A-PD-050-007/PH-001

# Royal Roads Military College

# Calendar 1981-82

# Victoria, B.C.

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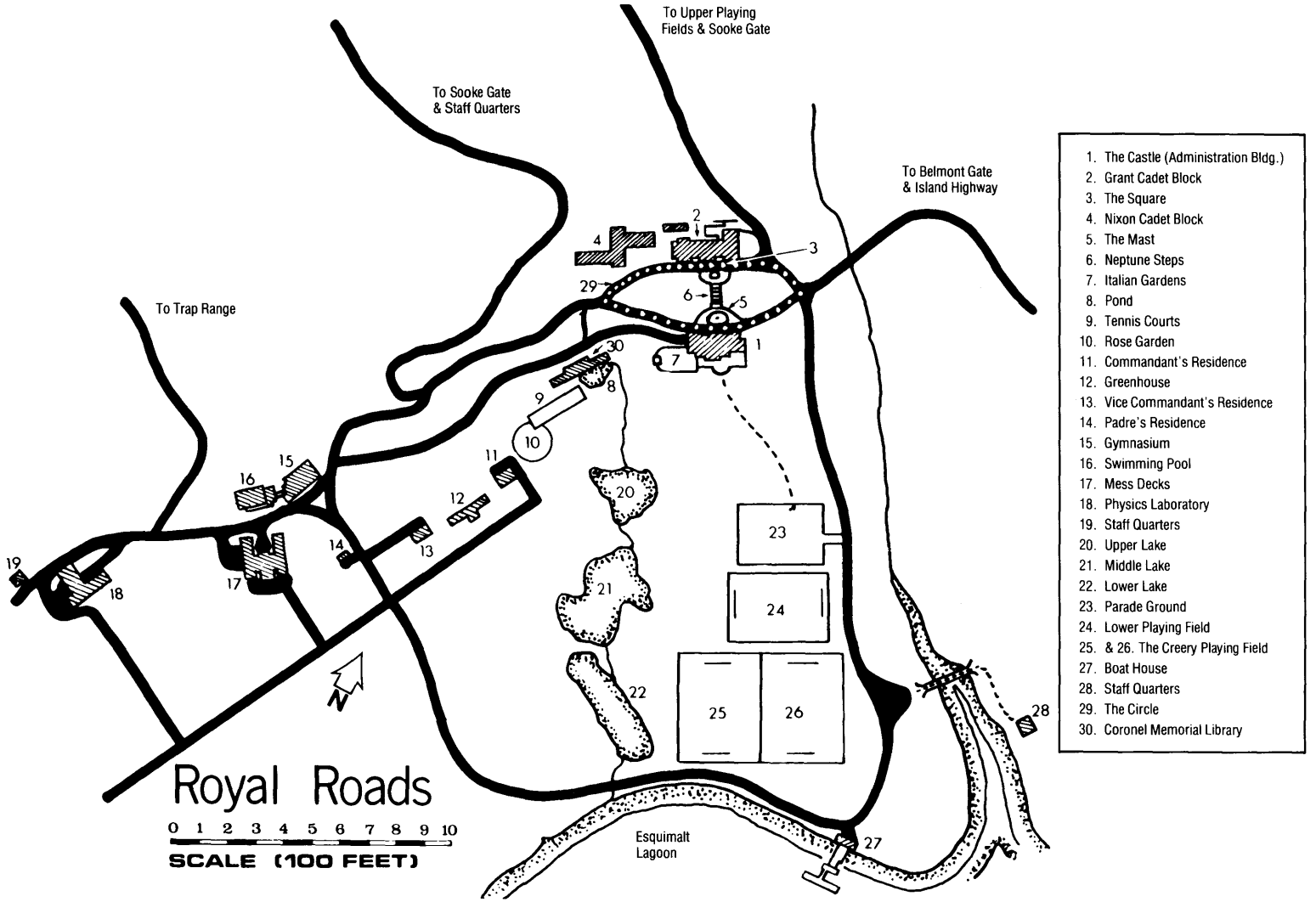
To Upper Playing Fields & Sooke Gate
To Sooke Gate & Staff Quarters
To Belmont Gate & Island Highway
To Trap Range
Esquimalt Lagoon
Royal Roads
0 1 2 3 4 5 6 7 8 9 10
SCALE (100 FEET)
1. The Castle (Administration Bldg.)
2. Grant Cadet Block
3. The Square
4. Nixon Cadet Block
5. The Mast
6. Neptune Steps
7. Italian Gardens
8. Pond
9. Tennis Courts
10. Rose Garden
11. Commandant's Residence
12. Greenhouse
13. Vice Commandant's Residence
14. Padre's Residence
15. Gymnasium
16. Swimming Pool
17. Mess Decks
18. Physics Laboratory
19. Staff Quarters
20. Upper Lake
21. Middle Lake
22. Lower Lake
23. Parade Ground
24. Lower Playing Field
25. & 26. The Creery Playing Field
27. Boat House
28. Staff Quarters
29. The Circle
30. Coronel Memorial Library

# 1981

## JANUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## FEBRUARY

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## MARCH

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| 29 | 30 | 31 | | | | |

## APRIL

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## MAY

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| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

## JUNE

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

## JULY

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| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
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## AUGUST

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| 30 | 31 | | | | | |

## SEPTEMBER

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| 27 | 28 | 29 | 30 | | | |

## OCTOBER

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## NOVEMBER

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## DECEMBER

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| 27 | 28 | 29 | 30 | 31 | | |

# 1982

## JANUARY

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| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

## FEBRUARY

| S | M | T | W | T | F | S |
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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | | | | | | |

## MARCH

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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 20 | 30 | 31 | | | |

## APRIL

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| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | |

## MAY

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| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

## JUNE

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| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
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| 27 | 28 | 29 | 30 | | | |

## JULY

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| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## AUGUST

| S | M | T | W | T | F | S |
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| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

## SEPTEMBER

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| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

## OCTOBER

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| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

## NOVEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
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| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

## DECEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

## THE ACADEMIC YEAR

## CALENDAR OF EVENTS — 1981-82

### First Semester

| | | |
|---|---|---|
| Aug 25 | Tues | Cadet Officers return |
| Aug 28 | Fri | BOTC Graduation |
| Aug 29 | Sat | Recruits arrive |
| Aug 31-Sept 2 | Mon-Wed | Administration |
| Sept 3 | Thurs | Registration and Book Issue |
| Sept 4 | Fri | Classes start |
| Oct 9-12 | Fri-Mon | Stand down (no classes) |
| Oct 30 | Fri | Mid-semester academic reports due |
| Dec 7 | Mon | Classes end |
| Dec 8 | Tues | Exams start |
| Dec 16 | Wed | Exams end |
| Dec 18 | Fri | 1200 — Results due Registrar |
| Dec 19 | Sat | 1000 — Faculty Board/Faculty Council |
| Dec 19 | Sat | Christmas Ball |
| Dec 20-Jan 3 | Sun-Sun | Christmas Leave |
| Jan 3 | Sun | Cadets return |
| Jan 4-8 | Mon-Fri | Military Training |
| Jan 8-9 | Fri-Sat | Supplemental Examinations |

### Second Semester

| | | |
|---|---|---|
| Jan 11 | Mon | Classes start |
| Feb. 12-15 | Fri-Mon | Stand down (no classes) |
| Feb 26 | Fri | Mid-semester academic reports due |
| Apr 15 | Thurs | Classes end |
| Apr 19-May 1 | Mon-Sat | Second semester examinations |
| May 12-13 | Wed-Thurs | First Year supplemental exams |
| May 14 | Fri | Convocation, Academic Awards, Sunset Ceremony |
| May 15 | Sat | Graduation Parade and Ball |
| May 16 | Sun | Successful cadets to summer duties |
| May 21-22 | Fri-Sat | Senior Years supplemental examinations |

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Vice Chief of the Defence Staff
Assistant Deputy Minister (Personnel)
Chief Research and Development

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Vice-Commandant — Commander R.S. Copley, CD, pcsc, BSc (Victoria)

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Chaplains —
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Chaplain (RC) — Major R.L. Marchand, MTH

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Staff Officer Cadets and Military Training — Major K.W. Casson, CD, pcsc, BA (York)

Squadron Commanders —
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Captain R.N. Hardman, rmc, BA (RMC)*
Captain M.W.T. Haché, rmc, BA (RMC)
Major K.R. Merkley, CD, BA (RMC), MA (Queen's)

Schools Liaison Officer — Captain M.J. Pacey, CD, rmc, BSc (RMC)*

Dental Officer — Captain B.D. Parker, BSc (Carleton), DDS (McGill)

Personnel Administrative Officer — Captain T. McCarthy, CD

Librarian — C.C. Whitlock, BA (Sask). BEd (Brit Col), BSL (McG)

Assistant Librarian — Susan E. Day, BA (Queen's), MLS (Toronto)

Director of Athletics — Captain W.M. Keener, CD, BA (P) (Western)

Physical Education and Recreation Officer — Captain K.M. Benoit, CD, rmc, BSc (RMC)*

University Liaison Officers —
Captain D.L. Browne, CD
Captain E.F. Zdancewicz, CD

*SENIOR STAFF*

## EMERITI

C.C. Cook, BA, MSc, LLD, Emeritus Professor of Physics (1961)

C.S. Burchill, BA, MA, BSc, Emeritus Professor of History (1971)

J.M.C. Meiklejohn, MBE, BSc, Registrar Emeritus (1972)

A.E. Carlsen, BA, MA, PhD, Emeritus Professor of Economics (1974)

H.R. Grigg, BSc, MSc, PhD, Emeritus Professor of Physics (1978)

G.F. Dalsin, BSc, MA, Emeritus Professor of Mathematics (1978)

W.G. McIntosh, BSc, PEng, Emeritus Professor of Engineering (1978)

A.G. Bricknell, BSc, MSc, PhD, Emeritus Dean of Science (1979)

R. Oldham, DFC, Croix de Guerre et Palme, BA, MA, PhD, Emeritus Dean of Arts (1979)

B. Aghassian, MA, Emeritus Professor of French (1979)

J.A. Izard, BEng, MASc, PEng, Emeritus Professor of Engineering

D.W. Hone, BA, PhD, Emeritus Professor of Physics (1981)

J.K. Kinnear, BA, MA, Emeritus Associate Professor of Physics (1981)

## OFFICERS OF INSTRUCTION

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M.R. Barr, BSc, MSc, PhD (Brit Col), MCIC, Associate Professor of Chemistry

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H.J. Duffus, ndc, BA, BASc, (Brit Col), DPhil (Oxon), PEng, Professor of Physics and Dean of Science and Engineering, (Acting Principal Jan-June, 1982)

P.J.S. Dunnett, BSc (Bradford), MA, PhD, (SFU), Assistant Professor of Economics

G.C. Dyer, MBE, aws, psc, snc, n. BA (Open University), MBIM, FRIN, Visiting Special Lecturer in History

J.M. Gilliland, BSc, MA (Brit Col), PhD (Alberta), Assistant Professor of Physics

E.S. Graham, BSc, MSc (Queen's), PhD (MIT), FCS, FOAS, Professor of Chemistry and Principal and Director of Studies (on sabbatical leave 1982-Royal Military College Duntroon, Australia)

A. Hadley, BA (Brit Col), DIPEd (Victoria), Instructor in French

Captain H.R. Harmer, rmc, BEng (RMC), Special Lecturer in Chemistry

N.S. Ho, BSc (Taiwan), MA, PhD (Toronto), Assistant Professor in Physics

D.B. Kerrighan, BSc, PhD (Waterloo), Assistant Professor of Mathematics

D.P. Krauel, BSc (McMaster), MSc (Dalhousie), PhD (Liverpool), Associate Professor and Head of the Department of Physics

G.M. Lancaster, BSc (Liverpool), PhD (Sask), Associate Professor and Head of the Department of Mathematics

Major D.L. Lang, CD, BA, BEd (St. F of X), MA (Queen's), Special Lecturer and Head of the Department of Military Leadership and Management

W.T. MacFarlane, BA (Sask), MSc (Alberta), PhD (Oregon State), Associate Professor of Physics

J.W. Madill, CD, BSc (CE) (Manitoba), MSc (CE) (Queen's), EdD, (WVU), MEIC, MCGS, MCSCE, PEng, Associate Professor of Engineering

M.S. Madoff, AB (Michigan), PhD (Brit Col), Assistant Professor of English

W.T. Mann, BComm (Brit Col), FCGA, Part-time Visiting Professor of Accounting

G.A. Martel, BA (SFU), MA (Fletcher), PhD (Toronto), Assistant Professor of History

F. Menard, BA (Montreal), Instructor in French

Major K.R. Merkley, CD, BA, (RMC), MA (Queen's), Special Lecturer in History and Political Economy.

F. Milinazzo, BSc, PhD (Brit Col), Assistant Professor of Mathematics, (on leave of absence 1981-83 - California Institute of Technology)

H. Montgomery, BA (Cantab), MA (Toronto), PhD (Washington), FCIC, Professor and Head of the Department of Chemistry

G. Morgan, BA (Loyola), MA (Phil), MA (Lit), PhD (Montreal), MNI, CMMC, Professor and Head of the Department of English and Philosophy

Y. Oved, BSc, MSc, DSc (Technion - Israel Inst of Tech), Assistant Professor of Mathematics

C. Plows, BA (Montreal), Instructor in French

Captain M. Plul, CD, BA, BEd (Ottawa), MSW (Brit Col), Special Lecturer in Military Leadership and Management

J.C. Pratt, BSc (Sheffield), PhD (London), Assistant Professor of Physics

M.J. Press, BSc, MSc, (McG), PhD (SFU), Assistant Professor of Physics

C.N. Ramkeesoon, BA (U of Wales), MA (Dalhousie), PhD (Western), Assistant Professor of French

K.J Reimer, BSc, MSc (Calgary), PhD (Western), MCIC, Assistant Professor of Chemistry

## *SENIOR STAFF*

A. Robichaud, BA (Laval), Instructor in French

J. Robichaud, BA (Edmunston), BAEd (Montreal), Licence théologie (Laval), Instructor in French

M.G. Robinson, BSc, PhD (Dunelm), Associate Professor of Chemistry

W. Rodney, DFC and Bar, BA (Alberta), MA (Cantab), PhD (London), FRGS, FRHistS, Professor of History, Dean of Arts and Head of the Department of History and Political Economy

P.J. Schurer, BSc, MSc, PhD (Groningen), Assistant Professor of Physics

P. Smart, BEd, BSc (Alberta), MEd (Brit Col), MPA (Victoria), PhD (Walden), Assistant Professor of Mathematics

R.C. Snell, BSc, MSc (Queen's), PhD (Brit Col), Associate Professor of Mathematics

C. Tchalekian, BSc, MA (Iowa), PhD (Texas), Associate Professor and Head of the Department of French

A. Tétreault, BA (Montreal), Instructor in French

J. VanCampen, BA, BSW (Laval), MA Linguistics (SFU), Instructor in French

Colonel (Ret'd) A.D. Wallis, CD, rmc, psac, BA (RMC), MA (London), Professor of Political Science and Registrar*

M.J. Wilmut, BSc (Sir George Williams), MA, PhD (Queen's), Associate Professor of Mathematics (on leave of absence 1981-82 - National Defence College)

W.W. Wolfe, BSc (Brandon), MSc, PhD (Queen's), Assistant Professor of Mathematics

S.D. Wray, BSc (Adelaide), BSc (Hons), MSc, PhD (Flinders), Assistant Professor of Mathematics

*Graduate Royal Roads

## SENATE

The Minister of National Defence (Chancellor of the College and President of the Canadian Military Colleges), the Commandant (Vice-Chancellor and Chairman), the Principal and Director of Studies, the Dean of Science and Engineering, the Dean of Arts, the Registrar (Secretary), Dr. J.A. Boutilier (term expires 31 May 1983), Dr. G.M. Lancaster (term expires 31 May 1982), plus one other member yet to be elected.

The Director of the RRMC Regional Sub-Committee of the Canadian Military Colleges Advisory Board and the Vice-Commandant of the College may attend meetings of the Senate.

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The Commandant *(Chairman)*, the Principal and Director of Studies, the Vice-Commandant, the Dean of Science and Engineering, the Dean of Arts, the Registrar *(Secretary)*, the Head of the Department of Engineering, the Staff Officer Cadets and Military Training, and the Chief Administrative Officer.

### THE FACULTY COUNCIL

The Principal and Director of Studies *(Chairman)*, the Vice-Commandant, the Dean of Science and Engineering, the Dean of Arts, the Staff Officer Cadets and Military Training, the heads of the departments of Chemistry, Engineering, English and Philosophy, French, History and Political Economy, Mathematics, Military Leadership and Management, Physics, as well as the Chief Librarian, and the Registrar *(Secretary)*.

### THE FACULTY BOARD

The Principal and Director of Studies *(Chairman)*, the Vice-Commandant, faculty members of the rank of lecturer and above, the officers of the military wing, the Chief Librarian and the Registrar *(Secretary)*.

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d. Fourth Year Cadets, M.J. Press.

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M.R. Barr, J.A. Bayer, K.M. Benoit, K.W. Casson, E.R. Chappell, R.S. Copley, J.R. DeLong (Secretary), H.J. Duffus, P.J.S. Dunnett, D.B. Fodor, E.S. Graham, M.W.T. Haché, R.N. Hardman, W. Keener, G.M. Lancaster, D.L. Lang, G.L. Logan, W.T. MacFarlane, J.W. Madill, M.S. Madoff, H. Montgomery, M.J. Pacey, C.M. Ramkeesoon, W. Rodney, P. Smart, R.C. Snell, C. Tchalkian, A.D. Wallis (Chairman), W.W. Wolfe.

## COMPUTER USERS COMMITTEE

J.S. Collins (Chairman and Interim Director of the ADP Facility), S.E. Day, J.R. DeLong, P.J.S. Dunnett, D.P. Krauel, K.J. Reimer, L.E. Wagar, W.W. Wolfe, and one member of the Cadet Wing (to be appointed).

## COMPUTER SERVICE CURRICULUM COMMITTEE

H.J. Duffus (Chairman), P.J.S. Dunnett, J.W. Madill, H. Montgomery, M.J. Press, R.C. Snell.

**THE FACULTY-CADET ACADEMIC COMMITTEE**

The Principal and Director of Studies (Chairman), the heads of the academic departments, the Registrar, the DCWC (Secretary), the CFLs of the first slate of cadet officers, a UTPM cadet, and three other cadets.

**THE COMMITTEE ON PROMOTIONS AND TENURE**

The Principal and Director of Studies (Chairman), and the heads of the academic departments.

**THE COMMITTEE ON GRADUATE FELLOWSHIPS**

M.R. Barr, K.W. Casson, E.R. Chappell, H.J. Duffus (Chairman), W.W. Wolfe.

## THE CANADIAN MILITARY COLLEGES

### ROLE

The role of the Canadian Military Colleges is to educate and train Officer Cadets and commissioned officers for a career of effective service in the Canadian Forces.

### OBJECTIVES

The objectives of the Canadian Military Colleges are:

a. to prepare and motivate Officer Cadets for effective service as commissioned officers in the Canadian Forces by —

(1) providing a university-level education in appropriate disciplines designed on a broad case to meet the unique needs of the Forces;

(2) developing qualities of leadership;

(3) developing the ability to communicate in both official languages and to understand the principles of biculturalism;

(4) developing a high standard of personal physical fitness;

(5) stimulating an awareness of the ethic of the military profession; and

b. to improve the educational background of commissioned officers in the Canadian Forces by providing undergraduate and post-graduate courses in appropriate fields.

## ROYAL ROADS MILITARY COLLEGE

### HISTORICAL SKETCH

The story of Hatley Park — rechristened Royal Roads from the offshore anchorage in the Straits of Juan de Fuca — has its beginnings in the singleness of purpose and dogged determination of one man. No history of the estate would be complete without some mention of the man in whose mind Hatley Park was conceived and through whose efforts it was brought to birth.

The Honourable James Dunsmuir was born at Fort Vancouver on 8 July 1851, the oldest son of Robert Dunsmuir, a Scottish miner who, at the time of his son's birth, was on his way from Ayrshire to "Vancouver's Island" to prospect for coal. It was not until 1869, however, when James was eighteen years old, that Robert, prospecting on his own, finally struck the rich seam of coal at Wellington, near Departure Bay. He raised sufficient capital, acquired 2,000 acres of land, and started operations which proved so successful that before long he had bought out the other three partners in the venture to become sole owner. During this time, James himself had worked through all the stages of mining and had risen to the position of manager in his father's business. Under his management, the daily output of coal quickly rose from 30 tons to 1,500 tons. After his father's death in 1889, James devoted himself to the development of the collieries at Wellington and Comox, laid out the townsite of Ladysmith, and initiated the Ladysmith-Vancouver ferry service.

**HATLEY CASTLE**

It was only natural that his prominence in business should lead him into politics. He was elected to the Legislature in 1898 and became Premier in 1900; but, having no taste for public life, he resigned in 1902. He later served a three-year term as Lieutenant-Governor of the Province.

It was during the early years of this century that he purchased the Hatley Park estate comprising about 650 acres. The original Hatley Park house stood on the site that is now the parade ground. This house had been completely destroyed by fire while its owner was in England. Having amassed a huge fortune, James now turned his attention to the building and planning of the new estate to which he intended to retire.

He commissioned Samuel McLure, a Victorian architect, to design the "Castle", and Messrs. Bett and Hall, landscape artists of Boston, Massachusetts, to plan the gardens and surroundings. Local stone, trimmed with Valdez and Saturna Island sandstone, was used in the building's construction. Its impressive exterior is matched only by the lavishness of the interior appointments — oak and rosewood panelled rooms, baronial fireplace, teak floors, and specially made lighting fixtures. James is quoted as saying: "Money doesn't matter — just build what I want." The building is 200 feet long and 86 feet wide; the turret is 82 feet high. The wall surrounding the estate, also built of local stone, cost over $75,000; the Conservatory, costing a like amount, was at one time filled with white orchids imported from India; a large banana tree grew in the centre under the dome. The rooms of the house were filled with flowers from the Conservatory throughout the year. Six miles of road interlaced the estate, and a hundred men were employed in the gardens. There were a number of other buildings on the estate to provide for the needs of the large household, but many of these have now been demolished — the vast refrigeration plant; the cow stables; the slaughter house and smoke house; the three silos, each of 100 ton capacity; the reserve water tank to the south of Belmont Drive; the old stable near the bridge to the east of the present fields; to say nothing of the Chinatown to accommodate 80 to 120 gardeners. There remain, however, the model dairy and the stables, which were of solid brick and concrete construction. The "Castle" was completed in 1908, and the Dunsmuir family took up reisdence in that year.

Early in 1910, James sold his collieries, his coal rights in the Esquimalt and Nanaimo belt, and all his business connections therewith to Messrs. MacKenzie and Mann, railway promoters, for $11,000,000. He thus separated himself from all former business with which the name of Dunsmuir had been associated. He then retired to enjoy his beautiful home, his yacht "Dolaura", his shooting, fishing, golf, etc. He died in May 1920, at the age of 69. His wife, formerly Laura Surles of Georgia, lived on in Hatley with her daughter Eleanor until she died in August, 1937. Her daughter died six months later.

For the next three years, the estate was left in the hands of a caretaker. In November 1940, it was purchased by the Dominion Government for $75,000 to begin its career as a Naval Training Establishment. No time was lost; early in 1941, HMCS "Royal Roads" was commissioned as an Officer Training Establishment for short-term probationary RCNVR sub-lieutenants and operated as such until October 1942.

During this time, some 600 officers underwent training. In October 1942, after a lapse of 20 years, the training of naval cadets was re-established in Canada, and the spirit of the old Royal Naval College of Canada was reborn in HMCS "Royal Roads".

After a brief history of five years, the Royal Canadian Naval College became, in 1947, the RCN-RCAF Joint Services College. The following year, with the admission of army cadets, Royal Roads became a tri-Service Cadet College, the Canadian Services Colleges Royal Roads. In 1968, the name of the College was changed to Royal Roads Military College.

## FACILITIES

### The Castle

The Castle was built in 1908. From 1941 until 1943, when Grant Block was completed, it accommodated the cadets of the Royal Canadian Naval College, after being commissioned as HMCS "Royal Roads". It is now the administrative centre of the College. It houses the Commandant, Principal, Vice-Commandant, Registrar and staff, Chief Administrative Officer, Comptroller and Logistics Officer, Personnel Administrative Officer, Staff Officer Cadets, and the University Liaison Officers.

### Coronel Memorial Library

The library building was officially opened 1 November 1974 by the late Honorable Walter S. Owen, QC, LLD, former Lieutenant-Governor of British Columbia, and was dedicated to the memory of four members of the First Class of the Royal Naval College of Canada who were lost in action at the Battle off Coronel on 1 November 1914.

Planned by Robert Harrison Associates of Vancouver, B.C., the building was designed to harmonize with its park-like setting, and to be adjacent to Nixon Block, the cadet dormitory. It satisfies both criteria. The library comprises 20,600 square feet, has a capacity of 80,000 volumes and includes 16 faculty offices, a conference room and audio visual facilities for cadets.

The current library collection includes 75,000 bound volumes, a subscription list of over 550 periodicals, and a growing collection of microfilms, recordings, films, and slide transparencies.

### Grant Block

Grant Block, completed in 1943, is the centre of all academic instruction. It was named after Captain J.M. Grant, first Commanding Officer of HMCS "Royal Roads".

This building houses a large general chemistry laboratory, capable of accommodating 48 students, and smaller laboratories used for advanced chemistry and chemical or biological oceanography experiments. A Coastal Marine Science Laboratory, an Applied Fluid Dynamics Laboratory, a Dental Clinic, a Medical Inspection and Treatment Area, and the Cadets' dining facilities are also located in this same building.

Since 1970, the College has had access to computer services. The computer facilities, located in Grant Block, are used for instruction, administration and research.

Currently the College has several computer terminals, including an IBM 3780 card-read/printer and a Tektronix 4013 graphics terminal, which are all connected to the computer center at Simon Fraser University.

**Nixon Block**

Nixon Block is the accommodation building. It includes about 150 rooms, and also contains common room, canteen, and post office facilities. It also accommodates the Squadron Commanders.

This fine building was officially opened by Her Royal Highness Princess Mary, the Princess Royal, on 17 October 1955. It bears the name of the late Commander E.A.E. Nixon, RCN, who was the Commanding Officer of the first Royal Naval College of Canada, situated from 1917-1922 in Halifax, Kingston, and finally in HMC Dockyard, Esquimalt, B.C.

**Mess Decks**

The Mess Decks originally housed the stables of the estate. It was reconstructed in 1941 and used as accommodation for single members of the ship's company of HMCS ''Royal Roads'', below commissioned rank. It was also used as classroom space by the cadets before completion of Grant Block.

An indoor rifle range, Non-Commissioned Officers' Mess and the Cadet Gunroom are now located in this building. The Cadet Gunroom consists of a lounge, dance floor and games rooms. In addition, there is also a smaller separate lounge which is used as a ''clubhouse'' by college sports teams. On Friday nights, the Cadet Gunroom serves as a movie theatre while on Saturday evenings dances are frequently scheduled. The Cadet Gunroom is the centre for cadet social functions at the college.

**Swimming Pool**

The Pool, built in 1957, measures 23 metres long, 10 metres wide, and 3 1/3 metres at the deep end where there are one-metre and three-metre diving boards. The water circulates through a closed filter system and the temperature is maintained at 25° C.

**Physics Building**

There have been extensive alterations to two of the original buildings of the Dunsmuir estate. The dairy and cattle barns have now become the physics laboratory area. The physics laboratory comprises a large laboratory room for each of the four years, a number of smaller rooms with special facilities for physical oceanography, and two large research laboratories on the ground level. Little remains of these buildings to betray their humble beginnings as part of the farm facilities on the Dunsmuir estate.

**Gymnasium**

The physical training centre, built in 1942, is of frame construction. The floor is marked to include basketball (one regulation and two lesser size courts), badminton (three courts), volleyball (two courts), and European team hand ball.

### Tennis Courts

There are five asphalt tennis courts for the use of officer cadets during recreational training and on weekends. Two are marked by figure 9 on the Plan of the College, and three are by the Sooke Gate Field.

### Squash Courts

Two squash courts are housed within the pool building; both are marked for softball (English) rules of play.

### Sports Fields

Within the scenic setting of the College grounds there are three soccer pitches, one rugger field, two ball diamonds, a ¼ mile (400 metres) track, and a 6.9 kilometre cross country course.

### Boat House

The boat house and jetty are of comparatively recent construction, replacing the original boat house belonging to the estate, which was located immediately south of the lower lake. This is the centre of all boat pulling and sailing activites. Special orders are published for the use of all boats at the boat house.

## OCEANOGRAPHIC RESEARCH VESSEL

The Ta-yut (Chinook Indian dialect meaning Inside-the-Bay) is a thirty-foot fiberglass hulled vessel of Fraser-River-gillnetter design suitably equipped to provide the advanced Oceanography classes with practical experience in acquiring samples and data for laboratory work and research projects. The boat is powered by a 225-hp Volvo inboard-outboard engine, and the installed research equipment includes a hydraulic cable winch for control of sampling equipment, a digital conductivity temperature/depth probe, side-scan sonar, sub-bottom profilers, etc. Data can be processed on board, or electronically recorded for further processing in the laboratory.

## OFFICER CADET ORGANIZATION

The Officer Cadets are organized into a wing of four squadrons. This organization controls officer cadet life at the College, within certain limits laid down by the Commandant. Officer Cadets of the second, third, and fourth years hold appointments from Cadet Wing Commander to Cadet Section Commander, and receive practical training in leadership by being responsible, under the guidance of Regular Force officers, for the discipline, progress, and efficiency of the groups under their command. To give as many Officer Cadets as possible an opportunity of receiving this valuable training, the slate of cadet officers is changed during the academic year at the discretion of the Commandant.

Every committee at the College dealing with cadets has strong cadet representation. This gives the representatives an insight into the problems of administering sports and entertainment, including the budgeting of funds.

## RECREATION CLUBS AND REP TEAMS

Although all Officer Cadets take part in a compulsory physical education and intra-mural sports program, they are encouraged to participate in other athletic, recreational, cultural, and extracurricular activities at the College.

A Recreation committee supervises and supports these activities, each of which is governed by a group of cadets under the direction of the Staff Officer Cadets and Military Training. The two groups of activities are as follows:

a. Sports — Rugger, soccer, basketball, volleyball, cross-country running, water polo, hockey (ice and floor), fencing, swimming, wrestling, judo, karate, tennis, squash, golf, and curling.
b. Recreation Clubs — Skin/scuba, sports parachuting, flying, skiing, hiking and camping, fishing, archery, sailing, scriblerus, camera, amateur radio, rifle, pistol, and trap shooting.

A College yearbook, the "LOG", and a College newspaper, the "Tricorn", are prepared by a committee of officer cadets assisted by a few members of the senior staff.

## ROYAL ROADS BAND

The Royal Roads band serves two purposes. It serves as a recreational outlet for the musically inclined cadets and also lends itself to performance of a military parade function. Under the direction of a professional musician from the Canadian Forces School of Music, the band provides an excellent opportunity for those cadets with musical ability to continue their training. Although some musical experience is desirable, many cadets have joined with little knowledge of music and have now learned to play an instrument well. The musical facilities and music library at Royal Roads enable the cadet band to perform at parades, mess dinners, and concerts. Recent off-shoots of the band include a stage band, a rock band, and a 15-piece pipe band. Any cadet with musical training is strongly encouraged to join this group.

## CATEGORIES OF STUDENTS

Three different categories of students may attend RRMC. These are:

a. Officer Cadets — Officer Cadets are admitted into the first year at RRMC under the Regular Officer Training Plan (ROTP), or under the Reserve Entry Training Plan (RETP), or under the University Training Plan — Men (UTPM), as full time students. Officer Cadets complete their first two years of training at RRMC and then proceed to RMC or CMR to complete the final two years of their degree program, except for those pursuing a BA in Military and Strategic Studies or a BSc in Physics and Oceanography, a degree unique to RRMC.
b. Officers — Students attending RRMC under the University Training Plan — Officers (UTPO).
c. Special Students — Other members of the Canadian Forces taking one or more courses at RRMC on a part-time basis.

**A UNIVERSITY DEGREE**

**AND A QUEEN'S COMMISSION**

## THE REGULAR OFFICER TRAINING PLAN (ROTP)

The defence program at home and abroad has created a demand for a large number of officers to meet current and future needs. This is especially true in the technical fields. To meet the demands of this program, the ROTP was introduced in 1951.

The purpose of the ROTP is to provide the principal source of highly qualified officers for the Canadian Forces. The plan gives young Canadians the opportunity of gaining a university education and a permanent commission in the Canadian Forces.

Under this plan, applicants who have been accepted for entry at the Canadian Military Colleges enroll in the Regular component of the Canadian Forces. Some candidates may be offered ROTP support at a civilian university, provided they have been admitted to that university to a program of study that is eligible for ROTP support. On successful completion of their training. Officer Cadets will be promoted to commissioned rank in the Canadian Forces.

Successful applicants are enrolled on a career basis, for an initial nine-year period of service at Her Majesty's pleasure, and thus are assured of all benefits to Regular Force officers.

Under this plan, the costs of tuition, uniforms, books and instruments, and other essential fees for the duration of the program of studies are borne by the Department of National Defence. In addition, an Officer Cadet is paid a monthly salary from which there are deductions for income tax, pension plan, supplementary death benefit contributions, and for rations and quarters charges. Free medical and dental care is provided through the entire training period. Annual leave with full pay is granted according to regulations.

An Officer Cadet is obliged to maintain a satisfactory academic, military, and physical standard throughout his course. An Officer Cadet who fails a year at College may, on the recommendation of the College and the element concerned, be permitted to attend a repeat year at his own expense (see the section on Fees and Allowances) and, if successful, be reinstated to full pay and allowances.

An Officer Cadet who is enrolled under the ROTP may apply for release without obligation between 1 November and up to, but not including, the first day of the second academic year. Thereafter, an ROTP Officer Cadet who seeks release shall reimburse the Crown for all expenses incurred by reason of attendance at a Canadian Military College or civilian university. If he is unable to pay the costs prior to release, he may sign a promissory note or he may elect to serve, as an Officer Cadet, a period appropriate to the indebtedness.

Regulations and procedures are established whereby Regular Officers may obtain release prior to reaching compulsory release age, unless a state of emergency exists. Former members of the ROTP are subject to the same arrangements, except that, in recognition of the subsidization that has been provided, release within four years of graduation will be considered only under special and unforseen circumstances. Release in such circumstances will be subject to reimbursement of all or part of the cost of subsidization.

The day after he has received his degree on graduation from the Royal Military College of Canada, Royal Roads Military College, or Collège militaire royal de Saint-Jean, an Officer Cadet is promoted to commissioned rank in the Regular component of the Canadian Forces, provided that he has also obtained complete qualifications.

A pamphlet with more complete information on the ROTP may be obtained on application to the Registrar at one of the Canadian Military Colleges or to the Director of Recruiting and Selection, National Defence Headquarters, Ottawa, Ontario K1A 0K2, or to the Commanding Officer of any Canadian Forces Recruiting Centre.

## THE RESERVE ENTRY TRAINING PLAN (RETP)

Since 1961, provision has been made to have up to 15 per cent of the annual ROTP intake at the Royal Military College of Canada, Royal Roads Military College, and Collège militaire royal de Saint-Jean accepted as Reserve Entry cadets. Therefore, young men who wish to enter any of the Canadian Military Colleges, other than through the ROTP, may apply for admission as Reserve Entry cadets. Reserve Entry Officer Cadets receive the same education and training as ROTP Officer Cadets, but they are required to pay fees to defray the costs of tuition, clothing, books, instruments, laundry, dry cleaning, meals, and accommodation during the academic year, according to the scale of fees set out in the section on Fees and Allowances. Reserve Entry cadets may transfer to the ROTP at any time during their College course, in which event they would pay no further fees and would receive the same financial benefits as ROTP cadets. Reserve Entry cadets are committed to serve in a component of the active Reserve Forces upon graduation and commissioning. The admission requirements for Reserve Entry cadets are the same as those for cadets who enter under the ROTP.

The purpose of the RETP is to provide a limited number of vacancies at the Canadian Military Colleges for those young men who would like to have military training along with their education, but who are not prepared to commit themselves to a Service career at the time of entry. All Reserve Entry cadets are required to take summer training with the component of their choice, for which they receive pay and allowances.

The day after he has received his degree on graduation at one of the Canadian Military Colleges, a Reserve Entry Officer Cadet is promoted to commissioned rank in the Reserve component of the Canadian Forces, provided that he has obtained complete military qualifications.

A bulletin with more complete information on the RETP may be obtained on application to the Registrar at one of the Canadian Military Colleges, or to the Director of Recruiting and Selection, National Defence Headquarters, Ottawa, Ontario K1A 0K2, or the commanding officer of any Canadian Forces Recruiting Centre.

Attention is drawn to the Dominion Cadetships and to the Royal Military College Club of Canada Foundation Scholarships, which are found in the section of the calendar dealing with Cadetships and Scholarships.

## THE UNIVERSITY TRAINING PLAN — MEN (UTPM)

Since 1973, provision has been made for serving members of the Canadian Forces who qualify for subsidization under the UTPM to take their degree programs at the Canadian Military Colleges. Approximately 10 UTPM candidates enter Royal Roads Military College each year under this scheme.

Training under the UTPM is limited to serving men and women of the Regular Force. A selected applicant undergoes academic training identical with that under the ROTP, but with a slightly modified military and athletic program while at the college. The summer military training is identical with that of the ROTP. Except for certain differences in pay and terms of service, the policy and procedures for the UTPM are identical with those for the ROTP as prescribed in CFA09-12. The UTPM is therefore a modification of the ROTP and its purpose is the same: to train selected candidates to become career officers in the Regular Force. Like one's counterpart in the ROTP, an Officer Cadet in the UTPM will be selected to attend a Canadian Military College (CMC) or a university.

## THE UNIVERSITY TRAINING PLAN — OFFICERS (UTPO)

The UTPO supplements other means of obtaining career officers with university degrees in the regular force. Servicing officers of the regular forces who have sufficient academic background to enable them to obtain a baccalaureate degree in two or less academic years, and who meet the other requirements as specified in CFAO 9-40, are eligible to apply for the UTPO.

Royal Roads currently offers a BSc degree program of study in Physics and Oceanography and a BA degree program of study in Military and Strategic Studies. Science applicants should, as far as possible, have completed Math, Physics, and Chemistry courses equivalent to those listed in RRMC Calendar for the first two years of a Science or Engineering Degree Program. Arts applicants should have completed History and Political Science courses equivalent to those listed in RRMC Calendar for the first two years of an Arts Degree Program.

## SUMMER TRAINING

The summer term, which must be taken by all Officer Cadets who successfully complete the academic terms, is spent in practical military training with the element in which they are enrolled. During the summer term, cadets will receive pay and allowances as prescribed. The summer training period is approximately nine weeks long.

## CANADIAN FORCES COUNSELLING

The staffs of the three colleges include officers from the Canadian Forces who are responsible for career counselling and arrangements for military training programs for all Officer Cadets of regular status. These officers are available to the cadets at all times to answer inquiries on military matters and to offer advice on military careers.

## ACADEMIC COUNSELLING

At Royal Roads, senior members of the faculty serve as academic advisors to the cadets. These professors are available to the cadets at all times to counsel them in their

academic progress, to guide them in their choice of programs of study, or to advise them on any non-military matters that the cadets may wish to discuss.

## FEES AND ALLOWANCES

### Regular Officer Training Plan

An Officer Cadet who is a member of the ROTP shall have his fees paid by the Department of National Defence and shall be entitled to receive pay, allowances, and transportation and travelling expenses as prescribed by the ROTP.

An Officer Cadet who is a member of the ROTP but who has failed a semester or year and is permitted to repeat that semester or year at his own expense shall be required to pay the amount prescribed in QR&Os. The current annual rates, which are subject to change, are:

a. $800.00 in respect of tuition, clothing, books, instruments, drawing materials, dry cleaning, and incidental expenses;
b. a fee of $1,804.59 each year to defray the costs of meals and accommodation; and
c. an annual Recreation Club Fee of $60.00.

### Reserve Entry Training Plan

An Officer Cadet who is enrolled at the college under the RETP shall pay the following fees on the first day of arrival at RRMC, based on the current prevailing annual rates established by the Queen's Regulations and Orders:

a. annual college fee of $800.00, to defray the costs of tuition, clothing, books, instruments, drawing materials, dry cleaning, laundry, and incidental expenses;
b. a fee of $1,804.59 each year to defray the costs of meals and accommodation;
c. an Annual Recreation Club Fee of $60.00;
d. a book deposit of $100 (refunded at end of academic year).

An optional payment system may be exercised whereby payment may be made in two stages:

a. each year, $1,486 on or before the first day a cadet reports to the College, and the balance payable on or before 31 January of the same academic year.

NOTE — These are the current rates, and are subject to change.

### University Training Plans — UTPM and UTPO

An Officer Cadet who is a member of the UTPM or an officer who is a member of the UTPO shall have his fees paid by the Department of National Defence and shall be entitled to receive pay, allowances, and transportation and travelling expenses as prescribed by the applicable plan.

### Mess Subscriptions

All Officer Cadets are required to pay a mess subscription, extra messing charges and charges levied for special functions at a rate prescribed by the Mess Constitution.

### Transportation

An Officer Cadet of the Regular Forces proceeding to his home on leave, once in each year, for the portion of the journey to his home and return actually made in Canada or between Canadian points, is entitled to transportation allowances at Public expense, in accordance with QR&O.

### Special Students

Special students taking a course or courses at RRMC will pay no fees but may be responsible for the purchase of their own textbooks and supplies.

## CADETSHIPS AND SCHOLARSHIPS

### Scholarships and Bursaries

Applicants under the Reserve Entry Training Plan may be eligible for a number of scholarships and bursaries available to students at Canadian Universities, including the Canada Student Loans Plan and also the Foundation Scholarships of the Royal Military College Club of Canada.

### Canada Student Loan Plan

This plan, instituted by the Federal Government in 1964, was introduced to provide loans to supplement the resources of a student and/or the parents where in the absence of such aid, a student would be unable to pursue a post-secondary education. A student should apply for a loan under this plan for only the funds needed, over and above those from his own resources and/or those of his family, to enable him to continue his studies. The institution to which application is made will determine the amount of loan required in each case.

Borrowers under this plan are required to repay principal and to pay interest, but no payments are required so long as the student is in full-time attendance at an eligible institution and for six months thereafter. Interest charges during this period are paid by the Federal Government, which also guarantees the loan principal. After the interest-free period, repayment of principal and simple interest charges on the outstanding balance are required in regular monthly payments to the bank from the borrower. The maximum amount which may be advanced under this plan to one student is $1,800 in one year. The maximum total indebtedness under this plan is $5,000.

Application should be made in the first instance to the Registrar. When a loan is approved, the institution will issue a Certificate of Eligibility that authorizes the student to make arrangements for the loan with any branch of any chartered bank in Canada.

Officer Cadets receiving the full benefits of the Regular Officer Training Plan normally will not be considered eligible for Canada Student Loans.

### Foundation Scholarships — Royal Military College Club of Canada

Three scholarships are open annually to Reserve Entry applicants for admission to the Royal Military College of Canada, Kingston, Ont., Royal Roads Military College, Victoria, B.C., or le Collège militaire royal de Saint-Jean, Que. An applicant, to be

awarded a scholarship, must be an accepted candidate for one of the three Canadian Military Colleges according to the regulations governing the Reserve Entry Training Plan established for the Colleges by the Department of National Defence. Each Scholarship has a value of $1,000 for the first year and a further increment of $500 for each subsequent year to graduation from the Royal Military College of Canada, le Collège militaire royal de Saint-Jean, or Royal Roads Military College.

The scholarship winners will be determined by the Scholarship Committee at the time of the selection of candidates for the Colleges by the Final Board of Selection at National Defence Headquarters, Ottawa, Ont. The basis of selection are high academic standing and other qualities of leadership as shown by reports from regional officers of the RMC Club of Canada and from assessment material on candidates at National Defence Headquarters.

Application forms and further information may be obtained from the Scholarship Committee or from the secretary of any one of the Branches of the RMC Club of Canada.

All applications must be submitted directly to:

The Secretary-Treasurer,
RMC Club of Canada,
Royal Military College of Canada,
Kingston, Ontario
K7L 2W3

**Dominion Cadetships**

The following Cadetships are offered to candidates admitted to their first year at the Canadian Military Colleges:

a. The value of a Dominion Cadetship shall be $580 and shall be applied against the recipient's first year fee.
b. Fifteen shall be the maximum number of Dominion Cadetships that may be awarded, of which five may be awarded to sea element cadets, five to land element cadets, and five to air element cadets.
c. A candidate, to be eligible for the award, must satisfy the requirements for entrance and must be the son of a person who was killed, or who died or is severely incapacitated, as a result of service in a component of the Canadian Forces.
d. Applications for Dominion Cadetships shall be made in writing giving full particulars of the candidate's eligibility according to the above terms, and shall be forwarded by the 1 July of the year of entrance to the Director of Recruiting and Selection, National Defence Headquarters, Ottawa, Ontario.

**MEDALS, AWARDS AND PRIZES**

The following annual awards may be won by Officer Cadets who meet the requirements as specified:

**Medals**

*The Governor General's Gold Medal*, awarded to the Officer Cadet who obtains the highest academic standing in his fourth year.

*The Lieutenant-Governor of British Columbia's Silver Medal*, awarded to the Officer Cadet who obtains the highest academic standing in his third year.

*The Governor General's Silver Medal*, awarded to the Officer Cadet who obtains the highest academic standing in his second year.

*The Governor General's Bronze Medal*, awarded to the Officer Cadet who obtains the highest academic standing in his first year.

*The French Government Medal* presented by the French Government to the Anglophone Officer Cadet of the Second Year who achieves the best overall progress in French over his two year period of study.

**Awards**

*The Royal United Services Institute of Vancouver Island Award*, presented to the Officer Cadet of the first year who is judged to be the best all around Officer Cadet.

*The Commandant's Cup*, awarded to the outstanding second, third or fourth year Officer Cadet for athletic ability and sportsmanship.

*The Director of Studies' Cup*, awarded to the outstanding first year Officer Cadet for athletic ability and sportsmanship.

*The H.E. Sellers Award*, presented to the Officer Cadet chosen as the best all around second year cadet.

*The RMC Ex-Cadet Club Award*, presented to the Officer Cadet of the second year who has displayed the most improvement in all phases of his military training.

*The Military Engineering Association Award*, presented to the best second year engineering classification Officer Cadet.

*The Royal Canadian Armoured Corp Award*, presented to the best second year land operations classification Officer Cadet.

*The Navy League of Canada Award*, presented to the best second year sea operations classification Officer Cadet.

*The RCAF Association Award*, presented to the second year air operations Officer Cadet with the highest academic and military proficiency.

*The LCol F.J. Pickering Award*, presented to the Officer Cadet judged to be the best all around third year cadet.

*The Clarence C. Cook Award in Physics*, presented by Professor Emeritus C.C. Cook, awarded to the Officer Cadet who achieves the highest standing in physics courses in the combined third and fourth year programs.

*The Naval Officers Association of Canada (Vancouver Island Branch) Award*, presented to the best fourth year sea operations classification cadet.

*The Claus Gorgichuk Memorial Award*, presented by the Graduating Class of 1979, awarded to the cadet of the graduating class judged by his peers to best exemplify the college motto: Truth, Duty, Valour.

**Additional prizes may also be awarded.**

### Departmental Prizes

Academic book prizes are awarded annually to the Officer Cadet in each year who achieves highest standing in the disciplines of Mathematics, Science and/or Engineering, Chemistry, Physics, Chemical and Physical Oceanography, and the Humanities-Social Sciences.

In addition, special book prizes may be awarded for work of unusual merit, when such prizes are recommended by an academic department and approved by Faculty Council.

### Certificates

First Class Honours certificates are awarded to Officer Cadets of the first, second, or third year who obtain an overall A average in their final examinations, with no failures. In addition, second class and pass certificates are awarded to second year Officer Cadets obtaining an overall B standing (with no failures), or C or D standing, respectively, in their final examinations. A degree certificate will be awarded to those meeting the requirements of the BSc (Physics and Oceanography) degree at the end of the fourth year.

A student who completes his final year with first class honours standing will have his degree script inscribed "With Distinction".

## ADMISSION TO ROYAL ROADS MILITARY COLLEGE

### APPLICATION FOR ADMISSION

### Officer Cadets

Forms and information for ROTP and RETP applicants may be obtained from any of the following:

a. Commanding Officer of any Canadian Forces Recruiting Centre;
b. Director of Recruiting and Selection, National Defence Headquarters, Ottawa, Ontario, K1A 0K2.
c. Registrar, Royal Roads Military College, FMO Victoria, British Columbia, V0S 1B0;
d. Registrar, Royal Military College of Canada, Kingston, Ontario, K7L 2W3; or
e. Registrar, Collège militaire royal de Saint-Jean, Québec, J0J 1R0.

Applications for admission should be made as early as possible in the year, but not later than 1 February. Applications are normally initiated through the Canadian Forces Recruiting Centre closest to the home of the applicant.

Application must be accompanied by a birth certificate and certificates of educational achievement, as specified in the instructions sent to all applicants.

Serving members interested in the UPTM should refer to CFAO 9-13.

Serving officers interested in the UTPO should refer to CFAO 9-40.

**Special Students**

Officers or men wishing to enrol as special students at RRMC must apply in writing to the Registrar, giving details of previous education and indicating the course or courses desired. All such candidates will be interviewed personally at the College regarding their course selection, at a time to be set by the Registrar; normally about three weeks before the start of classes each semester.

**ADMISSION REQUIREMENTS**

Applicants for admission to RRMC as Officer Cadets under the ROTP or RETP:

a. must be Canadian citizens;
b. must have reached their sixteenth, but not their twenty-first birthday by 1 January preceding entrance, with the exception of candidates for the Collège militaire royal de Saint-Jean, who must have reached their sixteenth, but not their twentieth birthday by 1 January preceding entrance;
c. must be single;
d. must meet the appropriate physical standards for the Canadian Forces; and
e. must possess the academic qualifications as set forth below.

NOTE — UTPM candidates should consult CFAOs.

**ACADEMIC QUALIFICATIONS**

**General**

All candidates should be aware that the course requirements at a Canadian Military College are considerably more diversified than at a civilian university, and include two years of Mathematics and Science at the university level for an Arts degree, and two years of English and French, as well as other Arts options, for a Science or Engineering degree.

While course patterns are available, on entry, for programs leading to degrees in Arts, Science (Mathematics and Physics), or Engineering, because of the nature of the course requirements at the military colleges, an important criterion in selection will be the candidate's Mathematics-Science average in high school. Further, because of the stated need for engineers in the Canadian Forces, *preference will be given to those candidates who have satisfactorily completed all the requirements for admission to a Science or Engineering program of study.*

It should be noted that all Arts programs of study at the Canadian Military Colleges, both General and Honours, are of four years' duration beyond the normal secondary school level required for university admission, except for candidates entering Collège militaire royal de Saint-Jean, where a five-year course is required.

**Science or Engineering**

An applicant for admission to a Science or Engineering program at the Royal Roads Military College must have completed a matriculant year, at a level satisfactory to the College, with credits acceptable for admission to a Faculty of Engineering at a university in the province in which he has completed his secondary education. These levels at present are:

| | |
|---|---|
| British Columbia | Grade XII |
| Alberta | Grade XII |
| Saskatchewan | Grade XII |
| Manitoba | Grade XII |
| Ontario | Grade XIII |
| Quebec | CEGEP 1, or equivalent |
| New Brunswick | Grade XII* |
| Nova Scotia | Grade XII |
| Prince Edward Island | First year university, or equivalent |
| Newfoundland | First year university, or equivalent |

Specific course requirements at this level include standing in the following subjects:

English or French
Mathematics
Physics
Chemistry

NOTE — In most provinces, one matriculant level course in Mathematics is required. In Alberta, Math 31 is required as well as Math 30. In Ontario, candidates require at least two of the following Mathematics courses: Algebra, Calculus or Functions and Relations. In Saskatchewan, both Algebra 30 and Geometry/Trigonometry 30 are preferred.

*Specific subjects offered for RRMC admission must be at the 121 or 122 level, with 121 level courses preferred.

Superior candidates may be admitted lacking English and one of Physics or Chemistry.

**Arts**

An applicant for admission to an Arts program at the Royal Roads Military College must have completed high school graduation at a level satisfactory to the College, with credits acceptable for admission to a university in the province in which he is completing his secondary education. These levels at present are:

| | |
|---|---|
| British Columbia | Grade XII |
| Alberta | Grade XII |

| | |
|---|---|
| Saskatchewan | Grade XII |
| Manitoba | Grade XII |
| Ontario | Grade XIII |
| Quebec | CEGEP 1, or equivalent |
| New Brunswick | Grade XII* |
| Nova Scotia | Grade XII |
| Prince Edward Island | First year university, or equivalent |
| Newfoundland | First year university, or equivalent |

All candidates must have obtained credits, in the year *prior* to high school graduation, in the following subjects:

English
Mathematics
Physics and Chemistry (or a course in Science leading to final year high school courses in Physics or Chemistry)

Specific course requirements for admission to Arts at RRMC include high school graduation with credits in the following subjects:

English
Mathematics

NOTES — 1. The Mathematics requirement is that high school graduation course that is a prerequisite for the study of Calculus.

2. In Alberta, where two matriculant level courses are offered, Math 30 is required and Math 31 preferred. In Ontario, where three courses are offered, Functions and Relations or Calculus is required as a minimum. In Saskatchewan, Algebra 30 is required and Geometry/Trigonometry 30 perferred.

*Specific subjects offered for RRMC admission must be at the 121 or 122 level, with 121 level courses preferred.

Candidates for admission to the Royal Military College of Canada should consult the calendar of that college for full particulars of the admission requirements.

Candidates for admission to Collège militaire royal de Saint-Jean should consult the calendar of that college for full particulars of the admission requirements and the syllabus for entrance examinations. Such candidates may enter preparatory year with Junior Matriculation (or equivalent) in the required subjects. Candidates who have a classical BA (Science-Mathematics option) may be admitted into first year at Collège militaire royal de Saint-Jean.

## PHYSICAL REQUIREMENTS

The fundamental medical requirement is a sound, healthy body with normal mental and muscular co-ordination. Any condition that, as it exists, or owing to possible progression, may limit the candidate's career as a member of the Canadian Forces shall be cause for rejection.

## SELECTION OF CANDIDATES

### Officer Cadets

Eligible applicants to the ROTP or RETP are required to appear at a Canadian Forces Recruiting Centre (CFRC) for a medical examination, testing, and interview, at a convenient time after the date of their application. They will be provided with return transportation and normal travelling expenses from their place of residence to the CFRC and with living expenses while at the CFRC.

Candidates will be advised shortly after their interview as to the status of their application.

The selection of Officer Cadets is made by the Final Board of Selection appointed by the Minister of National Defence. Candidates will be advised of the decision of the Final Board of Selection and shall subsequently be sent the necessary joining instructions.

Final selection is based on academic standing and on the recommendations of the Interview and Medical Boards as to the personal and physical suitability of the candidates.

Selection of applicants to the UTPM is made by military and academic boards convened at NDHQ in April each year.

### Special Students

Special students will be selected by the RRMC Admissions Committee. Candidates will be selected not only on their academic potential, but also on the basis of the courses they have selected and the feasibility of these courses being offered in any given semester.

Special students may select courses with the approval of the Registrar, the Head of the Department concerned, and the Royal Roads Military College Faculty Council.

## JOINING INSTRUCTIONS

As soon as the decision of the Final Board of Selection is made known, the Colleges send out Joining Instructions to each of the successful applicants. They shall be informed of the date of joining, the procedure to be followed, and the clothing and equipment they should bring with them, and they shall be given instructions about transportation and travelling allowances.

## THE CURRICULUM

### DEFINITIONS

Program of Study — A program of study is a group of courses in different subjects required for completion of a degree in a given area of concentration, eg. Mechanical Engineering, Honours Science (Mathematics and Physics), General English.

Subject — A subject is a division of the program of studies, eg. French, Economics, Physics.

Course — A course is a series of lectures, tutorials, and/or laboratory periods in a given subject. The different courses at Royal Roads Military College are designated by letter and number combinations. The designation system is explained on page 119 titled Course Descriptions. Courses may extend over one semester (eg. Physics RR201), or over two semesters (eg. Mathematics RR103).

Elective — An elective is a course selected by the student from several designated offerings to fulfill requirements of an approved program of study.

Units of Credit — The relative weight assigned to a course is defined in terms of units of credit. A full university-level course would normally be assigned a weighting of four units of credit per semester.

Semester Grade Average — The semester grade average is obtained by multiplying the final semester numerical grade in each course by the number of units of credit assigned to that course, summing the resultant products for each course in which a semester grade was reported, and dividing the sum by the total number of units of credit recorded.

### CANADIAN MILITARY COLLEGE DEGREE PROGRAMS

Officer Cadets may begin their degree studies at any one of the three Canadian Military Colleges. Cadets taking the BSc degree program in Physics and Oceanography will complete their final two years of studies at Royal Roads Military College. Cadets taking the BA degree program in Military and Strategic Studies may complete their final two years of studies at RRMC. Cadets enrolled in other degree programs must complete their final two years of studies at Royal Military College or Collège militaire royal de Saint-Jean.

The Canadian Military Colleges hold membership in the Association of Universities and Colleges of Canada. The degree programs are fully accredited. The engineering degree programs meet the standards laid down by the Association of Professional Engineers of the province of Ontario.

### The Royal Roads Military College Academic Program

The academic year at Royal Roads Military College consists of two semesters, each of which consists of about 13 weeks of instruction and two weeks of final semester examinations.

In the first year at Royal Roads Military College, two programs of study are available to Officer Cadets, one of which leads to a degree of Bachelor of Arts or Bachelor of Administration, and the other to a degree of Bachelor of Science, Bachelor of Engineering, Bachelor of Arts, or Bachelor of Administration.

In the second year at Royal Roads Military College, programs of study are available to Officer Cadets leading to all of the various undergraduate degrees offered at all of the CMCs.

Royal Roads Military College offers, in the third and fourth years, a Bachelor of Science degree in Physics and Oceanography, in either a "General" or "Combined Major" Program of Study as well as a Bachelor of Arts degree in Military and Strategic Studies in either a "General" or "Honours" Program of Study.

Royal Roads Military College offers the following degrees to those considered worthy of the honour:

a. Doctor of Law, *honoris causa*;
b. Doctor of Science, *honoris causa*; and
c. Doctor of Military Science, *honoris causa*.

The above degrees are granted by the Royal Roads Military College under the authority of "The Royal Roads Military College Degrees Act", passed by the thirtieth Parliament of the British Columbia Legislative Assembly and given Royal Assent on 26 March 1976.

**BSc IN PHYSICS AND OCEANOGRAPHY — RRMC**

The purpose of the RRMC Science degree programs is to produce general service officers who are capable of working in land, sea and air environments; who have a sound knowledge of basic physics, chemistry, mathematics and an appreciation of general engineering subjects and, who will appreciate those aspects of the social sciences and humanities relevant to the military profession and ethic. The programs fit students for military service in most classifications upon graduation, and are a suitable basis for further academic and military training.

The purpose of specialization in physics and physical oceanography is to learn how to apply physical laws and use the techniques of the exact sciences to solve problems. The interests of many classifications such as MARS, MARE, PLT and ANAV are reflected in the emphasis and choice of topics studied. Attention is paid to the characteristics of the environments in which military forces operate, and the student studies the structure of the earth, the ocean bed, the air-sea interface including ice, the atmosphere and space, and especially the water column. Both chemical and biological oceanography are studied, but there is more emphasis upon physical oceanography because it is more closely related to military problems.

Three levels of the BSc degree are offered in Physics and Oceanography. There is a "general" degree, a "combined major" degree, and exceptional students may be awarded a "combined major degree with honours" upon completion of additional

**OCEANOGRAPHIC RESEARCH**

**SEA MEASUREMENT**

requirements. The "combined major" and "honours" programs are more relevant to the highly technical classifications than the "general" program. None of these programs produces professional oceanographers, who will require graduate study. They do provide a sound scientific background and specialization in a modern field.

Much of the material studied is common to all the CMC science degrees, eg. introductory and intermediate level courses in engineering, physics, and chemistry, with emphasis upon mathematics. The specific topics covered in courses during the last two years may be found in the body of the calendar in the section on Course Descriptions. In all three programs the mathematics courses emphasize analysis with particular attention to complex variables and differential equations, digital computing, and probability and statistics with applications to communications and theory. Physics courses include applications of mechanics, digital electronics, and electromagnetic wave propagation encountered in communications, navigation, surveillance and control systems. The fourth year course in physics treats a variety of topics selected to permit the student to apply advanced mathematical techniques.

The course on geophysical oceanography deals particularly with the sea bed, as well as with the rest of the earth's structure. The course on aeronomy examines air-sea-ice problems, as well as the traditional dynamics of the atmosphere and ionosphere, and problems of remote sensing. In addition to courses in general chemistry and physical chemistry the Chemistry Department offers introductory courses in analytical chemistry and in chemical and biological oceanography in the third year and a course in applied thermodynamics in the fourth year. The important subject area of physical oceanography is covered by courses in descriptive and dynamic oceanography which are broadened by field work. Following first and second year courses in engineering graphics and mechanics of materials the Engineering Department gives a course on fluid dynamics which is an option for the general program. In addition, students taking the combined major or honours also study acoustics, atomic physics, nuclear physics, and advanced dynamic oceanography.

Laboratory experiments are augmented by visits to west coast research ships and institutions, and by projects which involve making standard oceanographic measurements from the College research launch. Seminars and research projects bring the student up to date in selected areas. More time is spent on these activities by students taking the "combined major" program than by those in the "general" program.

## RRMC BSc DEGREES
## ADMISSIONS REQUIREMENTS

### General Degree in Physics and Oceanography

Satisfactory completion of second year in any CMC science or engineering program of study which includes a course in chemistry. Preference will be given to candidates whose program include Mathematics RR241 and Engineering RR232, or their equivalents.

**Combined Major in Physics and Oceanography**

Completion of second year in a CMC science or engineering program of study which includes a course in chemistry and Mathematics RR241 and Engineering RR232, or their equivalents. A weighted grade average in mathematics, science, or engineering subjects of at least D+ is required.

**Honours Degree in Physics and Oceanography**

Completion of third year in the combined major program in Physics and Oceanography with a weighted average in courses in mathematics, science, and engineering of a least B+.

Third year enrolment will be limited in numbers. Preference will be given to Officer Cadets in accordance with their overall academic and military performance.

**BA IN MILITARY AND STRATEGIC STUDIES — RRMC**

The RRMC Military and Strategic Studies program is designed to introduce Officer Cadets to military history, strategic thought, international relations, and Canadian economic and political issues. It builds upon and develops from the first and second year programs of study at the CMCs. The program is intended as a solid foundation for subsequent officer development through individual study in disciplines relating to war and the military.

In order to familiarize students with research problems and critical analysis, and to enhance their ability in public speaking, seminar and thesis requirements are mandatory in the fourth year of the Honours program. Students in the "General" degree program will be required during the first semester to undertake a research project, requiring a seminar presentation. Students in the Honours program will be required to undertake an honours thesis extending over two semesters. They will discuss their research work in a seminar during the first term, and defend their findings in an oral exam at the end of the second term.

**RRMC BA DEGREES ADMISSION REQUIREMENTS**

**General and Honours Degree in Military and Strategic Studies**

Satisfactory completion of any CMC second year course of studies - arts, administration, science or engineering.

**The Royal Military College Academic Program**

The Royal Military College of Canada offers the following degree programs to Officer Cadets:

a. Bachelor of Arts (Honours) with specialization in —
English
History

International Studies
Political and Economic Science
Economics and Commerce
Military and Strategic Studies

b. Bachelor of Arts (General) with specialization in —
English
History
Commerce
Politics
Economics
Military and Strategic Studies

c. Bachelor of Science (Honours) with specialization in —
Mathematics and Physics

d. Bachelor of Science with specialization in —
Mathematics and Physics
Science (Applied)

e. Bachelor of Engineering with specialization in —
Fuels and Materials Engineering
Electrical Engineering
Civil Engineering
Mechanical Engineering
Engineering Physics
Engineering and Management

The Royal Military College of Canada offers the following degree programs to commissioned officers in the Canadian Forces:

a. Master of Arts;
b. Master of Science; and
c. Master of Engineering.

The Royal Military College of Canada offers the following degrees to those considered worthy of the honour:

a. Doctor of Laws, *honoris causa*;
b. Doctor of Science, *honoris causa*; and
c. Doctor of Military Science, *honoris causa*.

The above degrees are granted by the Royal Military College of Canada under the authority of ''The Royal Military College of Canada Degrees Act, 1959'' passed by the twenty-fifth Ontario Legislature and given Royal Assent on 26 March 1959.

**The Collège Militaire Royal de Saint-Jean**
**Academic Program**

The Collège militaire royal de Saint-Jean offers the following degree programs:

a. Bachelor of Administration;
b. Bachelor of Science — General;
c. Bachelor of Science with a major in Physics and a minor in Mathematics;

d. Bachelor of Science with Honours in Physics;
e. Bachelor of Arts in Canadian Studies and Administration;
f. Bachelor of Arts in Military and Strategic Studies; and
g. Bachelor of Arts with Honours in Military and Strategic Studies.

Cadets graduating from CMR are awarded the appropriate degree by the University of Sherbrooke.

**SELECTION OF PROGRAM STUDY**

Officer Cadets at Royal Roads Military College shall select a program of study that is compatible with their own interests and ambitions, the requirements of their element of the Canadian Forces, and the relevant academic regulations. The Canadian Forces reserves the right to limit enrolment in any given program of studies, or to select the location at which a program of studies will be taken. Each cadet will be assigned an Academic Adviser who can advise him on the academic requirements for the various programs of study. The programs of study which are acceptable to the different Military Officer Classifications are listed in Table 1.

## TABLE 1
## Military Classifications and Course Patterns Available to Members of the Regular Officer Training Plan

### CLASSIFICATIONS

### COURSE PATTERNS

| Legend: 1 — Preferred<br>2 — Desirable<br>3 — Acceptable<br>4 — Unacceptable<br>* — Available at CMCs | ENGINEERING | | | | | | | | | | SCIENCE | | | | | | | ARTS | | | | | | | | | | MISCELLANEOUS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MOC CLASSIFICATION | Aerospace | Chemical* | Civil* | Electrical* | Mechanical* | Management* | Nuclear | Physics* | Systems | Chemistry | Computer | Geology | Mathematics* | Physics* | Applied* | General | Canadian Studies* | English* | Economics* | French* | Geography | History* | International Studies* | Mathematics* | Political Science* | General | Business Administration | Commerce* | Physical Education | Nutrition | Journalism | Police Science Criminology |
| 21 Armour | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 4 | 4 | 4 | 4 |
| 22 Artillery | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 23 Infantry | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 31 Air Navigator | 1 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| 32 Pilot | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 |
| 63 Air Traffic Controller | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| 64 Air Weapon Controller | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| 71 Maritime Surface & Sub Surface | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 |
| 44 Maritime Engineer | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 41 Aerospace Engineer | 2 | 4 | 4 | 1 | 2 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 42 Comm and Electronic Engineer | 4 | 4 | 4 | 1 | 4 | 4 | 4 | 1 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 43 Land Ordinance Engineer | 4 | 4 | 4 | 1 | 1 | 2 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

TABLE 1: CONT'D

| | Aerospace | Chemical* | Civil* | Electrical* | Mechanical* | Management* | Nuclear | Physics* | Systems | Chemistry | Computer | Geology | Mathematics* | Physics* | Applied* | General | Canadian Studies* | English* | Economics* | French* | Geography | History* | International Studies* | Mathematics* | Political Science* | General | Business Administration | Commerce* | Physical Education | Nutrition | Journalism | Police Science | Criminology |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 Military Engineer | 4 | 3 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 69 Logistics | 4 | 3 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 3 | 1 | 4 | 1 | 3 | 4 | 3 | 4 | 4 | 1 | 4 | 4 | 4 | 3 | 1 | 3 | 4 | 1 | 1 | 4 | 1 | 4 | 4 |
| 68 Personnel Administration | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 4 | 4 | 4 | 4 |
| 66 Public Affairs | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 4 |
| 53 Physical Educ & Recreation | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 1 | 4 | 3 | 4 |
| 81 Security | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 4 | 3 | 1 |

## RRMC PROGRAM OUTLINES

Tables 2 to 15 outline the programs of study available at Royal Roads Military College.

Corresponding course descriptions can be found on page 119 to 156.

## TABLE 2

### First Year — Degrees in Arts or Administration

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| English RR113 | Logic; English Literature to the Augustan Period | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Language Training I | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 3 |
| Language Training IA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 2 |
| History RR113 | Modern European History | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | 5 |
| Political Science RR102 | Introduction to Political Science | — | — | — | — | 3 | 0 | 0 | 4 | |
| MLM RR111 | Individual Psychology | 3 | 0 | 0 | 4 | — | — | — | — | |
| MLM RR212 | Social Psychology | — | — | — | — | (3) | (0) | (0) | (4) | 4 |
| Mathematics RR103 | Calculus and Analytical Geom; Introduction to Modern Algebra | 3 | 2 | 0 | 4 | 3 | 2 | 0 | 4 | |
| Elective | | — | — | — | — | (3) | (0) | (0) | (4) | 6 |
| Computer Science RR102 | Introduction to Computer Programming | — | — | — | — | 1 | 0 | 1 | 2 | |
| Chemistry RR003 | Introductory Chemistry | 3 | 0 | 3 | 4 | 3 | 0 | 3 | 4 | |
| PE RR103 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR103 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 15 | 5 | 8 | 20 | 16 | 5 | 9 | 22 | |

NOTES — 1. Final grade based on year's work; no end-of-semester finals.
2. Taken in lieu of Language Training I by cadets who are functionally bilingual.
3. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.
4. Required by those cadets who transfer from Science/Engineering to Arts at the end of the first semester.
5. Deferred to second year for cadets transferring to Arts from Science/Engineering at the end of the first semester.
6. With the permission of Faculty Council.

## TABLE 3

### First Year — Degrees in Science or Engineering

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| English RR103 | Introduction to Logic, Grammar, and Composition, Utopian Literature | 3 | 1 | 0 | 4 | 3 | 1 | 0 | 4 | |
| English RR003 | Composition, Logic and Author Study, Utopian Literature | (3) | (1) | (0) | (3) | (3) | (1) | (0) | (3) | 4 |
| Language Training I | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 3 |
| Language Training IA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 2 |
| MLM RR111 | Individual Psychology | 3 | 0 | 0 | 4 | — | — | — | — | |
| Mathematics RR113 | Calculus and Linear Algebra | 5 | 3 | 0 | 5 | 5 | 2 | 0 | 5 | |
| Computer Science RR122 | Introduction to Computer Programming | — | — | — | — | 2 | 0 | 2 | 4 | |
| Physics RR101 | Mechanics | 4 | 1 | 3 | 5 | — | — | — | — | |
| Physics RR112 | Electricity and Magnetism | — | — | — | — | 4 | 1 | 3 | 5 | |
| Chemistry RR103 | General Chemistry; Qual Anal; Introduction to Org. Chem. | 3 | 0 | 3 | 4 | 3 | 0 | 3 | 4 | |
| PE RR103 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR103 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 18 | 8 | 11 | 22 | 17 | 7 | 13 | 22 | |

NOTES — 1. Final grade based on year's work; no end-of-semester examination.
2. Taken in lieu of Language Training I by cadets who are functionally bilingual.
3. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.
4. Taken in lieu of Eng 103 by cadets who require extra grammar and composition instruction.

## TABLE 4A

### Second Year — Degrees in Arts or Administration
### (Students who have completed first year in Arts/Administration — TABLE 2)

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| English RR213 | English Literature from Blake and Gibbon to 1950 | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 5, 8 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 5, 6 |
| History RR113 | Modern European History | (3) | (0) | (0) | (4) | (3) | (0) | (0) | (4) | 1 |
| History RR213 | Canada | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Economics RR213 | Principles of Economics | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | 2 |
| Commerce RR203 | Accounting | (3) | (0) | (0) | (4) | (3) | (0) | (0) | (4) | 3, 4 |
| Political Science RR102 | Introduction to Political Science | — | — | — | — | (3) | (0) | (0) | (4) | 1 |
| MLM RR111 | Individual Psychology | (3) | (0) | (0) | (4) | — | — | — | — | 1 |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | 2 |
| Mathematics RR203 | Calculus, Linear Algebra; Probability and Statistics; Operations Research | 3 | 2 | 0 | 4 | 3 | 2 | 0 | 4 | |
| Computer Science RR102 | Introduction to Computer Programming | — | — | — | — | (1) | (0) | (1) | (2) | 1 |
| Physics RR003 | Physical Science — Physics | 3 | 0 | 3 | 4 | 3 | 0 | 3 | 4 | 4 |
| Elective | | (3) | (0) | (0) | (4) | — | — | — | — | |
| Elective | | — | — | — | — | (3) | (0) | (0) | (4) | |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 15 | 5 | 8 | 20 | 18 | 5 | 8 | 24 | 7 |

NOTES —
1. Required if not completed in first year.
2. Not required if completed in first year.
3. Required for entry to BAdm degree program (CMR).
4. Cadets electing to take CO 203 may omit the second semester of PH 003 unless they are in the MARS classification.
5. Final grade based on year's work; no end-of-semester examinations.
6. Taken in lieu of Language Training II by cadets who are functionally bilingual.
7. Semester course loadings of less than 20 or more than 24 units of credit require the prior approval of Faculty Council.
8. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.

## TABLE 4B

### Second Year — Degrees in Art or Administration
### (Students who have completed first year in Science/Engineering — TABLE 3)

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| English RR213 | English Literature from Blake and Gibbon to 1950 | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 7, 9 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 7, 8 |
| History RR113 | Modern European History | 3 | 0 | 0 | 4 | (3) | (0) | (0) | (4) | 1, 5 |
| History RR213 | Canada | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Economics RR213 | Principles of Economics | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Commerce RR203 | Accounting | (3) | (0) | (0) | (4) | (3) | (0) | (0) | (4) | 2, 3 |
| Political Science RR102 | Introduction to Political Science | — | — | — | — | (3) | (0) | (0) | (4) | 1 |
| MLM RR111 | Individual Psychology | (3) | (0) | (0) | (4) | — | — | — | — | 1 |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | |
| Mathematics RR203 | Calculus, Statistics, Linear Algebra, and Operations Research | 3 | 2 | 0 | 4 | 3 | 2 | — | 4 | |
| Computer Science RR102 | Introduction to Computer Programming | — | — | — | — | (1) | (0) | (1) | (2) | 1 |
| Physics RR003 | Physical Science — Physics | 3 | 0 | 3 | 4 | 3 | 0 | 3 | 4 | 3, 4 |
| Chemistry RR103 | General Chemistry, Qual Anal; Introduction to Org Chem | (3) | (0) | (3) | (4) | (3) | (0) | (3) | (4) | 1 |
| Elective | | (3) | (0) | (0) | (4) | — | — | — | — | |
| Elective | | — | — | — | — | (3) | (0) | (0) | (4) | |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | — | — | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 18 | 5 | 8 | 24 | 18 | 5 | 8 | 24 | 6 |

## TABLE 4B CONT'D.

NOTES —
1. Required if not completed in first year.
2. Required for entry to BAdm degree program (CMR).
3. Cadets electing to take CO 203 may omit the second semester of PH 003 (ie. PH002), unless they are in the MARS classification.
4. PH 003 not required of cadets successfully completing PH 101 in their first year.
5. Second semester of HI 113 (ie. HI112) not required of cadets completing their first year in Sci/Eng but may be taken as an elective.
6. Semester course loadings of less than 20 or more than 24 units of credit require the prior approval of Faculty Council.
7. Final grade based on year's work; no end-of-semester examinations.
8. Taken in lieu of Language Training II by cadets who are functionally bilingual.
9. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.

## TABLE 5

### Second Year — General Degrees in Science

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 6 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 5 |
| History RR202 | Modern Europe | — | — | — | — | 3 | 0 | 0 | 4 | |
| Economics RR201 | Introduction to Economics | 3 | 0 | 0 | 4 | — | — | — | — | |
| Elective | | (3) | (0) | (0) | (4) | — | — | — | — | 3 |
| Elective | | — | — | — | — | (3) | (0) | (0) | (4) | 3 |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | |
| Mathematics RR223 | Calculus, Vector Calculus, Differential Equations | 3 | 1 | 0 | 3 | 3 | 1 | 0 | 3 | |
| Mathematics RR241 | Probability and Statistics | (2) | (1) | (0) | (2) | — | — | — | — | 4, 7 |
| Mathematics RR252 | Linear Algebra; Elements of Operations Research | — | — | — | — | (2) | (1) | (0) | (2) | 2 |
| Physics RR201 | Electricity | 4 | 1 | 3 | 5 | — | — | — | — | |
| Physics RR212 | Modern Physics | — | — | — | — | 4 | 1 | 3 | 5 | |
| Chemistry RR212 | Engineering and Physical Chemistry | — | — | — | — | 4 | 1 | 3 | 5 | |
| Computer Science RR201 | Computer Applications | 2 | 0 | 2 | 3 | — | — | — | — | |
| Engineering RR261 | Engineering Graphics | 2 | 0 | 1 | 2 | — | — | — | — | |
| Engineering RR232 | Mechanics of Materials | — | — | — | — | (3) | (0) | (2) | (4) | 3, 7 |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 14 | 5 | 11 | 17 | 17 | 6 | 11 | 21 | |

## TABLE 5 CONT'D.

NOTES —
1. Final grade based on year's work; no end-of-semester examinations.
2. Not required for Science (Applied) degree at RMC or General Science degree at CMR, but recommended. Required for other Science degree programs at RMC or CMR. Pass will give credit for MAT212 at CMR.
3. With the permission of Faculty Council.
4. Optional but recommended. Pass = credit for Mathematics 327A at RMC, and for MAT 251 at CMR.
5. Taken in lieu of Language Training II by cadets who are functionally bilingual.
6. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.
7. Recommended for students wishing to continue in the Physics and Oceanography program in third year.

## TABLE 6

### Second Year — Honours Degrees in Science (Mathematics and Physics)

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 3 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 2 |
| History RR202 | Modern Europe | — | — | — | — | 3 | 0 | 0 | 4 | |
| Economics RR201 | Introduction to Economics | 3 | 0 | 0 | 4 | — | — | — | — | |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | |
| Mathematics RR223 | Calculus; Vector Calculus, Differential Equations | 3 | 1 | 0 | 3 | 3 | 1 | 0 | 3 | |
| Mathematics RR241 | Probability and Statistics | 2 | 1 | 0 | 2 | — | — | — | — | |
| Mathematics RR252 | Linear Algebra, Elements of Operations Research | — | — | — | — | 2 | 1 | 0 | 2 | |
| Mathematics RR233 | Calculus; Vector Calculus; Differential Equations | (4) | (1) | (0) | (4) | (4) | (1) | (0) | (4) | 4 |
| Mathematics RR261 | Probability and Statistics | (2) | (1) | (0) | (2) | — | — | — | — | |
| Mathematics RR272 | Linear Algebra; Elements of Operations Research | — | — | — | — | (2) | (1) | (0) | (2) | |
| Physics RR201 | Electricity | 4 | 1 | 3 | 5 | — | — | — | — | |
| Physics RR212 | Modern Physics | — | — | — | — | 4 | 1 | 3 | 5 | |
| Chemistry RR201 | Engineering Chemistry | 4 | 1 | 0 | 4 | — | — | — | — | |
| Chemistry RR242 | Engineering Chemistry Laboratory | — | — | — | — | 0 | 0 | 3 | 1 | |
| Computer Science RR201 | Computer Applications | 2 | 0 | 2 | 3 | — | — | — | — | |
| Engineering RR261 | Engineering Graphics | 2 | 0 | 1 | 2 | — | — | — | — | |
| Engineering RR232 | Mechanics of Materials | — | — | — | — | 3 | 0 | 2 | 4 | |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 20 | 7 | 11 | 23 | 18 | 6 | 13 | 23 | |

NOTES — 1. Final grade based on year's work; no end-of-semester examinations.
2. Taken in lieu of Language Training II by cadets who are functionally bilingual.
3. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted.
4. Not required but recommended.

## TABLE 7
## Second Year — Engineering Degree in Engineering Physics

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 3 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 2 |
| History RR202 | Modern Europe | — | — | — | — | 3 | 0 | 0 | 4 | |
| Economics RR201 | Introduction to Economics | 3 | 0 | 0 | 4 | — | — | — | — | |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | |
| Mathematics RR223 | Calculus; Vector Calculus; Differential Equations | 3 | 1 | 0 | 3 | 3 | 1 | 0 | 3 | |
| Mathematics RR241 | Probability and Statistics | 2 | 1 | 0 | 2 | — | — | — | — | |
| Mathematics RR252 | Linear Algebra; Elements of Operations Research | — | — | — | — | 2 | 1 | 0 | 2 | |
| Mathematics RR233 | Calculus; Vector Calculus; Differential Equations | (4) | (1) | (0) | (4) | (4) | (1) | (0) | (4) | 4 |
| Mathematics RR261 | Probability and Statistics | (2) | (1) | (0) | (2) | — | — | — | — | 4 |
| Mathematics RR272 | Linear Algebra; Elements of Operations Research | — | — | — | — | (2) | (1) | (0) | (2) | 4 |
| Physics RR201 | Electricity | 4 | 1 | 3 | 5 | — | — | — | — | |
| Physics RR212 | Modern Physics | — | — | — | — | 4 | 1 | 3 | 5 | |
| Chemistry RR201 | Engineering Chemistry | 4 | 1 | 0 | 4 | — | — | — | — | |
| Computer Science RR201 | Computer Applications | 2 | 0 | 2 | 3 | — | — | — | — | |
| Engineering RR263 | Engineering Graphics and Descriptive Geometry | 2 | 0 | 1 | 2 | 3 | 0 | 1 | 4 | |
| Engineering RR232 | Mechanics of Materials | — | — | — | — | 3 | 0 | 2 | 4 | |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 20 | 7 | 11 | 23 | 21 | 6 | 11 | 26 | |

NOTES — 1. Final grade based on year's work; no end-of-semester examinations.
2. Taken in lieu of Language Training II by cadets who are functionally bilingual.
3. For each fifteen lessons of Dialogue Canada satisfactorily completed, three units of academic credit will be granted.
4. Not required but recommended.

## TABLE 8

### Second Year — Engineering Degrees

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training II | Conversational French | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 3 |
| Language Training IIA | Conversational French | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 2 |
| History RR202 | Modern Europe | — | — | — | — | 3 | 0 | 0 | 4 | |
| Economics RR201 | Introduction to Economics | 3 | 0 | 0 | 4 | — | — | — | — | |
| MLM RR212 | Social Psychology | — | — | — | — | 3 | 0 | 0 | 4 | |
| Mathematics RR223 | Calculus; Vector Calculus; Differential Equations | 3 | 1 | 0 | 3 | 3 | 1 | 0 | 3 | |
| Mathematics RR241 | Probability and Statistics | 2 | 1 | 0 | 2 | — | — | — | — | |
| Mathematics RR252 | Linear Algebra; Elements of Operations Research | — | — | — | — | 2 | 1 | 0 | 2 | |
| Mathematics RR233 | Calculus; Vector Calculus; Differential Equations | (4) | (1) | (0) | (4) | (4) | (1) | (0) | (4) | 4 |
| Mathematics RR261 | Probability and Statistics | (2) | (1) | (0) | (2) | — | — | — | — | 4 |
| Mathematics RR272 | Linear Algebra; Elements of Operations Research | — | — | — | — | (2) | (1) | (0) | (2) | 4 |
| Physics RR201 | Electricity | 4 | 1 | 3 | 5 | — | — | — | — | |
| Physics RR212 | Modern Physics | — | — | — | — | 4 | 1 | 3 | 5 | |
| Chemistry RR201 | Engineering Chemistry | 4 | 1 | 0 | 4 | — | — | — | — | |
| Computer Science RR201 | Computer Applications | 2 | 0 | 2 | 3 | — | — | — | — | |
| Engineering RR263 | Engineering Graphics and Descriptive Geometry | 2 | 0 | 1 | 2 | 3 | 0 | 1 | 4 | |
| Engineering RR232 | Mechanics of Materials | — | — | — | — | 3 | 0 | 2 | 4 | |
| PE RR203 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR203 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 20 | 7 | 11 | 23 | 21 | 6 | 11 | 26 | |

NOTES — 1. Final grade based on year's work; no end-of-semester examinations.
2. Taken in lieu of Language Training II by cadets who are functionally bilingual.
3. For each fifteen lessons of Dialogue Canada or equivalent completed, three units of academic credit will be granted.
4. Recommended for those who plan on continuing in Electrical Engineering.

## TABLE 9

### Third Year — General Degree in Physics and Oceanography

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training III | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IIIA | Second Language Trg. | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 3 |
| MLM RR311 | Principles of Administration and Supervision | 3 | 0 | 0 | 4 | — | — | — | — | |
| Elective | | — | — | — | — | 3 | 0 | 0 | 3 | 4 |
| Elective | | — | — | — | — | 3 | 0 | 0 | 3 | 4, 5 |
| Mathematics RR301 | Differential Equations | 3 | 0 | 0 | 4 | — | — | — | — | |
| Mathematics RR312 | Topics in Applied Math | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR332 | E-M Wave Propagation | — | — | — | — | 3 | 0 | 3 | 4 | |
| Physics RR352 | Intermediate Mechanics | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR371 | Electronics and Microcomputers | 3 | 0 | 3 | 4 | — | — | — | — | |
| Chemistry RR301 | Quantitative Analysis | 2 | 0 | 4 | 4 | — | — | — | — | |
| Oceanography RR301 | Descriptive Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR322 | Biological Oceanography | — | — | — | — | 2 | 0 | 1 | 3 | |
| Oceanography RR332 | Chemical Oceanography | — | — | — | — | 3 | 0 | 2 | 4 | |
| Oceanography RR341 | Practical Oceanography | 0 | 0 | 3 | 1 | — | — | — | — | |
| PE RR303 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR303 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 14 | 3 | 15 | 21 | 20 | 3 | 11 | 25 | |

NOTES —
1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Second Language Training III by cadets who are functionally bilingual.
4. Electives are Political Science RR102, French RR212, or any 300S or any 400S level course offered in Economics, English, French, History, Philosophy, or Political Science.
5. May be deferred to 4th year.

## TABLE 10

### Third Year — Combined Major in Physics and Oceanography

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training III | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IIIA | Second Language Trg. | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 3 |
| MLM RR311 | Principles of Administration and Supervision | 3 | 0 | 0 | 4 | — | — | — | — | |
| Elective | | — | — | — | — | 3 | 0 | 0 | 3 | 4 |
| Mathematics RR301 | Differential Equations | 3 | 0 | 0 | 4 | — | — | — | — | |
| Mathematics RR312 | Topics in Applied Math | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR332 | E-M Wave Propagation | — | — | — | — | 3 | 0 | 3 | 4 | |
| Physics RR352 | Intermediate Mechanics | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR361 | Acoustics | 2 | 0 | 0 | 3 | — | — | — | — | |
| Physics RR371 | Electronics and Microcomputers | 3 | 0 | 3 | 4 | — | — | — | — | |
| Chemistry RR301 | Quantitative Analysis | 2 | 0 | 4 | 4 | — | — | — | — | |
| Oceanography RR301 | Descriptive Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR322 | Biological Oceanography | — | — | — | — | 2 | 0 | 1 | 3 | |
| Oceanography RR332 | Chemical Oceanography | — | — | — | — | 3 | 0 | 2 | 4 | |
| Oceanography RR341 | Practical Oceanography | 0 | 0 | 3 | 1 | — | — | — | — | |
| Engineering RR312 | Applied Fluid Mechanics | — | — | — | — | 4 | 0 | 2 | 5 | |
| PE RR303 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR303 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 16 | 3 | 15 | 24 | 21 | 3 | 13 | 27 | |

NOTES —
1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Second Language Training III by cadets who are functionally bilingual.
4. Electives are Political Science RR102, French RR212, or any 300S or 400S level course offered in Economics, English, French, History, Philosophy, or Political Science.

## TABLE 11

### Third Year — General and Honours Degree in Military and Strategic Studies

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training III | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IIIA | Second Language Trg. | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 3 |
| MLM RR311 | Principles of Administration and Supervision | 3 | 0 | 0 | 4 | — | — | — | — | |
| History RR301 | Technology and War 1815-1914 | 3 | 0 | 0 | 4 | — | — | — | — | |
| History RR302 | Technology and War 1914 to Present | — | — | — | — | 3 | 0 | 0 | 4 | |
| History RR313 | Imperialism | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| History RR333 | History of War since 1815 | (3) | (0) | (0) | (4) | (3) | (0) | (0) | (4) | 7 |
| Political Science RR313 | International Politics | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| Elective | | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | 5 |
| Elective | | — | — | — | — | 3 | 0 | 0 | 4 | 4, 5 |
| PE RR303 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR303 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 15 | 3 | 5 | 20 | 15 | 3 | 5 | 20 | 6 |

NOTES — 1. Grade based on year's work with no final examination.
2. For each fifteen lessons on Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Second Language Training III by cadets who are functionally bilingual.
4. If Political Science RR102, or its equivalent, was not completed in second year, it must be selected in the second semester.
5. Electives may be selected from any 300 or 400 level Arts or Science course if timetabling permits.
6. Semester course loadings of less than 20 or more than 24 units of credit require the prior approval of Faculty Council.
7. Not offered in 1981/82 Academic Year but will be offered in 1982/83.

## TABLE 12

### Fourth Year — General Degree in Physics and Oceanography

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training IV | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IVA | Second Language Trg. | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 3 |
| MLM RR402 | Personnel Management | — | — | — | — | 3 | 0 | 0 | 4 | |
| Elective | | — | — | — | — | 3 | 0 | 0 | 3 | 4 |
| Mathematics RR241 | Introd. Probability and Statistics | (2) | (1) | (0) | (2) | — | — | — | — | 5 |
| Mathematics RR401 | Complex Variables | 3 | 0 | 0 | 4 | — | — | — | — | |
| Mathematics RR412 | Advanced Probabilities and Statistics | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR411 | Applied Physics | 3 | 0 | 0 | 4 | — | — | — | — | |
| Physics RR421 | Atomic Physics | 3 | 0 | 0 | 4 | — | — | — | — | |
| Physics RR432 | Applied Nuclear Physics | — | — | — | — | (3) | (0) | (0) | (4) | 6 |
| Chemistry RR401 | Applied Thermodynamics | 3 | — | — | 4 | — | — | — | — | |
| Oceanography RR401 | Geology & Geophysical Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR412 | Aeronomy | — | — | — | — | 3 | 0 | 0 | 4 | |
| Oceanography RR431 | Practical Oceanography | 0 | 0 | 3 | 1 | — | — | — | — | |
| Oceanography RR432 | Practical Oceanography | — | — | — | — | 0 | 0 | 3 | 1 | 1 |
| Oceanography RR451 | Introduction to Dynamic Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR492 | Oceanography Seminar | — | — | — | — | 0 | 0 | 2 | 0 | |
| Engineering RR232 | Mechanics of Materials | — | — | — | — | (3) | (0) | (2) | (4) | 5 |
| Engineering RR312 | Applied Fluid Mechanics | — | — | — | — | (4) | (0) | (2) | (5) | 6 |
| PE RR403 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR403 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 18 | 3 | 11 | 25 | 12 | 3 | 10 | 16 | |

## TABLE 12 CONT'D.

NOTES —
1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or its equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Language Training IV by cadets who are functionally bilingual.
4. Electives are Political Science RR102, French RR212, or any 300S or 400S level course offered in Economics, English, French, History, Philosophy, or Political Science.
5. Required of cadets in the general program if not completed earlier.
6. Optional course for cadets in the general program.

## Table 13

## Fourth Year — Combined Major in Physics and Oceanography

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training IV | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IVA | Second Language Trg. | (0) | (1) | (2) | (0) | (0) | (1) | (2) | (0) | 1, 3 |
| MLM RR402 | Personnel Management | — | — | — | — | 3 | 0 | 0 | 4 | |
| Elective | | 3 | 0 | 0 | 3 | — | — | — | — | 4 |
| Elective | | — | — | — | — | 3 | 0 | 0 | 3 | 4 |
| Mathematics RR401 | Complex Variables | 3 | 0 | 0 | 4 | — | — | — | — | |
| Mathematics RR412 | Advanced Probabilities and Statistics | — | — | — | — | 3 | 0 | 0 | 4 | |
| Physics RR411 | Applied Physics | 3 | 0 | 3 | 4 | — | — | — | — | |
| Physics RR421 | Atomic Physics | 3 | 0 | 0 | 4 | — | — | — | — | |
| Physics RR432 | Applied Nuclear Physics | — | — | — | — | 3 | 0 | 0 | 4 | |
| Chemistry RR401 | Applied Thermodynamics | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR401 | Geology & Geophysical Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR412 | Aeronomy | — | — | — | — | 3 | 0 | 0 | 4 | |
| Oceanography RR431 | Practical Oceanography | 0 | 0 | 3 | 1 | — | — | — | — | |
| Oceanography RR432 | Practical Oceanography | — | — | — | — | 0 | 0 | 3 | 1 | 1 |
| Oceanography RR451 | Introduction to Dynamics Oceanography | 3 | 0 | 0 | 4 | — | — | — | — | |
| Oceanography RR462 | Advanced Dynamic Oceanography | — | — | — | — | 3 | 0 | 0 | 4 | |
| Oceanography RR483 | Project | (0) | (1) | (3) | (2) | (0) | (1) | (3) | (2) | 5 |
| Oceanography RR492 | Oceanography Seminar | — | — | — | — | 0 | 0 | 2 | 0 | |
| PE RR403 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR403 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 21 | 3 | 11 | 28 | 18 | 3 | 10 | 24 | |

## TABLE 13 CONT'D.

NOTES —
1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Language Training IV by cadets who are functionally bilingual.
4. Electives are Political Science RR102, French RR212, or any 300S or 400S level course offered in Economics, English, French, History, Philosophy, or Political Science.
5. Required of cadets in the honours program only.

## TABLE 14

### Fourth Year — General Degree in Military and Strategic Studies (tentative)

| Course | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training IV | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IVA | Second Language Trg. | (0) | (3) | (2) | (0) | (0) | (3) | (2) | (0) | 1, 3 |
| MLM RR402 | Personnel Management | — | — | — | — | 3 | 0 | 0 | 4 | |
| Political Science RR411 | Development of Strategic Thought | 3 | 0 | 0 | 4 | — | — | — | — | |
| Political Science RR422 | Canada Abroad; Defence, Foreign and Trade Policies | — | — | — | — | 3 | 0 | 0 | 4 | |
| History RR413 | America as a World Power | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| History RR421 | China and Japan in the Twentieth Century | 3 | 0 | 0 | 4 | — | — | — | — | |
| History RR431 | Seminar in Military History | 3 | 0 | 0 | 4 | — | — | — | — | |
| History RR452 | Soviet Russia as a World Power | — | — | — | — | 3 | 0 | 0 | 4 | |
| Elective | | 3 | 0 | 0 | 4 | — | — | — | — | 4 |
| Elective | | — | — | — | — | 3 | 0 | 0 | 4 | 4 |
| PE RR403 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR403 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 15 | 3 | 5 | 20 | 15 | 3 | 5 | 20 | 5 |

NOTES — 1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Language Training IV by cadets who are functionally bilingual.
4. Electives may be selected from any 300 or 400 level Arts or Science course if timetabling permits.
5. Semester course loadings of less than 20 or more than 24 units of credit require the prior approval of Faculty Council.

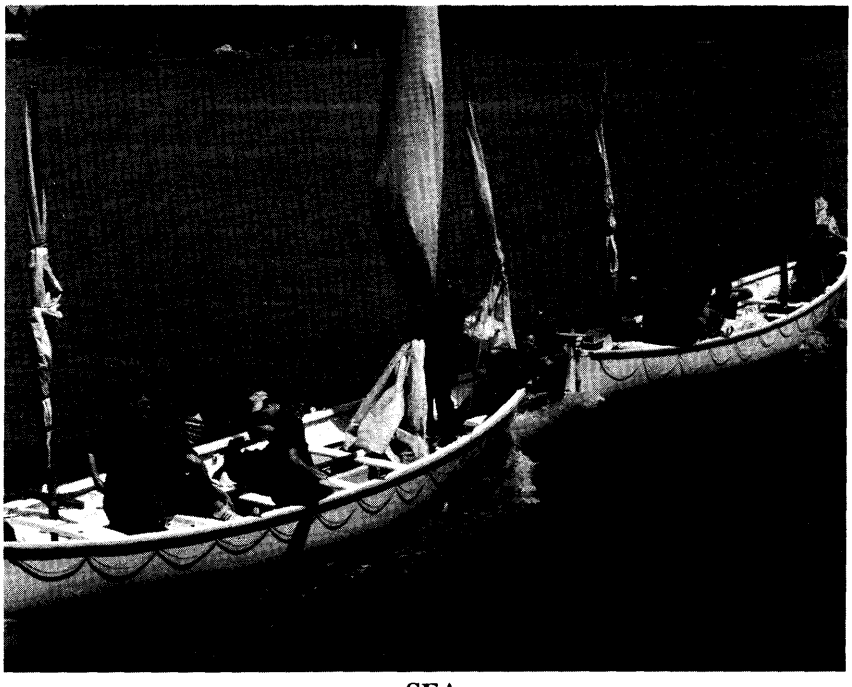
## TABLE 15

### Fourth Year — Honours Degree in Military and Strategic Studies (tentative)

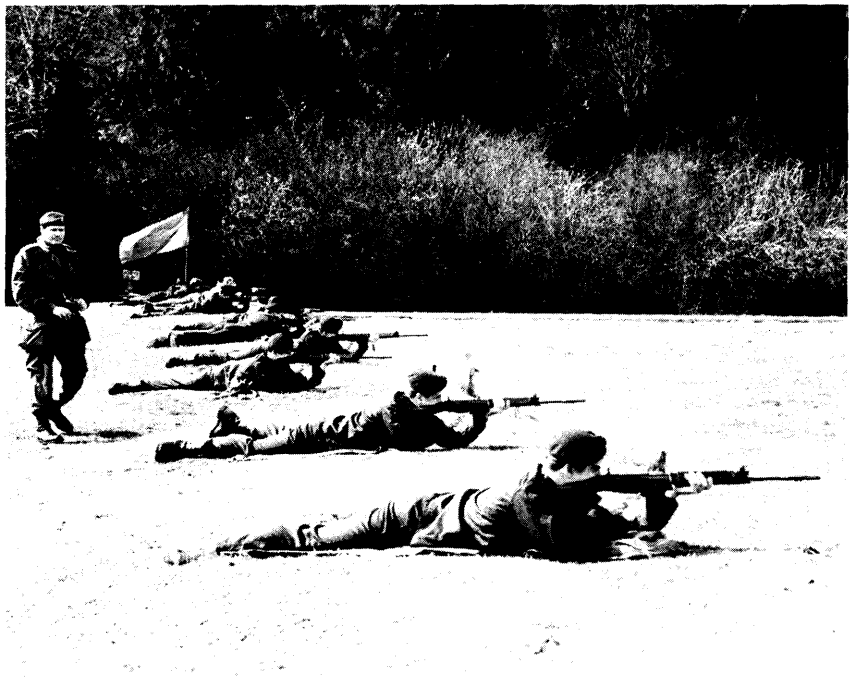
| Course f040 | Description | First Semester | | | | Second Semester | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lect | Tut | Lab | Credits | Lect | Tut | Lab | Credits | |
| Language Training IV | Second Language Trg. | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 1, 2 |
| Language Training IVA | Second Language Trg. | (0) | (3) | (2) | (0) | (0) | (3) | (2) | (0) | 1, 3 |
| MLM RR402 | Personnel Management | — | — | — | — | 3 | 0 | 0 | 4 | |
| Political Science RR411 | Development of Strategic Thought | 3 | 0 | 0 | 4 | — | — | — | — | |
| Political Science RR422 | Canada Abroad; Defence, Foreign and Trade Policies | — | — | — | — | 3 | 0 | 0 | 4 | |
| History RR413 | America as a World Power | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| History RR421 | China and Japan in the Twentieth Century | 3 | 0 | 0 | 4 | — | — | — | — | |
| History RR443 | Honours Thesis | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 4 | |
| History RR452 | Soviet Russia as a World Power | — | — | — | — | 3 | 0 | 0 | 4 | |
| Elective | | 3 | 0 | 0 | 4 | — | — | — | — | 4 |
| Elective | | — | — | — | — | 3 | 0 | 0 | 4 | 4 |
| PE RR403 | | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | |
| Drill RR403 | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | |
| Total | | 15 | 3 | 5 | 20 | 18 | 3 | 5 | 24 | 5 |

NOTES —
1. Grade based on year's work with no final examination.
2. For each fifteen lessons of Dialogue Canada or equivalent satisfactorily completed, three units of academic credit will be granted to a maximum of nine in the full degree program.
3. Taken in lieu of Language Training IV by cadets who are functionally bilingual.
4. Electives may be selected from any 300 or 400 level Arts or Science course if timetabling permits.
5. Semester course loadings of less than 20 or more than 24 units of credit require the prior approval of Faculty Council.

## MILITARY TRAINING



**SEA**



**LAND**


**AIR**

## RMC PROGRAM OUTLINES

Tables 16 to 35 outline the third and fourth year programs of study available at Royal Military College, Kingston, Ontario.

Corresponding course descriptions are not included in this calendar, but may be found in the RMC calendar.

### RMC COURSE IDENTIFICATION CODE

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

example: EEE 319A

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).

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.

For courses in Third and Fourth Years, an odd digit in the third position indicates a course in an Engineering Program of Study, although some of these courses may be open to students in Arts or Science. An even digit in this position indicates a course in an Arts or Science Program of Study, although some may be open to Engineers.

The course numbering for the First and Second Years indicates the year and the departmental course numbering only.

The seventh character, if present, indicates that the course is a half-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.

### List of Subject Codes

Listed below are the subject codes for courses given in English and their counterpart for courses given in French.

| | |
|---|---|
| CEE — Civil Engineering | GCF — Génie civil |
| CHE — Chemistry | CHF — Chimie |
| COE — Commerce | COF — Commerce |
| DRE — Drill | EXF — Exercice |
| ECE — Economics | ECF — Économie politique |
| EEE — Electrical Engineering | GEF — Génie électrique |
| EGE — Engineering Graphics | DIF — Dessin industriel |
| EME — Engineering and Management | GGF — Génie et gestion |

| | |
|---|---|
| ENE — English* | ANF — Anglais* |
| EPE — Engineering Physics | GPF — Génie physique |
| FRE — French* | FRF — Français* |
| GOE — Geography | GOF — Géographie |
| HIE — History | HIF — Histoire |
| KEE — Chemical Engineering | GKF — Génie chimique |
| MAE — Mathematics | MAF — Mathématiques |
| MEE — Mechanical Engineering | GMF — Génie mécanique |
| MLE — Military Leadership and Management | LGF — Leadership et gestion militaire |
| NEE — Nuclear Engineering | GNF — Génie nucleaire |
| PEE — Physical Education | EPF — Education physique |
| PHE — Physics | PHF — Physique |
| POE — Politics | POF — Politique |
| PYE — Philosophy | PIF — Philosophie |
| SCE — Science | SCF — Sciences |
| SLE — Second Language* | LSF — Langue seconde* |

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

## EXPLANATION OF NOTES ON RMC COURSE OUTLINES[1]

Numbers enclosed in parentheses within the RMC Program Outlines Tables indicate that the course they refer to are elective courses.

The letter (A) following the course number denotes that classes are normally held in the Fall Term only. The letter (B) likewise denotes Winter Term.

## WEIGHTING FACTORS (RMC)

Each course will have associated with it a number denoting its weighting factor. The weighting factors for any Program of Study total 100. They are used in the determination of the overall average and the priviliges of writing supplemental examinations and repeating a year.

[1]The programs of study available in the third and fourth years at RMC and CMR are described in general terms in this Calendar. It should be noted, however, that information provided the RRMC calendar regarding the programs of study at other colleges is not official and may not be completely up-to-date. For complete accuracy, the calendars of the other colleges should be consulted and any inquiries should be directed to the Registrar of the appropriate college.

## TABLE 16: Third Year Science (Applied)

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Period/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE304: | Foundations Leadership | 9 | 2 | — | 2 | 2 | — | 2 | |
| MLE398: | Leadership Project | (9) | (2) | — | (2) | (2) | — | (2) | |
| One elective course in Arts, or MLE310 | | 14 | 3 | — | 3 | 3 | — | 3 | A |
| HIE300: | Canada | 14 | 3 | — | 3 | 3 | — | 3 | |
| MAE325B: | Computer Techniques | 7 | — | — | — | 2 | 2 | 4 | |
| MAE327: | Prob. & Stats., O.R. | 10 | 2 | — | 2 | 2 | — | 2 | B |
| MAE333A: | Diffl. Equations | 7 | 3 | — | 3 | — | — | — | |
| KEE333: | Mtrls, Engery Convrn. | 17 | 3 | 2 | 5 | 3 | 2 | 5 | |
| EEE395: | Circuits, Devices | 17 | 3 | 2 | 5 | 3 | 2 | 5 | |
| MEE389: | Shop | 5 | — | 3 | 3 | — | 3 | 3 | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 19 | 15 | 34 | 18 | 17 | 35 | |

NOTES: A. A course may be selected in any department in the Arts Division, subject to a list of preferred courses in each department and to Timetable limitations. The course selected must be approved by the Instructor. A course in language improvement, one being available in each language, may be counted as an Arts elective.

B. Part I of this course is not required of those with previous credit in an acceptable course in Statistics.

WF means Weighting Factor. See note on page 68 at front of RMC Program Outlines.

## TABLE 17: Third Year Honours Mathematics and Physics

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTEN |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Management Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts Elective | | 8 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 8 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE301: | Dif'l Eqns, Complex Variables | 22 | 4 | — | 4 | 4 | — | 4 | |
| MPE300: | Qntm Mchs; At & Ml Physics | 11 | 2 | — | 2 | 2 | — | 2 | |
| PHE302: | Instrumentation | 16 | 1 | 4 | 5 | 1 | 4 | 5 | |
| PHE316: | Thermal & Statl. Physics | 11 | 2 | — | 2 | 2 | — | 2 | |
| EPE301B: | Elect. Wave Propagation | 7 | — | — | — | 2 | 1 | 3 | |
| EPE307: | Computer Systems & Applications | 13 | 2 | — | 2 | 2 | — | 2 | |
| Mathematics Tutorial | | 0 | — | 2 | 2 | — | — | — | |
| SLE3 | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 16 | 14 | 30 | 17 | 13 | 30 | |

NOTES: A. See Table 26.

WF means Weighting Factor (see note on page 68).

## TABLE 18: Third Year General Mathematics and Physics

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Management Techniques | 6 | 2 | 0 | 2 | — | — | — | A |
| Arts Elective | | 11 | 1½ | 0 | 1½ | 2 | 0 | 2 | A |
| HIE303: | Canada | 11 | 1½ | 0 | 1½ | 2 | 0 | 2 | A |
| MAE305: | C Var, D.E., Bndr Val | 22 | 3 | 1 | 4 | 3 | 1 | 4 | B |
| EPE307: | Pt. I - Cmptr Systs, & tut'l | 9 | 2 | 2 | 4 | — | — | — | B |
| EPE301B: | Elect. Wave Propagation | 9 | — | — | — | 2 | 1 | 3 | B |
| PHE316: | Thermal & Statl Phyiscs | 13 | 2 | 0 | 2 | 2 | 0 | 2 | B |
| PHE302: | Instrumentation | 19 | 1 | 4 | 5 | 1 | 4 | 5 | B |
| SLE3: | | — | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 13 | 15 | 28 | 12 | 14 | 26 | |

NOTES: A. The courses shown are taken from Table 27. Students may choose to take those shown in Table 26.

B. The student is required, in each of the third and fourth years, to select as major courses, the equivalent of at least four full courses, in Mathematics and/or Physics. These courses will normally be selected from any offered to third or fourth year Honours Mathematics and Physixs*, or Engineering Physics, students. However, one of these four courses in each year may be taken in Chemistry, or Engineering. *Any selection of courses will be subject to normal prerequisite requirements, and appropriate departmental approval.* A student will normally be required to have a mathematics and physics average of 55% in Second Year in order to be admitted to this program.

WF means Weighting Factor (see note on page 68).

## TABLE 19: Third Year Fuels and Materials Engineering

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE335: | D.E., Bndry Val Prbs | 8 | 2 | — | 2 | 2 | — | 2 | |
| CHE301: | Organic Chemistry | 12 | 3 | 2 | 5 | 2 | 2 | 4 | |
| CHE303A: | Thermodynamics | 7 | 3 | 1 | 4 | — | — | — | |
| CHE307B: | Reactions, Surfaces | 9 | — | — | — | 4 | — | 4 | |
| CHE313: | Phys & Anlt Chem Lab | 8 | — | 4 | 4 | — | 4 | 4 | |
| MSE301: | Solids-Struc, Proprts | 10 | 2 | — | 2 | 3 | — | 3 | |
| FME301: | Fluid, Heat, Mass Tsfr | 11 | 3 | — | 3 | 3 | — | 3 | |
| FME303B: | Energy & Fuels Engrg | 7 | — | — | — | 3 | — | 3 | |
| FME305B: | Engineering Lab | 5 | — | — | — | — | 4 | 4 | |
| EEE315A: | Electrical Systems | 7 | 3 | 3 | 6 | — | — | — | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 21 | 18 | 39 | 21 | 18 | 39 | |

NOTES: A. See Table 26.

WF means Weighting Factor (see note on page 68).

## TABLE 20: Third Year Civil Engineering

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| CEE307B: | Structural Theory | 9 | — | — | — | 3 | 2 | 5 | |
| CEE309A: | Strength of Materls | 9 | 4 | 2 | 6 | — | — | — | |
| CEE313A: | Civ Eng Analysis | 6 | 3 | 1 | 4 | — | — | — | |
| CEE353A: | Engineering Geology | 7 | 3 | 2 | 5 | — | — | — | |
| CEE355B: | Soil Mechanics | 9 | — | — | — | 3 | 2 | 5 | |
| CEE369: | Elementary Surveying | 11 | 3 | 2 | 5 | 1½ | 1½ | 3 | |
| CEE371B: | Terrain Analysis | 6 | — | — | — | 1½ | 1½ | 3 | |
| CEE381A: | Elec Therm Systems | 7 | 3 | 2 | 5 | — | — | — | |
| CEE389A: | Transp'n & Planning | 11 | — | — | — | 4 | 2 | 6 | |
| MEE315B: | Fluid Mechanics | 9 | — | — | — | 3 | 2 | 5 | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 21 | 7 | 38 | 20 | 19 | 39 | |

NOTES: A. See Table 26.

WF means Weighting Factor (see note on page 68).

## TABLE 21: Third Year Electrical Engineering

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE301: | Dif'l Eqns, Cmplx Var | (14) | (4) | — | (4) | (4) | — | (4) | B |
| MAE305: | C Var, D.E., Bndr Val | 14 | 3 | 1 | 4 | 3 | 1 | 4 | |
| PHE316: | Therml & Statl Phys | (7) | (2) | — | (2) | (2) | — | (2) | C |
| EEE303A: | Intro Elect Dev & Ccts | 9 | 4 | 2 | 6 | — | — | — | |
| EEE305B: | Comp Logic & Micropr | 9 | — | — | — | 3 | 2 | 5 | |
| EEE307A: | El Msrmnts & Comp'n | 7 | 2 | 3 | 5 | — | — | — | |
| EEE321A: | Linear Networks I | 9 | 3 | 2 | 5 | — | — | — | |
| EEE323B: | Linear Networks II | 9 | — | — | — | 3 | 2 | 5 | |
| EEE329B: | Elmg Field & Forces | 10 | — | — | — | 3 | 3 | 6 | |
| EEE331B: | Energy Conversion | 10 | — | — | — | 3 | 3 | 6 | |
| MEE357A: | Appld Thermodynamics | 7 | 2 | 2 | 4 | — | — | — | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | a- | - | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 19 | 18 | 37 | 19 | 19 | 38 | |

## TABLE 21 CONT'D.

NOTES: A. See. Table 21.

B. Those candidates who have completed MAE217 & MAE221 in Second Year and have achieved a Mathematics and Physics average of at least 66% may elect MAE 301 instead of MAE305.

C. Those candidates who have achieved an average of more than 65 per cent in Mathematics and Physics in Second Year may elect PHE316 in place of MEE357A.

WF means Weighting Factor (see note on page 68).

## TABLE 22: Third Year Engineering Physics

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE301: | Dif'l Eqns, Cmplx Var | 16 | 4 | — | 4 | 4 | — | 4 | |
| MPE300: | Qntm Mchs; At & Ml Phys | 8 | 2 | — | 2 | 2 | — | 2 | |
| PHE316: | Thermal & Statl Phys | 8 | 2 | — | 2 | 2 | — | 2 | |
| EEE303A: | Intro Elect Dev & Ccts | 9 | 4 | 2 | 6 | — | — | — | |
| EEE305B: | Comp Logic & Micropr | 8 | — | — | — | 3 | 2 | 5 | |
| EEE321A: | Linear Network I | 8 | 3 | 2 | 5 | — | — | — | |
| EEE323B: | Linear Networks II | 8 | — | — | — | 3 | 2 | 5 | |
| EPE301B: | Elect Wave Prop | 5 | — | — | — | 2 | 1 | 3 | |
| EPE305: | Laboratory | 6 | — | 4 | 4 | — | 4 | 4 | |
| EPE307: | Cmptr Systs & Applns | 8 | 2 | — | 2 | 2 | — | 2 | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 22 | 16 | 38 | 22 | 17 | 39 | |

NOTES: A. See Table 26.

WF means Weighting Factor (see note on page 68).

## TABLE 23: Third Year Mechanical Engineering

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE301: | Dif'l Eqns, Cmplx Var | (12) | (4) | — | (4) | (4) | — | (4) | B |
| MAE329: | D.E., Bndr Val, C Var | 12 | 3 | 1 | 4 | 3 | 1 | 4 | |
| EEE319B: | Electr Technology I | 9 | — | — | — | 3 | 2 | 5 | |
| MEE301B: | Machine Design | 9 | — | — | — | 3 | 2 | 5 | |
| MEE311B: | Fluid Dynamics | 12 | — | — | — | 4 | 2 | 6 | |
| MEE331A: | Strength of Matrls | 7 | 3½ | 1 | 4½ | — | — | — | |
| MEE333A: | Metlrgy & Engr Mtrls | 7 | 3½ | 1 | 4½ | — | — | — | |
| MEE335B: | Shopwork | 0 | — | — | — | — | 3 | 3 | |
| MEE345A: | Applied Mechanics | 9 | 4 | 2 | 6 | — | — | — | |
| MEE351A: | Thermodynamics | 12 | 5 | 2 | 7 | — | — | — | |
| MEE381B: | Engrg Experimentatn | 7 | — | — | — | 3 | 1 | 4 | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 24 | 15 | 39 | 20 | 19 | 39 | |

## TABLE 23 CONT'D.

NOTES: A. See Table 26.

B. Elective instead of MAE329 for students having passed MAE217 and 221 and obtaining a Mathematics and Physics average of at least 66 per cent.

WF means Weighting Factor (see note on page 68).

## TABLE 24: Third Year Engineering and Management

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | 4 | 2 | — | 2 | — | — | — | |
| MLE399A: | Leadership Project | (4) | (2) | — | (2) | — | — | — | |
| Arts elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| HIE303: | Canada | 5 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MAE319: | Stats, Prob | 14 | 3 | 1 | 4 | 3 | 1 | 4 | |
| MAE339A: | D.E., Bndr Val Prob | 5 | 2 | 1 | 3 | — | — | — | |
| EEE319B: | Electr Technology I | 9 | — | — | — | 3 | 2 | 5 | |
| MEE333A: | Metlrgy & Engr Mtrls | 8 | 3½ | 1 | 4½ | — | — | — | |
| MEE349B: | App Mechs, Strs Anal | 6 | — | — | — | 3 | — | 3 | |
| MEE359B | Appld Thermodynamics | 8 | — | — | — | 2 | 2 | 4 | |
| MEE383A: | Shopwork | 0 | — | 3 | 3 | — | — | — | |
| EME301B: | Prod Mgmt I | 9 | — | — | — | 2 | 2 | 4 | |
| EME303A: | Engr Economy | 10 | 3 | 2 | 5 | — | — | — | |
| EME305A: | Mgmnt Info Systems | 6 | 3 | 1 | 4 | — | — | — | |
| EME307B: | Math Methods of OR | 9 | — | — | — | 2 | 2 | 4 | |
| SLE3: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 19½ | 17 | 36½ | 19 | 17 | 36 | |

NOTES: A. See Table 26. ECE301 must be selected Third or Fourth Year.
WF means Weighting Factor (see note on page 68).

## TABLE 25: Third and Fourth Year Arts

| Courses offered in 1981-82 are marked with an asterisk (*) | | | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE303A: | Mgmt Techniques | * | 2 | — | 2 | — | — | — | A |
| MLE304: | Foundations Ldrshp | * | 2 | — | 2 | 2 | — | 2 | B |
| MLE310: | Personality Theories | * | 3 | — | 3 | 3 | — | 3 | |
| MLE320: | Soclgy Mil'y Profssn | * | 3 | — | 3 | 3 | — | 3 | |
| MLE398: | Leadership Project | | (2) | — | (2) | (2) | — | (2) | |
| MLE399A: | Leadership Project | | (2) | — | (2) | — | — | — | |
| MLE403: | Mil'y Persnnl System | * | 1½ | — | 1½ | 2 | — | 2 | 1, C |
| MLE499: | Personnel Management | | (1½) | — | (1½) | (2) | — | (2) | |
| ANF302: | Gram, pron, lectures | * | 3 | — | 3 | 3 | — | 3 | |
| ENE304: | Eng Lit Ren-Restor | * | 3 | — | 3 | 3 | — | 3 | |
| ENE310: | Canadian Lit | * | 3 | — | 3 | 3 | — | 3 | |
| ENE312: | Eng Novel to 1916 | | 3 | — | 3 | 3 | — | 3 | |
| ENE314B: | History of the Lang | * | — | — | — | 3 | — | 3 | |
| ENE320: | American Lit to 1900 | * | 3 | — | 3 | 3 | — | 3 | |
| ENE324A: | Literary Principles | * | 3 | — | 3 | — | — | — | |
| ENE402: | Old & Middle Eng Lit | * | 3 | — | 3 | 3 | — | 3 | |
| ENE408: | Restor & 18C Eng Lit | | 3 | — | 3 | 3 | — | 3 | |
| ENE410: | 19C English Lit | | 3 | — | 3 | 3 | — | 3 | |
| ENE416: | 20C English Lit | | 3 | — | 3 | 3 | — | 3 | |
| ENE420: | 20C American Lit | * | 3 | — | 3 | 3 | — | 3 | |
| ENE428: | English Drama | * | 3 | — | 3 | 3 | — | 3 | |

**TABLE 25: CONT'D**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PYE304: | Logic & Moral Phil | * | 3 | — | 3 | 3 | — | 3 | |
| PYE314: | Political Philosophy | * | 3 | — | 3 | 3 | — | 3 | |
| PYE404: | Modern Philosophy | | 3 | — | 3 | 3 | — | 3 | |
| PYE420: | 20th C Philosophy | | 3 | — | 3 | 3 | — | 3 | |
| FRE304: | Translation I | * | 3 | — | 3 | 3 | — | 3 | |
| FRF312: | Stylistique comparé | | 3 | — | 3 | 3 | — | 3 | |
| FRE314: | Fr Civilization | * | 3 | — | 3 | 3 | — | 3 | |
| FRF366: | Hist Litt Franc I | | 3 | — | 3 | 3 | — | 3 | |
| FRF466: | Hist Litt Franc II | | 3 | — | 3 | 3 | — | 3 | |
| HIE300: | Canada | * | 3 | — | 3 | 3 | — | 3 | D |
| HIE302: | Gt Powers 1815-1945 | * | 3 | — | 3 | 3 | — | 3 | |
| HIE306: | French Revn & Napol | * | 3 | — | 3 | 3 | — | 3 | |
| HIE312: | Medieval Europe | * | 3 | — | 3 | 3 | — | 3 | |
| HIE314: | Can Dfnce Plcy 1867- | * | 3 | — | 3 | 3 | — | 3 | |
| HIE322: | History of the U.S. | | 3 | — | 3 | 3 | — | 3 | |
| HIE330: | Warfare and Society | * | 3 | — | 3 | 3 | — | 3 | |
| HIE340: | Eng Rev'n 1485-1715 | | 3 | — | 3 | 3 | — | 3 | |
| HIE408: | U.S. as World Power | * | 3 | — | 3 | 3 | — | 3 | |
| HIE410: | Commonwealth Defence | * | 3 | — | 3 | 3 | — | 3 | |
| HIE414: | World Wars I & II | * | 3 | — | 3 | 3 | — | 3 | |
| HIE416: | Russian Revolution: | * | 3 | — | 3 | 3 | — | 3 | |
| HIE418: | Modern East Asia | * | 3 | — | 3 | 3 | — | 3 | |
| HIE420: | Canada in 20th Cent | * | 3 | — | 3 | 3 | — | 3 | |
| HIE422: | Naval, Mrtme Stratgy | * | 3 | — | 3 | 3 | — | 3 | |
| HIE424: | Dissertation | | 1 | 2 | 3 | — | 3 | 3 | |
| HIE428: | Modern Britain | | 3 | — | 3 | 3 | — | 3 | |
| HIE432: | Imperialism 1850- | * | 3 | — | 3 | 3 | — | 3 | |

**TABLE 25: CONT'D**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HIE434: | Strategic Theory | * | 3 | — | 3 | 3 | — | 3 |
| HIE436: | Civil-Miltry Relatns | * | 3 | — | 3 | 3 | — | 3 |
| HIE438: | War, Diplomacy 1946- | | 3 | — | 3 | 3 | — | 3 |
| ECE304: | Money and Banking | * | 3 | — | 3 | 3 | — | 3 |
| ECE308B: | History of Ec Thought | | — | — | — | 3 | — | 3 |
| ECE314B: | Economic Development | * | — | — | — | 3 | — | 3 |
| ECE316A: | Canadian Ec History | * | 3 | — | 3 | — | — | — |
| ECE318B: | Internatl Ec Problms | * | — | — | — | 3 | — | 3 |
| ECE322: | Economic Theory | * | 3 | — | 3 | 3 | — | 3 |
| ECE340: | Economic Statistics | * | 3 | — | 3 | 3 | — | 3 |
| ECE408A: | Public Finance | * | 3 | — | 3 | — | — | — |
| ECE412A: | Intrntl Trade Theory | * | 3 | — | 3 | — | — | — |
| ECE414B: | Intl Monetary Theory | * | — | — | — | 3 | — | 3 |
| ECE422A: | Compr Econmc Systems | * | 3 | — | 3 | — | — | — |
| ECE424B: | Economics of Defence | * | — | — | — | 3 | — | 3 |
| ECE426: | Economics of Defence | | 3 | — | 3 | 3 | — | 3 |
| ECE428B: | Topics in Ec Theory | * | — | — | — | 3 | — | 3 |
| ECE432A: | Econometrics | * | 3 | — | 3 | — | — | — |
| ECE434B: | Canadian Ec Problems | * | — | — | — | 3 | — | 3 |
| ECE436: | Quant Econ Analysis | * | 3 | — | 3 | 3 | — | 3 |
| COE304: | Princs of Accounting | * | 3 | — | 3 | 3 | — | 3 |
| COE418B: | Mng Accntg & Control | * | — | — | — | 3 | — | 3 |
| COE420A: | Business Law | * | 3 | — | 3 | — | — | — |
| COE422B: | Business Admin | * | — | — | — | 3 | — | 3 |
| COE424A: | Business Finance | * | 3 | - | 3 | — | — | — |
| COE426A: | Bus Pol & Mktg Strat | * | 3 | — | 3 | — | — | — |
| POE304: | Intro to Govt & Pol | * | 3 | — | 3 | 3 | — | 3 |
| POE306: | "see PYE314" | | | | | | | |

## TABLE 25: CONT'D

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| POE314: | "see HIE314" | | | | | | | | |
| POE316: | Intro Intntl Relns | * | 3 | — | 3 | 3 | — | 3 | |
| POE320: | Comparative Politics | * | 3 | — | 3 | 3 | — | 3 | |
| POE406: | Canadian Government | * | 3 | — | 3 | 3 | — | 3 | |
| POE418: | Political Analysis | * | 3 | — | 3 | 3 | — | 3 | |
| POE420: | Public Administration | * | 3 | — | 3 | 3 | — | 3 | |
| POE422: | Contempry Intl Probs | * | 3 | — | 3 | 3 | — | 3 | |
| POE424: | Third World Politics | * | 3 | — | 3 | 3 | — | 3 | |
| GOE302: | Wrld Regional Survey | * | 3 | — | 3 | 3 | — | 3 | |
| GOE402: | Geographic Problems | | 3 | — | 3 | 3 | — | 3 | |
| GOE404: | Pol & Mil Geography | * | 3 | — | 3 | 3 | — | 3 | |
| GOE406: | Economic Geography | | 3 | — | 3 | 3 | — | 3 | |
| SLE3: | | * | — | 5 | 5 | — | 5 | 5 | |
| SLE4: | | * | — | 5 | 5 | — | 5 | 5 | |
| PEE301: | | * | — | 2 | 2 | — | 2 | 2 | |
| PEE401: | | * | — | 2 | 2 | — | 2 | 2 | |
| DRE301: | | * | — | 1 | 1 | — | 1 | 1 | |
| DRE401: | | * | — | 1 | 1 | — | 1 | 1 | |
| Total (minimum) | Third Year | | 17 | 8 | 25 | 17 | 8 | 25 | |
| | Fourth Year | | 16½ | 8 | 24½ | 17 | 8 | 25 | |

NOTES
A. In Third Year students in Honours courses take MLE303, 2 hours per week for one term only. The Weighting Factor (see note on page 69) is 4 for MLE, and 16 for each of the other six courses.
B. Third Year students in General courses normally take MLE304. The WF is 10 for MLE, and 18 for each of the other five courses.
C. MLE403 has a WF of 10. Full courses for Fourth Year students in Honours are weighted 15 each (with a Fall-7, Winter-8 split for one-term courses). Full courses for students in General Courses of Study are weighted 18 each.
D. Required of students who have not taken an equivalent course.

For details of course of study see the entries under the respective Departments. Military and Strategic Studies is listed under both History and Political and Economic Science.

## TABLE 26: Third and Fourth Year Engineering and Mathematics and Physics Elective Arts Courses

| Courses offered in 1981-82 are marked with an asterisk(*). | | | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE309: | Personality Theories | * | 1½ | — | 1½ | 2 | — | 2 | |
| ENE301: | Readings in Lit | * | 1½ | — | 1½ | 2 | — | 2 | |
| ANF303: | Gram, pron, lectures | * | 1 | 1 | 2 | 1 | 1 | 2 | |
| ENE401: | Rdings in Recent Lit | | 1½ | — | 1½ | 2 | — | 2 | |
| PYE301: | Logic, Probs of Phil | * | 1½ | — | 1½ | 2 | — | 2 | |
| FRE303: | Translation I | * | 1½ | — | 1½ | 2 | — | 2 | |
| FRF309: | Lit & civ can-fr | | 1½ | — | 1½ | 2 | — | 2 | |
| FRF311: | Trad'n et styl comp | * | 1½ | — | 1½ | 2 | — | 2 | |
| FRE313: | Fr Civilization | * | 1½ | — | 1½ | 2 | — | 2 | |
| FRE403: | Translation II | * | 1½ | — | 1½ | 2 | — | 2 | |
| FRF405: | Civilisation can-fr | * | 1½ | — | 1½ | 2 | — | 2 | |
| HIE415: | Selected Campaigns | | 1½ | — | 1½ | 2 | — | 2 | |
| HIF415: | Campagnes choisies | | 1½ | — | 1½ | 2 | — | 2 | |
| HIE423: | Naval History | * | 1½ | — | 1½ | 2 | — | 2 | |
| ECE301: | Publ Fin & Defnc Eco | * | 1½ | — | 1½ | 2 | — | 2 | |
| ECF301: | Fin Publ & éc de déf | * | 1½ | — | 1½ | 2 | — | 2 | |
| POE401: | Introd to Politics | * | 1½ | — | 1½ | 2 | — | 2 | |
| POF401: | Introd à la politique | * | 1½ | — | 1½ | 2 | — | 2 | |
| Additional Elective for Fourth Year; | | | | | | | | | |
| GOE301: | World Survey | * | 1½ | — | 1½ | 2 | — | 2 | |

## TABLE 27: Fourth Year Science (Applied)

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Persnnl System | 9 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (9) | (1½) | — | (1½) | (2) | — | (2) | 1 |
| One elective course in Arts, or MLE310 | | 14 | 3 | — | 3 | 3 | — | 3 | A |
| MAE433: | Math Methods of O.R. | 15 | 3 | — | 3 | 3 | — | 3 | |
| PHE431: | Contemp'y Appld Phys | 18 | 2 | 3 | 5 | 2 | 3 | 5 | B |
| EEE495 | El Circts & Systms | 20 | 2 | 3 | 5 | 2 | 3 | 5 | |
| MEE419B: | Appl Fluid Mechanics | 14 | — | — | — | 4 | 2 | 6 | |
| MEE459A: | Appld Thermodynamics | 10 | 3 | 2 | 5 | — | — | — | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 14½ | 16 | 30½ | 16 | 16 | 32 | |

NOTES: A. Any course for students taking Arts may be selected, subject to Timetable limitations and permission of the instructor.

B. Includes four free lab periods.

WF means Weighting Factor (see note on page 68).

## TABLE 28: Fourth Year Honours Mathematics and Physics (1980-81)

| | | WF | Fall Term — Periods/Week | | | Winter Term — Periods/Week | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Persnnl System | 9 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (9) | (1½) | — | (1½) | (2) | — | (2) | |
| Arts elective | | 9 | 1½ | — | 1½ | 2 | — | 2 | A |
| MAE405: | Electron Field Thry | (9) | (3) | — | (3) | (3) | — | (3) | B |
| MAE409: | Fluid & Aero Mechncs | (9) | (3) | — | (3) | (3) | — | (3) | B |
| MAE413: | Quant Mech II & III | 9 | 2 | — | 2 | 2 | — | 2 | B |
| MAE425A: | Computer Systems | 4 | 2 | — | 2 | — | — | — | |
| MAE431: | Prob, Adv Mchs & Rel'y | 11 | 3 | — | 3 | 2 | — | 2 | |
| MAE461B: | Mathematical Physics | 6 | — | — | — | 3 | — | 3 | |
| PHE403: | Solid State Physics | 9 | 2 | — | 2 | 2 | — | 2 | |
| PHE405: | Nuclear Physics | 9 | 2 | — | 2 | 2 | — | 2 | |
| PHE406A: | Physics of Plasmas | 4 | 2 | — | 2 | — | — | — | C |
| PHE408A: | Statistical Physics | 4 | 2 | — | 2 | — | — | — | C |
| PHE409A: | Low Temp Physics | (4) | (2) | — | (2) | — | — | — | C |
| PHE410A: | Acoustics | (4) | (2) | — | (2) | — | — | — | C |
| PHE414B: | Int to Astrophysics | 5 | — | — | — | 2 | — | 2 | C |
| PHE416B: | Gr Th App to Sol St | 5 | — | — | — | 2 | — | 2 | C |
| PHE418B: | Opt Props of Solids | (5) | — | — | — | (2) | — | (2) | C |
| PHE420: | Physics Project | 12 | — | 5 | 5 | — | 6 | 6 | |
| EPE408A: | Applied Optics | 4 | 2 | — | 2 | — | — | — | |

## TABLE 28: (CONT'D)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLE4: | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | — | — | 1 | 1 | — | 1 | 1 | |
| Total | 100 | 20 | 13 | 33 | 19 | 14 | 33 | |

NOTES: A. See Table 26.

B. Once course to be selected from those currently offered.

C. Four courses to be selected from those currently offered.

WF means Weighting Factor (see note on page 68).

## TABLE 29: Fourth Year General Mathematics and Physics (1980-81)

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 9 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE409: | Personnel Management | (9) | (1½) | — | (1½) | (2) | — | (2) | |
| Arts Elective | | 9 | 1½ | — | 1½ | 2 | — | 2 | A |
| MAE347: | Analysis | (14) | (3) | — | (3) | (2) | — | (2) | B |
| MAE405: | Electrom Field Thry | (14) | (3) | — | (3) | (3) | — | (3) | B |
| MAE409: | Fluid and Aero-Mechanics | (14) | (3) | — | (3) | (3) | — | (3) | B |
| MAE413: | Quant Mech II & III | 14 | 2 | — | 2 | 2 | — | 2 | |
| MAE423B: | Adv Mechs, Relativity | (7) | — | — | — | (2) | — | (2) | B |
| MAE425A: | Computer Systems | (7) | (2) | — | (2) | — | — | — | B |
| MAE427B: | Comp & Decis Making | (7) | — | — | — | (2) | — | (2) | B |
| MAE461B: | Mathematical Physics | (7) | — | — | — | (3) | — | (3) | B |
| MAE463A: | Fundamentals of Probability | (7) | (3) | — | (3) | — | — | — | B |
| PHE403: | Solid State Physics | 14 | 2 | — | 2 | 2 | — | 2 | |
| PHE405: | Nuclear Physics | 14 | 2 | — | 2 | 2 | — | 2 | |
| PHE420: | Physics Project | 19 | — | 5 | 5 | — | 6 | 6 | |
| EPE303: | Classical Mechanics | 14 | 2 | — | 2 | 2 | — | 2 | B |
| EPE408A: | Applied Optics | 7 | 2 | — | 2 | — | — | — | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |

## TABLE 29 CONT'D.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DRE401: | — | — | 1 | 1 | — | 1 | 1 | |
| Total | 100 | 13 | 13 | 26 | 12 | 14 | 26 | |

NOTES: A. See Table 26.

B. One full course or two half courses to be selected from those currently offered. EPE303 must be selected if it was not taken in the Third Year.

WF means Weighting Factor (see note on page 68).

## TABLE 30: Fourth Year Fuels and Materials Engineering

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | 1 |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| FME401A: | Electrochemical Power | 5 | 3 | — | 3 | — | — | — | |
| FME403B: | Corrosion Engineering | 6 | — | — | — | 3 | — | 3 | |
| FME405A: | Separ'n Ops Design | 6 | 4 | — | 4 | — | — | — | |
| FME407A: | Reaction Engineering | 5 | 3 | — | 3 | — | — | — | B |
| FME409A: | Combustion Engineering | 5 | 3 | — | 3 | — | — | — | |
| FME411A: | Engineering Thermodynamics | 6 | 4 | — | 4 | — | — | — | |
| FME413B: | Modelling, Optimization | 6 | — | — | — | 3 | — | 3 | |
| FME415B: | Control Systems | 6 | — | — | — | 3 | — | 3 | |
| FME417B: | Design Project | 8 | — | — | — | — | 6 | 6 | |
| FME419: | Engineering Lab | 8 | — | 4 | 4 | — | 4 | 4 | |
| FME421B | Polymer Engineering | 8 | — | — | — | 4 | — | 4 | C |
| FME423B: | Synthetic Materials | (8) | — | — | — | (4) | — | (4) | C |
| NEE409A: | Nuclear Technology | 6 | 4 | — | 4 | — | — | — | |
| NEE411B: | Nuclear Power Sources | 8 | — | — | — | 4 | — | 4 | |
| EME415A: | Engineering Project Management | (5) | (3) | — | (3) | — | — | — | B |
| MEE457A: | Heat Engines Lab | 3 | — | 3 | 3 | — | — | — | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |

## TABLE 30 CONT'D.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PEE401: | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | — | — | 1 | 1 | — | 1 | 1 | |
| Total | 100 | 24 | 15 | 39 | 21 | 18 | 39 | |

NOTES: A. See Table 26.

B. One course to be selected.

C. One course to be selected.

WF means Weighting Factor (see note on page 68).

## TABLE 31: Fourth Year Civil Engineering

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | 1 |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| CEE401A: | Adv Struct Theory | 7 | 3 | 2 | 5 | — | — | — | |
| CEE407A: | Intr Conc & Timber | 7 | 3 | 2 | 5 | — | — | — | |
| CEE415B: | Reinf Conc Design | 9 | — | — | — | 3 | 2 | 5 | |
| CEE419B: | Steel Design | 10 | — | — | — | 4 | 2 | 6 | |
| CEE451A: | Pavement Design | 6 | 2 | 1½ | 3½ | — | — | — | |
| CEE459B: | Found Earthw Engineering | 10 | — | — | — | 3½ | 2½ | 6 | |
| CEE469A: | Topo Surveying | 6 | 1½ | 3 | 4½ | — | — | — | |
| CEE483A: | Hydr & Eng Hydrology | 7 | 3½ | 1½ | 5 | — | — | — | |
| CEE485B: | Sanitary & Env Engineering | 10 | — | — | — | 4 | 2 | 6 | |
| CEE493: | CE Project | 14 | 1 | 3 | 4 | — | 4 | 4 | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 17 | 21 | 38 | 18½ | 20½ | 39 | |

NOTES: A. See Table 26.

WF means Weighting Factor (see note on page 68).

## TABLE 32: Fourth Year Electrical Engineering

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | 1 |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| EEE401A: | Signal An & Comm'n | 8 | 3 | 2 | 5 | — | — | — | |
| EEE403A: | Electronic Circuits | 8 | 3 | 2 | 5 | — | — | — | |
| EEE405B: | Advanced Electronics | 9 | — | — | — | 3 | 2 | 5 | |
| EEE407A: | Cmptr Arch & Intrfeg | 8 | 3 | 2 | 5 | — | — | — | |
| EEE409B: | Computer Engineering | 9 | — | — | — | 3 | 2 | 5 | C |
| EEE435A: | Electrom Prop & Rdn | 8 | 3 | 2 | 5 | — | — | — | B |
| EEE427A: | Control Systems I | 8 | 3 | 2 | 5 | — | — | — | |
| EEE429A: | Elec Machine, Power | (8) | (3) | (2) | (5) | — | — | — | B |
| EEE435B: | Weapons Syst Analysis | 9 | — | — | — | 3 | 2 | 5 | C |
| EEE437B: | Electr Mach Analysis | 9 | — | — | — | 3 | 2 | 5 | C |
| EEE439B: | Communications | (9) | — | — | — | (3) | (2) | (5) | C |
| EEE441B: | Microwave Systems | (9) | — | — | — | (3) | (2) | (5) | C |
| EEE443B: | Adv Network Theory | (9) | — | — | — | (3) | (2) | (5) | C |
| EEE445B: | Pwr Distribution System | (9) | — | — | — | (3) | (2) | (5) | C |
| EEE447B: | Control Systems II | (9) | — | — | — | (3) | (2) | (5) | C |
| EEE455: | EE Design Project | 10 | — | 2 | 2 | — | 6 | 6 | |
| Non-EE Elective | | (9) | — | — | — | (3) | (2) | (5) | C |

**TABLE 32 CONT'D.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLE4: | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | — | — | 1 | 1 | — | 1 | 1 | |
| Total | 100 | 18 | 20 | 38 | 16 | 22 | 38 | |

NOTES: A. See Table 26.

B. A student may take only one of these courses.

C. Elective courses. A total of three must be selected in the Winter Term. A student may normally choose three EE courses or two EE courses and one non-EE course. The non-EE course must be chosen from suitable courses given in Mathematics, Science, or another Engineering Department. In this case approval is required from the Head of both the EE Department and the other Department concerned.

WF means Weighting Factor (see note on page 68).

## TABLE 33: Fourth Year Engineering Physics

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1½ | — | 1½ | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| MAE443A: | Quantum Mechanics II | 4 | 2 | — | 2 | — | — | — | |
| PHE403: | Solid State Physics | 8 | 2 | — | 2 | 2 | — | 2 | |
| PHE405: | Nuclear Physics | 8 | 2 | — | 2 | 2 | — | 2 | |
| FME411A: | Engineering Thermo | 6 | 4 | — | 4 | — | — | — | |
| NEE411B: | Nuclear Power Sources | 9 | — | — | — | 4 | — | 4 | |
| EEE401A: | Signal An & Comm'n | 9 | 2½ | — | 2½ | — | — | — | B |
| EEE403A: | Electronic Circuits | (9) | (2½) | — | (2½) | — | — | — | B |
| EEE405B: | Advanced Electronics | 9 | — | — | — | 2½ | — | 2½ | B |
| EEE425A: | Electrom Prop & Radn | 9 | 2½ | — | 2½ | — | — | — | B |
| EEE427A: | Control Systems I | (9) | (2½) | — | (2½) | — | — | — | B |
| EEE435B: | Weapons Systems Analysis | (9) | — | — | — | (2½) | — | (2½) | B |
| EEE439B: | Communications | (9) | — | — | — | (2½) | — | (2½) | B |
| EEE441B: | Microwave Systems | (9) | — | — | — | (2½) | — | (2½) | B |
| EEE443B: | Adv Network Theory | (9) | — | — | — | (2½) | — | (2½) | B |
| EEE447B: | Control Systems II | (9) | — | — | — | (2½) | — | (2½) | B |
| Laboratory/Tutorial | | — | — | 5 | 5 | — | 2½ | 2½ | |
| EPE405: | Eng Design Project | 8 | — | 2 | 2 | — | 6 | 6 | |

## TABLE 33 CONT'D.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| EPE407B: | Applied Optics | 8 | — | — | — | 3 | 2 | 5 | |
| EPE411: | Classical Mechanics | 8 | 2 | — | 2 | 2 | — | 2 | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 20 | 15 | 35 | 19½ | 18½ | 38 | |

NOTES: A. See Table 26.

B. Three courses to be selected in consultation with Head of EE Department.

WF means Weighting Factor (see note on page 68).

## TABLE 34: Fourth Year Mechanical Engineering

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1½ | — | 1½ | 2 | — | 2 | |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| EEE419B: | Electr Technology II | 12 | — | — | — | 3½ | 2½ | 6 | |
| MEE401A: | Machine Design | 7 | 2½ | 2 | 4½ | — | — | — | |
| MEE403B: | Design of Engrg Systems | 8 | — | — | — | 1 | 3 | 4 | B |
| MEE411A: | Fluid Dynamics | 12 | 4½ | 2 | 6½ | — | — | — | |
| MEE413A: | Compressible Flow | 8 | 3½ | 1 | 4½ | — | — | — | |
| MEE421B: | Heat Transfer | 12 | — | — | — | 4 | 2 | 6 | |
| MEE445A: | Dynamic Systems | 12 | 4½ | 2 | 6½ | — | — | — | |
| GMF451B: | Moteurs à combustion | (8) | — | — | — | (3) | (1) | (4) | B |
| MEE453B: | Thermodynamics | 5 | — | — | — | 2 | 1 | 3 | |
| MEE455B: | Thermal Envir Engrg | (8) | — | — | — | (3) | (1) | (4) | B |
| MEE461B: | Aeron, Space Propulsion | (8) | — | — | — | (3) | (1) | (4) | B |
| MEE471: | Engineering Project | 10 | — | 3 | 3 | — | 6 | 6 | |
| EME483B: | Relblty & Maintnblty | (8) | — | — | — | (3) | (1) | (4) | B |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 18 | 18 | 36 | 16½ | 20½ | 37 | |

NOTES: A. See Table 26.
B. One course to be selected.

WF means Weighting Factor (see note on page 68).

## TABLE 35: Fourth Year Engineering and Management

| | | WF | Fall Term — Periods/Weeks | | | Winter Term — Periods/Weeks | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| MLE403: | Mil'y Personnel System | 7 | 1 | — | 1 | 2 | — | 2 | 1 |
| MLE499: | Personnel Management | (7) | (1½) | — | (1½) | (2) | — | (2) | 1 |
| Arts Elective | | 7 | 1½ | — | 1½ | 2 | — | 2 | A |
| CEE413A: | Structural Engineering | 5 | 3 | 1 | 4 | — | — | — | |
| EEE419B: | Electr Technology II | 11 | — | — | — | 3½ | 2½ | 6 | |
| MEE415A: | Fluid Mechanics | 9 | 4 | 2 | 6 | — | — | — | |
| MEE481B: | Engrg Experimentation | 6 | — | — | — | 3 | 1 | 4 | |
| EME401A: | Production Management II | 10 | 3 | 2 | 5 | — | — | — | |
| EME403B: | Management Seminar | 7 | — | — | — | 2 | 2 | 4 | |
| EME405: | Engineering Report | 10 | — | 4 | 4 | — | 4 | 4 | |
| EME407A: | Math Methods of O.R. | 7 | 3 | 2 | 5 | — | — | — | |
| EME409: | O.R. Management Applns | 10 | 2 | 1 | 3 | 2 | 1 | 3 | |
| EME423B: | Relblty & Maintnblty | 11 | — | — | — | 4 | 2 | 6 | |
| SLE4: | | 0 | — | 5 | 5 | — | 5 | 5 | |
| PEE401: | | — | — | 2 | 2 | — | 2 | 2 | |
| DRE401: | | — | — | 1 | 1 | — | 1 | 1 | |
| Total | | 100 | 18 | 20 | 38 | 18½ | 20½ | 39 | |

NOTES: A. See Table 26. ECE301 must be selected in either Third or Fourth Year.

WF means Weighting Factor (see note on page 68).

## CMR PROGRAM OUTLINES

Tables 36 to 49 outline the third and fourth year programs of study available at Collège militaire royal de Saint-Jean.

Corresponding course descriptions are not included in this calendar, but may be found in the CMR calendar.

## TABLE 36: Third Year — Bachelor of Science with Honours in Physics

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| Physical Education | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 341 | Psychology of Management | 3 | — | 3 | — | — | — | |
| FRA 311 | FRA-LS | (3) | — | (3) | — | — | — | (a) |
| FRA 312 | FRA-LS | — | — | — | (3) | — | (3) | (a) |
| MAT 321 | Differential Equations I | 3 | 1 | 4 | — | — | — | |
| MAT 322 | Differential Equations II | — | — | — | 3 | 1 | 4 | |
| MAT 328 | Analysis I | 3 | — | 3 | — | — | — | |
| MAT 411 | Modern Algebra I | — | — | — | 3 | — | 3 | |
| PHY 311 | Classical Mechanics I | 3 | — | 3 | — | — | — | |
| PHY 316 | Mechanics of Continuous Media | — | — | — | 3 | — | 3 | |
| PHY 321 | Electronics I | 2 | — | 2 | — | — | — | |
| PHY 322 | Electronics II | — | — | — | 2 | — | 2 | |
| PHY 331 | Physical Optics | 3 | — | 3 | — | — | — | |
| PHY 341 | Statistical Physics | 3 | — | 3 | — | — | — | |
| PHY 361 | Atomic and Nuclear Physics I | — | — | — | 3 | — | 3 | |
| PHY 391 | Experimental Physics | — | 3 | 3 | — | — | — | |
| PHY 392 | Experimental Physics | — | — | — | — | 3 | 3 | |
| PHY 421 | Electrodynamics I | — | — | — | 3 | — | 3 | |
| SCH 432 | Military History of Canada II | — | — | — | 3 | — | 3 | (b) |
| Number of periods per week | | 20 | 7 | 27 | 20 | 7 | 27 | |

(a) For non-functional anglophone cadets.

(b) 1. The English-speaking students will take the courses in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

**TABLE 37: Third Year — Bachelor of Science with Major in Physics and Minor in Mathematics**

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| Physical Education | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 341 | Psychology of Management | 3 | — | 3 | — | — | — | |
| FRA 311 | FRA-LS | (3) | — | (3) | — | — | — | (a) |
| FRA 312 | FRA-LS | — | — | — | (3) | — | (3) | (a) |
| MAT 321 | Differential Equations I | 3 | 1 | 4 | — | — | — | |
| MAT 322 | Differential Equations II | — | — | — | 3 | 1 | 4 | |
| MAT 328 | Analysis I | 3 | — | 3 | — | — | — | |
| MAT 411 | Modern Algebra I | — | — | — | 3 | — | 3 | |
| PHY 311 | Classical Mechanics I | 3 | — | 3 | — | — | — | |
| PHY 321 | Electonics I | 2 | — | 2 | — | — | — | |
| PHY 322 | Electronics II | — | — | — | 2 | — | 2 | |
| PHY 331 | Physical Optics | 3 | — | 3 | — | — | — | |
| PHY 341 | Statistical Physics | 3 | — | 3 | — | — | — | |
| PHY 361 | Atomic and Nuclear Physics I | — | — | — | 3 | — | 3 | |
| PHY 391 | Experimental Physics | — | 3 | 3 | — | — | — | |
| PHY 392 | Experimental Physics | — | — | — | — | 3 | 3 | |
| PHY 421 | Electrodynamics I | — | — | — | 3 | — | 3 | |
| SCH 432 | Military History of Canada II | — | — | — | 3 | — | 3 | (b) |
| Number of periods per week | | 20 | 7 | 27 | 17 | 7 | 24 | |

(a) For non-functional anglophone cadets.

(b) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

## TABLE 38: Third Year — Bachelor of Science — General (1)

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| PART A | | | | | | | | |
| Physical Education | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 341 | Psychology of Management | 3 | — | 3 | — | — | — | |
| FRA 311 | FRA-LS | (3) | — | (3) | — | — | — | (a) |
| FRA 312 | FRA-LS | — | — | — | (3) | — | (3) | (a) |
| MAT 312 | Linear Algebra | (4) | — | (4) | — | — | — | (b) |
| MAT 251 | Probability and Statistics | — | — | — | (3) | — | (3) | (b) |
| MAT 326 | Differential Equations I | 3 | — | 3 | — | — | — | |
| MAT 327 | Differential Equations II | — | — | — | 3 | — | 3 | |
| PHY 314 | Intermediate Mechanics | (3) | — | (3) | 3 | — | 3 | (c) |
| PHY 323 | Experimental Electronics | 2 | 2 | 4 | — | — | — | |
| PHY 324 | Experimental Electronics | — | — | — | 2 | 2 | 4 | |
| SCH 432 | Military History of Canada II | — | — | — | 3 | — | 3 | (d) |
| PART B | | | | | | | | |
| INF 351 | Computer Science in Administration | 3 | — | 3 | — | — | — | |
| MLM 222 | Organizational Psychology | — | — | — | 3 | — | 3 | |
| ADM 231 | Accounting I | 3 | — | 3 | — | — | — | |
| ADM 332 | Management Accounting | — | — | — | 3 | — | 3 | |
| PART C | | | | | | | | |
| CHM 252 | Physical Chemistry Laboratory | — | — | — | — | (3) | (3) | (b) |
| CHM 261 | Analytical Chemistry | 1 | 2 | 3 | — | — | — | |
| CHM 321 | Organic Chemistry | 2 | 2 | 4 | — | — | — | |
| CHM 322 | Organic Chemistry | — | — | — | 2 | 2 | 4 | |
| CHM 341 | Physical Chemistry | 2 | 2 | 4 | — | — | — | |
| CHM 342 | Physical Chemistry | — | — | — | 2 | 2 | 4 | |
| Number of periods per week | | A + B | 14 | 5 | 19 | 17 | 5 | 22 |
| | | A + C | 13 | 11 | 24 | 15 | 9 | 24 |

(1) A BSc (General) may be obtained by combining either parts A and B or parts A and C. With the authorization of the Faculty Council, it is also possible to get a BSc (General) by replacing, timetable permitting, one or more courses from part B or C by equivalent or more demanding courses offered by the departments of the Science division.

(a) For non-functional anglophone cadets.

## TABLE 38 CONT'D.

(b) For Officer Cadets who have not taken this course in Second Year.

(c) May be given either term to optimize the student's workload.

(d) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

## TABLE 39: Third Year — Administration

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| FRA 311 | FRA-LS | (3) | — | (a) |
| FRA 312 | FRA-LS | — | (3) | (a) |
| ADM 311 | Organization Theory and Practice | 3 | — | |
| ADM 321 | Personnel Management | 3 | (3) | (b) |
| ADM 323 | Commercial & Fiscal Law | (3) | 3 | (b) |
| ADM 324 | Public Administration | — | (3) | (d) |
| ADM 331 | Finance | 3 | — | |
| ADM 332 | Management Accounting | — | 3 | |
| ADM 341 | Applied Statistics | 3 | — | |
| ADM 342 | Operations Research I | — | 3 | |
| ADM 343 | Research Methodology | — | (3) | (d) |
| SCH 311 | Economic History in a Social Context | (3) | — | (c) |
| SCH 312 | Canadian Economic History | — | (3) | (d) |
| SCH 313 | Macroeconomic Analysis | 3 | — | |
| SCH 432 | Military History of Canada II | — | 3 | (e) |
| INF 351 | Computer Science in Administration | (3) | — | (c) |
| MAT 475 | System simulation | — | (3) | (d) |
| Seminars, Symposia and Industrial Visits | | 3 | 3 | |
| Number of periods per week | | 24 | 24 | |

(a) For non-functional anglophone cadets.

(b) May be given either term to optimize the student's workload.

(c) Students may elect SCH 311 or INF 351 (Elective courses).

(d) Students must elect 2 of SCH 312, ADM 324, MAT 475 and ADM 343 (Elective courses). (N.B.: SCH 311 is a prerequisite for SCH 312).

(e) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

## TABLE 40: Third Year — B.A. (Canadian Studies and Administration)

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| FRA 311 | FRA-LS | (3) | — | (a) |
| FRA 312 | FRA-LS | — | (3) | (a) |
| ADM 321 | Personnel Management | 3 | (3) | (b) |
| ADM 323 | Commercial and Fiscal Law | 3 | (3) | (f) |
| ADM 331 | Finance | 3 | — | |
| ADM 463 | Industrial Relations | — | 3 | |
| ENG 301 | Canadian Literature in English I | 3 | — | |
| ENG 302 | Canadian Literature in English II | — | 3 | |
| FRA 301 | Littérature québécoise I | 3 | — | |
| FRA 302 | Littérature québécoise II | — | 3 | |
| SCH 232 | Military History of Canada I | (3) | — | (b) |
| SCH 254 | Canadian Society | — | (3) | (b) |
| SCH 311 | Economic History in a Social Context | 3 | — | |
| SCH 312 | Canadian Economic History | — | 3 | |
| SCH 432 | Military History of Canada II | — | 3 | (c) |
| SCH 452 | Canadian Civilization | — | 3 | (d) |
| One elective course | | — | 3 | (e) |
| Seminars, visits & meetings | | 3 | 3 | |
| Number of periods per week | | 24 | 27 | |

(a) For non-functional anglophone cadets.

(b) This course will be offered in 1980-81, in 1982-83, etc., and thus alternate every two years.

(c) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

## TABLE 40 CONT'D.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

(d) This course will be offered in 1979-80, in 1981-82, etc., and thus alternate every two years.

(e) ADM 232; Accounting II; ADM 324; Public Administration.

**TABLE 41: Third Year — B.A. with Honours in Military and Strategic Studies**

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| ENG 310 | Military Readings | — | 3 | (a) |
| ENG 311 | English Tutorial | (3) | — | (b) |
| ENG 312 | English Tutorial | — | (3) | (b) |
| FRA 306 | Communication: techniques de redaction et d'elocution | 3 | — | |
| FRA 310 | Guerre et littérature | 3 | — | (a) |
| MLM 341 | Psychology of Management | 3 | — | |
| SCH 232 | Military History of Canada I | 3 | — | |
| SCH 315 | Canadian Defence Policy | — | 3 | |
| SCh 316 | Principles of Classical Strategy | — | 3 | |
| SCH 317 | Economic Geography of Strategic Resources | — | 3 | |
| SCH 318 | USSR and its Defence Policy | — | 3 | |
| SCH 319 | Great Battles of the Past | 3 | — | |
| SCH 432 | Military History of Canada II | — | 3 | |
| PHY 399 | Technology of Weapons | — | 2 | |
| CHM 399 | Technology of Weapons | — | 1 | |
| MAT 335 | Introduction to Game Theory | 3 | — | |
| ADM 323 | Introduction to Law | 3 | — | |
| Number of periods per week | | 24 | 24 | |

(a) The French-speaking students will take ENG 310 if they have reached the functional level in the English language; those who are not functional will take FRA 310.

(b) For non-functional francophone cadets.

## TABLE 42: Third Year — B.A. (Military and Strategic Studies)

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| ENG 310 | Military Readings | — | 3 | (a) |
| ENG 311 | English Tutorial | (3) | — | (b) |
| ENG 312 | English Tutorial | — | (3) | (b) |
| FRA 306 | Communication: techniques de redaction et d'elocution | 3 | — | |
| FRA 310 | Guerre et littérature | 3 | — | |
| MLM 341 | Psychology of Management | 3 | — | |
| SCH 232 | Military History of Canada I | 3 | — | |
| SCH 315 | Canadian Defence Policy | — | 3 | |
| SCH 316 | Principles of Strategic Thought | — | 3 | |
| SCH 318 | USSR and its Defence Policy | 3 | — | |
| SCH 432 | Military History of Canada II | — | 3 | |
| Elective courses | | 3 or 6 | — | (c) |
| Elective courses | | — | 6 or 9 | (c) |
| Number of periods per week | | 21 or 24 | 21 or 24 | |

(a) The French-speaking students will take ENG 310 if they have reached the functional level in the English language; those who are not functional will take FRA 310.

(b) For non-functional francophone cadets.

(c) Elective courses*

PHY/CHM 399 Technology of Weapons (2nd term)
MAT 335 Introduction to Game Theory (1st term)
ADM 321 Personnel Management (1st or second term, as the case may be)
ADM 324 Public Administration (2nd term) — prerequisite for ADM 413
ADM 323 Introduction to Law (1st term) — prerequisite for ADM 425
SCH 311 Economic History in a Social Context (1st term) — prerequisite for SCH 312

## TABLE 42 CONT'D.

SCH 312 Canadian Economic History (2nd term)
SCH 313 Macroeconomic Analysis (1st term)
SCH 317 Economic Geography of Strategic Resources (2nd term)
SCH 319 Great Battles of the Past (1st term)
FRA 340 L'Experience militaire selon les auteurs canadiens (Canada-francais) (1st term)
ENG 340 The Military Experience According to Canadian Writers (English Canada) (2nd term)

*NOTE: Students in (3rd year) General B.A., Military and Strategic Studies programme will take a minimum of four elective courses.

**TABLE 43: Fourth Year — Bachelor of Science with Honours in Physics**

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| Physical Education | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 422 | Behaviour in Military Setting | — | — | — | 3 | — | 3 | (a) |
| FRA 411 | FRA-LS | (3) | — | (3) | — | — | — | (b) |
| FRA 412 | FRA-LS | — | — | — | (3) | — | (3) | (b) |
| MAT 325 | Complex Variables | 3 | — | 3 | — | — | — | |
| MAT 329 | Analysis II | 3 | — | 3 | — | — | — | |
| MAT 412 | Modern Algebra II | — | — | — | 3 | — | 3 | |
| MAT 421 | Methods of Mathematical Physics I | 3 | — | 3 | — | — | — | |
| MAT 422 | Methods of Mathematical Physics II | — | — | — | 3 | — | 3 | |
| MAT 475 | System Simulation | — | — | — | (3) | — | (3) | (c) |
| PHY 312 | Classical Mechanics II | 3 | — | 3 | — | — | — | |
| PHY 316 | Mechanics of Continuous Media | — | — | — | (3) | — | (3) | (d) |
| PHY 362 | Atomic and Nuclear Physics II | 3 | — | 3 | — | — | — | |
| PHY 422 | Electrodynamics II | — | — | — | 3 | — | 3 | |
| PHY 451 | Quantum Mechanics | — | — | — | 3 | — | 3 | |
| PHY 471 | Solid State Physics | 3 | — | 3 | — | — | — | |
| PHY 472 | Solid State Physics | — | — | — | 3 | — | 3 | |
| PHY 491 | Experimental Physics | — | 6 | 6 | — | — | — | |
| PHY 492 | Experimental Physics | — | — | — | — | 6 | 6 | |
| Seminars | | — | 1 | 1 | — | 1 | 1 | |
| Number of periods per week | | 18 | 10 | 28 | 18 | 10 | 28 | |

(a) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.
2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

(b) For non-functional anglophone cadets.

(c) Optional.

(d) Compulsory for Officer Cadets who have not taken this course in the preceding year.

**TABLE 44: Fourth Year — Bachelor of Science with Major in Physics and Minor in Mathematics (1)**

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| Physical Training | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 422 | Behaviour in Military Setting | — | — | — | 3 | — | 3 | (a) |
| FRA 411 | FRA-LS | (3) | — | (3) | — | — | — | (b) |
| FRA 412 | FRA-LS | — | — | — | (3) | — | (3) | (b) |
| MAT 325 | Complex Variables | 3 | — | 3 | — | — | — | |
| MAT 330 | Methods of Optimization | 3 | — | 3 | — | — | — | |
| MAT 461 | Numerical Analysis | 3 | — | 3 | — | — | — | |
| MAT 471 | Operations Research | — | — | — | 3 | — | 3 | |
| MAT 475 | System Simulation | — | — | — | 3 | — | 3 | |
| PHY 362 | Atomic and Nuclear Physics II | 3 | — | 3 | — | — | — | |
| PHY 426 | Electronics III | — | — | — | 3 | — | 3 | |
| PHY 427 | Microprocessor System Design | — | — | — | (3) | — | (3) | (c) |
| PHY 471 | Solid State Physics | 3 | — | 3 | — | — | — | |
| PHY 491 | Experimental Physics | — | 6 | 6 | — | — | — | |
| PHY 492 | Experimental Physics | — | — | — | — | 6 | 6 | |
| Seminars | | — | 1 | 1 | — | 1 | 1 | |
| Number of periods per week | | 15 | 10 | 25 | 12 | 10 | 22 | |

(1) With the authorization of the Faculty Council, timetable permitting, Officer Cadets may replace some Physics and/or Mathematics courses from this program by other courses in Physics and/or Mathematics taken from the Honours in Physics program.

(a) 1. The English-speaking students will take the course in French if they have reached the functional level in the French langauge.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

(b) For non-functional anglophone cadets.

(c) Optional — PHY 426 is a prerequisite for PHY 427.

## TABLE 45: Fourth Year — Bachelor of Science — General (1)

| Courses | | Periods per week | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|
| | | First Term | | | Second Term | | | |
| | | Lect. | Lab. | Total | Lect. | Lab. | Total | |
| PART A | | | | | | | | |
| Physical Education | | — | 2 | 2 | — | 2 | 2 | |
| Drill | | — | 1 | 1 | — | 1 | 1 | |
| MLM 422 | Behaviour in Military Setting | — | — | — | 3 | — | 3 | (a) |
| FRA 411 | FRA-LS | (3) | — | (3) | — | — | — | (b) |
| FRA 412 | FRA-LS | — | — | — | (3) | — | (3) | (b) |
| MAT 351 | Probability | 3 | — | 3 | — | — | — | |
| MAT 415 | Modern Applied Algebra | — | — | — | 3 | — | 3 | |
| MAT 461 | Numerical Analysis | 3 | — | 3 | — | — | — | |
| MAT 471 | Operations Research | — | — | — | 3 | — | 3 | |
| PHY 314 | Intermediate Mechanics | (3) | — | (3) | — | — | — | (c) |
| PHY 331 | Physical Optics | 3 | — | 3 | — | — | — | |
| PHY 423 | Electromagnetic Waves | — | — | — | (3) | — | (3) | (d) |
| PHY 491 | Experimental Physics | — | 6 | 6 | — | — | — | |
| PHY 492 | Experimental Physics | — | — | — | — | 6 | 6 | |
| Seminars | | — | 1 | 1 | — | 1 | 1 | |
| PART B | | | | | | | | |
| ADM 311 | Organization Theory and Practice | 3 | — | 3 | — | — | — | |
| ADM 331 | Finance | 3 | — | 3 | — | — | — | |
| ADM 450 | Information Systems Analysis | — | — | — | 3 | — | 3 | |
| ADM 463 | Industrial Relations | — | — | — | 3 | — | 3 | |
| PART C | | | | | | | | |
| CHM 421 | Organic Chemistry | 2 | 2 | 4 | — | — | — | |
| CHM 422 | Organic Chemistry | — | — | — | 2 | 2 | 4 | |
| CHM 441 | Physical Chemistry | 2 | 2 | 4 | — | — | — | |

**TABLE 45 CONT'D.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CHM 442 | Physical Chemistry | | — | — | — | 2 | 2 | 4 | |
| Number of periods per week | | A + B | 15 | 10 | 25 | 15 | 10 | 25 | |
| | | A + C | 13 | 14 | 27 | 13 | 14 | 27 | |

(1) A BSc (General) may be obtained by combining either parts A and B or parts A and C. With the authorization of the Faculty Council, it is also possible to get a BSc (General) by replacing, timetable permitting, one or more courses from part B or C by equivalent or more demanding courses offered by the departments of the Science division.

(a) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

(b) For non-functional anglophone cadets.

(c) For Officer Cadets who have not taken this course in Third Year.

(d) Optional.

**TABLE 46: Fourth Year — Administration**

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| MLM 412 | Adjustment Personality | — | (3) | (d) |
| MLM 422 | Behaviour in Military Setting | — | 3 | (a) |
| FRA 411 | FRA-LS | (3) | — | (b) |
| FRA 412 | FRA-LS | — | (3) | (b) |
| ADM 412 | Business Policy II | — | 3 | |
| ADM 413 | Management Control in Non-profit Organizations | 1½ (3) | 1½ — | (c) |
| ADM 414 | Operations Management | — | 3 | |
| ADM 431 | Operational Auditing | (3) | — | (e) |
| ADM 441 | Operations Research II | (3) | — | (e) |
| ADM 451 | Theory of Communication | 3 | — | |
| ADM 452 | Marketing | 3 | — | |
| ADM 460 | Project in Administration | 1½ | 1½ | |
| ADM 463 | Industrial Relations | — | 3 | |
| SCH 412 | Managerial Economics | 3 | — | |
| SCH 421 | International Relations | 3 | — | |
| Seminars, Symposia & Industrial Visits | | 3 | 3 | |
| Number of periods per week | | 22½ | 22½ | |

(a) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.
2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will take a second language course of three periods a week.

(b) For non-functional anglophone cadets.

(c) Students may elect ADM 413 or ADM 460 (Elective courses).

(d) Optional course.

(e) Students may elect ADM 431 or ADM 441 (Elective courses).

**TABLE 47: Fourth Year — B.A. (Canadian Studies and Administration)**

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| MLM 422 | Behaviour in Military Setting | — | 3 | (a) |
| FRA 411 | FRA-LS | (3) | — | (b) |
| FRA 412 | FRA-LS | — | (3) | (b) |
| FRA 401 | Littérature québécoise | 3 | — | |
| FRA 402 | Littérature québécoise | — | 3 | |
| ENG 401 | Canadian Literature in English III | (3) | — | (d) |
| ENG 402 | Canadian Literature in English IV | — | (3) | (d) |
| SCH 232 | Military History of Canada I | (3) | — | (c) |
| SCH 254 | Canadian Society | — | (3) | (c) |
| SCH 411 | Geopolitics and Geostrategy | 3 | — | |
| SCH 421 | International Relations | 3 | — | |
| SCH 424 | The Canadian Identity | — | 3 | |
| SCH 452 | Canadian Civilization | — | 3 | (d) |
| CMR 401 | Essay | 3 | 3 | (e) |
| ADM 452 | Marketing | 3 | — | |
| Seminars, Visits & Meetings | | 3 | 3 | |
| Number of periods per week | | 24 | 24 | |

(a) 1. The English-speaking students will take the course in French if they have reached the functional level in the French language.

2. Those who have not attained the functional level in the second language will take the course in their mother tongue. They will also take a second language course of three periods a week.

(b) For non-functional anglophone cadets.

(c) This course will be offered in 1980-81, in 1982-83, etc., to those who have not already taken it in Second or Third Year.

(d) This course will be offered in 1979-80, in 1981-82, etc., and thus alternate every two years.

(e) This Essay will be 50 pages minimum in length and must be approved by a teaching member of Canadian Studies and Administration Program. It will be written under his supervision and in accordance with an approved schedule of work.

## TABLE 48: Fourth Year — B.A. with Honours in Military and Strategic Studies (1)

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| ENG 411 | English Tutorial | (3) | — | (a) |
| ENG 412 | English Tutorial | — | (3) | (a) |
| MLM 415 | Sociology of Warfare | 3 | — | |
| MLM 422 | Behaviour in Military Setting | — | 3 | (b) |
| SCH 414 | Current Military Events I | 3 | — | |
| SCH 416 | Principles of Nuclear Strategy | 3 | — | |
| SCH 418 | China and its Defence Policy | — | 3 | |
| SCH 419 | Current Military Events II | — | 3 | |
| SCH 421 | International Relations | 3 | — | |
| SCH 424 | Canadian Identity | — | 3 | |
| SCH 426 | Comparative Defence Policies | — | 3 | |
| SCH 428 | U.S.A. and its Defence Policy | 3 | — | |
| ADM 425 | War and the Law | 3 | — | |
| MAT 476 | War Games | — | 3 | |
| CMR 402 | Honours Essay | 3 | 3 | |
| Number of periods per week | | 24 | 24 | |

(1) This program will be offered for the first time in 1982-1983.

(a) For non-functional francophone cadets.

(b) The French-speaking students will take the course in English if they have reached the functional level in the English language; those who are not functional will take the course in French.

**TABLE 49: Fourth Year — B.A. (Military and Strategic Studies) (1)**

| Courses | | Periods per week | | Notes |
|---|---|---|---|---|
| | | First Term | Second Term | |
| Physical Education | | 2 | 2 | |
| Drill | | 1 | 1 | |
| ENG 411 | English Tutorial | (3) | — | (a) |
| ENG 412 | English Tutorial | — | (3) | (a) |
| MLM 422 | Behaviour in Military Setting | — | 3 | (b) |
| SCH 414 | Military Current Events I | 3 | — | |
| SCH 416 | Principles of Nuclear Strategy | 3 | — | |
| SCH 418 | China and its Defence Policy | — | 3 | |
| SCH 419 | Military Current Events II | — | 3 | |
| SCH 421 | International Relations | 3 | — | |
| SCH 424 | Canadian Identity | — | 3 | |
| SCH 426 | Comparative Defence Policies | — | 3 | |
| SCH 428 | U.S.A. and its Defence Policy | 3 | — | |
| 1 or 2 elective courses | | 3 or 6 | — | (c) |
| 1 or 2 elective courses | | — | 3 or 6 | (c) |
| Number of periods per week | | 18 to 21 | 21 to 24 | |

(1) This program will be offered for the first time in 1982-1983.

(a) For non-functional francophone cadets.

(b) The French-speaking students will take the course in English if they have reached the functional level in the English language; those who are not functional will take the course in French.

(c) Elective courses*

MLM 412 Job Adjustment and Personality (2nd term)
MLM 415 Sociology of Warfare (1st term)
ADM 413 Management Control in Non-profit Organization (1st term) — ADM 324 prerequisite
ADM 425 War and the Law (1st term) — ADM 325 prerequisite
ADM 463 Industrial Relations (2nd term)

## TABLE 49 CONT'D.

MAT 476 War Games (2nd term)
SCH 412 Managerial Economics (2nd term)
ENG 405 Great Books of Western World (1st term)
FRA 410 Les idées du XX$^{e}$ siècle (2nd term)

*NOTE: Students in (4th year) General B.A., Military and Strategic Studies programme will take a minimum of two elective courses.

## COURSE DESCRIPTIONS

The different courses offered at RRMC are described in detail in the sections that follow (listed alphabetically by departments). For each course at RRMC the name of the subject (e.g. History) is given, followed by a three digit number prefixed by the letters RR. The RR designates that the course is offered at Royal Roads Military College; the first number indicates the year in which the course is normally taken, the second number is used to distinguish between the various courses offered by the department in that year, and the third number indicates the semester in which the course is offered. Some courses at RRMC extend over a full academic year of two semesters; these courses will be indicated by a 3 as the third number (e.g. Mathematics RR203). The course number is followed by a brief descriptive title of the course; this in turn is followed by four numbers in parentheses that indicate respectively the number of lectures, tutorials, and laboratory periods each week in each semester, and the number of units of credit assigned to the course each semester. A detailed course description would read as follows:

**PHYSICS RR101: Mechanics** **(4,2,3,5/-,-,-,-)**

This is a one semester course in mechanics offered by the Department of Physics in the first semester in the first year. The course meets four times each week for lectures, twice for tutorials, three times for laboratory periods, and carries five units of credit.

**MATHEMATICS RR203: Calculus, Linear Algebra, Probability and Statistics, Operations Research** **(4,2,0,4/4,2,0,4)**

This is a year course in modern algebra offered by the Department of Mathematics in the second year. The course extends over both the first and second semesters of the year, meets four times each week for lectures, twice for tutorials, has no laboratory periods, and carries eight units of credit for the year (four units each semester).

Note 1: In a few cases, a student may take only one semester of a two semester course. In this case his transcript will indicate a course numbering ending in a 1 or 2, instead of the usual 3 (e.g. History RR111 is the first semester of the History RR113 courses).

Note 2: Arts electives taken by BSc students, have been reduced from four units of credit to three with no change in course content but with a reduction in the requirements with respect to major term papers. Such courses will carry the same course description as the course when taken by Arts students but will be identified by the letter S following the course number (for example, Economics RR312S vice Economics RR312) with a notation reflecting the reduced out-of-lecture requirements.

## DEPARTMENT OF CHEMISTRY

Professor and Head of the Department — H. Montgomery, BA, MA, PhD, FCIC

Associate Professor — M.R. Barr, BSc, MSc, PhD, MCIC

Associate Professor — M.G. Robinson, BSc, PhD, MCIC

Assistant Professor — K.J. Reimer, BSc, MSc, Phd, MCIC

Special Lecturer — Captain H.R. Harmer, rmc, BEng (RMC)

### PHYSICAL SCIENCE COURSES

A four-semester sequence of courses in Physical Science is offered for cadets entering the Arts program of study. Two semesters are devoted to topics in chemistry and two to topics in physics. The order of presentation of the courses is as follows:

a. First year — Chemistry RR003.

b. Second year — Physics RR003.

Details of the course in physics will be found in that section of the calendar under the heading Physics RR003.

**CHEMISTRY RR003: Introductory Chemistry (3,0,3,4/3,0,3,4)**

This course surveys development in modern chemistry starting in the first semester with topics in inorganic chemistry which begin with atomic structure, the nature of chemical bonds and the relation of structure to chemical properties as summarized in the periodic table. Problems given include the molecular weight concept stoichiometry and balancing equations for acid-base and redox reactions. Problems on natural and artificial radioactivity are included. The chemistry of water purification and waste disposal is examined. The second semester consists of organic chemistry topics. These topics start with IUPAC nomenclature, various types of isomerism and a study of alcohols, acids and benzene derivatives. They finish with a selection from: polymers (natural and man-made), energy options, explosives, war gases and chemotherapy.

The laboratory work supplements the course work and includes (first semester) electrolysis, molecular and atomic weight determination, salinity of sea water, a gravimetric determination and an inorganic preparation. The organic work includes isolation and identification of natural products and the preparation of simple drugs.

**CHEMISTRY RR103: General Chemistry (3,0,3,4/3,0,3,4)**

Review of fundamental laws. The properties of gases; elementary kinetic theory, Atomic structure, the Periodic Law. Types of valence bond; molecular structure. Redox processes; balancing of redox equations; electrolytic and voltaic cells. The properties of solutions. Rates of chemical reactions. Chemical equilibrium; ionic equilibria; pH, hydrolysis, and buffers. A brief introduction to organic chemistry.

The laboratory course is intended to supplement the lectures. Quantitative determinations include gravimetric methods and neutralization, precipitation, and redox vol-

umetric methods. Qualitative analysis covers the identification and determination of most common inorganic anions and cations. A final organic section deals with the synthesis and properties of the common functional groups.

**CHEMISTRY RR201: Engineering Chemistry** **(4,1,0,4/-,-,-,-,)**

A course intended for cadets electing Engineering, Honours Science, or Engineering Physics program in the third year.

The course is divided into two parts:

(a) Review of the Gas Laws — Elementary thermodynamics — discussion of the first, second and third laws — reversible and irreversible processes — spontaneity of reactions involving gases and different types of heterogeneous systems. Electrode potentials, cells, free energy, chemical potential, one and two phase systems, the phase rule; and, as time allows;

(b) Applications of chemistry of interest specifically to engineers, drawn from such topics as gaseous, liquid, and solid fuels, lubricants, corrosion, cells, batteries, plastics, protective coatings, explosives, etc.

**CHEMISTRY RR212: Engineering and Physical Chemistry** **(-,-,-,-/4,1,3,5)**

This course is taken by those students who have elected the General Science program.

The lecture section of this course is essentially the same as that described under Chemistry RR201.

However, cadets taking this program are required to accompany the lectures by an appropriate laboratory practice.

Selected fundamental experiments in physical chemistry will be allocated, illustrating such aspects of the coursework as phase rule, electrode potential, heats of reaction, etc.

The laboratory course amplifies and illustrates the topics discussed in lectures. All experiments selected are quantitative, and some use is made of modern instrumental techniques.

**CHEMISTRY RR242: Engineering Chemistry Laboratory** **(-,-,-,-/0,0,3,1)**

This course is identical to the laboratory part of Chemistry RR212 and is required of students in Honours Science. Selected fundamental experiments in physical chemistry will be allocated, illustrating such aspects as phase rule, electrode potential, heats of reaction, etc

**CHEMISTRY RR301: Quantitative Inorganic Analysis** **(2,0,4,4/-,-,-,-)**

The main object of this course is to introduce students to the techniques of analytical procedures and to develop in them a considerable manipulative skill, in order that they may deal more effectively with the practical aspects of the course OC 322 and OC 332.

Lecturers will deal with the theories underlying volumetric methods and the use of indicators; gravimetric methods, the mechanism of precipitation and use of organic precipitants; some complexometric procedures; theory of photoanalytical methods and applications in colorimetry, spectrophotometry; electoranalytical methods. Problems suitable to illustrate the various topics will be assigned.

Laboratory work will be selected from among the following procedures: Redox, precipitation and EDTA titrations; classical gravimetric determinations; precipitation from homogeneous solutions, electro-deposition; anodic stripping; visible and UV spectrophotometric determinations, photometric titration, infrared spectrometry.

**OCEANOGRAPHY RR322: Biological Oceanography (-,-,-,-/2,0,1,3)**

Introduction to phytoplankton and zooplankton — classification, populations, occurrence, and distribution. Primary productivity and limiting factors, nutrients and light. Food chains and biogeochemical cycles.

**OCEANOGRAPHY RR332: Chemical Oceanography (-,-,-,-/3,0,2,4)**

Chemical composition and properties of sea water. Geochemical cycles, carbonate silicon, etc. Dissolved and suspended organic material. Dissolved gases, pH and alkalinity. Nutrients. Trace metals and sediments. Corrosion and fouling.

In the laboratory program an attempt is made to duplicate the collection of samples in an actual oceanographic study. Students collect samples from stations in nearby marine areas and analyze them using standard methods. Experiments and analyses illustrating principles in Oceanography RR322 are included.

**CHEMISTRY RR401: Applied Thermodynamics (3,0,0,4/-,-,-,-)**

Review of the laws of thermodynamics and applications of fundamental relationships. Heat engines; study of types and thermodynamics of operation, gas liquification and refrigeration systems; non-ideal substances and the use of steam tables; thermodynamics of flow processes for compressible and incompressible fluids. Methods of presenting thermodynamic data. Psychrometry and the application of thermodynamics to meteorology. Introduction to statistical thermodynamics; ensembles, partition functions, relationship of thermodynamic functions to the partition function.

Note: Details of individual courses offered at RMC and CMR should be obtained from their respective calendars.

## DEPARTMENT OF ENGINEERING

Associate Professor and Head of the Department — E.R. Chappell, rmc, BSc, MA Sc, MEIC, MCSCE, MCASI, PEng.

Associate Professor — J.W. Madill, BSc (CE), MSc (CE) EdD, MEIC, MCGS, MCSE, PEng.

Assistant Professor — J.S. Collins, BSc, BEng (EE), MEng (EE) PhD (EE), MCSEE, MEIC, MIEEE, PEng.

**COMPUTER SCIENCE RR201: Computer Applications** **(2,0,2,3/-,-,-,-)**

For second year Science or Engineering students.

This course is intended to develop the student's ability to use the computer for practical problem solving. The students will write their own programs as well as use library programs. Proper documentation, critical examination and interpretation of program results will be emphasized.

Hardware concepts of computers, major peripherals, and system communication will be introduced. Single board microcomputers will be used to illustrate the fundamentals of machine and assembly language programming and computer architecture.

Selected applications from engineering, physics, and chemistry will be used to illustrate the use of the computer.

**ENGINEERING RR261: Engineering Graphics** **(2,0,1,2/-,-,-,-)**

For second year General and Honours Science students.

Use of drawing instruments and drawing materials; geometric contructions; lettering; sketching and shape description; multiview projection; reading drawings; sectional views; auxiliary views; dimensioning; oblique and isometric pictorial sketching.

**ENGINEERING RR263: Engineering Graphics and Descriptive Geometry** **(2,0,1,2/3,0,1,4)**

For second year Engineering students.

Includes all topics covered in Engineering RR261 and the following additional topics.

Point projection of lines, normal views of planes, cuts and fills, revolutions, developments, graphical solution of vectors, simple determinate truss analysis, graphical calculus, determination of areas, centroids and moments of inertia, empirical equations.

Perspective drawing, auxiliary views, conventions, screw threads and an introduction to creative design where cadet teams provide design solutions to given problems.

Practical problems are used throughout the course.

**ENGINEERING RR232: Mechanics of Materials** **(-,-,-,-/3,0,2,4)**

For second year Engineering and Honours Science students; recommended for those intending to enter the Physics and Oceanography program; optional for General Science.

Review of statics; stresses due to axial loads, strain and axial deformation; physical properties of materials; torsion of circular shafts; stress concentration, analysis of plane stress, stresses in beams due to bending, combined stresses, deflection of statically determinate beams; compression members. The elastic properties are emphasized throughout, with plastic behaviour introduced in selected topics.

The Mechanics of Materials laboratory gives the student an opportunity to carry out: tensile tests on a number of different metal samples; tests to determine the elastic modules; Rockwell Hardness tests; and torsion tests to failures.

Demonstrations are given of column action and photoelasticity to help illustrate the subject matter.

**ENGINEERING RR312: Applied Fluid Mechanics** **(-,-,-,-/4,0,2,5)**

For third year Science students.

Newtonian and non-Newtonian fluid properties, fluid pressure, ship stability, free surfaces and manometry; fundamental equations for steady one-dimensional, non-viscous incompressible flow; dimensional analysis and principles of similarity and modelling; laminar flow, turbulent flow, boundary layer, skin friction, and drag estimation; incompressible flow in closed circuits and open channels; Mach number, cavitation and selected topics.

The laboratory course amplifies topics discussed in the lectures. Experiments include ship stability, jet impact, flow measurements, boundary layer flows, pipe system friction losses and demonstrations of flow phenomena.

Note: Details of individual courses offered at RMC or CMR should be obtained from their respective calendars.

## DEPARTMENT OF ENGLISH AND PHILOSOPHY

Professor and Head of Department — G.A. Morgan, BA, MA (Phil), MA (Lit), PhD, MNI, CMMC.

Assistant Professor — M. Madoff, AB, PhD.

Special Lecturer — Major G.W.S. Brodsky, CD, BA, MA.

**ENGLISH RR003** **(3,1,0,3/3,1,0,3)**

For first year Science and Engineering students considered weak in English grammar and composition.

**Part I:** Composition, Logic and Linguistics; Students in Major Authors from Chaucer to Shakespeare (First Semester)

This part of the course includes review and practice of the principles of clear and accurate expression, through an introduction to traditional formal logic and to the history and structure of English, with frequent composition assignments drawn from these studies. Tutorials will be devoted to guided practice in composition. Study of selected works by major authors from Chaucer to Shakespeare will provide subjects for oral and written composition.

Three essays and frequent short assignments are required from each cadet.

**Part II:** Utopian Literature (Second Semester)

In this part of the course, the student analyzes various literary forms of social criticism and examines the effect of ideas of social organization on the individual citizen. Students examine Utopian thought as expressed in six or seven works, by authors ranging from Plato to Burgess. Tutorials will be devoted to continued composition practice, including frequent short assignments and preparation and revision of major essays.

Three essays and frequent short assignments are required from each cadet.

**ENGLISH RR103** **(3,1,0,4/3,1,0,4)**

For first year Science and Engineering students.

**Part I:** Logic and Linguistics; Survey of English Literature from Chaucer to Marlowe (Fall Semester)

This part of the course includes a review of the principles of clear and accurate expression with a study of major authors from Chaucer to Marlowe.

Three essays are required from each cadet, one of which will be an oral report.

**Part II:** Utopian Literature (Spring Semester)

In this part of the course, the student analyzes various literary forms of social criticism and examines the effect of ideas of social organization on the individual citizen.

Beginning with Plato, More and Bacon, the student proceeds to other examples of Utopian thought, including the satire of Swift and several modern anti-Utopias (e.g. Zamiatin, Burgess).

Three essays are required from each cadet.

**ENGLISH RR113: English Language and Literature to Augustan period: Logic** **(3,0,0,4/3,0,0,4)**

For first year Arts students.

The course includes a study of formal logic and linguistics with a study of language and content in representative works from the Anglo-Saxon to the Augustan period.

Each cadet will submit three essays and other short written assignments during each Semester.

**ENGLISH RR213: English Literature from Blake and Gibbon to 1950** **(3,0,0,4/3,0,0,4)**

For second year Arts students.

Cadets working towards an Honours BA in English must obtain 66 per cent in English RR213 and a general average of 60 per cent.

This course, the second part of the two-year survey, traverses the period from Pope, Swift and Sterne to the 1950s. About half the time is given to poetry and about half to prose. A seminar is conducted during the Spring Term.

Cadets are encouraged to take original approaches and to practice self-expression with formal precision of statement. Wide background reading is stimulated and required.

Two major papers are required, as well as brief essays and rhetorical exercises.

**ENGLISH RR301: Canadian Literature** **(3,0,0,4/-,-,-,-)**

A study of the themes, models, techniques, and problems of the English writer in Canada during two centuries. Wide background reading is stimulated and required.

Offered on demand. Prerequisite: consent of the instructor.

**ENGLISH RR312: Literature of War** **(-,-,-,-/3,0,0,4)**

This course is a study of views of war in Western literature from Homeric epic to modern novel. The literatures of tribal, classical, feudal, and industrial cultures will be examined and compared, with particular reference to ethical problems and concepts of heroism.

Two essays and one oral report are required from each cadet.

**PHILOSOPHY RR301: Introduction to Philosophy** **(3,0,0,4/-,-,-,-)**

A survey of the problems of knowledge, nature, and morals, in which the philosophies studied range from Plato to Marx, from Aristotle to Lonergan. Frequent discussion is encouraged.

Offered on demand. Prerequisite: consent of the instructor.

**PHILOSOPHY RR412: Perspectives in Philosophy** **(-,-,-,-/3,0,0,4)**

Contemporary ideas of knowledge and action are traced from sources leading to Comte and Nietzche, as two extremes. Various types of current synthesis are examined in lectures and seminars. Topics include cybernetics, neuro-psychology, relativity, ontology, analogical concept, ecology of knowledge, ethics.

Offered on demand. Prerequisite: consent of the instructor.

Note: Details of individual courses offered at RMC or CMR should be obtained from their respective calendars.

## DÉPARTEMENT DE FRANÇAIS

Professeur agrégé. Chef de département et directeur de langue seconde — C. Tchalékian, BSc, MA, PhD.

Professeur adjoint — C.M. Ramkeesoon, BA, MA, PhD.

Chargés de cours — A. Allard, BA, MA
— C. Bordeleau-Zenko, BA
— A. Hadley, BA, DipEd
— F. Ménard, BA
— C. Plows, BA
— A. Robichaud, BA.
— J. Robichaud, BA, Licence (théologie)
— A. Tétreault, BA
— J. van Campen, BA, MA

Pour enseigner la langue seconde, les méthodes de base employées sont Dialogue Canada et les Ateliers.

Les cours de langue sont offerts en chacune des quatre années. Chaque élève suit cinq périodes de langue par semaine au cours des deux sessions.

| | |
|---|---|
| Première année | Cours de langue I |
| Deuxième année | Cours de langue II |
| Troisième année | Cours de langue III |
| Quatrième année | Cours de langue IV |

Royal Roads Military College utilise les méthodes suivantes pour noter et accréditer les cours de français langue seconde:

(a) Notes: L'attitude, l'effort et le progrès relatif seront notés en employant l'échelle militaire habituelle de A, B, C+, C, C−, D, F. Ces notes seront soumises à l'Escadre Militaire et feront partie du dossier de l'éducation de l'élève au Collège.

(b) Crédit: Pour chaque série du quinze leçons de Dialogue Canada complétée de façon satisfaisante, il sera accordé un crédit académique de trois unités. Cette mesure objective de proprès académique sera insrite sur le bulletin académique d l'élève. La note sera reportée comme "crédit" (CR), soutenu, si disponibles, par les scores de l'élève aux tests de la Fonction Publique, dans les catégories, compréhension auditive, expression orale, compréhension de l'écrit, et expression écrite.

Les élèves-officiers qui ont atteint le niveau fonctionnel bilingue ne suivent que trois périodes de langue par semaine. Les élèves-officiers francophones sont dispensés de suivre les cours de langue.

The Department of French offers courses in both second language training and in literature.

Courses in language training have the aim of bringing the cadet to the level of "functional bilingualism", i.e. Public Service Commission. Language Bureau test

scores of at least 3 (listening comprehension): 3 (speaking ability); 2 (reading comprehension); and 2 (writing ability), where the scale of scores runs from 0 to 5 with the latter corresponding to native fluency. Individuals who are "functionally bilingual" should be quite able to conduct business in their specialty in the second language. Nevertheless, they are required to attend 3 class periods a week in order to maintain their fluency.

The method used in language training courses is an audio-visual approach using *Dialogue Canada* and les *Ateliers*. All cadets are tested in second-language competence on entry and will be placed in appropriate sections of 6 to 10 students. Cadets will advance at their own pace and will be moved to more or less advanced sections as required.

Language training courses are designated by year only, with all cadets in first year being enrolled in Language Training I, second year cadets in Language Training II, etc. For cadets who have reached the "functionally bilingual" level, advanced courses meeting fewer periods per week are available (Language Training IA, IIA, etc.)

| | | |
|---|---|---|
| Language Training I | Conversational French | (0,3,2,0)/(0,3,2,0) |
| Language Training IA | Conversational French | (0,1,2,0)/(0,1,2,0) |
| Language Training II | Conversational French | (0,3,2,0)/(0,3,2,0) |
| Language Training IIA | Conversational French | (0,1,2,0)/(0,1,2,0) |
| Language Training III | Conversational French | (0,3,2,0)/(0,3,2,0) |
| Language Training IIIA | Conversational French | (0,1,2,0)/(0,1,2,0) |
| Language Training IV | Conversational French | (0,3,2,0)/(0,3,2,0) |
| Language Training IVA | Conversational French | (0,1,2,0)/(0,1,2,0) |

Royal Roads Military College uses the following grading and accreditation procedures for second language training courses:

(a) **Grades:** Attitude, effort and relative progress in SLT courses will be graded using the usual military scale of A, B, C+, C, C−, D, F. These grades will be submitted to the Military Wing and will become part of the training record of the cadet at the College.

(b) **Credit:** For each fifteen lessons of Dialogue Canada satisfactorily completed, three units of academic credit will be granted. This objective measure of academic achievement will appear on the cadet's academic transcript. The grade will be reported as "credit" (CR) bolstered, if available, by the cadet's scores on the PSC tests of listening, speaking, reading, and writing.

Par surcroît le département de français offre des cours à crédit ceux d'en bas:

In addition, the Department of French offers advanced courses carrying credit as described below:

**FRANÇAIS RR212: Cours de grammaire et de composition** **(-,-,-,-/3,0,0,4)**

Destiné aux élèves-officiers de deuxième année en lettres qui désirent, en troisième année, s'orienter vers les lettres, avec specialisation.

Le cours comprend une révision de grammaire et la lecture, de plusieurs contes québécois. Des thèmes sont soumis au cours de l'année.

Offert sur demande. Pré-requis: Niveau fonctionnel ou accepté par le professeur.

**FRENCH RR212: Grammar and Composition** **(-,-,-,-/3,0,0,4)**

This course is designed for second year Arts students who intend to proceed with an Honours degree and who have attained a reasonable fluency in their second language.

The course content includes a review of grammar, some readings of French-Canadian short stories and some "thèmes" to translate into French. The course is conducted entirely in the second language.

Offered on demand. Prerequisite: Functional level or consent of the instructor.

**FRANÇAIS RR311: Cours de grammaire** **(3,0,0,4/-,-,-,-)**

Destiné aux élèves-officiers de deuxième année en lettres, de troisième et de quatrième année.

Le cours comprend une révision approfondie de la grammaire, la lecture des auteurs Canadien-Français, des compositions et des thèmes. Bref, le candidat acroitra sa compétence en la seconde langue, en pratiquant la compréhension et l'expression orales.

Offert sur demande. Pré-requis: accepté par le professeur.

**FRENCH RR311: Advanced Grammar and Composition** **(3,0,0,4/-,-,-,-)**

For second year Arts, third and fourth year students. This course is offered to students who have attained, or who are close to attaining "functional" levels of bilingualism.

The course consists of an in-depth review of grammar, readings of short stories by French-Canadian writers, compositions and "thèmes".

Offered on demand. Prerequisite: consent of the instructor.

**FRANÇAIS RR412: Introduction à la littérature et à la culture du Canada-Français** **(-,-,-,-/3,0,0,4)**

Destiné aux élèves-officiers de deuxième année en lettres, de troisième et de quatrième année.

Les candidats doivent s'exprimer couramment et écrire convenablement la langue seconde. L'étude des écrivains Canadien-Français par la lecture et l'évaluation critique des morceaux choisis des origines à nos jours.

Une étude approfondie du roman "Bonheur d'Occasion" de Gabrielle Roy.

Offert sur demande. Pré-requis: accepté par le professeur.

**FRENCH RR412: Introduction to the Literature and Culture of French Canada** **(-,-,-,-/3,0,0,4)**

For second year Arts, third and fourth year students.

Candidates must express themselves fluently and write their second language competently. The study of French-Canadian writers will be carried out through the reading and critical evaluation of selected passages from the earliest writers to those of the modern days. An in-depth study of Gabrielle Roy's novel ''Bonheur d'Occasion'' will be undertaken.

Offered on demand. Prerequisite: Consent of the instructor.

## DEPARTMENT OF HISTORY AND POLITICAL ECONOMY

Dean of Arts, Professor and Head of the Department — W. Rodney, DFC and Bar, BA, MA, PhD, FRGS, FR Hist S.

Professor — A.D. Wallis, CD, rmc, psac, BA, MA

Associate Professor — J.A. Boutilier, BA, MA, PhD

Assistant Professor — J.A. Bayer, BA, MA, PhD

Assistant Professor — P.J.S. Dunnett, BSc, MA, PhD

Assistant Professor — G.A. Martel, BA, MA, PhD

Visiting Special Lecturer — Major K.R. Merkley, BA, MA

Visiting Special Lecturer — G.C. Dyer, MBE, aws, psc, snc, n, BA, MBIM, FRIN

Special Lecturer — W.T. Mann, BCom, FCGA

**HISTORY RR113: Modern European History** **(3,0,0,4/3,0,0,4)**

**HISTORY RR111** **(3,0,0,4/-,-,-,-)**

**HISTORY RR112** **(-,-,-,-/3,0,0,4)**

For first year Arts students or for second year Arts students who have completed their first year in Science and Engineering.

A survey of European civilization from the Renaissance to the Twentieth Century with emphasis upon economic, political, and social changes; military organization and techniques; the impact of new ideas upon states; the relation of new concepts to conflicts within and between states, and their resolution.

Second year Arts students who have completed their first year in Science and Engineering will cover the period from the Renaissance to the French Revolution in the first semester and may then write a final examination in HISTORY RR111; or they may continue into the second semester and write a final examination in HISTORY RR113 at the end of the second semester.

**HISTORY RR202: Modern Europe** **(-,-,-,-/3,0,0,4)**

For second year Science and Engineering students.

A survey of the history of European civilization from the French Revolution to the Twentieth Century; the fundamental changes in economic and military techniques and their impact on political and social organization; the development of ideas; the relation of these ideas to conflicts between states or within states, and the solution of these conflicts.

**HISTORY RR213: Canada** **(3,0,0,4/3,0,0,4)**

For second year Arts students.

The history of Canada from earliest times to the present. Directed reading, essays, and seminar discussions, supplemented by lectures covering various aspects of economic, political, military, and social development.

**HISTORY RR301: Technology and War 1815-1914** **(3,0,0,4/-,-,-,-)**

A broad view of technological changes which occurred during the century following the Napoleonic Wars. Examples are drawn from European wars, showing how technological advances affected their conduct and outcomes. The course concentrates on improvements in communications, weapons, and explosives, modernization of naval warfare, and problems of combatting diseases, including those resulting from overseas expansion. Certain topics from the history of science — discoveries in electricity, dyes, drugs, the beginning of experimental military science — will be covered, together with the links between industrial capabilities and their transfer to military application.

**HISTORY RR302: Technology and War 1914 to Present** **(-,-,-,-/3,0,0,4)**

A survey of technological innovation since the Great War with emphasis on the development and adaptation of communications, computers, detection techniques, explosives, and weapons systems. Examples will be drawn from colonial conflicts, World War II, Korea, and Vietnam. Some attention will be devoted to contemporary developments and trends.

**HISTORY RR313: Imperialism** **(3,0,0,4/3,0,0,4)**

A survey of theories of imperialism with examples drawn from the rise of France, Great Britain, Holland, Japan, Russia and the United States as colonial powers. The transition from imperial power, the emergence of the Third World, and the evolution of the British Commonwealth will be examined.

**HISTORY RR333: History of War Since 1815** **(3,0,0,4/3,0,0,4)**

An examination of the major conflicts since the Napoleonic Wars with emphasis on changes in military structures, organization, mobilization, technological adaptations, strategic considerations and tactical innovations. The relationship between political goals and military power will be considered together with problems arising from alliances, with limited attention towards a wider social phenomenon.

**HISTORY RR413: America as a World Power** **(3,0,0,4/3,0,0,4)**

A survey of United State's foreign relations from the Spanish-American War to America's withdrawal from Vietnam. It analyses the transformation of the United States from colonial to great power status, with attention upon the internal dynamics of that evolution as well as external causes. America's foreign policies are considered in relation to the nation's economic growth and cultural development, its involvement in wars, and the advent of the Truman Doctrine, the Marshal Plan, NATO, SEATO, and NORAD. Particular emphasis is given to the impact of industrial development and technological change, coupled with the role of ideology in the political decision-making process, including changes in strategic thinking and diplomatic method.

**HISTORY RR421: China and Japan in the Twentieth Century** **(3,0,0,4/-,-,-,-)**

This course examines: the rise of Japan as an imperial power; the 1911 Revolution in China and ensuing warlord era; the struggle between the Kuomintang and communist forces in China prior to the Pacific War; the Pacific War; the Chinese Revolution of 1949;

the American occupation of Japan; the Korean War; the dramatic growth of the Japanese economy; the cultural revolution in China; the rapproachment between China and the Western powers; and the new economic, political, and military balance in East Asia.

**HISTORY RR431: Seminar in Military History** **(3,0,0,4/-,-,-,-)**

Fourth year students in the General Program will be required, during the first semester, to undertake, under supervision, an approved research project in military history. Topics will be presented and discussed in seminars, and a final essay will be submitted.

**HISTORY RR443: Honours Thesis** **(3,0,0,4/3,0,0,4)**

During the fourth year, honours students will be required to undertake a research project or "honours thesis" extending over two terms, directed by a supervisor. Students will be required to speak on their research topic during the first term, and defend their findings in an oral examination at the end of the second semester.

**HISTORY RR452: Soviet Russia as a World Power** **(-,-,-,-/3,0,0,4)**

Establishment and consolidation of Soviet power; NEP and its repercussions; Stalinization; Comintern; the evolution of Soviet foreign policy and the development of Soviety military power.

**ECONOMICS RR201: Introduction to Economics** **(3,0,0,4/-,-,-,-)**

For second year Science and Engineering students.

A general survey of the field of economic behaviour designed to enable prospective Service officers to understand some of the major problems of domestic and world economics. Specific attention is paid to analyses of supply and demand; the theory of the firm; markets and pricing; national income, employment, and fiscal policy; international trade; money and banking; war economics.

**ECONOMICS RR213: Principles of Economics** **(3,0,0,4/3,0,0,4)**

For second year Arts students.

This course amplifies the material covered in Economics RR201 and includes research projects calculated to enrich a principles course.

**COMMERCE RR203: Accounting** **(3,0,0,4/3,0,0,4)**

For second year Arts students intending to pursue a degree in Administration at Collège militaire royal de Saint-Jean.

With Faculty Council permission, also available as an arts option to other cadets.

Basic elements of accounting method. Analysis of financial transactions. The recognition of revenue and expense. Financial statement preparation. Recognition of profit. Introduction to analysis of funds flow, cost control and identification of costs, budgetary planning and control systems and accounting for corporations and partnerships.

**POLITICAL SCIENCE RR102: Introduction to Political Science** **(-,-,-,-/3,0,0,4)**

For first year Arts students.

This course is in two parts: a survey of the history of political theory from Machiavelli to Marx, and an examination of the main political movements and forces in world politics in the 20th century.

**POLITICAL SCIENCE RR313: International Politics** **(3,0,0,4/3,0,0,4)**

A study of factors governing international relations with emphasis on the role of organizations such as the League of Nations and the United Nations. Examples will be drawn from the foreign policies of major powers (China, France, Great Britain, USA, USSR).

**POLITICAL SCIENCE RR411: Modern Strategic Thought** **(3,0,0,4/-,-,-,-)**

A study of theories of strategy and war from Machiavelli to modern times. The survey will range from the classical views of battle and siege warfare, to the theories of strategies such as Clausewitz, and the exponents of air, land, and sea power. Examples of applied strategy, mostly taken from twentieth century conflicts, will be used.

**POLITICAL SCIENCE RR422: Canada Abroad** **(-,-,-,-/3,0,0,4)**

An analysis of the significant factors which determine Canadian foreign, defence, and trade policies.

## HISTORY AND POLITICAL ECONOMY

The following courses may be taken by cadets in third and fourth year as an Arts elective, and by cadets in second year Arts, Administration, or General Science as an extra course (Faculty Council approval required for extra courses). These courses will be offered only on sufficient demand (four or more students).

**HISTORY RR401: The Pacific Rim in the Twentieth Century** **(3,0,0,4/-,-,-,-)**

Political developments in China and Japan; the emergence of Japan as a modern power; re-allocation of Pacific territories and Islands after WWI; Japanese and Russian ambitions in the Pacific and S.E. Asia; the Pacific theatre during WWII; the collapse of western imperial power and the rise of modern independence movements in Malaya, Indonesia, the Philippines, and the Pacific Islands.

Offered on demand. Prerequisite: Consent of the instructor.

**HISTORY RR422: Naval History in the Twentieth Century** **(-,-,-,-/3,0,0,4)**

This course examines the emergence and eclipse of Japan as a major naval power, the decline of the Royal Navy, the character of critical naval engagements in the First and Second World Wars, the growth of the American and Soviet navies, the role of the Royal Canadian Navy in war and peace, and changes in naval technology and doctrine.

Offered on demand. Prerequisite: Consent of the instructor.

**ECONOMICS RR312: The Canadian Economy** **(-,-,-,-/3,0,0,4)**

An examination of contemporary economic issues in Canada; inflation, unemployment, immigration, the economic basis of nationalism, separatism, trade unionism, and the role of multi-national corporations.

**ECONOMICS RR322: The Economics of Defence** **(-,-,-,-/3,0,0,4)**

An examination of the implications of Canadian defence policy upon the Canadian economy, and the constraints placed by economic considerations.

**ECONOMICS RR332: Canadian Economic History** **(-,-,-,-/3,0,0,4)**

This course examines the development of the Canadian economy to the present day. The roles of labour, capital and technology are analysed in the light of modern growth theories.

Offered on demand. Prerequisite: consent of the instructor.

**ECONOMICS RR402: Labour Economics** **(-,-,-,-/3,0,0,4)**

Using Canadian applications this course studies the labour supply and the determination of wages. Topics to be covered will include labour force participation, labour mobility, the role of unions, the changing composition of the workforce, trends in hours of work, unemployment, manpower policy and incomes policy.

Offered on demand. Prerequisite: consent of the instructor.

**ECONOMICS RR412: Industrial Organization** **(-,-,-,-/3,0,0,4)**

Industrial Organization examines the structure, conduct and performance of industry. Topics to be covered will include: industry concentration, economics of scale, patents, vertical integration and barriers to entry, the goals of the firm, the growth of the firm, multi-nationals, advertising, price formation and government influences on industrial organization.

Offered on demand. Prerequisite: consent of the instructor.

**POLITICAL SCIENCE RR302: Crisis and War in International Relations** **(-,-,-,-/3,0,0,4)**

The course is intended to give military officers insight into the nature of the international political system, crisis, and war. It is divided into two sections.

(a) an introduction to basic concepts of international politics; discussions of the international political process, the motivation of states and their mutual impact;

(b) examination of theories of war causation, alternatives to war, attitudes to war, national forces, diplomatic crises, modes of control of conduct of hostilities.

**POLITICAL SCIENCE RR321: Irregular Warfare** **(3,0,0,4/-,-,-,-)**

A survey of the uses of intelligence, subversion, and terrorism as techniques for the disruption of the nation state's security.

**POLITICAL SCIENCE RR431: Arms Control** **(3,0,0,4/-,-,-,-)**

The examination of weapons technology and military strategy in the USA-USSR arms race, with particular reference to their relationship in the emergence of detente. Topics considered will include SALT ONE and TWO, CTB, CSCE, MBFR, and PTB.

## DEPARTMENT OF MATHEMATICS

Associate Professor and Head of the Department — G.M. Lancaster, BSc, PhD

Associate Professor — M.J. Wilmut, BSc, MA, PhD, (attending NDC 1981-82)

Associate Professor — R.C. Snell, BSc, MSc, PhD

Assistant Professor — P. Smart, BSc, BEd, MEd, MPA, PhD

Assistant Professor — W.W. Wolfe, BSc, MSc, PhD

Assistant Professor — F. Milinazzo, BSc, PhD, (on leave of absence 1981-83)

Assistant Professor — S.D. Wray, BSc, BSc (Hon), MSc, PhD

Assistant Professor — D.B. Kerrighan, BSc, PhD

Assistant Professor — Y. Oved, BSc, MSc, DSc

Special Lecturer — Captain J.D.R. Coulombe, BSc, MSc

**COMPUTER SCIENCE RR102: An Introduction to Computer Programming** **(-,-,-,-/1,0,1,2)**

For first year Arts or Administration students.

Cadets will be introduced to the FORTRAN language. Proficiency in programming will be achieved by writing programs to solve problems. Fundamental techniques of file manipulation and information retrieval useful to managers will be covered.

**COMPUTER SCIENCE RR122: An Introduction to Computer Programming and Numerical Analysis** **(-,-,-,-/2,0,2,4)**

For first year Science or Engineering students.

An introduction to programming and problem solving on a computer. FORTRAN and elements of structured programming, de-bugging, and basic concepts of system hardware, numerical methods such as root finding and quadrature.

**MATHEMATICS RR103: Calculus and Analytic Geometry** **(4,2,0,4/4,2,0,4)**

For first year Arts students.

An introduction to the Calculus of one and two variables, including geometric vectors. The emphasis is on non-science applications and includes the mathematics of finance.

**MATHEMATICS RR113: Calculus and Linear Algebra** **(5,3,0,5/5,2,0,5)**

For first year Science and Engineering students.

This course includes the normal topics of a first year calculus course and selected topics from elementary linear algebra. Topics from both areas will be selected in each semester.

Algebra. Sets, relations, and functions: vector algebra with applications to geometry in two and three dimensions; quadric surfaces; determinants; and complex numbers.

Calculus. An introductory course in differential and integral calculus, including differentiation of algebraic, trigonometric, and other elementary functions; related rates; slopes, maxima and minima, and inflection points; curve sketching, the differential; the definite integral and applications to areas, volumes, arc length, surfaces, centroids, moments of inertia, and other physical problems; simple separable differential equations. Analytic geometry of the straight line and conics, including polar co-ordinates and parametric equations; techniques of integration. Indeterminate forms. Improper integrals. Hyperbolic functions and partial fractions are introduced as the need arises in the calculus.

**MATHEMATICS RR203: Calculus, Linear Algebra, Probability and Statistics, Operations Research** **(4,2,0,4/4,2,0,4)**

For second year Arts students.

Selected topics from linear algebra, probabiltiy, statistics, game theory, linear programming, network and graph theory.

**MATHEMATICS RR223: Calculus, Vector Calculus, and Differential Equations** **(3,1,0,3/3,1,0,3)**

For General Science students and most Engineering students.

Partial differentiation with applications to maxima and minima in several variables, indeterminate forms, multiple integration, vector analysis including Greene's divergence, and Stoke's Theorems, and infinite series.

Differential equations of first order, linear equations of higher order with constant coefficients, applications.

**MATHEMATICS RR233: Calculus, Vector Calculus, and Differential Equations** **(4,1,0,4/4,1,0,4)**

Recommended for those students who plan on choosing Honours Science, Engineering Physics, or Electrical Engineering programs of study.

This course will include all of the topics of Mathematics RR223 but with more rigorous treatment. The study of differential equations will include Laplace transforms and applications, and the gamma function. Elements of Fourier series are included in the study of infinite series.

This course may be taken only with the approval of the Department of Mathematics.

**MATHEMATICS RR241: Probability and Statistics** **(2,1,0,2/-,-,-,-)**

For second year Engineering students.

Optional for General Science students.

Elementary probability; organization and analysis of data; discrete and continuous distributions; elementary estimation theory and hypothesis testing.

**MATHEMATICS RR252: Linear Algebra, Elements of Operations Research** **(-,-,-,-/2,1,0,2)**

For second year Engineering students; optional for General Science students.

Matrix transformations; systems of linear equations; abstract vector spaces; subspaces, linear transformations; isomorphisms; co-ordinatization of vectors; characteristic values and vectors; diagonalization Cayley-Hamilton theorem; and linear programming.

**MATHEMATICS RR261: Probability and Statistics** **(2,1,0,2/-,-,-,-)**

Recommended for those students who plan on choosing Honours Science, Engineering Physics, or Electrical Engineering.

The topics are those of Mathematics RR241 with greater emphasis placed on theoretical considerations. This course may be taken only with the approval of the Department of Mathematics.

**MATHEMATICS RR272: Linear Algebra and Elements of Operations Research** **(-,-,-,-/2,1,0,2)**

Recommended for those students who plan on choosing Honours Science, Engineering Physics, or Electrical Engineering.

The topics are those of Mathematics RR252, with greater emphasis placed on theoretical considerations.

This course may be taken only with the approval of the Department of Mathematics.

**MATHEMATICS RR301: Differential Equations** **(3,0,0,4/-,-,-,-)**

Laplace Transform methods for solving ordinary differential equations; series solutions; solution of partial differential equations using separation of variables, the principle of super-position and Fourier series; applications to problems such as wave motion, heat transfer, gravitational potential, control theory, and Sturm-Liouville systems.

Prerequisite: Mathematics RR223.

**MATHEMATICS RR312: Topics in Applied Mathematics** **(-,-,-,-/3,0,0,4)**

Numerical solutions of problems encountered in applied mathematics using the computer, numerical integration, solutions of ordinary differential equations; roots of equations; simulation techniques.

Prerequisites: Mathematics RR223, RR301, Computer Science RR201.

**MATHEMATICS RR401: Complex Analysis** **(3,0,0,4/-,-,-,-)**

Continuity, differentiability of functions of a complex variable; analytic functions; Cauchy-Reimann conditions; integration; Cauchy's Theorem and formulas; Maximum modulus theorem; Liouville's theorem; series representations; Laurent series; singularities; residue theorem and applications; elementary conformal mappings.

Prerequisite: Mathematics RR301.

**MATHEMATICS RR412: Topics in Probability, Statistics and Random Processes** **(-,-,-,-/3,0,0,4)**

Probability: random variables; the Fourier transform and frequency domain analysis of signals; random processes; filtering; analysis of linear systems and other topics from communications theory.

Prerequisite: Mathematics RR241 or Mathematics RR261 and Mathematics RR301.

Note: Details of individual courses offered at RMC or CMR should be obtained from their respective calendars.

## DEPARTMENT OF MILITARY LEADERSHIP AND MANAGEMENT

Special Lecturer and Head of Department — LCdr D.L. Lang, CD, BA, BEd, MA

Special Lecturer — Captain M. Plul, CD, BA, BEd, MSW

### MILITARY LEADERSHIP AND MANAGEMENT
**RR111: Psychology of the Individual** **(3,0,0,4/-,-,-,-)**

An introduction of those areas of human development and behaviour that are relevant to a future leader's needs and interests. The course commences with an exposure to the fundamental topics and elementary psychological vocabulary necessary for the understanding of the rationale of individual differences. These topics are then related to certain developmental and social psychological concepts with a view to understanding human behaviour in situations where there is a requirement to influence the behaviour of others. To this end, elementary topics of perception, learning, motivation, intelligence, personality, adjustment, and maturation will be related to concepts of social structure, individual socialization, attitude formation, and interpersonal processes.

### MILITARY LEADERSHIP AND MANAGEMENT
**RR212: Social Psychology** **(-,-,-,-/3,0,0,4)**

The basic objective is to introduce and acquaint the student with the broad field of social psychology. The course is designed to provide a fundamental understanding of human social behaviour. Emphasis is placed on the types and degrees of social influences on individuals by groups. An awareness of the dynamic components of social behaviour will contribute to the development of effective leadership and management principles and help the student to prepare for a career as a military officer. Topics will be selected from social perception, norms, attitudes and persuasion, conformity, obedience, groups and group behaviour, aggression, violence and conflict, and social power. In addition, professional officer development and leadership theories and approaches will be presented.

### MILITARY LEADERSHIP AND MANAGEMENT
**RR311: Principles of Administration and Supervisory Management** **(3,0,0,4/-,-,-,-)**

The course objective is to develop in the student an awareness of administration and supervisory management. Topics to be covered include functions of management, communications, economics, human relations, teamwork, employee performance, allocation and schedule of work, induction of new employees, giving orders, controlling employee behaviour, use of the interview, problem solving, developing a training program, holding group discussions, simplifying and improving work, and managing paper. Emphasis will be on administration and supervisory management as it is practiced in the Canadian Forces.

## MILITARY LEADERSHIP AND MANAGEMENT

**RR402: Seminars in Personnel Management** **(-,-,-,-/3,0,0,4)**

Commencing with seminars on the theories of McGregor (theory X-theory Y), Maslow (need hierarchy), Herzberg (the motivation-hygiene theory), Drucker (management by objectives) and Allport (nature of man), subsequent seminars will relate these to the CF personnel system in an examination of such topics as performance evaluation, job satisfaction, counselling, punishment, communication, and leadership.

## DEPARTMENT OF PHYSICS

Associate Professor and Head of the Department — D.P. Krauel, BSc, MSc, PhD

Professor and Dean of Science and Engineering — H.J. Duffus, ndc, BA, BASc, DPhil, PEng.

Associate Professor — W.T. MacFarlane, BA, MSc, PhD.

Assistant Professor — J.M. Gilliland, BSc, MA, PhD

Assistant Professor — N.S. Ho, BSc, MA, PhD

Assistant Professor — M.J. Press, BSc, MSc, PhD

Assistant Professor — P.J. Schurer, BSc, MSc, PhD

Assistant Professor — J.C. Pratt, BSc, PhD

Program Coordinator RRMC Coastal Marine Science Laboratory — W.N. English, BA, PhD

Laboratory exercises are designed to supplement and illustrate the work discussed in the lecture courses, and to provide training in methods of measurement and experiment design. Satisfactory laboratory work must be achieved in order to obtain pass standing.

### PHYSICAL SCIENCE COURSES

Chemistry RR003 followed by Physics RR003, make up terminal courses in physical science for students entering the Arts program of studies. The courses cover a traditional outline of the physical sciences and introduce some aspects of modern science. Calculus is not a prerequisite.

**PHYSICS RR003: Physical Science** **(3,0,3,4/3,0,3,4)**

Physics RR003 consists of two main sections.

One section deals with the concepts of force, mass, length, time, momentum, kinetic energy, potential energy, work and inertia in Newtonian Systems; some ideas of the Special Theory of Relativity are introduced.

The other section deals with the fundamental ideas of the electric field, potential, capacity, resistance, DC and AC circuits, the magnetic field, and the electro-magnetic properties of materials. Aspects of acoustics, optics and radio waves that particularly affect the Canadian Forces may be studied, as time allows.

**PHYSICS RR101: Mechanics** **(4,1,3,5/-,-,-,-)**

For first year cadets taking the Science and Engineering program of studies.

Newtonian mechanics of particles and rigid bodies are studied, using vector methods and simple applications of integral and differential calculus. The course is taught with the help of members of the Engineering Department, who emphasize engineering statics.

**PHYSICS RR112: Electricity and Magnetism** **(-,-,-,-/4,1,3,5)**

For first year cadets taking the Science and Engineering program of studies.

Electrostatics, direct current electricity, magnetism and elementary current induction are studied using vector methods and elementary calculus.

**PHYSICS RR201: Electricity** **(4,1,3,5/-,-,-,-)**

For second year cadets taking the Science or Engineering programs of study.

AC circuits, including series and parallel resonant circuits, are analysed using Kirchhoff's laws and phasor methods. The transient response of simple circuits is analysed. Electric and magnetic fields in free space and matter are studied. An introduction is made to Maxwell's equations.

Prerequisites: Physics RR101, RR112, Mathematics RR113

**PHYSICS RR212: Modern Physics** **(-,-,-,-/4,1,3,5)**

For second year students taking the Science or Engineering programs of study.

About half of the course is devoted to a general study of oscillations and waves. The remainder is devoted to modern physics as developed by Einstein, De Broglie, Heisenberg, Bohr, and Schrodinger.

Prerequisites: Physics RR101, RR112, and Mathematics RR113

**PHYSICS RR332: Electromagnetic Wave Propagation** **(-,-,-,-/3,0,3,4)**

This course deals with the creation, propagation, reflection and absorption of electromagnetic waves in homogeneous isotropic or layered media, and by transmission lines, wave guides, antennas, and cavities.

Prerequisites: Physics RR112, RR201, RR212, Mathematics RR301

**PHYSICS RR352: Intermediate Mechanics** **(-,-,-,-/3,0,0,4)**

This course lays the foundation for applications of classical and quantum mechanics studied in Physics RR411, RR421 and RR432. Methods of handling systems and rigid body dynamics in three dimensions are studied, including the use of Lagrange's equations and the use of accelerated coordinate frame equations.

Prerequisites: Physics RR101, RR212

**PHYSICS RR361: Acoustics** **(2,0,0,3/-,-,-,-)**

This course deals with the creation, propagation, reflection and absorption of acoustic waves in homogeneous or horizontally layered media, sound ducts and real oceans. Applications to communication, exploration geophysics, and particularly to underwater detection and surveillance are discussed.

Prerequisites: Physics RR101, RR212, Mathematics RR301

**PHYSICS RR371: Electronics and Microcomputers** **(3,0,3,4/-,-,-,-)**

The course can be broken into three main sections. I. Analog electronics: theory of operation of diodes and transistors and typical solid state circuits, operational amplifiers and analog control theory. II. Digital electronics: gates, counters, registers, ROM, RAM, multiplexers, analog-digital and digital-analog conversion. III. Introduction to microcomputers: architecture, timing, input-output, interfacing, simple programming and digital control.

Prerequisites: Physics RR112, RR201.

**PHYSICS RR411: Applied Physics** **(3,0,3,4/-,-,-,-)**

This course is concerned with the application of physics to problems of military interest. The level of discussion will permit the student to apply the most advanced mathematics he has studied to problems about such topics as heat flow, control systems, detector arrays, communication and navigation.

Prerequisites: Physics RR371, RR332, Mathematics RR301

Laboratory courses associated with Physics RR332, RR371, and RR411 consist of experiments which demonstrate principles and techniques discussed in several other physics courses as well, or which are of special military interest. Experiments include: microprocessor controls, servomechanisms, digital logic, properties of tubes and solid state devices, temperature sensitive bridge, ultrsonic waves in water surface tension waves in water, electronic filters, digital filters, spectral analysis, wave guides, microwaves and radar, transmission lines, multiplexing, acoustic detector arrays, magnetometers, optical pumping, high voltage pulse techniques, optical and electron microscopy, and nuclear magnetic resonance spectroscopy.

**PHYSICS RR421: Atomic Physics** **(3,0,0,4/-,-,-,-)**

This course deals with the quantum theory of the electronic structure of the atom. Applications to optical and solid state devices are discussed, e.g. lasers, magnetometers, fibre optics, integrated circuits, spectroscopy, and remote sensing.

Prerequisite: Physics RR332

**PHYSICS RR432: Applied Nuclear Physics** **(-,-,-,-/3,0,0,4)**

This course deals with phenomenological aspects of nuclear physics. Topics discussed are Rutherford scattering, radiation monitoring and nuclear hazards, nuclear composition and binding energy, radioactivity, nuclear reactors and radiation shielding.

Prerequisites: Physics RR332, RR352.

**OCEANOGRAPHY RR301: Descriptive Oceanography** **(3,0,0,4/-,-,-,-)**

This course gives a general introduction to the oceans. The principal topics covered are: a survey of the physical properties of sea water; the distribution of salinity,

temperature, etc., and their seasonal variations; the circulation of the oceans; energy budgets; oceanographic instrumentation and measurement techniques; and underwater sound velocity distributions as a result of temperature and salinity variations.

**OCEANOGRAPHY RR341: Practical Oceanography (0,0,3,1/-,-,-,-)**

Field experience is obtained in a local coastal environment. Measurement of current, temperature, salinity, etc. are taken. Data reduction, interpretation, and a final report are required.

**OCEANOGRAPHY RR401: Geophysics and Geology (3,0,0,4/-,-,-,-)**

This course gives a general introduction to the physics of the earth within the framework of global plate tectonics. Following a discussion of the plate tectonic hypothesis and the differences between ocean floors and continental surfaces, the main topics are: gravimetry and the interpretation of gravity anomalies; the Earth's rotation, tides, and the shape of the earth; geomagnetism and paleomagnetism; geothermal studies; marine geophysics and geophysical prospecting.

Prerequisites: Physics RR371, RR332, Mathematics RR301

**OCEANOGRAPHY RR412: Aeronomy (-,-,-,-/3,0,0,4)**

This course deals principally with the atmosphere and its interaction with the oceans. Major topics covered are: the composition and properties of the atmosphere; comparison of dynamics of the atmosphere to the dynamics of the ocean; thermodynamics of the atmosphere; water vapour and cloud formation; solar and terrestrial radiation; transfer processes, including air-sea-ice interaction; satellites, remote sensing and interpretation of satellite imagery; magnetic fields and ionospheric physics; instruments, observations and their presentation; synoptic patterns; and military applications.

Prerequisites: Physics RR201, RR212, Mathematics RR223

**OCEANOGRAPHY RR431: Practical Oceanography (0,0,3,1/-,-,-,-)**

This course usually takes the form of a field project. Project topics are chosen in consultation with the instructor. Examples of acceptable topics: the measurement of seawater properties; bottom sampling; seismic experiments; coastal gravimetry; geomagnetic studies, etc. Data reduction, interpretation and a final report are required.

Prerequisite: Oceanography RR301.

**OCEANOGRAPHY RR432: Practical Oceanography (-,-,-,-/0,0,3,1)**

Field experience is obtained in a local coastal environment. Measurement of current, temperature, salinity, etc. are taken. Data reduction, interpretation, and a final report are required.

Prerequisite: Oceanography RR301

**OCEANOGRAPHY RR451: Introduction to Dynamic Oceanography** **(3,0,0,4/-,-,-,-)**

The equations of motion and continuity are developed and applied to hydrostatics, geostrophic and wind-driven currents, thermohaline circulation, waves, tides, and estuarine circulation.

Prerequisite: Oceanography RR301

**OCEANOGRAPHY RR462: Advanced Dynamic Oceanography** **(-,-,-,-/3,0,0,4)**

For students in the combined major or honours program. Selected topics in turbulence, turbulent diffusion, waves, design of experiments, and analysis of data.

Prerequisite: Oceanography RR301, RR451

**OCEANOGRAPHY RR483: Oceanography Project** **(0,1,3,2/0,1,3,2)**

Fourth year cadets in the honours program, working singly or in syndicates, work on an experimental or theoretical project in the general area of oceanography with members of the staff of the Department of Chemistry, Engineering, Mathematics or Physics. A written report is required.

**OCEANOGRAPHY RR492: Oceanography Seminar** **(-,-,-,-/0,0,2,0)**

A series of lectures on various topics in oceanography, presented by guest speakers, members of the college staff, and by Officer Cadets in the Honours program.

## DRILL

Officer in Charge of Drill — Captain R.N. Hardman, rmc, BA

Drill Sergeant Major — MWO L.P. Baumgarten, CD

Instructor — Sgt. G.A. Mason, CD

Instructor — Sgt. J.H. Bentley, C.D.

The objectives of the Drill program are to teach the officer cadets the fundamentals of drill as required in the Canadian Forces, to develop discipline and esprit de corps, to stimulate the power of command through mutual instruction, and to promote leadership through responsibility in handling groups of officer cadets.

Reference: A-PD-201-000/PT-000 — Canadian Forces Manual of Drill and Ceremonial.

**DRILL RR103** **(0,0,1,0/0,0,1,0)**

Includes rifle, foot, and ceremonial drill.

**DRILL RR203** **(0,0,1,0/0,0,1,0)**

In addition to rifle, foot, and ceremonial drill, this course includes sword drill and mutual instruction.

**DRILL RR303** **(0,0,1,0/0,0,1,0)**

Includes rifle, foot, sword, and colours drill, as well as ceremonial and mutual instruction.

**DRILL RR403** **(0,0,1,0/0,0,1,0)**

Reviews of all phases of drill previously taught.

Note: Details of individual courses offered at RMC or CMR should be obtained from their respective calendars.

## DEPARTMENT OF PHYSICAL EDUCATION AND ATHLETICS

Captain W.M. Keener, CD, BA (PHE)

Captain K.M. Benoit, CD, rmc, BSc

MWO R. Bootland, CD

Sgt. K.V. Roberts, CD

Sgt. W.E. Sears, CD

MCpl J.J. McQueen, CD

CPL G.L. Hughes, CD

The aims of the Physical Education and Athletics Program are to create and maintain physical fitness, to develop leadership qualities, and to engender habits necessary for maintaining the standards of physical fitness required by officers throughout their service careers. The program is broken down into instructional as well as recreational phases. A progressive four year program designed for the Canadian Military Colleges is followed.

**PHYSICAL EDUCATION RR103** **(0,0,0,2,0/0,0,2,0)**

The instructional phase of this course covers personal conditioning activities, combatives (wresting) and aquatics. Physiological fitness tests are conducted to further assess individual capabilities and improvement.

In the recreational phase of this course, practical participation in major team games is introduced, with participation compulsory in at least three of the college intramural sports. In conjunction with participation as players, cadets are also involved actively in officiating various sports.

**PHYSICAL EDUCATION RR203** **(0,0,2,0/0,0,2,0)**

The instructional phase of this course branches into a core elective program. Electives offered include soccer, hockey, squash, basketball, volleyball, and aquatics. The high level of instructor ability allows the cadet to develop his potential in each activity. An example is the aquatic program and, although all cadets must attain the Military Swim Standard, instruction to Red Cross Senior level is available.

The recreational phase is a continuation of PE RR103 by maintenance of compulsory participation in three intramural sports (two of which must be different from first year). Cadets are again active in officiating. As well, participation in the organization and conduct of various special events is introduced.

**PHYSICAL EDUCATION RR303** **(0,0,2,0/0,0,2,0)**

The instructional phase continues the comprehensive elective program, offering instruction in basketball, badminton, golf, squash, tennis, and aquatics. Cadets choose sports in which they may pursue further personal development of skills.

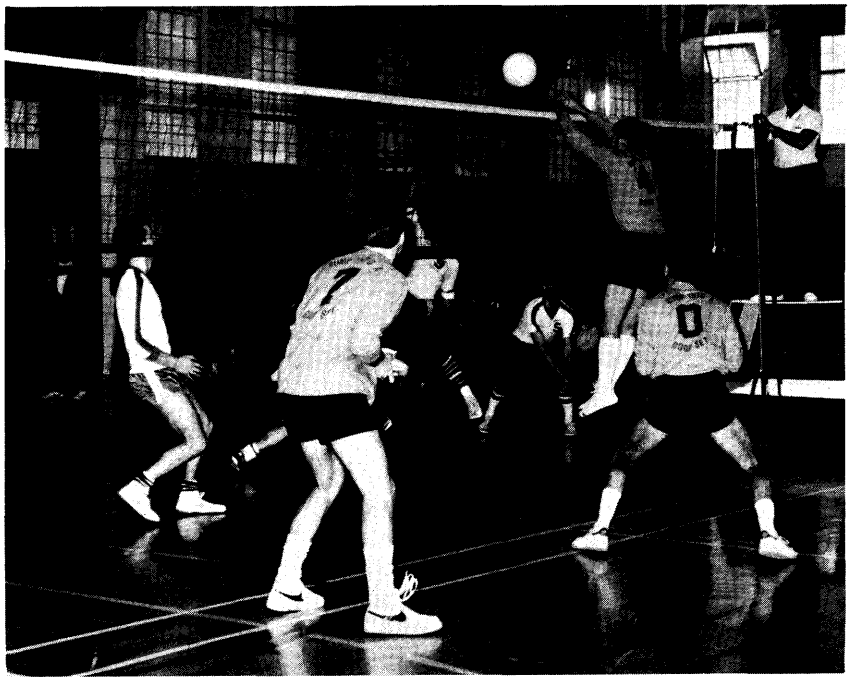
The recreational phase continues compulsory participation in two intramural sports (one of which must be new to the cadet). Cadets also become involved in the

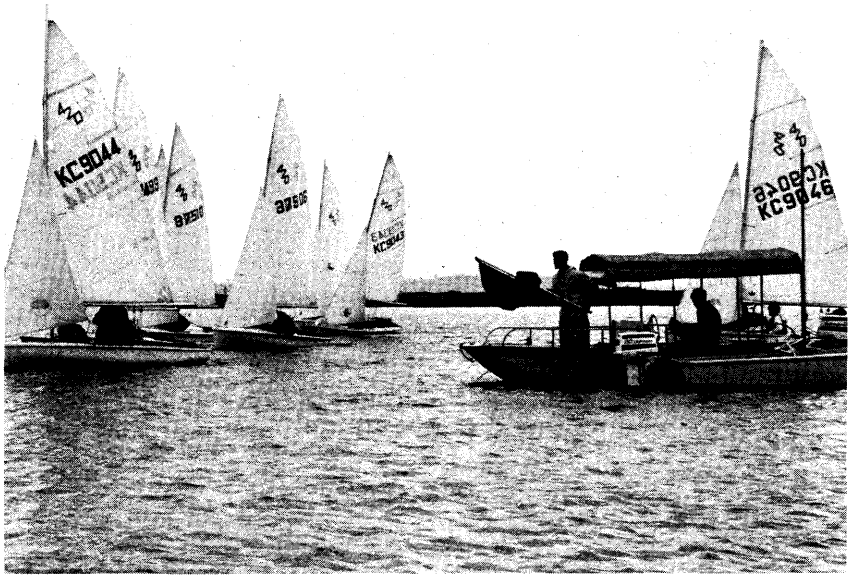
leadership and management of the various recreation clubs at the college, ranging in scope from a camera club to a scuba club. Approximately fifteen such clubs operate at Royal Roads.

**PHYSICAL EDUCATION RR403** **(0,0,2,0/0,0,2,0)**

The instructional phase electives offered are badminton, squash, curling, tennis, volleyball, and aquatics. As well, specific instruction is given related to post graduation career responsibilities and duties related to the PE field.

The recreational phase is a continuation of that programmed in PE RR303.

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# ACADEMIC REGULATIONS

## DEFINITIONS

**Student:** A member of the Canadian Forces attending Royal Roads Military College to study full time for a degree. Such students may be of the following types:

a. **Officer Cadet:** a student attending RRMC under the Regular Officer Training Plan (ROTP), the Reserve Entry Training Plan (RETP), or the University Training Plan — Men (UTPM).

b. **Officer:** a student attending RRMC under the University Training Plan — Officers (UTPO).

c. **Special Student:** other members of the Canadian Forces taking one or more courses at RRMC on a part-time basis. The academic regulations which follow do not apply to special students except where specifically noted.

**Program of Study:** A group of courses comprising a year's program of studies, as, for example, Mechanical Engineering, Physics and Oceanography, etc.

**Subject:** A division of the program of studies, as, for example, physics, history, etc.

**Course:** A series of lectures and/or laboratory sessions in a given subject, designated by a number and for which an annual or semester assessment must be provided, as, for example, Chemistry RR103, Oceanography RR401, etc.

**Extra Course:** A course which is not a required part of a program of study but which, under certain circumstances, may be taken in addition to the regular requirements of the program of study.

**Elective:** A course selected by the student from several designated offerings to fulfill requirements of an approved program of study.

**Failed-Credit Standing:** Standing granted on the recommendation of the Faculty Board, and with the approval of the Faculty Council and the Commandant, in a failed course for the purpose of allowing a student who has failed one course to pass the year. The actual final grade earned will be recorded on the transcript with the annotation "failed-Credit" (FC), and will remain a failure for the purpose of determining whether or not work prerequisite to other courses has been completed.

**Carry a Course:** When so recommended by the Faculty Board and approved by the Faculty Council and the Commandant, a student carries a course — after failing this course in the previous semester or year — by taking the failed course (or an authorized equivalent) again in the first subsequent academic term or year in which the course is scheduled, together with the normal academic workload of that term or year. The grade accorded on the first attempt will be recorded on the student's transcript with the notation "Failed — but permitted to carry". The semester or year will not be cleared until the carried course has been passed. A student may not carry a course from one CMC to another.

**Credit:** A course at RRMC would be assigned four units of credit for a semester's work (thirteen weeks of instruction) if it corresponded to approximately one-fifth to one-sixth of a normal Canadian university academic work load in a faculty of arts and science. Most courses at RRMC carry four units of credit in a semester, some may be heavier and carry as much as six units of credit in a semester, and others may be lighter (one, two, or three units of credit in a semester).

**Supplemental Exmination:** An examination set upon the recommendation of the Faculty Board, and with the approval of Faculty Council and the Commandant, in a course in which a student has failed. A pass in a supplemental examination may be accepted by Faculty Board to remove the deficiency of the failure. If the failed course is required to complete the work of a year, the year is failed until the supplemental examination is passed.

## DURATION OF THE PROGRAM OF STUDIES

1. For students starting their studies at the Royal Military College of Canada, or at the Royal Roads Military College, the duration of the program of studies is four years of two terms or semesters each; for students starting their studies at Collège militaire royal de Saint-Jean, it is four or five years of two terms or semesters each, depending upon whether the student enters at the first year or at the preparatory year level.

2. The years in the program of studies for students are designated as follows: preparatory year (at Collège militaire royal de Saint-Jean only); the first, second, third, and fourth years (all three colleges).

3. Students successfully completing the second year at Royal Roads Military College and not entering the Bachelor of Science program in Physics and Oceanography, or Bachelor of Arts program in Military and Strategic Studies at RRMC will complete their final two years at either RMC or CMR.

## DEGREES

### Royal Military College of Canada

4. A degree of Bachelor of Arts, Science, or Engineering, as appropriate, shall be granted by the Royal Military College of Canada to a student who has successfully completed his final year at that institution.

### Collège militaire royal de Saint-Jean

5. On the recommendation of the authorities at the Collège militaire royal de Saint-Jean, a degree of Bachelor of Arts, Science, or Administration, as appropriate, shall be granted by l'Universitè de Sherbrooke to a student who has successfully completed his final year at the Collège militaire royal de Saint-Jean. CMR will also, in its own name, grant a graduation certificate of academic and military qualifications to a student of that college who has earned his bachelor's degree and his commission as an officer in the Canadian Forces.

**Royal Roads Military College**

6. A degree of Bachelor of Science or Arts, as appropriate, shall be granted by the Royal Roads Military College to a student who has successfully completed his final year at that institution.

7. A student who completes his final year with first class honours standing will have his degree script inscribed "With Distinction" (see Academic Regulations 24 and 26).

8. At the end of the second year a Certificate of Qualification may be granted by the Royal Roads Military College to any student who has successfully completed the first and second years of his program of studies at that institution.

## THE PROGRAMS OF STUDY

### General Limitations

9. The Canadian Forces reserve the right to limit enrolment in any given program of studies at any Canadian Military College, or to select the location at which a program of studies will be offered.

### All Years Royal Roads Military College

10. In the first year a student at RRMC is required to take all of the courses prescribed in the calendar under "First Year — Degrees in Arts or Administration" or "First Year — Degrees in Science or Engineering".

11. In the second year a student at RRMC is required to take all of the courses prescribed in the calendar under:

— "Second Year — Degrees in Arts or Administration";
— "Second Year — General Degree in Science";
— "Second Year — Honours Degree in Science (Mathematics and Physics)";
— "Second Year — Engineering Degree in Engineering Physics"; or
— "Second Year — Engineering Degrees".

12. In the third and fourth years a student at RRMC is required to take all of the courses prescribed in the calendar under:

— "Third Year" — General Degree in Physics and Oceanography";
— "Third Year" — Combined Major in Physics and Oceanography";
— "Third Year" — General and Honours Degree in Military and Strategic Studies";
— "Fourth Year" — General Degree in Physics and Oceanography";
— "Fourth Year" — Combined Major in Physics and Oceanography";
— "Fourth Year" — General Degree in Military and Strategic Studies";
— "Fourth Year" — Honours Degree in Military and Strategic Studies".

13. Admission into the degree programs completed at RRMC requires the satisfactory completion of second year at any CMC with the following prerequisites:

— General Degree in Physics and Oceanography

any CMC Science or Engineering program of study which includes a course in chemistry. Preference will be given to candidates whose program

included Mathematics RR241 and Engineering RR232, or their equivalents.

— Combined Major in Physics and Oceanography

any CMC Science or Engineering program of study which includes courses in chemistry, Mathematics RR241, and Engineering RR232, or their equivalents. A weighted grade average of at least D+ is required in mathematics, science, and engineering courses.

— General or Honours Degree in Military and Strategic Studies

any CMC program of studies — arts, administration, science or engineering.

## HONOURS DEGREE PROGRAM

14a. Admission into the Honours Degree Program in Physics and Oceanography requires completion of "Third Year-Combined Major in Physics and Oceanography" with a weighted average of at least B+ in third year mathematics, science and engineering subjects.

14b. Admission into the Honours Degree Program in Military and Strategic Studies requires completion of third year Military and Strategic Studies with a minimum of second class honours. Students who have achieved less than second class honours may be admitted to the Honours program on a probationary basis with Faculty Council approval.

## EXTRA COURSES

15. In certain years of some programs of study a student may, with the permission of the Faculty Council, register in an extra course over and above those required for the given program of study. The grade received in such a course is counted when calculating the student's overall average and class standing.

## DRILL AND PHYSICAL TRAINING

16. Courses in Drill and Physical Training must be taken by all students in all years at all colleges.

## CONTINUITY OF STUDY

17. Under normal circumstances, a student at a Canadian Military College may not postpone a semester or a year of study.

## CHANGES IN REGISTRATION (RRMC)

18. Any change in registration in a program of study or in a course (including an extra course) requires the permission of the Faculty Council.

19. A student may not normally transfer from one program of study to another without having completed full prerequisite standing in the courses of the program of study he wishes to enter.

## ATTENDANCE

20. Students are required to attend all classes and laboratory sessions unless specifically excused by the Commandant, and must attend all tutorial sessions unless specifically excused by the instructor concerned.

21. A student who does not attend classes through illness or any other cause must complete term work and all assignments to the satisfaction of the department concerned.

## RESTRICTION OF PRIVILEGES

22. A student who fails to maintain a satisfactory academic standing may be subject to such restrictions of privilege as may be recommended by the Faculty Council and approved by the Commandant.

23. A special student who fails to maintain a satisfactory academic standing in a given course may be withdrawn from that course upon the recommendation of the head of the department concerned, and the approval of the Faculty Council.

## GRADES

24. Final grades in all courses will be reported as follows:

| | | |
|---|---|---|
| First Class Honours | (over 75%) | graded A |
| Second Class Honours | (66 to 74%) | graded B |
| Third Class Honours | (60 to 65%) | graded C |
| Pass | (50 to 59%) | graded D |
| Failure | (40 to 49%) | graded F |
| Serious Failure | (less than 40%) | graded FF |

25. Aegrotat standing may be granted by the Faculty Council, upon the recommendation of the head of the department concerned, to any student or special student who has been unable to write one or more of the final examinations but who has achieved a satisfactory standard in the course or courses concerned.

## GRADE AVERAGE AND RANK IN CLASS

26. At the end of each year a student's numerical grade average and rank in class will be calculated by adding together, for all courses taken, the product of the numerical grade in each course times the units of credit assigned to that course and dividing the sum by the total number of units of credit carried (including any extra courses). Final grades in courses are granted by the Faculty Board, subject to confirmation by the Faculty Council. Marks obtained in supplemental examinations may not be used to advance a student's academic grade average for the semester or year.

27. To be granted pass standing for a year, and to be allowed to continue into the subsequent year, a student must obtain a final grade average over the year's work of at least D, and must obtain a final grade of at least D in each course of his program of study (other than Second Language Training courses — see description under French Department); or must successfully write supplemental examinations in failed subjects (see Academic Regulations 36, 37 and 39). However,

with the permission of the Faculty Council, a student who fails to obtain a D standing in one subject may carry that course into the subsequent year. Satisfactory progress (D or better) in Second Language Training courses is expected.

28. To be allowed to continue into the second semester of a year, a student should normally obtain a grade of at least D in each final examination written, or successfully write supplemental examinations in failed subjects (see Academic Regulations 36, 37 and 39). However, with the permission of the Faculty Council, a student who fails to obtain D standing in one subject in the first semester may carry that subject into the subsequent semester or year.

29. To complete pass standing in each semester, a student must reach a satisfactory standard in Physical Training and in Drill, and must receive a favourable report in officer-like qualities.

**FINAL EXAMINATIONS**

30. Final examinations in each course will be held at the end of each semester at dates and times to be specified in the examination timetable, except for courses that extend over two semesters (year courses) for which the examination at the end of the second semester is normally the final examination.

31. Students taking a year course who, at the end of the first semester, wish to transfer into a program of study for which the second semester of the year course is not required may petition the Faculty Council for permission to write a final examination in the first semester's work of the year course and to retain credit for the work thus completed.

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

33. A student or special student may be refused permission by Faculty Council to write his final examination:

    a. in any course in which he fails to meet the requirements with regard to assignments; or

    b. in any course involving practice work in a laboratory, if this work has been unsatisfactory.

34. All instructors will submit final grades each semester in each course in which a final examination is written. In each course, the relative contribution to the final grade of class assignments, tests, laboratory work, and the final examination will be determined by the instructor concerned, in consultation with the head of the department.

35. Final grades in courses are granted by the Faculty Board, subject to confirmation by the Faculty Council.

**SUPPLEMENTAL EXAMINATIONS**

36. In the first semester of a year, a student may write supplemental examinations in not more than two subjects, or in not more than three subjects, providing that one of the failed subjects carries not more than one unit of credit.

37. In the second semester of a year, a student may write supplemental examinations in not more than two subjects, or in not more than three subjects, providing that one of the failed subjects carries not more than one unit of credit and that his grade average over the year's work in his program of study is D or better.

38. Supplemental examinations shall be written at dates and times to be specified by the Faculty Council and shall normally be written within three weeks of the completion of final examinations. Supplemental examinations in second language training courses are not offered.

39. To obtain pass standing in a supplemental examination, an Officer Cadet must obtain a grade of D or better, normally not including the previous term work or final examination mark.

40. Marks obtained in supplemental examinations may not be used to advance a student's academic grade average for the semester or year.

41. With the consent of the Faculty Council, and under extenuating circumstances, a special student may write a supplemental examination.

**FAILURE OF A YEAR**

42. A student shall fail his year if:

    a. his overall grade average for the year is less than D;

    b. he is ineligible to write supplemental examinations in failed subjects as per Academic Regulations 36 and 37;

    c. he fails a supplemental examination and is not granted failed-credit standing or is not allowed to carry a failed course; or

    d. he fails a course he has been allowed to carry.

**REPEATING A YEAR**

43. A student who has failed a year but who has indicated sufficient military and academic potential to succeed at a Canadian Military College may repeat the year at his own expense. Normally, a student who has failed in courses totalling as much as 50 per cent of the units of credit written in the final examinations would not be considered academically eligible to repeat. Except as noted in Regulation 44, a student permitted to repeat must repeat the entire year including any courses, or their equivalent, passed in the first attempt.

44. A student who fails his year as a result of failing his work for the first semester to the degree that he is not permitted for academic reasons to enter the second semester may be permitted to repeat the first semester at his own expense.

45. A student may repeat a year only if authorized by NDHQ on the recommendation of the Faculty Council and the Commandant.

46. A student may be permitted to repeat any year, including the fourth year.

47. A student may be permitted to repeat the second year in engineering if he has failed to qualify for engineering as required by Academic Regulations.

48. A student may repeat a year only once during his career at a Canadian Military College.

49. A student permitted to repeat a year must do so at the first opportunity.

50. A student permitted to repeat a year must carry the equivalent work load of his full program of study.

**WITHDRAWAL**

51. A student who fails in more than 50 per cent of the units of work written in any semester final examinations will normally be required to withdraw.

52. A student who fails a semester or year, having previously failed a semester or year, must withdraw.

53. A student who, in the opinion of the staff, fails to develop the necessary officer-like qualities will, on the approval of the Commandant, be required to withdraw.

# ROYAL ROADS MILITARY COLLEGE

## FORMER COMMANDANTS

| | | Years |
|---|---|---|
| Captain J.M. Grant, CBE, | RCN | 1942-1946 |
| Captain W.B. Creery, CBE, CD | RCN | 1946-1948 |
| Captain H.S. Rayner, DSC, CD | RCN | 1948-1949 |
| Group Captain J.B. Millward, DFC, CD | RCAF | 1949-1952 |
| Colonel C.B. Ware, DSO, CD | PPCLI | 1952-1954 |
| Captain J.A. Charles, OMM, CD | RCN | 1954-1957 |
| Colonel P.S. Cooper, OBE, CD | L EDMN R | 1957-1960 |
| Group Captain A.F. Avant, DSO, DFC, CD | RCAF | 1960-1963 |
| Captain W.P. Hayes, CD | RCN | 1963-1965 |
| Group Captain D.B. Wurtele, CD | RCAF | 1965-1968 |
| Colonel K.E. Lewis, CMM, CD | CF | 1968-1970 |
| Captain (N) R.C.K. Peers, CD | CF | 1970-1976 |
| Colonel J.H. Roddick, CD | CF | 1976-1979 |

## FORMER DIRECTORS OF STUDY

| | |
|---|---|
| Commander K.G.B. Ketchum | 1942-1945 |
| Captain William Ogle | 1945-1951 |
| Professor L.A. Brown | 1951-1955 |
| Professor C.C. Cook | 1955-1961 |

## HONORARY DEGREE RECIPIENTS

**1977**

John Moreau Grant, Doctor of Military Science
Clennell Haggerston Dickens, Doctor of Military Science

**1978**

Charles Perry Stacey, Doctor of Military Science
Keith Rogers Greenaway, Doctor of Military Science

**1979**

Owen Connor Straun Robertson, Doctor of Military Science
Robert Thomas Duff Wallace, Doctor of Laws
John William Tranter Spinks, Doctor of Military Science

**1980**

George Lawson Pickard, Doctor of Military Science
Harry George DeWolf, Doctor of Military Science

**1981**

Henry Pybus Bell-Irving, Doctor of Military Science