychology and Leadership (PSE123 - Fundamentals of Human Psychology, or its equivalent)

Note that course offerings for the BSc are limited at this time and completion of a degree may require attendance at RMC or the completion of some courses at other universities.

Minor

A minor in Arts and in Science consists of eight credits or their equivalent, as specified by departmental regulations. Students admitted into the BA, BSc, or the BMASc Honours programmes may undertake a minor in the Faculty of Arts or in the Faculty of Science with the permission of the appropriate Dean.

Please consult the relevant departmental sections within the RMC Undergraduate Calendar for the specific requirements of a minor.

Students admitted into the BMASc General programme may not apply for the recognition of a minor course of study to be indicated on their transcript.

Certificate in Management with Applications to Defence

This Certificate is intended to allow individuals to gain a basic understanding of the defence management field. The topics include Principles of Management, Quantitative Methods, Marketing, Information Systems, Financial and Management Accounting, Decision-making, and Fundamentals of Human Psychology. In addition, the Certificate can be applied to the three-year Continuing Studies General BA and BMASc degrees.

The equivalent of 10 one-term courses is required for completion of the Certificate.

Core courses (nine one-term courses) or their equivalent:

- BAE101 - Introduction to Defence Management and Decision Making
- BAE202 - Financial Accounting
- BAE208 - Managerial Accounting
- BAE220 - Introduction to Information Technology
- BAE242 - Quantitative Methods I
- BAE314 - Marketing Fundamentals
- BAE326 - Human Resources Management
- BAE344 - Operations Management
- PSE123 - Fundamentals of Human Psychology, or PSE328 - Group Dynamics
- PSE301 - Organizational Behaviour and Leadership

Certificate in Environmental Protection

Every task and activity within the Department of National Defence/Canadian Forces interacts with the environment. Personnel see environmental issues and expertise as an important component of their role with the Department. This programme will contribute to the achievement of the "DND Sustainable Development Strategy" by providing personnel with the skills, techniques and knowledge they need to prevent pollution and conserve our environment. This programme offers students a Certificate in a field of interest to DND, as well as to government and private-sector employers. In addition, the Certificate can be applied to the three-year Continuing Studies General BA and BMASc degrees.

The equivalent of nine one-term courses is required for completion of the Certificate.

Core courses (6 one-term courses + Directed Research Project):

- CCE285 - Introduction to Environmental Impact Assessment
- CCE289 - Environmental Sciences: Impact of Science and Technology on the Environment
- CCE304 - Military Chemistry (can be substituted by a recent university-level organic chemistry course)
- CCE306 - Hazardous Materials Management (**Prerequisite:** CCE289 Impact of Science and Technology on the Environment
- CCE386 - Introduction to Environmental Management Systems
- CCE485 - Environmental Engineering
- MAS400 - Directed Research Project on current environmental issues (two-term course equivalent)

Electives (1 one-term course):

- an Arts or Science course related to the environment
- CCE281 - Corrosion: Impact, Principles, and Practical Solutions

OFFICER PROFESSIONAL MILITARY EDUCATION - OPME

OPME Web Site

This section of the Calendar is designed to give students participating in the Canadian Forces Officer Professional Military Education (OPME) an overview of the programme. Students are strongly encouraged to contact the OPME Programme Section if they have any questions pertaining to the programme. It should be noted that most of the university-level course component of this programme has been integrated into the BMASc programme (see above), and also into the other two undergraduate programmes (BA & BSc) offered through DCS.

Background

A. CANFORGEN 082/00 ADM (HR-Mil) 041900Z Jul 2000

B. CANFORGEN 092/01 ADM (HR-Mil) 221200Z Aug 2001

Effective September 2000, the six Officer Professional Development Programme (OPDP) courses were replaced by five CF Military Studies Programme courses for Developmental Period Two (CFMSP O-DP2). This was announced through reference A. The CFMSP O-DP2 programme was developed by RMC to deliver the DP2 knowledge component of the Officer General Specification (OGS).

MND direction and evolution of the Enhanced Leadership Model (ELM) Project subsequently led to a revised combined DP1/DP2 professional development programme that reduced the workload on the junior officer, eliminated some duplication, and provided for just-in-time learning. The current OPME Programme, as announced at reference B, replaced the CFMSP O-DP2.

The OPME Programme is intended to orient the junior officer to select topics within a common body of knowledge related to the military profession. From this body of knowledge officers will begin to enhance their critical thinking skills and develop innovative responses to a myriad of issues. The OPME programme is supported by a collaborative learning culture to begin an officer's life-long appreciation for professional military development.

Structure of Programme

The OPME courses are classified as either professional-level or university-level and incorporate the body of professional knowledge in subject areas identified, at the DP1 and DP2 levels, in the OGS.

The professional-level courses are:

- DCE/DEF001 - Introduction to Defence Management; and
- DCE/DEF002 - Introduction to Military Law

the remaining four courses;

- HIE/HIF208 - Canadian Military History;
- HIE/HIF275 - Survey of Technology, Society and Warfare;
- POE/POF206 - The Canadian Forces and Modern Society: Civics, Politics and International Relations; and
- PSE/PSF402 - Leadership and Ethics

are at the university level.

A professional-level course is based on the depth of knowledge required of a professional officer and students can expect to allocate nine hours per week to studying.

A university-level course is based on a depth of knowledge commensurate with undergraduate instruction and is designed to provoke independent thought and to enhance an officer's ability in decision-making. Such courses are either junior level (equivalent to a first or second-year university course) or senior level (equivalent to a third or fourth-year university course), and students can expect to allocate between 9 and 12 hours per week to studying.

Please note that OPME courses have been developed in a modular format. A module covers a portion or subset of the course content and normally includes at least one assignment. The number of modules varies depending on the course. Students are expected to complete the modules in a specific sequence. Completion of a module occurs when the student successfully completes the assignment(s). The modular format allows flexibility within

the programme to provide some accommodation for the operational tempo of units and personnel.

OPME Eligibility

- Regular Force Officers who did not successfully completed one or more CFMSP O-DP2 courses by 1 July 2001 must complete all OPME courses satisfactorily to meet the OGS DP1 & DP2 knowledge requirement.
- Personnel who have successfully completed one or more CFMSP O-DP2 courses by 1 July 2001 must complete a total of five distinct O-DP2 or OPME courses for DP2 OPME qualification, including the course in Leadership and Ethics. For example, a student who has completed only CFMSP O-DP2 A *Defence Organization and Establishments* must now complete four (4) OPME courses, including Leadership and Ethics, to finish the programme.

Completion of the OPME Programme, or the equivalent earlier programmes, is a requirement for promotion to Maj/LCdr in the Regular Force and for attendance at CF Command and Staff Course.

Students admitted into any programme offered through DCS - who are neither officers nor members of the CF - may register in OPME university-level courses (or their equivalents) to meet core requirements of their academic programme. It should be noted that the educational objectives of the OPME professional-level courses are met, in whole or in part, through RMC undergraduate courses: for instance, BAE101 - Introduction to Defence Management and Decision-Making covers at a university level the subject matter taught in both modules of DCE001 - Introduction to Defence Management; POE488 - The Law of Armed Conflict covers at a university level the subject matter taught in Module 2 of DCE002 - Introduction to Military Law. It should also be noted that some graduate courses and seminars offered by RMC present other paths toward OPME certification. For more information on these alternate paths, please consult the DCS website or the Prior Learning Assessment and Recognition Section within DCS.

OPME Assessments

Appropriate university and college courses and military training can be considered for military equivalencies within the OPME programme. Requests for military equivalency must be directed in writing to the RMC Prior Learning Assessment and Recognition Section and must include:

- a copy of appropriate transcripts and course outlines (if available)
- student number from the credit-granting institution a copy of Member Personnel Record Resume (MPRR)
- maiden name (if applicable)
- current mailing address

Canadian Military College graduates must submit both their college number and MPRR. Transcripts and course outlines are not required.

Please note: Military equivalencies granted in the OPME programme result in military credit toward the completion of the OPME programme. They are not academic equivalencies and do not result in academic credit at RMC.

The Prior Learning Assessment and Recognition Section of RMC can be reached at the following address:

Prior Learning Assessment and Recognition
Division of Continuing Studies
Royal Military College of Canada
PO Box 17000, Station Forces
Kingston, ON
K7K 7B4

plar@rmc.ca

Military Certification and University Credit

Professional-level OPME courses are considered passed (for military credit) when the student gets a passing grade in all modules.

University-level courses are considered passed (for military credit) when:

- a) all the required assignments or elements of evaluation have been handed in; and
- b) the cumulative mark for the whole course is over 50%. Thus, a student may fail one or more modules, yet pass the course, provided the student handed in all assignments.

So long as an assignment or any other element of evaluation is missing, the course is not considered to have been completed and hence is not passed.

Students who have received PLAR credit for some modules must successfully complete, (achieve a mark over 50%) in all the remaining modules to be considered as having passed the course for military credit. Students who have received PLAR credit for some modules, but who wish to receive a university credit for an OPME University-level course, must complete all the modules as described above.

REGISTRATION AND FEES

REGISTRATION

All courses offered through the Division of Continuing Studies have limited enrolment and all registrations require approval from the Division of Continuing Studies.

There is a separate system and fee structure for undergraduate courses and for the OPME Programme.

Students admitted to the undergraduate programme can register for courses using the RMC 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. A late registration fee per course will be applicable to students seeking to register in DL courses after the close of the scheduled registration periods. For the Fall term, registration is open in the period from 1 June to 15 August; for the Winter term, 1 October to 30 November; and for the Summer term, 1 February to 15 April. It is strongly recommended that students register for and complete junior-level courses prior to attempting any senior-level undergraduate courses.

FEES AND PAYMENTS

DCS undergraduate course registrations are not processed until payment has been confirmed. RMC will not accept payment by cheque, but the following methods of payment are acceptable:

- money order
- credit card (MasterCard or Visa only)

Money orders should be made payable to the 'Receiver General for Canada.' Credit card payments must include the authorizing signature, card number and the expiry date.

RMC fees are listed at: RMC Academic Fees

ACADEMIC REIMBURSEMENT

All fee-paying students can print their tuition fees receipt and tuition income tax receipt via the RMC portal. For questions related to these, please call (613) 541-6000 ext 6618.

Military members should consult DAOD 5031-3 for academic reimbursement procedures or consult their local Base/Wing/Unit Education Officer or Personnel Selection Officer.

OPME COURSE REGISTRATIONS

Individuals admitted to the OPME Programme register for courses using a separate website. There are no costs to members of the CF for the OPME Programme, since it is a fully sponsored professional development activity. For more information on OPME Course Registrations, please visit the OPME website at: Officer Professional Military Education (OPME)

LETTERS OF PERMISSION

RMC 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 is a partner of the Canadian Virtual University, 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.

Contacts: Division of Continuing Studies - Contact Information

Course Offerings: Division of Continuing Studies - Course Offerings

Professional Military Training

General Information

Military Staff

Director of Cadets - Lieutenant-Colonel A.J. O'Keeffe

Deputy Director of Cadets - Lieutenant-Commander H.D. Laplante

Adjutant - Captain D.Y.G. Brassard

A/B Division Commander - Major M.M. Parisien

C/D Division Commander - Major A.J. Erkelens

Chief Instructor - Major B.R. MacLean

Staff Officer Financial Plans - Captain G.D. Carpenter

Staff Officer Training - Captain G.D. Carpenter

Staff Officer Standards - Captain D. Chambers

Cadet Wing Sergeant-Major - Master Warrant Officer J.A.J. Leveillee

Band Officer - Master Warrant Officer J.F.M. Huppe

Band Master - Master Warrant Officer J.F.M. Huppe

Pipe Major - Warrant Officer D.J. Smith

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 provide Professional Military Training during the academic year. This Component is compulsory for all OCdts in all years.

Programme Design

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 RMC. 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:

1. General Military Knowledge
2. Personal Attributes
3. Teamwork
4. Leadership
5. Communications, and
6. Drill

Programme Delivery

Three periods per week are allocated for drill classes or other formal classroom 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 and 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 to provide semester-long development and assessment opportunities.

Equivalencies and Credits

The military record of service for OCdts in the UTPNCM programme, or for OCdts in the ROTP and RETP programmes that have previous military service is reviewed upon joining RMC. Previous training may be accepted for credits under the Military Component.

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 RMC-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 4 yr 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 RMC 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.

PMT 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:

ACTIVITY	YEAR				COMMENTS
	1st	2nd	3rd	4th	
FALL SEMESTER					
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					
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	

Legend: A All E Elective/Optional
D Designated S If/When Scheduled

Athletic Department

STAFF

Athletic Department

Athletic Director Head of the Department - Mr. D. Cates, BKin, MA

VARSITY

Varsity Manager - Mr G. Dubé, BComm (SPAD)

Varsity Coordinator - Mr J. Girard, CD, NCCP Level II Badminton

Fencing Program 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 Basketball Program Coordinator and Head Coach - Mr S. James, BA, NCCP III Basketball, NCI Level IV Candidate

Men's Hockey Program Coordinator and Head Coach - Mr A. Shell, BCOM, CA, NCCP Level 2

Men's Rugby Program Coordinator and Head Coach / Sports Information Officer - Mr S. McDonaugh, BEd (Phys ed), BA (Psych)

Running Program Coordinator and Head Coach - Lt(N) T. Davies, rmc, CD, BEng, MASc, P.Eng

Men's Soccer Program Coordinator and Head Coach - Mr V. Mendes, HR Marketing, Ontario Soccer Association Provincial "B"

Men's Volleyball Program Coordinator and Head Coach - Mr S. Leknois, CD I, NCCP III Volleyball, NCCP I Soccer

TaeKwonDo Program Coordinator and Head Coach - Mr J. Ridley, B.Eng.Sc, CPT, CHEK I, NCCP III Theory, 4th Dan Master Instructor taekwondo, 1st Dan Hapkido

Women's Basketball Program Coordinator and Head Coach - Mr B. Schur, BA, NCCP III Basketball

Women's Soccer Program 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 Program Coordinator and Head Coach - Ms C. Welden, BRLS, NCCP III Volleyball

Athletic Therapist - Ms J. Hudson, CAT I

PHYSICAL EDUCATION

Physical Education Manager - Ms. K. Lupton, CD, CSEP-CEP, MA, BPHE, BSc, BEd

Physical Educator Aquatic Program Coordinator - Mr N.J.M. Breuvart, CD, CPT, NCCP I Soccer, Swimming Inst, Bronze Sail IV Sailing, Canoe Inst Level I, First Aid Inst, Personal Trainer Level I SPI

Physical Educator Collective Sports Program Coordinator - Ms K. Mazerolle, BKin, CSEP-CEP, NLS, NCCP II Volleyball, Basketball, Special Olympics, SPI - Personal Trainer, Can-Fit Pro - FIS, BOSU Trainer, Fitness Kickboxing, Jump Rope Level I

Physical Educator Curriculum Development Coordinator - Mr S. Robert, BSc (HK), CSEP-CEP, NSCA-CPT, NCCP Level I- Olympic Weightlifting, PICP Level II- Strength and Conditioning Specialist, PICP Biosignature Practitioner

Physical Educator Evaluation Program Coordinator - Ms. Erin Vint, BKin, CSEP-CEP, NLS

Physical Educator Individual Sports Program Coordinator - Mr B. Bennett, CD, CPT, NCCP II Volleyball

Physical Educator Military Skills Program Coordinator - Mr J. Blanchet, CD, CFC, Rappel Master

Physical Educator Supplementary Physical Training Instructor - Ms E. O'Reilly, BSc, CSEP-CEP, NLS, CSIA Level I

Physical Educator Combative Program Coordinator - Mr J. Ridley, B.Eng.Sc, CPT, CHEK I, NCCP III Theory, 4th Dan Master Instructor taekwondo, 1st Dan Hapkido

RECREATION AND INTRAMURAL

Recreation and Intramural Manager - Ms C. Powers, BSc Kin, NCCP Level III Theory and Volleyball

Assistant Recreation and Intramural - Mr Chad Blundy, B'Ed Kin

General Information

Mission

As an integrated part of the Royal Military College, the Athletic Department supports the mission of RMC by providing operationally oriented physical education, competitive intramural sports, varsity and recreational club programs for officer-cadets. These programs provide extensive leadership development opportunities in an atmosphere that helps instil 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 programs of excellence that contribute to the development of outstanding leaders for the CF who value physically active and healthy lifestyles. These programs 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 program oriented and is as follows:

- to maintain diverse athletic programs, i.e., Physical Education, Competitive Intramural Sports, Varsity and Recreation;
- to provide athletic programs 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 Club and Foundation;
- to take advantage of the Red and White Club for recruiting varsity athletes;
- to take advantage of the reduced Varsity Program to focus and increase College support for the remaining Varsity sports;
- to increase the presence of the RMC Athletic Department on the Internet and in local, provincial and national media;
- to improve upon the historic performance of RMC 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 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's athletic facilities are shared with those of CFB Kingston and include a large triple-gymnasium with various combinations of basketball, volleyball and badminton; 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; one indoor artificial ice arena; eight soccer fields; five outdoor tennis courts; six squash courts, and two martial arts rooms.

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 Program, Varsity Program, Competitive Intramural Sports Program and Recreational Program.

PROGRAMS

Physical Education Program

The aim of the Physical Education Program is to:

- develop a basic knowledge of physical education theory and philosophy;

- develop physical fitness through a program of strenuous physical activities;
- develop sports skills and introduce the fundamentals of team play as commonly practiced by members of the Canadian Forces (CF);
- 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 Program 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 three times a year i.e. during the Fall, Winter and Spring trimesters.

RMCPPT and CF EXPRES TESTING

RMCPPT - Royal Military College Personal Physical Test

To meet the Athletic component requirement students must successfully complete one RMCPPT in third and fourth year. Successful completion of RMCPPT in first and second year is expected. However, if unsuccessful in these first two years, officer cadets must show sufficient progress in physical fitness level as deemed by administrative review. Further, every officer cadet must pass or reach exemption on the Canadian Forces (CF) EXPRES test in accordance with CF policy.

The RMCPPT is composed of 5 items, the 20-meter shuttle run (20MSR), push-ups, sit-ups, an agility run and a standing long jump. Each item is scored on 100 points for a total of 500 points.

All officer cadets are required to attain a the RMC minimum standard which is a total of 250 points and pass each item of the physical evaluation. 50 points is the minimum required to pass the 20MSR and 35 points is the minimum for each of the four others items.

Officer Cadets who do not reach the minimum standards or have had medical restrictions for the RMCPPT are given a second chance with a retest. If they fail a second time, they are placed in the Supplementary Physical Training (SPT) Program where they are lead in supervised physical training sessions by the Supplementary Physical Training Coordinator.

Officer Cadets who do not meet the Minimum Physical Fitness Standard (MPFS) at the end of the school year will default to the process outlined in DAOD 5023-2. After a twelve-week training period officer cadets will be given the opportunity to make another attempt at the test as arranged by the Evaluation Coordinator (most likely during the in-clearance schedule at the end of August of that calendar year).

Varsity Program

The aim of the varsity program is to achieve competitive excellence. This will mean different things to different sports; however, the aim in general is that:

- RMC become a highly respected opponent in terms of competitive challenge and sportsmanship;
- RMC is the smallest university member of the Canadian Interuniversity Sport (CIS) with a student population of 900 officer-cadets in the undergraduate program. 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;
- instil, 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 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 program for students capable of participating at a higher skill level.

RMC competes as a member of the Ontario University Athletics (OUA) in the following events: basketball (men and women), cross-country/track (men and women), fencing (men and women), hockey (men), rugby (men), soccer (men and women) and volleyball (men and women).

The taekwondo team competes at local, provincial and national levels.

The varsity program is an extension of the physical education program 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 Program 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.

Intramural Sports Program

The Intramural Sports Program has a two-fold purpose.

- **First,** it provides each cadet with the opportunity to develop sports skills and apply the principles, which are taught in the Physical Education Program.
- **Second,** it provides each cadet with the opportunity to compete in a variety of team sports on a weekly basis.

The Intramural Sports Program is composed of sports leagues within the college, where each squadron forms teams to compete. The program is compulsory for cadets who are not varsity athletes.

The fall term Intramural Sports Program offers leagues such as soccer, hockey, ultimate, handball, water polo and ball hockey. Included in the winter term Competitive Intramural Sports Program are basketball, dodgeball, water polo, hockey, and ball hockey.

The program is organized on a seasonal basis. The fall program runs from October to the end of November, and the winter program runs from January to the end of March. Responsibility for the day-to-day operation of the program is given to the cadets themselves under the supervision of the Recreation and Intramural Manager, 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.

Officer Cadets are assessed on every phase of the program and the cumulative assessment becomes part of their personal service file.

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.

Recreation Program

The aim of the RMC Recreation Program is to:

- provide leadership opportunities;
- leisure activities of choice;
- develop social skills and self-fulfilment; and
- promote active and healthy living

The RMC Recreation program consists of clubs that are organized around different recreational activities that include group and individual sports and hobbies. All students and staff at RMC are permitted and encouraged to participate in the Recreation Program. The list of clubs is subject to change depending on the interest: Arts, Astronomy, Broomball, Cheerleading, Climbing, Cycling, Debating, Fish and Game, Golf, Judo, Juggling, Outdoor, Paintball, Photo, Power Flying, Sailing, Racket, Social Dance, Stage Band, Théatre, Triathlon, Video Editing, War Games, Waterpolo, Windsurfing and Women's Rugby.

COURSE DESCRIPTIONS

PO 107

The first year programme is aimed at giving officer cadets the tools to take charge of their personal fitness. Courses in that programme include: theory on exercise physiology, nutrition, training principles and injury prevention. The practical contents expose officer cadets to the different training methods commonly used in the Canadian Forces. They are also required to complete the Basic Military Swim Standard test.

PO 207

The second year programme offers a variety of elective sport courses where officer cadets select one course per term for a total of three sports. The second year programme concentrates it's options on collective sports activities played within the Canadian Forces plus some other popular ones.

Among those sports, we have soccer, broomball, spinning, volleyball, basketball, squash, badminton, handball, water polo and Flag football. Students also acquire basic knowledge related to organizing sports tournaments.

PO 307

The third year programme is developed to expose all officer cadets to military skills requiring physical fitness. These courses introduce activities such as various forms of unarmed combat, different obstacle courses, waterborne training as well as military rappelling.

PO 407

The fourth year programme offers a variety of elective sport courses and follows the same principles as the second year programme. It concentrates it's options on individual sports and activities such as canoeing, rock climbing, Rappel Master course, advance weight training, swimming and life guarding, advanced unarmed combat, pressure points control tactics and spinning leadership.