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## 1 Agricultural and Environmental Sciences

### 1.1 Agricultural Economics Major – Natural Resource Economics Option

**Core Required and Complementary Courses:** 51 credits.  
**Option Required and Complementary Courses:** 32 credits.  
**Electives:** to meet the minimum 90-credit requirement for the degree.

	<b>CREDITS</b>
<b>Option Required Courses:</b>	<b>12</b>
AEMA 306 Mathematical Methods in Ecology	3
NRSC 333 Physical and Biological Aspects of Pollution	3
NRSC 437 Assessing Environmental Impact	3
WILD 205 Principles of Ecology	3
<b>Option Complementary Courses:</b>	<b>9</b>
9 credits chosen from the following list:	
AGEC 344 (3) Entrepreneurial Leadership	3
AGRI 210 (3) Agro-Ecological History	3
ECON 405 (3) Natural Resource Economics	3
ENVR 203 (3) Knowledge, Ethics and Environment	3
NRSC 201 (3) Introductory Meteorology	3
NUTR 361 (3) Environmental Toxicology	3
WILD 415 (3) Conservation Law	3
WILD 421 (3) Wildlife Conservation	3

### 1.2 Agricultural Sciences Major – Ecological Agriculture Option

**Required Courses:** 61 credits.  
**Complementary Courses:** 16 - 19 credits.  
**Electives:** selected in consultation with Academic Adviser, to meet the minimum 90-credit requirement for the degree.

	<b>CREDITS</b>
<b>Required Courses:</b>	<b>61</b>
All of the required courses (52 credits) specified for the Agricultural Sciences Major – General Option, with the addition of:	
AGRI 340 Principles of Ecological Agriculture	3
AGRI 341 Ecological Agriculture Systems	3
WILD 205 Principles of Ecology	3
<b>Complementary Courses:</b>	<b>16 to 19</b>
at least one of:	
ANSC 323 (4) Mammalian Physiology	4
PLNT 353 (4) Plant Structure and Function	4
at least one production course in Agricultural Science:	
AGEC 331 (3) Farm Business Management	3
ANSC 450 (3) Dairy Cattle Production	3
ANSC 452 (3) Beef Cattle and Sheep Production	3
ANSC 454 (3) Swine Production	3
ANSC 456 (3) Poultry Production	3
PLNT 331 (3) Field Crops	3
at least 3 credits must be chosen from three of the four blocks below:	
AGRI 201D1 (3) Agri-Environment Internship	3

### 1.3 Agricultural Sciences Internship Major – Ecological Agriculture Option

**Required Courses:** 73 credits.  
**Complementary Courses:** 13 credits.  
**Electives:** selected in consultation with Academic Adviser, to meet the minimum 102-credit requirement for the degree.

### 1.4 Agricultural Sciences Major – Soil Science Option

**Required Courses:** 52 credits.  
**Complementary Courses:** 25 credits.  
**Electives:** selected in consultation with Academic Adviser, to meet the minimum 90-credit requirement for the degree.





PLNT 451 (3) Special Topics: Plant Science 2  
 SOIL 210 (3) Principles of Soil Science

**1.10 Ecological Agriculture, Certificate in**

**Required Courses:** 9 credits.  
**Complementary Courses:** 21 credits.

	<b>CREDITS</b>
<b>Required Courses:</b>	<b>9</b>
AGRI 210 Agro-Ecological History	3
AGRI 340 Principles of Ecological Agriculture	3
AGRI 341 Ecological Agriculture Systems	3
<b>Complementary Courses:</b>	<b>21</b>
21 credits chosen from the following, in consultation with the Academic Adviser for Ecological Agriculture with at least 3 credits chosen from:	
	3-9
SOIL 335 (3) Soil Ecology and Management	
SOIL 490 (3) Plan global de fertilisation intégrée	
SOIL 521 (3) Soil Microbiology and Biochemistry	
and the remaining credits to be chosen from:	
	12-18
AGEC 333 (3) Resource Economics	
AGRI 435 (3) Soil and Water Quality Management	
AGRI 491D1 (1.5) Co-op Experience	
AGRI 491D2 (1.5) Co-op Experience	
ENTO 352 (3) Control of Insect Pests	
MICR 331 (3) Microbial Ecology	
NUTR 512 (3) Herbs, Foods and Phytochemicals	
PLNT 300 (3) C81.5)PLNTbe chos00	

**1.11 Ecological Agriculture, Minor in**

**Required Courses:** 9 credits.  
**Complementary Courses:** 15 credits.

**1.12 Environmental Biology Major**

**Required Courses:** 27 credits.  
**Complementary Courses:** 30 credits.  
**Electives:** To meet the minimum requirements of 90 credits for the degree.

With the permission of the Academic Adviser and the Committee on Academic Standing, ecological or environmental courses offered on the Downtown Campus may be substituted for those appearing in the above list of Complementary Courses.

**1.13 Microbiology Major**

**Required Courses:** 60 credits.  
**Electives:** to meet the minimum requirement of 90 credits for the degree; chosen in consultation with the Academic Adviser.

<sup>1</sup> Downtown Campus

**Note:** Other courses on the Downtown Campus may be equivalent to some required courses; consult the Academic Adviser.

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#### 1.14 Resource Conservation Major

**Required Courses:** 26 credits

**Complementary Courses:** 33 credits.

**Electives:** to meet the minimum 90-credit requirement for the degree.

## 2 Arts

### 2.1 Computer Science

#### 2.1.1 Computer Science, Minor Concentration

This Minor Concentration may be taken in conjunction with any program in the Faculty of Arts with the approval of the Adviser of the student's main program and the School of Computer Science.

#### Minor Concentration in Computer Science

(Non-expandable) (18 credits)

#### Required Courses (12 credits)

COMP 202	(3)	Introduction to Computing 1
COMP 203	(3)	Introduction to Computing 2
COMP 206	(3)	Introduction to Software Systems
COMP 302	(3)	Programming Languages and Paradigms

#### Complementary Courses (6 credits)

selected from:

COMP 273	(3)	Introduction to Computer Systems
COMP 310	(3)	Computer Systems and Organization
COMP 335	(3)	Software Engineering Methods
COMP 350	(3)	Numerical Computing
or MATH 317	(3)	Numerical Analysis
COMP 360	(3)	Algorithm Design Techniques
COMP 420	(3)	Files and Databases
COMP 421	(3)	Database Systems
COMP 424	(3)	Topics: Artificial Intelligence 1
COMP 426	(3)	Automated Reasoning
COMP 433	(3)	Personal Software Engineering
COMP 435	(3)	Basics of Computer Networks
COMP 505	(3)	Advanced Computer Architecture
COMP 506	(3)	Advanced Analysis of Algorithms
COMP 507	(3)	Computational Geometry
COMP 520	(4)	Compiler Design
COMP 524	(3)	Theoretical Foundations of Programming Languages
COMP 534	(3)	Team Software Engineering
COMP 535	(3)	Computer Networks 1
COMP 537	(3)	Internet Programming
COMP 538	(3)	Person-Machine Communication
COMP 540	(3)	Matrix Computations
COMP 547	(3)	Cryptography and Data Security
COMP 557	(3)	Computer Graphics
COMP 560	(3)	Graph Algorithms and Applications
COMP 566	(3)	Discrete Optimization 1
COMP 573	(3)	Microcomputers
COMP 575	(3)	Fundamentals of Distributed Algorithms

or courses outside of the School approved by the adviser.

#### 2.1.2 Computer Systems, Minor Concentration

This Minor Concentration may be taken only by students registered in the Major Concentration in Foundations of Computing. Taken together, these constitute a program very close to the Major in Computer Science offered by the Faculty of Science.

#### Minor Concentration in Computer Systems

(Combinable) (18 credits)

#### Required Courses (9 credits)

COMP 206	(3)	Introduction to Software Systems
COMP 273	(3)	Introduction to Computer Systems
COMP 310	(3)	Computer Systems and Organization

#### Complementary Courses (9 credits)

selected from:

COMP 335	(3)	Software Engineering Methods
COMP 420	(3)	Files and Databases
COMP 421	(3)	Database Systems
COMP 424	(3)	Topics: Artificial Intelligence 1
COMP 433	(3)	Personal Software Engineering
COMP 435	(3)	Basics of Computer Networks
COMP 505	(3)	Advanced Computer Architecture

COMP 506	(3)	Advanced Analysis of Algorithms
COMP 507	(3)	Computational Geometry
COMP 520	(4)	Compiler Design
COMP 524	(3)	Theoretical Foundations of Programming Languages
COMP 531	(3)	Theory of Computation
COMP 534	(3)	Team Software Engineering
COMP 535	(3)	Computer Networks 1
COMP 537	(3)	Internet Programming
COMP 547	(3)	Cryptography and Data Security
COMP 557	(3)	Computer Graphics
COMP 573	(3)	Microcomputers
COMP 575	(3)	Fundamentals of Distributed Algorithms

### 2.2 Education for Arts Students Minor Concentration

*Program Director* — Professor Jon Bradley  
 Department of Integrated Studies in Education  
 Faculty of Education, 3700 McTavish Street  
 e-mail: jon.bradley@mcgill.ca  
 Website: [www.mcgill.ca/edu-integrated/](http://www.mcgill.ca/edu-integrated/)

This Minor Concentration allows Arts students to develop and explore an interest in education. It will give students a solid footing in the basics of pedagogy and may provide a starting point towards a B.Ed. degree.

Completion of the Minor Concentration **does not** qualify a student for certification to teach in the province of Quebec. Students interested in a teaching career should consult the Faculty of Education, "Faculty Programs" on page 139 of the Undergraduate Programs Calendar.

#### MINOR CONCENTRATION IN EDUCATION FOR ARTS STUDENTS (18 credits)

#### Required Courses (12 credits)

EDEC 402	(3)	Media, Technology and Education
EDEM 405	(3)	Policy Issues in Quebec Education
EDPE 300	(3)	Educational Psychology
EDPI 309	(3)	Exceptional Students

#### Complementary Courses (6 credits)

3 credits, one of:

EDER 398	(3)	Philosophy of Catholic Education
EDER 400	(3)	Philosophical Foundations of Education

3 credits, one of:

EDEC 410	(3)	Multi-Cultured/Multi-Racial Class
EDEE 441	(3)	First Nations and Inuit Education
EDER 464	(3)	Intercultural Education

### 2.3 German Studies

#### 2.3.1 German Studies, Honours

#### HONOURS PROGRAM IN GERMAN STUDIES (60 credits)

#### Required Courses (42 credits)

GERM 200	(6)	German Language, Intensive Beginners'
GERM 300	(6)	German Language Intensive Intermediate
GERM 325	(6)	German Language - Intensive Advanced
GERM 352	(3)	German Literature - 19th Century 3
GERM 360	(3)	German Literature 1890 to 1918
GERM 363	(3)	German Postwar Literature
GERM 450	(3)	Classical Period in German Literature
GERM 451	(3)	German Romanticism
GERM 511	(3)	Middle High German Literature
GERM 575	(6)	Honours Thesis

With permission of the adviser, students with advanced standing in German language will replace language courses for more advanced courses in language, culture or literature.

**Complementary Courses** (18 credits)

12 credits selected from:

- GERM 331 (3) Germany after Reunification
- GERM 353 (3) 19th Century Literary Topics
- GERM 361 (3) German Literature 1918 to 1945
- GERM 362 (3) 20th Century Literature Topics
- GERM 365 (3) Media Studies in German
- GERM 380 (3) 18th Century German Literature
- GERM 400 (3) Interdisciplinary Seminar: Contemporary German Studies

Note: In the event that there are not enough courses offered in German, substitution with courses from the list below is allowed only with permission of the adviser.

6 credits selected from:

- GERM 259 (3) Individual and Society in German Literature 1
- GERM 260 (3) Individual and Society in German Literature 2
- GERM 336 (3) German Grammar Review
- GERM 354 \*3) Literary Approach to Song
- GERM 355 (3) Nietzsche and Wagner
- GERM 358 (3) Franz Kafka
- GERM 359 (3) Bertolt Brecht
- GERM 364 (3) German Culture: Gender and Society
- GERM 367 (3) Topics in German Thought
- GERM 371 (3) Cultural Change and Evolution of German
- GERM 382 (3) Faust in European Literature
- GERM 397 (3) Individual Reading Course
- GERM 398 (3) Individual Reading Course
- GERM 561 (3) German Literature: Baroque

or other suitable courses in the Department or in other related disciplines and departments with the approval of adviser.

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## 2.4 International Development Studies

**2.4.1 IDS, Minor Concentration****MINOR CONCENTRATION IN INTERNATIONAL DEVELOPMENT STUDIES** (18 credits) (Expandable)**Required Courses** (6 credits)

- ECON 208 (3) Microeconomic Analysis and Applications
- ECON 313 (3) Economic Development 1

**Complementary Courses** (12 credits)

a minimum of 3 credits selected from the IDS Complementary Course list Group A. Only one course from each discipline can be counted.

the remaining credits to be selected from the IDS Complementary Course list Group B, with the addition of ECON 314 Economic Development 2 to the category "Development Policies and Practices".

At least 9 of the 18 credits must be at the 300 level or above.

**2.4.2 IDS, Major Concentration****MAJOR CONCENTRATION IN INTERNATIONAL DEVELOPMENT STUDIES** (36 credits)**Required Courses** (12 credits)

- ECON 208 (3) Microeconomic Analysis and Applications
- ECON 313 (3) Economic Development 1
- ECON 314 (3) Economic Development 2
- INTD 497 (3) Research Seminar on International Development

**Complementary Courses** (24 credits)

a minimum of 3 credits selected from the IDS Complementary Course list Group A. Only one course from each discipline can be counted.

**2.4.3 IDS Honours****HONOURS PROGRAM IN INTERNATIONAL DEVELOPMENT STUDIES** (57 credits)

Honours students must maintain a program GPA of 3.00 and an overall CGPA of 3.00.

**Required Courses** (12 credits)**Complementary Courses** (45 credits)**2.4.4 IDS, Joint Honours****JOINT HONOURS PROGRAM – INTERNATIONAL DEVELOPMENT STUDIES COMPONENT** (36 credits)

Joint Honours students must maintain a program GPA of 3.00 and an overall CGPA of 3.00.

Joint Honours students should consult an adviser in each department to discuss their course selection and their interdisciplinary research project (if applicable).

**Required Courses** (12 credits)



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RELG 326 (3) Ancient Christian Church AD54- AD604  
RELG 334 (3) The Christian Faith  
RELG 336 (3) Contemporary Theological Issues  
RELG 381 (3) Advanced New Testament Greek  
RELG 399 (3) Christian Spirituality  
RELG 423 (3) Reformation Thought  
RELG 438 (3) Topics in Jewish Theology  
RELG 482 (3) Exegesis of Greek New Testament

**2.7.3 Scriptures and Interpretations, Major Concentration**

**MAJOR CONCENTRATION IN SCRIPTURES AND INTERPRETATIONS (36 credits)**

**Required Courses (6 credits)**

**Complementary Courses (30 credits)**

**2.7.2 Scriptural Languages, Minor Concentration (Stream II, Indo-Tibetan Languages)**

**MINOR CONCENTRATION IN SCRIPTURAL LANGUAGES**

(18 credits) (Non-expandable)

Students will chose from one of two streams:

Stream I: Biblical Languages

Stream II: Sanskrit.

**Minor Concentration in Scriptural Languages  
Stream II: Indo-Tibetan Languages**

Sanskrit is the language of classical Indian civilization and is recommended for students interested in gaining access to religious texts, philosophical works, academic treatises on all subjects and poetry written in classical and medieval India.

Classical Tibetan is one of the main scriptural languages of Buddhism. Many texts originally composed in Sanskrit are only extant in their Tibetan translations, and a vast body of philosophical, devotional, poetic and academic works composed in Classical Tibetan are only accessible to one who has a firm grasp of the language.

**Complementary Courses (18 credits)**

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RELG 357D1	(3)	Sanskrit 2
RELG 357D2	(3)	Sanskrit 2
RELG 364	(3)	Intermediate Tibetan 1
RELG 365	(3)	Intermediate Tibetan 2
RELG 442	(3)	Pure Land Buddhism
RELG 443	(3)	Japanese Esoteric Buddhism
RELG 451	(3)	Zen: Maxims and Methods
RELG 452	(3)	East Asian Buddhism
RELG 454	(3)	Modern Hindu Thought
RELG 457D1	(3)	Advanced Sanskrit
RELG 457D2	(3)	Advanced Sanskrit
RELG 464	(3)	Advanced Tibetan 1
RELG 465	(3)	Advanced Tibetan 2
RELG 546	(3)	Indian Philosophy
RELG 548	(3)	Indian Buddhist Philosophy
RELG 552	(3)	Advaita Vedanta
RELG 553	(3)	Religions of South India 1
RELG 554	(3)	Religions of South India 2

#### 2.7.4 World Religions, Minor Concentration

**MINOR CONCENTRATION IN WORLD RELIGIONS** (18 credits)  
(Expandable to Major Concentration in World Religions)

**Complementary Courses** (18 credits\*)

12 credits in Religious Traditions, chosen from the following:

*Judaism and Christianity:*

RELG 201 Md C4 bG6e(M)2LG

#### 2.7.5 World Religions, Major Concentration

**MAJOR CONCENTRATION IN WORLD RELIGIONS**  
(36 credits)

**Required Course** (3 credits)

**Complementary Courses** (33 credits)

- RELG 442 (3) Pure Land Buddhism
- RELG 451 (3) Zen: Maxims and Methods
- RELG 452 (3) East Asian Buddhism
- RELG 454 (3) Modern Hindu Thought
- RELG 546 (3) Indian Philosophy
- RELG 548 (3) Indian Buddhist Philosophy
- RELG 549 (3) East Asian Buddhist W o0J2.9139 -1.1126 TD0.0012 Tc-0.0009 Tw1hi-0.1.112009 Tw09 Tw1hi-0.1.11/si25.003 Twp4(44)6Tw1hi-0.1e0.003

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### 3 Education

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#### 3.1 Bachelor of Education Kindergarten and Elementary Program

The four-year program begins with the foundation courses in the first term and has a higher concentration of academic courses in the first two years. The professional courses and practicum have a heavier weight in the final two years. The practicum consists of school-based experiences and a series of professional seminars that provide an opportunity for students to reflect on that experience in a systematic way and with the guidance of a tutor.

##### 3.1.1 Jewish Studies Option

This option, Jewish Studies, is offered within the Bachelor of Education in Kindergarten and Elementary Education.

Students who wish to follow this option should contact:

Professor Eric Caplan  
Department of Integrated Studies in Education  
Faculty of Education  
Telephone: (514) 398-6544  
e-mail: eric.caplan@mcgill.ca

<b>ACADEMIC COMPONENT</b>	<b>CREDITS</b>	<b>Required Courses</b>	
	<b>42</b>	EDEE 223 Language Arts Part 1	3
This component provides background in the subject areas of the elementary school curriculum. During their four years of study, students will take:		EDEE 250 The Kindergarten Classroom	2
<b>Required Courses</b>	<b>12</b>	EDEE 275 Science Teaching	2
EDEC 203 Communication in Education	3	EDEE 282 Teaching Social Sciences	2
EDEE 230 Elementary School Mathematics	3	EDEE 332 Teaching Mathematics 1	3
EDEE 270 Elementary School Science	3	EDEE 350 Integrating the Curriculum	2
JWST 211 Jewish Studies 1: Biblical Period	3	EDER 252 Understanding and Teaching Jewish Life	3
<b>Complementary Courses</b>	<b>30</b>	EDER 401 Teaching Biblical Literature - Jewish School 1	3
12 credits in Jewish Studies chosen from:	12	EDER 407 Teaching the Jewish Liturgy	3
JWST 345 Introduction to Rabbinic Literature or RELG 306 Rabbinic Judaism		EDER 421 Teaching the Holocaust	3
JWST 314 Denominations in North American Judaism		<b>Complementary Courses</b>	<b>5</b>
or SOCI 327 Jews in North America		one of:	2
JWST 206 Introduction to Yiddish Literature		EDER 375 Catholic Religious Education (K/Elem)	
or JWST 325 Israeli Literature in Translation		EDER 360 MRE in the K/Elem. Curriculum	
JWST 365 Modern Jewish Ideologies		one of:	3
or JWST 366 History of Zionism		EDEA 332 Art Curriculum and Instruction - Elementary	
POLI 347 Arab-Israel Conflict, Crisis, Peace		EDEA 342 Curriculum and Instruction in Drama Education	
or POLI 437 Politics in Israel		EDEA 345 Music Curriculum and Instruction for Generalists	
HIST 207 Jewish History: 400 BCE to 1000		<b>PEDAGOGICAL SUPPORT</b>	<b>11</b>
or JWST 216 Jewish Studies 2: 400 BCE-1000		<b>Required Courses</b>	
HIST 219 Jewish History: 1000-2000		EDEE 352 Classroom Practices	2
or JWST 217 Jewish Studies 3: 1000 to 2000		EDEE 355 Classroom-based Evaluation	3
JWST 367 Studies in Hebrew Language and Literature		<b>Complementary Courses</b>	
JWST 368 Studies in Hebrew Language and Literature		EDEC 402 Media, Technology and Education	3
JWST 369 Studies in Hebrew Language and Literature		or, for students with a background in computers or other media applications in education, one of the following 3-credit courses may substitute for the above:	
JWST 370 Studies in Hebrew Language and Literature		EDPT 341 Instructional Programming 1	
6 credits in Jewish Studies chosen from:	6	EDPT 420 Media Literacy for Education	
JWST 327 A Book of the Bible		one 3-credit course in Multicultural Education from the following list:	3
JWST 328 A Book of the Bible		EDER 464 Intercultural Education	
JWST 329 A Book of the Bible		EDEE 441 First Nations and Inuit Education	
JWST 330 A Book of the Bible		EDEC 410 Multi-cultured/Multi-racial Class	
JWST 331 Bible Interpretation/Medieval Ashkenaz		<b>ELECTIVE COURSES</b>	<b>3</b>
or JWST 332 Bible Interpretation/Sefardic Tradition		<b>TOTAL CREDITS</b>	<b>126</b>
or JWST 510 Jewish Bible Interpretation 1			
12 credits, 3 credits from each of any four other subject areas: English, Mathematics, Natural Sciences, Social Sciences, The Arts, Physical Education, Moral and Religious Education, French.	12		
<b>PROFESSIONAL COMPONENT</b>	<b>81</b>	<b>4 Engineering</b>	
This component includes the practicum, theoretical aspects of pedagogy, the pedagogical support for the practicum and foundation courses, divided as follows:		<b>4.1 Electrical and Computer Engineering</b>	
<b>PRACTICUM</b>	<b>24</b>	<b>4.1.1 B.Eng. Degree in Computer Engineering</b>	
<b>Required Courses</b>		<b>REQUIRED COURSES</b>	<b>COURSE CREDIT</b>
Field Experiences		<b>Non-Departmental Courses</b>	
EDFE 200 First Year Field Experience	2	MATH 260 Intermediate Calculus	3
EDFE 253 Second Field Experience (K/Elem)	4	MATH 261 Differential Equations	3
EDFE 303 Third Field Experience (K/Elem)	7	or MATH 325 Ordinary Differential Equations (3)	
EDFE 406 Fourth Field Experience (K/Elem)	7	MATH 265 Advanced Calculus	3
<b>PROFESSIONAL SEMINARS</b>		or MATH 248* Advanced Calculus 1 (3)	
EDEC 201 First Year Professional Seminar	1	MATH 270 Applied Linear Algebra	3
EDEC 405 Fourth Year Professional Seminar (K/Elem)	3	or MATH 247* Linear Algebra (3)	
<b>FOUNDATIONS</b>	<b>15</b>	MATH 363 Discrete Mathematics	3
<b>Required Courses</b>		MATH 381 Complex Variables and Transforms	3
EDEM 405 Policy Issues in Quebec Education	3	CIVE 281 Analytical Mechanics	3
EDER 320 Visions and Realities of Jewish Education	3	or PHYS 251 Classical Mechanics 1 (3)	
EDPI 309 Exceptional Students	3	MIME 221 Engineering Professional Practice	2
EDPI 341 Instruction in Inclusive Schools	3	MIME 310 Engineering Economy	3
EDPE 300 Educational Psychology	3	COMP 202 Introduction to Computing 1	3
<b>PEDAGOGY</b>	<b>31</b>	COMP 250 Introduction to Computer Science	3





or COMP 573	Microcomputers
ECSE 504	Computer Control
ECSE 522	Asynchronous Circuits and Systems
ECSE 526	Artificial Intelligence
ECSE 529	Image Processing and Communication
ECSE 530	Logic Synthesis
ECSE 531	Real Time Systems
ECSE 532	Computer Graphics
or COMP 557	Computer Graphics
COMP 410	Mobile Computing
COMP 412	Software for E-commerce
COMP 505	Advanced Computer Architecture
COMP 520	Compiler Design
COMP 566	Discrete Optimization 1

**General Complementaries****6**

Two courses (6 credits), selected from an approved list: one course on the impact of technology on society and one in the humanities and social sciences, administrative studies and law. See section 3.4 "Complementary Studies", under the Faculty of Engineering in the Undergraduate Programs Calendar, for further information.

**TOTAL CREDITS****108/109****4.2 Mechanical Engineering****4.2.1 B.Eng. Degree in Mechanical Engineering (Regular)**

REQUIRED COURSES	COURSE CREDIT	
<b>Non-Departmental Subjects</b>		
CIVE 207	Solid Mechanics	4
COMP 208	Computers in Engineering	3
ECSE 461	Electric Machinery	3
EDEC 206	Communication in Engineering	3
MATH 260	Intermediate Calculus	3
MATH 261	Differential Equations	3
MATH 265	Advanced Calculus	3
MATH 266	Linear Algebra and Boundary Value Problems	4
MIME 221	Engineering Professional Practice	2
MIME 260	Materials Science and Engineering	3
MIME 310	Engineering Economy	3
<b>Departmental Courses</b>		
MECH 201	Introduction to Mechanical Engineering	2
MECH 210	Mechanics 1	2
MECH 220	Mechanics 2	4

**4.2.2 B.Eng. Degree in Mechanical Engineering (Honours)****34**

MECH 362	Mechanical Laboratory 1	2	
MECH 383	Applied Electronics and Instrumentation	3	
MECH 403D1	Thesis (Honours)	3	
MECH 403D2	Thesis (Honours)	3	
MECH 404	Honours Thesis 2	3	
MECH 419	Advanced Mechanics of Systems	3	
MECH 430	Fluid Mechanics 2	3	
MECH 452	Mathematical Methods in Engineering 1	3	
MECH 494	Honours Design Project	3	<b>63</b>

**COMPLEMENTARY COURSES**

2 of the following three courses (6 credits):

MECH 545	Advanced Stress Analysis	
MECH 562	Advanced Fluid Mechanics	
MECH 578	Advanced Thermodynamics	

2 courses (6 credits) at the 300 level or higher to be selected from Mechanical Engineering. For students who entered in September 2000 or later, one of these two courses must be chosen from the following list:

MECH 343	Energy Conversion	
MECH 413	Control Systems	
MECH 432	Aircraft Structures	
MECH 471	Industrial Engineering	
MECH 472	Case Inst(j5)-1911.2(3)]TJ511.3(T)2.6(hesiTc06.3(u)-0-178w71)T5(Ca-04-T49(546)21)*11-Tc0-0047-T278)6-3(1)	

**21**

All courses must be passed at a level C or better.

Students should also discuss the matter with their advisor and complete a special form indicating their intention to take this Concentration.

**4.3 Mining, Metals and Materials Engineering**

**4.3.1 B.Eng. Degree in Materials Engineering – Co-op Program**

Change of program name from B.Eng. Degree in Materials Engineering – Co-op Program; program requirements remain the same.

**4.4 Environmental Engineering Minor**

The Environmental Engineering Minor is offered for students of Engineering and the Department of Bioresource Engineering (formerly Agricultural and Biosystems Engineering) wishing to pursue studies in this area.

The Minor program consists of 21 credits in courses. Up to a maximum of 12 credits of coursework in the student's B.Eng. program may double-count with the Minor.

In the case of Agricultural and Biosystems, Chemical, and Civil Engineering students, courses taken towards the Humanities and Impact course requirements for the Major cannot double-count as Minor program courses.

To complete the Minor in Environmental Engineering, students must obtain a grade of C or better in all approved courses in the Minor; and satisfy the requirements of the Minor and of their departmental program.

The Environmental Engineering Minor Program is administered by the Department of Civil Engineering and Applied Mechanics. Further information may be obtained from Professor S. Ghoshal, Room 475C, Macdonald Engineering Building.

**Note:** Not all courses listed are offered every year. Students should consult with the department concerned about the courses which are offered in a given year.

**Complementary Courses** (21 credits)

**4.2.3 Aeronautical Engineering Concentration (for B.Eng. in Mechanical Engineering, Regular and Honours)**

**Required Courses** (6 credits:

**Engineering Course List (Environmental Engineering Minor)**





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### 6.1.7 Materials Option, Chemistry Honours

#### HONOURS WITH MATERIALS OPTION (77 credits)

##### Required Courses (62 credits)

56 credits, all courses specified above for Honours Chemistry plus the following 6 credits:

CHEM 344 (3) Advanced Materials  
CHEM 455 (3) Introductory Polymer Chemistry

##### Complementary Courses (15 credits)

6 credits of research\*:

CHEM 470 (6) Research Project  
or CHEM 480 (3) Research Project  
and CHEM 490(3) Research Project

6 credits, two of:

CHEM 531 (3) Chemistry of Inorganic Materials  
CHEM 534 (3) Nanoscience and Nanotechnology  
CHEM 543 (3) Chemistry of Pulp and Paper  
CHEM 571 (3) Polymer Synthesis  
CHEM 585 (3) Colloid Chemistry

3 credits, one of:

CHEE 481 (3) Polymer Engineering  
MIME 260 (3) Materials Science and Engineering  
MRKT 360 (3) Marketing of Technology

\* Students may take up to 12 Research Project credits but **only** 6 of these may be used to fulfill the program requirement.

Attainment of the Honours degree requires a CGPA of at least 3.00.

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## 6.2 Cognitive Science

#### MINOR PROGRAM IN COGNITIVE SCIENCE (27 credits)

##### Required Course (3 credits)

PSYC 532 (3) Cognitive Science

##### Complementary Courses (24 credits)

from outside of the student's home department, selected from the courses listed below.

##### *Computer Science*

COMP 424 (3) Topics: Artificial Intelligence 1  
COMP 426 (3) Automated Reasoning  
COMP 558 (3) Fundamentals of Computer Vision

##### *Educational Psychology*

EDPE 555 (3) Applied Cognitive Science

##### *Linguistics*

LING 331 (3) Phonology 1  
LING 355 (3) Language Acquisition 1  
LING 370 (3) Introduction to Semantics  
LING 371 (3) Syntax 1  
LING 419 (3) Linguistic Theory 1  
LING 440 (3) Morphology  
LING 531 (3) Phonology 2  
LING 555 (3) Language Acquisition 2  
LING 571 (3) Syntax 2  
LING 590 (3) Introduction to Neurolinguistics

##### *Mathematics*

MATH 318 (3) Mathematical Logic  
MATH 328 (3) Computability and Mathematical Linguistics

##### *Philosophy*

PHIL 210 (3) Introduction to Deductive Logic 1

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## 6.3 Computer Science

### 6.3.1 Computational Molecular Biology, Minor

**Note:** Because a minimum of 18 new credits must be completed in a Minor in the Faculty of Science (see Section 3.5.3 of the Faculty of Science section of the *Undergraduate Programs Calendar*), students in Computer Science or Joint Computer Science programs cannot take the Minor Program in Computational Molecular Biology.

### 6.3.2 Computer Science, Minor

#### MINOR PROGRAM IN COMPUTER SCIENCE (24 credits)

##### Required Courses (12 credits)

##### Complementary Courses (12 credits)







Note: Courses at the 300 or higher level in other departments in the Faculties of Science and Engineering may also be used as complementary credits, with the permission of the Director of Undergraduate Studies.

### 6.4.3 Earth Sciences, Honours

**HONOURS PROGRAM IN EARTH SCIENCES** (75 credits)  
(CGPA  $\geq$  3.20)

**U1 Required Courses** (27 credits)

EPSC 203	(3)	Structural Geology 1
EPSC 210	(3)	Introductory Mineralogy
EPSC 212	(4)	Introductory Petrology
EPSC 220	(3)	Principles of Geochemistry
EPSC 231	(2)	Field School 1
EPSC 233	(3)	Earth and Life History
EPSC 312	(3)	Spectroscopy of Minerals
MATH 222	(3)	Calculus 3
approved	(3)	statistics course

**Note:** Students who have not had the following course or its equivalent in CEGEP or the Freshman Program may be required to take MATH 133 Vectors, Matrices and Geometry.

**U2 and/or U3 Required Courses** (33 credits)

EPSC 320	(3)	Elementary Earth Physics
EPSC 350	(3)	Tectonics
EPSC 423	(3)	Igneous Petrology
EPSC 445	(3)	Metamorphic Petrology
EPSC 452	(3)	Mineral Deposits 2
EPSC 455	(3)	Sedimentary Geology
EPSC 480D1	(3)	Honours Research Project
EPSC 480D2	(3)	Honours Research Project
EPSC 519	(3)	Isotope Geology
MATH 314	(3)	Advanced Calculus
MATH 315	(3)	Ordinary Differential Equations

**Complementary Courses** (15 credits)

3 credits, one of:

EPSC 331	(3)	Field School 2
EPSC 341	(3)	Field School 3

plus 12 credits (4 courses) chosen from the following:

EPSC 330	(3)	Earthquakes and Earth Structure
EPSC 334	(3)	Invertebrate Paleontology
EPSC 425	(3)	Sediments to Sequences
EPSC 435	(3)	Geophysical Applications
EPSC 451	(3)	Hydrothermal Mineral Deposits
EPSC 501	(3)	Crystal Chemistry
EPSC 530	(3)	Volcanology
EPSC 542	(3)	Chemical Oceanography
EPSC 547	(3)	High Temperature Geochemistry
EPSC 548	(3)	Processes of Igneous Petrology
EPSC 549	(3)	Hydrogeology
EPSC 550	(3)	Selected Topics 1
EPSC 551	(3)	Selected Topics 2
EPSC 552	(3)	Selected Topics 3
EPSC 561	(3)	Ore-forming Processes 1
EPSC 562	(3)	Ore-forming Processes 2
EPSC 570	(3)	Cosmochemistry
EPSC 580	(3)	Aqueous Geochemistry
EPSC 590	(3)	Applied Geochemistry Seminar

Note: Courses at the 300 or higher level in other departments in the Faculties of Science and Engineering may also be used as complementary credits, with the permission of the Director of Undergraduate Studies.

### 6.4.4 Geochemistry, Minor

**MINOR PROGRAM IN GEOCHEMISTRY** (25 credits)

**Required Courses** (10 credits)

EPSC 201	(3)	Understanding Planet Earth
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EPSC 210 (3) Introductory Mineralogy

EPSC 212 (4) Introductory Petrology

**Complementary Courses** (15 credits)

15 credits selected from:

EPSC 220	(3)	Principles of Geochemistry
EPSC 243	(3)	Environmental Geology
EPSC 501	(3)	Crystal Chemistry
EPSC 519	(3)	Isotope Geology
EPSC 542	(3)	Chemical Oceanography
EPSC 545	(3)	Low-Temperature Geochemistry
EPSC 561	(3)	Ore-forming Processes 1
EPSC 562	(3)	Ore-forming Processes 2

### 6.4.5 Planetary Sciences, Honours

**HONOURS PROGRAM IN PLANETARY SCIENCES** (81 credits)  
CGPA  $\geq$  3.20

**U1 Required Courses** (27 credits)

EPSC 203	(3)	Structural Geology
EPSC 210	(3)	Introductory Mineralogy
EPSC 212	(4)	Introductory Petrology
EPSC 220	(3)	Principles of Geochemistry
EPSC 231	(2)	Field School 1
EPSC 233	(3)	Earth and Life History
EPSC 312	(3)	Spectroscopy of Minerals
MATH 222	(3)	Calculus 3
MATH 223	(3)	Linear Algebra

**Note:** Students who have not had the following course or its equivalent in CEGEP or the Freshman Program may be required to take MATH 133 Vectors, Matrices and Geometry.

**U2 and/or U3 Required Courses** (42 credits)

EPSC 320	(3)	Elementary Earth Physics
EPSC 330	(3)	Earthquakes and Earth Structure
EPSC 350	(3)	Tectonics
EPSC 423	(3)	Igneous Petrology
EPSC 480D1	(3)	Honours Research Project
EPSC 480D2	(3)	Honours Research Project

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## 6.5 Physics

### 6.5.1 Electrical Engineering, Minor Program

#### MINOR PROGRAM IN ELECTRICAL ENGINEERING

(23 or 25 credits)

[Program registration done by Student Affairs Office]

The Minor program does not carry professional recognition. Only students who satisfy the requirements of the Major in Physics are eligible for this Minor. Students registered for this option cannot count PHYS 241 towards the requirements of the Major in Physics, and should replace this course by another Physics or Mathematics course. Students who select ECSE 334 in the Minor cannot count PHYS 328 towards the requirements of the Major in Physics, and should replace this course by another Physics or Mathematics course.

**Required Courses** (17 or 19 credits)