

Entrepreneurship

A major in Entrepreneurship is offered within the Bachelor of Commerce. The major is administered by the Department of Management.

In addition to all other requirements for the major, a minimum GPA of 2.2 is required in ACCT 3332, MGMT 2383, MGMT 2384, MGMT 2380, MGMT 3389, MGMT 4487, MGMT 4494, and MGMT 4495 (as indicated below by *).

Year 3

*ACCT 3332 Planning and Control – see Note (i)

FINA 2360 Business Finance I

FINA 3361 Business Finance II

*MGMT 3380 Family Business

*MGMT 3389 Structuring the Start-Up

MGMT 3480 Ethical Responsibilities of Organizations

Six (6) credit hours in non-Commerce electives

Six (6) credit hours in free electives

Year 4

*MGMT 4487 New Venture Opportunities

MGMT 4489 Strategic Management

*MGMT 4494 Entrepreneurship: Theory and Concepts

*MGMT 4495 Small Business Performance Improvement

Six (6) credit hours in non-Commerce electives

Twelve (12) credit hours in free electives

Note: (i) Students cannot receive credit for both ACCT 3332 and ACCT 3333.

Environmental Studies (ENVS)

Executive

Program Coordinator G. Pe-Piper, Geology
Professor T. Charles, Management Science/
Environmental Studies

Associate Professors J. Clyburne, Chemistry/
Environmental Studies
J. Lundholm, Biology/
Environmental Studies
C. Suteanu, Geography/
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Part-Time Faculty R. Richardson, Environmental
Studies

Adjunct Professors D. Walmsley, P. White

Program website:

<http://www.smu.ca/academic/science/envstud>

This program offers a major, honours and minor in Environmental Studies. The program leads to a Bachelor of Science in Environmental Studies and is a rigorous interdisciplinary program combining core sciences with management, social sciences and humanities. Students working toward a Bachelor of Arts or Commerce may also combine a minor in Environmental Studies.

A major or minor in Environmental Studies will provide students with the necessary academic preparation to understand environmental and resource-oriented issues and to prepare them to contribute to an environmentally sound future. Students have the options to declare a major, double major, dual degree, honours, double honours, minor and/or co-op. Graduates of the honours program may be qualified for admission to graduate programs in Environmental

Studies or related subjects, see the *Graduate Academic Calendar* for details.

Students may pursue a cooperative education option. See the Co-operative Education Office for details.

Major in Environmental Studies

Environmental Studies is an interdisciplinary program, drawing upon courses from departments in the Faculty of Science, as well as those in Arts and Commerce. As such, students fulfill the breadth requirements of the Bachelor of Science (regulations 6c and 6e) implicitly within the major requirements. For a major in Environmental Studies, students must complete the following courses. Students are encouraged to follow the recommended sequence in arranging their courses.

Year 1:

- MATH 1210 Intro Calculus I and either
MATH 1211 Intro Calculus II or
MATH 1216 Intro to Mathematical Statistics
or CSCI 1226 Intro to Computing Science and
either CSCI 1227 Intermediate Programming or
CSCI 1228 Accelerated Programming
- CHEM 1210 General Chemistry I
- One of CHEM 1211, 1212 or 1213 General Chemistry II
- BIOL 1201 Molecular and Cell Biology
- BIOL 1202 Organismal and Ecological Biology
- ENVS 1200 Environmental Challenges
- ECON 1201 Principles of Economics: micro
- ENGL 1205 Introduction to Literature

156 Environmental Studies

- GEOG 1200 People, Place and Environment

Year 2:

- BIOL 2308 Biostatistics
or GEOG 3326 Statistical Methods for Geographers
- ENV5 2300 Environmental Science: Populations and Ecosystems
- ENV5 2310 Environmental Science: Energy, Resources and Pollution
- GEOL 1214 Understanding the Earth
- GEOL 1215 The Dynamic Earth
- GEOG 2100 Fundamentals of Physical Geography
- CISO 1225 Intro to Computer Application
- ECON 3363 Environmental Economics
or ECON 3361 Fisheries Economics,
or ECON 3362 Natural Resource Economics
- Six (6) credit hours from Group B

Year 3:

- Nine (9) credit hours from Group A
- Six (6) credit hours from group B
- Nine (9) credit hours from group C
- Three (3) credit hours from the Humanities (Classics, English, History, Philosophy, Religious Studies and Modern Language courses with a focus on literature and culture).
- Three (3) credit hours of electives

Year 4:

- ENV5 4499 Seminar in Environmental Science
- Six (6) credit hours from Group C
- Twelve (12) credit hours from Group C at the 4000 level
- Six (6) credit hours of electives

Group A

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| ENV5 1200 | Environmental Challenges |
| ENV5 2100 | Green Chemistry |
| ENV5 2300 | Environmental Science: Populations & Ecosystems |
| ENV5 2310 | Environmental Science: Energy, Resources & Pollution |
| ENV5 3410 | Environmental Impact Assessment |
| ENV5 3420 | Environmental Monitoring and Auditing |
| ENV5 3430 | Environmental Information Management |
| ENV5 4440 | Environmental Policy |
| ENV5 4450 | Natural Resource Management |
| ENV5 4460 | Methods of Environmental and Natural Resource Analysis |

Group B

Environment related courses:

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| ANTH 4306 | Foraging Adaptation |
| ECON 3361 | Fisheries Economics |
| ENGL 2318 | The Writer and Nature |
| GEOG 1100 | Global Perspectives on Land & Life |
| GEOG 2200 | Fundamentals of Human Geography |
| GEOG 2315 | The Oceans |
| GEOG 3304 | Environmental Management |
| GEOG 3329 | Cultural Ecology |
| GEOG 3454 | Bay of Fundy: Environment and Issues |
| GEOG 4434 | Watershed Management |
| IDST 4470 | Environment and Development |

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| MGMT 3480 | Ethical Responsibilities of Organizations |
| PHIL 2305 | Environmental Ethics |
| POLI 2304.0 | Canadian Politics in the 21 st Century |
| POLI 2305.0 | International Relations |
| POLI 2307 | Provincial Government and Politics |
| POLI 3321 | International Organization |
| POLI 3322 | Global Political Economy |
| POLI 4493 | Global Social Movements |
| PSYC 4414 | Environmental Perception and Cognition |
| PSYC 4418 | Environmental Psychology |
| RELS 2347 | Ecology and Religion |
| RELS 3348 | Religion and Ecological Issues in the Developing World [IDST 3348] |
| SOCI 3391 | Rural Sociology |
| SOCI 4419 | Sociology of the Environment |

Background/Techniques courses:

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| COMM 2293 | Communication |
| COMM 3394 | Oral Communication and Presentation Techniques |
| ECON 1202 | Principles of Economics: Macro |
| ECON 3364 | Cost Benefit Analysis |
| MGMT 3392 | Occupational Health & Safety |
| PHIL 2302 | Ethics |
| PHIL 2318 | Science and Society |
| PHIL 3448 | Philosophy of Science |
| PSYC 1250 | Social Behaviour |
| PSYC 3309 | Human Factors and Performance |
| PSYC 4497 | Community Psychology |
| RELS 3349 | Science & Religion |
| SOCI 3387 | Women & Development [WMST 3387] |

Any language courses, up to six (6) credit hours.

Group C

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| BIOL 2324 | Ecology |
| BIOL 3002 | Insect Ecology |
| BIOL 3303 | Plant Form and Function |
| BIOL 3304 | Animal Form and Function |
| BIOL 3398 | Microbiology |
| BIOL 3421 | Applied Plant Biology |
| BIOL 3424 | Diversity & Ecology of Fishes |
| BIOL 4003 | Molecular Ecology |
| BIOL 4331 | Ecosystems |
| BIOL 4404 | Behavioural Ecology |
| BIOL 4410 | Plant Ecology |
| BIOL 4414 | Environmental Microbiology |
| BIOL 4422 | Conservation Biology |
| BIOL 4430 | Ornithology |
| BIOL 4431 | Herpetology |
| BIOL 4433 | Ecotoxicology |
| BIOL 4448 | Biology Field Course |
| BIOL 4451 | Ecology in the Tropics |
| CHEM 2332 | Introductory Analytical Chemistry: Wet Methods [GEOL 2332] |
| CHEM 2333 | Introductory Analytical Chemistry: Instrumental Methods [GEOL 2333] |
| CHEM 2344 | Organic Chemistry I |
| CHEM 2345 | Organic Chemistry II (note that CHEM 2344 and CHEM 2345 are recommended for CHEM/ENV5 double majors) |
| CHEM 2346 | Organic Chemistry for Life Sciences |
| CHEM 2373 | Environmental Chemistry I |

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| CHEM 2374 | Environmental Chemistry II |
| CHEM 3451 | Introductory Biochemistry |
| CHEM 4452 | Biochemistry: Metabolism |
| ENVS 3310 | Field Course in Environmental Studies |
| ENVS 3410 | Environmental Impact Assessment |
| ENVS 3420 | Environmental Monitoring and Auditing |
| ENVS 4430 | Directed Research |
| ENVS 4440 | Environmental Policy |
| ENVS 4450 | Natural Resource Management |
| ENVS 4460 | Methods of Environmental and Natural Resource Analysis |
| GEOG 2316 | Map and Air Photo Interpretation |
| GEOG 2336 | Principles of Cartography |
| GEOG 3313 | Geomorphology [GEOL 3373] |
| GEOG 3333 | Biogeography |
| GEOG 3343 | Weather & Climate |
| GEOG 3356 | Remote Sensing of the Environment |
| GEOG 3366 | Field Techniques and Research Methods |
| GEOG 3386 | Concepts of Geographical Information Systems |
| GEOG 4413 | Coastal Geomorphology [GEOL 4476] |
| GEOG 4414 | Integrated Coastal Zone Management |
| GEOG 4423 | Glacial Geomorphology [GEOL 4475] |
| GEOG 4433 | Fluvial Geomorphology |
| GEOG 4443 | Natural Hazards |
| GEOG 4496 | Applications in GIS |
| GEOL 1206 | Global Change |
| GEOL 2301 | Mineralogy |
| GEOL 2325 | Sedimentology [GEOG 2325] |
| GEOL 3340 | Surface and Groundwater Hydrology |
| GEOL 3453 | Principles of Geochemistry |
| GEOL 3454 | Applied Geochemistry |
| PHYS 1000 | Physics for Life Sciences I |
| PHYS 1001 | Physics for Life Sciences II |
| PHYS 1100 | University Physics I |
| PHYS 1101 | University Physics II |

Honours or Double Honours in Environmental Studies

For the Bachelor of Science (Honours) degree in Environmental Studies, students must:

- satisfy the requirements for a major in Environmental Studies
- complete ENVS 4599 Honours Research Project
- achieve a degree GPA of at least 3.00

Concentration in Environmental Studies

A 3 year (90 credit hour) Bachelor of Science with a concentration in Environmental Studies is not available.

Minor in Environmental Studies

Students may combine a minor in Environmental Studies with a major in another discipline as part of a Bachelor of Science, Arts or Commerce.

Completion of the minor requires thirty (30) credit hours with a minimum grade of C in the following courses:

- Nine (9) credit hours from:
 - ENVS 1200 Environmental Challenges
 - ENVS 1203 Biology and the Human Environment [BIOL 1203]
 - ENVS 2300 Environmental Science: Populations and Ecosystems
 - ENVS 2310 Environmental Science: Energy, Resources and Pollution

- Nine (9) credit hours from:
 - ENVS 3310 Field Course in Environmental Studies
 - ENVS 3410 Environmental Impact Assessment
 - ENVS 3420 Environmental Monitoring and Auditing
 - ENVS 3430 Environmental Information Management
 - ENVS 4430 Directed Research
 - ENVS 4440 Environmental Policy
 - ENVS 4450 Natural Resource Management
 - ENVS 4460 Methods of Environmental and Natural Resource Analysis
 - ENVS 4499 Seminar in Environmental Science
- Twelve (12) credit hours from:
 - CHEM 2373 Environmental Chemistry I
 - CHEM 2374 Environmental Chemistry II
 - ECON 3363 Environmental Economics
 - ECON 3361 Fisheries Economics
 - ENGL 2318 The Writer and Nature
 - GEOG 2200 Fundamentals of Human Geography
 - GEOG 2315 The Oceans
 - GEOG 3304 Environmental Management
 - GEOG 3454 Bay of Fundy: Environment and Issues
 - GEOG 4414 Integrated Coastal Zone Management
 - GEOG 4433 Fluvial Geomorphology
 - GEOL 1206 Global Change
 - IDST 4470 Environment and Development
 - PHIL 2305 Environmental Ethics
 - PSYC 4414 Environmental Perception and Cognition
 - PSYC 4418 Environmental Psychology
 - RELS 3348 Religion and Ecological Issues in the Developing World
 - SOCI 4419 Sociology of the Environment

Course Descriptions

1200 Environmental Challenges

3 credit hours

This course is an interdisciplinary introduction to environmental studies. It considers scientific methods, the scale and magnitude of environmental variables, societal pathways and impediments to solving environmental problems, and critical thinking about environmental issues. Topics include: hypothesis testing, social and scientific causation, linear and non-linear processes, temporal and spatial scales, feedback cycles, biodegradation and accumulation, and the social and organizational context of environmental activities.

Classes 3 hrs and lab 3 hrs a week.

1203 Biology and the Human Environment (for non-science students) [BIOL 1203]

6 credit hours

The importance of biology in today's world is discussed with particular emphasis on human ecology and the impact of human activity on other living things. This course will not include laboratory work, but rather two lecture hours per week, and discussion sessions averaging one hour per week where demonstrations will sometimes be presented.

Note: This is a natural science course intended for Arts students and may not be used by B. Sc. Students to satisfy

the requirement of a science elective under regulations 3.e., 6.e., 10.c., and 12.b. for B.Sc. degrees.

2100 Green Chemistry [CHEM 2100]

3 credit hours

Prerequisite: six (6) credit hours in CHEM at the 1000 level.

Green chemistry, or environmentally benign chemistry, is the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances. This course will examine the chemical principles and processes in the development of technology and in the effects that this technology has on the environment. The course will avoid traditional approaches that only consider the treatment of pollution after it was created, and will focus on alternative routes that limit the production of waste.

Classes 3 hrs and lab 3 hrs a week.

2300 Environmental Science: Populations & Ecosystems

3 credit hours

Prerequisite: ENVS 1200; BIOL 1202; one university-level chemistry course or permission of the Environmental Studies Program Coordinator.

This course provides a scientific introduction to environmental problems and their solutions. The emphasis is on biological and ecological processes and their importance to global sustainability. Labs include hands on experience sampling local environments, participation on real research projects, and field trips to local environmental industry facilities.

Classes 3 hrs. and lab 3 hrs.

2310 Environmental Science: Energy, Resources and Pollution

3 credit hours

Prerequisites: ENVS 2300.

This course expands the scientific introduction to environmental problems and their solutions to the atmospheric and geophysical realms. Topics include evolving patterns of resource identification, exploration, and consumption, environmental pollution, climate change and their implications for the dynamics of human-environment relations from the local to the global scale. Labs offer a hands-on approach to concrete environmental problems, including the practical evaluation of patterns of environmental change based on real data.

Classes 3 hrs. and lab 3 hrs.

3310 Field Course in Environmental Studies

3 credit hours

Prerequisite: ENVS 1203, or 2300 or 2310

An examination of natural, urban and industrial ecosystems based on integrative study from the biological, geological, geographical, management, social and economic perspectives. Relationships among the physical environment, biota, and human population will be illustrated and discussed. Sampling design and techniques, treatment of data, and interdisciplinary approaches to resource

management will be incorporated in field work, labs, lecture-discussion, and projects.

Presented at Acadia University and in the Halifax Metropolitan Area this course is being offered in cooperation with the B.Sc. Environmental Science Program at Acadia University, Wolfville, Nova Scotia.

Classes 72 hrs, including lab and field work. Normally this course is offered in the spring.

3410 Environmental Impact Assessment

3 credit hours

Prerequisite: ENVS 1203, or ENVS 2300, or 2310.

This course describes the legislative background and techniques for the prediction of impacts on biophysical and socio-economic environments. This course will cover screening, scoping, baseline studies, impact prediction, mitigation, monitoring and auditing.

Classes 3 hrs. and lab 3 hrs..

3420 Environmental Monitoring and Auditing

3 credit hours

Prerequisite: ENVS 1203, or 2300, or 2310 and 45 credit hours.

This course describes the principles and applications of environmental auditing and monitoring. Techniques for environmental audit of facilities, organizations and projects will be covered, together with the design of monitoring programs and techniques for atmospheric, biological, hydrological, and socio-economic monitoring.

Classes 3 hrs. and lab 3 hrs. a week.

3430 Environmental Information Management

3 credit hours

Prerequisites: ENVS 1203, or 2300, or 2310 and 45 credit hours.

This course provides concepts, methods, and practical training with respect to environmental information acquisition, interpretation and processing, and environmental communication. It concentrates on qualitative and quantitative environmental data handling, sign systems detection and interpretation, geographical pattern identification, context-adapted information preparation, graphical representations, and interdisciplinary interactions. Laboratory sessions will include practical patterns evaluation, case simulations, and real-world applications. Students will thus develop information management skills which are required for an effective approach to environmental problems.

Classes 3 hrs., and lab 3 hrs a week

3826 – 3849 Special Topics in Environmental Studies

3 credit hours

Prerequisite: permission of instructor

3876 – 3899 Directed Study in Environmental Studies

3 credit hours

Prerequisite: permission of instructor

4430 Directed Research

3 credit hours

Prerequisite: ENVS 2300 or 2310 or permission of the Environmental Studies Program Coordinator.

Students will pursue a short term research project in such areas as: oceanographic sampling and analysis, policy development or environmental impact assessment. Students must identify an appropriate supervisor; provide a project proposal; and at the end of the project, submit a written report.

Lab 6 hrs. a week.

4440 Environmental Policy

3 credit hours

Prerequisite: ENVS 1203, or ENVS 2300, and 45 credit hours.

This course focuses on environmental and natural resource policy in Canada and the world. Attention is paid to all scales at which policy is developed – local, provincial, national and international. The process of policy making is examined, including aspects of legislation and regulations participatory and stakeholder approaches, and conflict resolution. Interactions between policy, management measures and compliance are explored, including the role of standards and environmental management systems, and the circumstances under which organizations and businesses comply with regulations concerning environmental impacts and natural resource use.

Classes 3 hrs. and lab 3 hrs. a week. 1 semester.

4450 Natural Resource Management [GEOG 4424]

3 credit hours

Prerequisite: ENVS 1203, or 2300, or 2310, or GEOG 3304, and 45 credit hours.

This interdisciplinary course examines the management of natural resource industries such as fisheries, forestry, mining and energy, focusing on interactions between biophysical, ecological, socioeconomic, and technological components. The course will cover such topics as sustainable development and environment-economy interactions in the resource sector; approaches to integrated natural resource development; theoretical and practical aspects of managing resources and resource industries; economics of sustainable resource use; methods for analysing the impacts of resource use.

Classes 3 hrs. and lab 3hrs. a week.

4460 Methods of Environmental and Natural Resource Analysis [GEOG 4444]

3 credit hours

Prerequisites: ENVS 1203, or 2300, or 2310, or GEOG 3304, and one of MATH 1207, or GEOG 3326, or MGSC 2207, or BIOL 2308.

This interdisciplinary course provides a “tool-kit” of methods for planning and evaluation in natural resource and environmental management. Emphasis is placed on methods to assess dynamics of change in biophysical, ecological, socioeconomic, and technological aspects of resource and environmental systems, and for analysing the impacts of management interventions. Topics to be covered include computer-based techniques to acquire and manage information; bio-economic and simulation models; statistical and forecasting methods; economic valuation and ecological economics; sustainability indicators in resource and environmental systems; analysis of real-world case studies. Classes 3 hrs. and lab 3 hrs. a week.

4499 Seminar in Environmental Science

6 credit hours

Prerequisite: ENVS 1203, or 2300 or 2310 and 45 credit hours. Restricted to students in the honours program or permission of the Environmental Studies Program Coordinator.

The course deals with selected topics in environmental science. Specific topics vary depending on current issues, new developments, availability of speakers and the interests of students and instructor.

Seminar 3 hrs. a week.

4599 Honours Research Project

6 credit hours

Prerequisite: Honours standing in Environmental Studies.

Honours students will work with a research advisor who will guide the students in the formulation of research proposals, the methodology to be followed during the course of the research, and in the analysis and write-up of the research findings. The thesis will also be presented orally.

Lab 6 hrs. (minimum) per week.

4826 – 4849 Special Topics in Environmental Studies

3 credit hours

Prerequisite: permission of instructor

4876 - 4899 Directed Studies in Environmental Science

3 credit hours

Prerequisite: restricted to students in the honours program or permission of the Environmental Studies Program Coordinator.

The course provides an opportunity for ENVS honours students to study a particular subject in detail. It requires independence and initiative from the student. It involves discussion of research papers and lab work. This course is intended particularly to meet the special needs and interests of honours students. Major students may be admitted with permission of the Environmental Studies Program Coordinator.

Classes and labs 6 hrs. a week.