Environmental & Resource Science/Studies

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Program Coordinator

S. Hill, BSc, BA (Queen's), PhD, PEng (Calgary)

Associated Faculty

J. Aherne, Environment; **D. Beresford**, Biology, Environment; **S. Bocking**, Environment; **M. C. Eimers**, Environment; **M. G. Fox**, Environment, Biology; **S. E. Franklin**, Environment; **C. Furgal**, Indigenous Studies, Environment; **C. Guéguen**, Chemistry, Environment; **M. Havas**, Environment; **D. G. Holdsworth**, Environment; **B. Hickie**, Environment; **H. Hintelmann**, Chemistry, Environment; **I. Power**, Environment; **C. D. Metcalfe**, Environment; **R. Ponce-Hernandez**, Environment; **S. Rutherford**, Environment; **K. Thompson**, Environment; **D. Wallschläger**, Environment, Chemistry; **S. Watmough**, Environment; **T. Whillans**, Environment

The Trent School of the Environment provides many opportunities to study the environment, with more than 100 courses in all aspects of environmental science and policy. Many of these courses emphasize practical experience, including field work in Trent's network of nature areas and in local communities. Students can choose to pursue an Honours BA in Environmental & Resource Studies or an Honours BSc in Environmental & Resource Science. Students may earn a single-major or joint-major degree with any of more than 20 other University departments or programs that offer Honours degrees. The School also offers an Honours Bachelor of Environmental Science/Studies (BESS). Students earning a degree in another subject may also obtain a minor in Environmental & Resource Science or Studies. These programs offer a high degree of flexibility in course selection, including options for a year abroad, community research placements, and research and training internships within and outside of the University.

Notes

- Science courses, which fulfill University requirements for the BSc, are designated Environmental & Resource Science (ERSC) and marked "Sc"; arts courses are designated Environmental & Resource Studies (ERST).
- Any course involving work with live vertebrate animals requires the Animal Care Course, which is described on p. 20 of the Calendar.
- Students who have taken CHEM 1000H and 1010H and achieved a grade of at least 70% are exempt from the requirement to take ERSC 2220H for the BSc or BESS degrees. This exemption will not, however, alter the minimum number of credits in Environmental & Resource Science/Studies required for the degree.
- Community-based research and Honours thesis courses normally require a minimum cumulative average of 75%.

Bachelor of Arts Program in Environmental & Resource Studies, Bachelor of Science Program in Environmental & Resource Science, and Bachelor of Environmental Science/Studies

- In addition to the program requirements listed below, students must satisfy the University degree requirements (see p. 15).
- The same course may not simultaneously satisfy the requirements of both programs in a joint-major degree.

A Environmental Science	B Resource Management	C Environmental Studies	D Capstone & Experiential
ERSC 2090H	ERSC 2240H	ERST 2100H	ERSC 3220H
ERSC 2220H	ERSC 2300H	ERST 2510H	ERSC/T 3230H
ERSC 2230H	ERSC 2350H	ERST 2525H	ERSC/T 4010Y/4020D
ERSC 2401H	ERSC 2360H	ERST 2601Y	ERST 4140H
ERSC 3002H	ERST 2520H	ERST 3000H	ERSC 4640H
ERSC 3020H	ERSC 2530H	ERST 3110H	ERSC 4703H
ERSC 3370H	ERST 3081H	ERST 3120H	ERST 4704H
ERSC 3450H	ERST 3082H	ERST 3250H	ERST 4705H
ERSC 3510H	ERSC 3160H	ERST 3301H	ERSC/T 4801H
ERSC 3551H	ERSC 3200Y	ERST 3302H	ERSC/T 4802H
ERSC 3560H	ERST 3330H	ERST 3311H	ERSC/T 4830Y
ERSC 3661H	ERSC 3650H	ERST 3312H	ERSC 4850Y/4860H/ 4870H/4880H
ERSC 3701H	ERSC 4240H	ERST 3340H	ERSC/T 4900Y/4901H/4902H
ERSC 3702H		ERST 3501H	ERSC/T 4905Y/4906H
ERSC 3710H		ERST 3502H	
ERSC/T 3730Y		ERST 3602H	
ERSC 4060H		ERST 3603H	
ERSC 4070H		ERST 3720H	
ERSC 4350H		ERST 3780H	
ERSC 4520H		ERST 4250H	
ERSC 4530H		ERST 4610H	
ERSC/T 4740Y		ERST 4670H	
		ERST 4810H	

Bachelor of Arts Program in Environmental & Resource Studies

The single-major Honours program. 20.0 credits including the following 10.0 credits:
- 1.0 ERSC credit consisting of ERSC 1010H and 1020H (or 1000Y)
- 2.5 ERST credits consisting of ERST 2100H, 2510H, 2520H, 2525H, and 3000H
- 0.5 ERSC/T credit from Category A
- 1.0 additional ERSC/T credit from Category B
- 2.0 additional ERST credits from Category C
- 1.0 ERSC/T credit from Category D
- 2.0 ERSC/T credits at the 3000 level or beyond in addition to the above

The joint-major Honours program. 20.0 credits including the following 7.5 credits:
- 1.0 ERSC credit consisting of ERSC 1010H and 1020H (or 1000Y)
- 2.5 ERST credits consisting of ERST 2100H, 2510H, 2520H, 2525H, and 3000H
- 0.5 ERSC/T credit from Category A
- 0.5 additional ERSC/T credit from Category B
- 1.0 additional ERST credit from Category C
- 0.5 ERSC/T credit from Category D
- 1.5 ERSC/T credits at the 3000 level or beyond in addition to the above

The minor in Environmental & Resource Studies consists of the following 5.0 credits:
- 1.0 ERSC credit consisting of ERSC 1010H and 1020H (or 1000Y)
- 2.0 ERST credits consisting of ERST 2100H, 2510H, 2520H, and 2525H
- 0.5 ERSC/T credit from Category A
- 0.5 additional ERSC/T credit from Category B
- 1.0 additional ERST credit from Category C

Bachelor of Science Program in Environmental & Resource Science

The single-major Honours program. 20.0 credits including the following 10.0 credits:
- 3.0 ERSC credits consisting of ERSC 1010H and 1020H (or 1000Y), 2080H, 2220H, 2230H, and 2240H
- 0.5 ERST credit consisting of ERST 3000H
- 2.0 additional ERSC credits from Category A
- 1.0 additional ERSC/T credit from Category B
- 0.5 additional ERST credit from Category C
- 1.0 ERSC/T credit from Category D
- 2.0 ERSC/T credits at the 3000 level or beyond in addition to the above
- 14.0 science credits are required for the Honours degree, including 1.0 MATH credit

The joint-major Honours program. 20.0 credits including the following 7.5 credits:
- 3.0 ERSC credits consisting of ERSC 1010H and 1020H (or 1000Y), 2080H, 2220H, 2230H, and 2240H
- 0.5 ERST credit consisting of ERST 3000H
- 1.0 additional ERSC credit from Category A
- 0.5 additional ERSC/T credit from Category B
- 0.5 additional ERST credit from Category C

– 0.5 ERSC/T credit from Category D
– 1.5 ERSC/T credits at the 3000 level or beyond in addition to the above
– 14.0 science credits are required for the Honours degree, including 1.0 MATH credit

The minor in Environmental & Resource Science consists of the following 5.0 credits:
– 3.0 ERSC credits consisting of ERSC 1010H and 1020H (or 1000Y), 2080H, 2220H, 2230H, and 2240H
– 0.5 additional ERSC credit from Category A
– 0.5 additional ERSC/T credit from Category B
– 1.0 additional ERST credit from Category C

Bachelor of Environmental Science/Studies

- The Bachelor of Environmental Science/Studies is a unique degree program that combines both the arts and sciences in the study of the environment.
- Students applying to this direct-entry program are required to have a minimum admission average of 75%. To graduate from the program, students must obtain a minimum overall combined average of 75% in ERSC 1010H and 1020H.

The single-major Honours program. 20.0 credits including the following 14.0 credits:
– 2.0 ERSC credits consisting of ERSC 1010H and 1020H (or 1000Y), 2080H, and 2220H
– 1.0 ERST credit consisting of ERST 2100H and 3000H
– 0.5 ERSC credit from ERSC 2230H or 2240H
– 0.5 ERST credit from ERST 2510H, 2520H, or 2525H
– 2.0 additional ERSC/T credits from Category A
– 1.0 additional ERSC/T credit from Category B
– 2.0 additional ERST credits from Category C
– 1.0 ERSC/T credit from Category D
– 2.0 ERSC credits at the 3000 level or beyond in addition to the above
– 2.0 ERST credits at the 3000 level or beyond in addition to the above

Please consult the academic timetable for information on courses that will be offered in 2018–2019, including when they will be scheduled.

» **ERSC 1010H: Environmental Science and Sustainability (Sc)**
An interdisciplinary inquiry into the biophysical and social foundations that enable the study of environmental issues, emphasizing the scientific, political, social, economic, and historical dimensions of environmental issues. These dimensions are examined through a series of issues including climate change, air pollution, land and resource use, biodiversity and protected areas, contaminants, and water quality and quantity. Excludes ERSC 1000Y.

» **ERSC 1020H: Cases in Environment and Sustainability (Sc)**
An interdisciplinary exploration of how humans use, affect, and protect the environment. Through in-depth case studies on environmental and/or resource issues, the complex interrelationships between humans and the environment are explored using scientific, social, political, economic, and numerical approaches. Excludes ERSC 1000Y.

» **ERST-CAST-GEOG-INDG 2040Y: Canada: The Land (ICR) (see Canadian Studies)**

» **ERSC-GEOG-BIOL 2080H: Natural Science Statistics (Sc) (see Geography)**

» **ERSC-GEOG 2090H: Introduction to Geographical Information Systems (Sc) (see Geography)**

» **ERST-POST 2100H: Environmental Science and Politics**
The roles of science in current environmental controversies. Topics examine science and environmental ethics, the application of science to natural resource management, the contribution of science to action on international environmental problems such as climate change, and the role of science in making decisions about environmental risks. Prerequisite: 1.0 ERSC or POST credit at the 1000 level.

» **ERSC-IESS-INDG 2150H: Environmental Assessment Techniques for Indigenous Communities (Sc)**
This two-week residential field course is designed to provide students with appropriate Western scientific theory and basic scientific skills to address environmental assessment and natural resource issues frequently encountered by Indigenous communities. Pre- or co-requisite: INDG-ERST 2601Y. Not open to students in a Bachelor of Science program.

» **ERSC 2220H: Environmental Assessment: Chemical and Laboratory Methods (Sc)**
Theory and methods for assessing the impacts of contaminants and related stressors in the environment. Emphasized are environmental chemistry and the nature, mobility, and potential impacts of pollutants. Students who have taken CHEM 1000H and 1010H and achieved a grade of at least 70% are exempt from the requirement to take ERSC 2220H. Prerequisite: ERSC 1010H and 1020H (or 1000Y). Excludes ERSC 2210H.

» **ERSC 2230H: Environmental Assessment: Sampling and Analysis (Sc)**
Theory and application of sampling design, data analysis, and monitoring for environmental assessment of effluent impacts, particularly of industry, municipalities, and agriculture. Prerequisite: ERSC 2220H or both CHEM 1000H and 1010H. Excludes ERSC 2210H.

» **ERSC 2240H: Ecological Assessment for Natural Resource Management (Sc)**
Field survey design, techniques, and theory for the assessment of natural resources, including consideration of watershed and local scales, biotic indices, soils, hydrology, and policy/legal issues. Prerequisite: ERSC 1010H and 1020H (or 1000Y). Excludes ERSC 2210H.

» **ERSC-BIOL 2260H: Introductory Ecology (Sc) (see Biology)**

» **ERSC 2300H: Energy Science and Technology (Sc)**
A discussion of the scientific principles of energy and thermodynamics, and the current and future prospects for energy production, conversion, storage, and transmission. Prerequisite: ERSC 1010H and 1020H (or 1000Y).

» **ERST-GEOG 2320H: Lands and Environments of the Circumpolar North (see Geography)**

» **ERST-GEOG 2330H: Changing Resources of the Circumpolar North (see Geography)**

» **ERSC-SAFS 2350H: Ecological Agriculture (Sc)**
An exploration of the history and scientific basis of agriculture in southern Ontario, and the ecological underpinnings of farming. Nutrient cycling, crop rotation, integrated pest management, and grazing systems are discussed. Traditional, conventional, and intense systems are considered in the context of sustainability. Farm visits are included. Course materials fee: $10. Prerequisite: ERSC 1010H and 1020H (or 1000Y). Recommended: SAFS 1001H, BIOL 1020H, or 1030H. Excludes ERSC-SAFS 3350H.

» **ERSC-SAFS 2360H: Agriculture and Agricultural Alternatives (Sc)**
Focuses on the origins and domestication of crops and livestock, and on the increasingly narrow genetic resources available to modern production systems. Conventional, intensive, and industrial farming systems are considered, as well as alternatives such as organic farming, biodynamics, and the development of niche markets. Farm visits are included. Prerequisite: ERSC 1010H and 1020H (or 1000Y). Recommended: SAFS 1001H; BIOL 1020H or 1030H; and ERSC-SAFS 2350H or 3350H. Excludes ERSC-SAFS 3360H.

» **ERSC-GEOG 2401H: Environmental Geology (Sc) (see Geography)**

» **ERST-GEOG 2510H: Qualitative Methods in Geography and Environmental Studies (see Geography)**

» **ERST-CAST 2520H: Natural Resource Management: Theory and Comparative Cases**
Canadian natural resource management is examined with attention to the context within which management occurs, and the requirement to address different interests, understandings, and issues. Prerequisite: ERSC 1010H and 1020H (or 1000Y).

» **ERST-CAST 2525H: Critical Environmental Thinking: Political Economy and Policy Process**
The context of market theory and ecological/resource economics is used to provide environmental students with experience in critical thinking. Objectives are to understand the framework of political economy, particularly Canadian, that informs contemporary political and economic practice, and to master basic elements of critical research and writing. Prerequisite: ERSC 1010H and 1020H (or 1000Y); or 1.0 PHIL credit; or POST 1001H and 1002H (or 1000Y).

» **ERSC-GEOG 2530H: Water Resources (Sc) (see Geography)**

» **ERST-IESS-INDG 2601Y: Introduction to Indigenous Environmental Studies (ICR) (see Indigenous Studies)**

» **ERSC-CHEM 2610H: Atmospheric Environmental Chemistry (Sc) (see Chemistry)**

» **ERSC-CHEM 2620H: Aquatic Environmental Chemistry (Sc) (see Chemistry)**

» **ERSC-BIOL 2701H: Environmental Education: Biological Issues (Sc)**
The science behind environmental issues that are primarily biological in nature, including biodiversity, habitat loss, invasive species, and toxicity. Intended for prospective educators, natural area interpreters, and environmental communicators. Prerequisite: 5.0 university credits. Excludes ERSC-BIOL 2700Y.

» **ERSC-BIOL 2702H: Environmental Education: Fostering Stewardship and a Sustainable Future (Sc)**
The science behind environmental issues that are primarily physical or chemical in nature, including energy conservation, global warming, and air and water pollution. Intended for prospective educators, nature interpreters, and others interested in working with the public on environmental stewardship and sustainability initiatives. Prerequisite: 5.0 university credits; ERSC-BIOL 2701H highly recommended. Excludes ERSC-BIOL 2700Y.

» **ERST-ENGL 2705H: Literature and the Environment (see English Literature)**

» **ERST 3000H: Environmental Professional Practice**
An exploration of the professional and social aspects of environmental and resource sciences and studies through applied problems and projects. Students are introduced to environmental professionals from government, non-profit organizations, and corporations. Students develop professional leadership skills by working in small groups to address a meaningful environmental problem. Prerequisite: 1.0 credit from ERSC 2220H, 2230H, ERST 2240H, 2510H, 2520H, or 2525H.

» **ERSC-SAFS 3002H: Environmental Implications of Agriculture (Sc) (see Sustainable Agriculture & Food Systems)**

» **ERSC-EGEO-GEOG 3003H: Field Methods in Environmental Geoscience (Sc) (see Environmental Geoscience)**

» **ERSC-GEOG 3010H: Fundamentals of Geographical Information Systems Analysis (Sc)**
Focuses on Geographical Information Systems and analysis in the vector data domain (discrete object representation). It examines the fundamentals of spatial database development and the main analytical operations in vector. Practical application through laboratory exercises with examples from the urban and rural environment is a major component. Prerequisite: ERSC-GEOG-BIOL 2080H and ERSC-GEOG 2090H. Not open to students in the GIS Application Specialist Joint Program with Fleming College.

» **ERSC-GEOG 3020H: Remote Sensing of the Environment (Sc) (see Geography)**

» **ERST-POST 3030H: Green Politics (see Political Studies)**

» **ERST 3081H: Local Waste Management**
Examines ways to address the wastes handled in the municipal waste management system. It includes residential, commercial, institutional, and non-hazardous industrial waste. The philosophy underlying this course is the transformation from a waste management approach to a resource management approach, where "wastes" are seen as "valuable used materials." Prerequisite: 1.0 ERSC or ERST credit at the 2000 level or beyond. Excludes ERST 3080Y.

» **ERST 3082H: Issues in Waste Management**
Examines several major issues in waste management, including extended producer responsibility, radioactive waste, hazardous waste cleanup, agricultural waste management, waste facility siting, waste in developing countries, and waste export and import. Prerequisite: 1.0 ERSC or ERST credit at the 2000 level or beyond. Excludes ERST 3080Y.

» **ERST 3110H: Environmental Impact Assessment: A Case Study Approach**
Environmental impact assessment brings together scientific, economic, social, and political perspectives in an attempt to anticipate and manage environmental impacts. This course examines different approaches to environmental assessment, contrasting federal with provincial and social with biophysical. Prerequisite: 9.0 university credits including 1.0 ERSC or ERST credit at the 2000 level or beyond.

» **ERST-CAST-POST 3120H: Canadian Environmental Policy**
An interdisciplinary inquiry into how environmental policies in Canada are developed, implemented, and improved, applying political, economic, legal, scientific, Indigenous, and moral perspectives. Focus is on federal, provincial, and municipal contexts, recognizing that the environment does not respect jurisdictions. Topics include energy and materials use, biodiversity, toxic substances, waste management, and land use. Prerequisite: 1.0 ERST, CAST, POST, or ADMN credit at the 2000 level or beyond. Excludes ERST-CAST-POST 3100Y.

» **ERST-CAST-WMST 3141H: Gender, Health, and Environments (see Gender & Women's Studies)**

» **ERSC 3160H: Community-Based Natural Resource Management (Sc)**
Examines critically and constructively community-based management of natural resources. Explores the topic of self-regulation and co-management by resource interest groups, drawing on cases from fisheries, forestry, wildlife, and integrated sectors. Traditional and developmental approaches are contrasted. Prerequisite: 1.0 ERSC or ERST credit at the 2000 level or beyond.

» **ERSC-ANTH-GEOG 3175H: The Archaeology of Natural Disasters (Sc) (see Anthropology)**
Students majoring in Environmental & Resource Studies/Science may only take one of ERSC-ANTH-GEOG 3175H or 3185H as an ERSC credit.

» **ERSC-ANTH-GEOG 3185H: The Archaeology of Climate Change (Sc) (see Anthropology)**
Students majoring in Environmental & Resource Studies/Science may only take one of ERSC-ANTH-GEOG 3175H or 3185H as an ERSC credit.

» **ERSC 3200Y: Management of Forest Ecosystems (Sc)**
Offers an appreciation of the problems in managing forest ecosystems. Looks at the ecological processes which create and maintain forests and at how foresters attempt to manage them, and the environmental consequences of forestry practices; then examines case studies drawn from Ontario and other parts of the world. Prerequisite: ERSC-BIOL 2260H or ERSC 2210H or 2240H.

» **ERSC 3220H: Community Engaged Lacustrine Shoreline Assessment and Monitoring (Sc)**
A field course covering approaches and methods for the assessment of lacustrine shorelines in collaboration with property owners. Prerequisite: BIOL-ERSC 2260H or ERSC 2240H or permission of instructor.

» **ERSC/ERST-IDST 3230H: Environmental Problems and Solutions in Small Island Developing States: A Field Course (Sc)**
Barbados, like many islands in the West Indies, is facing a variety of challenges, such as overfishing, pollution, and loss of coral reefs and other habitats. This course, which has a one-week field component and an online component, introduces students to the challenges faced by Barbados and other islands, as well as potential solutions. The default credit for the course is ERSC, but students may take the course as an ERST credit provided this request is made to the instructor prior to the start of the course. Students pay a course fee in addition to travel costs. Prerequisite: ERSC 2230H (2210H) or ERST-CAST 2520H or IDST 2000Y, or permission of the instructor.

» **ERST 3250H: Introduction to Environmental Law**
A comprehensive overview of environmental law in Canada, examining the key environmental laws and policies at the provincial, federal, and international levels. Prerequisite: 9.0 university credits including ERSC 1010H and 1020H (or 1000Y).

» **ERST-PHIL 3301H: Environmental Ethics**
Provides a consideration of the moral dimensions of human/nonhuman relationships. We critically examine a range of systems of thought that address such ethical questions, including deep ecology, ecofeminism, Indigenous perspectives, and animal rights, with specific cases on each philosophical orientation. Deals explicitly with the ethical dimensions of ecological restoration. Prerequisite: 1.0 ERST or PHIL credit at the 2000 level or beyond. Excludes ERST 3300Y.

» **ERST-PHIL-SAFS 3302H: Animals and Society**
Provides an introduction to animal studies. Topics considered include the constructed divide between humans and non-human animals, societies' use of animals—for food, clothing, entertainment, companionship, research—and the implications of these relationships. The course also discusses animal rights, animal protection, and posthumanist perspectives. Prerequisite: 1.0 ERST or PHIL credit at the 2000 level or beyond. Excludes ERST 3300Y.

» **ERST 3311H: Environmental Risk and the Risk Society**
Examines social and cultural aspects of risk, with attention as well to the techniques of risk analysis. Themes discussed include the rise of industrial risk assessment, the relations between risk assessment and social and environmental impact assessment, and risk assessment science as professional practice. Prerequisite: 9.0 university credits including 0.5 ERSC or ERST credit at the 2000 level or beyond. Excludes ERSC/ERST 3310Y.

» **ERST 3312H: Ecological Risk Assessment**
Examines the recent development of ecological risk assessment and its relationship to political ecology, complexity, and communication. A variety of cultural and social themes are considered, including critical ecological theory, ecological restoration as professional practice, and the implications for political ethics. Prerequisite: 9.0 university credits including 0.5 ERSC or ERST credit at the 2000 level or beyond. Excludes ERSC/ERST 3310Y.

» **ERST-CAST-GEOG 3330H: Wilderness Resources (see Geography)**

» **ERSC-ANTH 3333H: Ecological Anthropology (Sc) (see Anthropology)**

- **ERST-CAST-SAFS 3340H: The Canadian Food System: Community Perspectives and Experiences (see Sustainable Agriculture & Food Systems)**
- **ERSC-BIOL-SAFS 3370H: Organic Agriculture: Principles and Practices (Sc) (see Sustainable Agriculture & Food Systems)**
- **ERSC-BIOL 3380H: Advanced Ecology (Sc) (see Biology)**
- **ERST-GEOG 3390H: Contemporary Issues of the Circumpolar World (see Geography)**
- **ERSC-CHEM-FRSC 3400H: Chromatography (Sc) (see Chemistry)**
- **ERSC-CHEM-FRSC 3410H: Methods of Spectral Analysis (Sc) (see Chemistry)**
- **ERSC 3450H: Environmental Air Pollution (Sc)**
  The sources, distribution, and impacts of atmospheric pollution in urban and rural environments are discussed. Explores atmospheric monitoring, back-trajectory analysis, trends, and meteorology in assessing atmospheric pollution. Emphasis is on using Canadian monitoring data to investigate environmental air pollution. Prerequisite: ERSC 2230H or both CHEM 1000H and 1010H.
- **ERST 3501H: Environment and Communication: Oral and Visual Presentation**
  Intended to develop skills for the oral and visual presentation of scientific information to interdisciplinary non-expert audiences. Students work with real scientific data to design and present the findings. Prerequisite: 9.0 university credits including ERSC 1010H and 1020H (or 1000Y) and 1.0 additional science credit.
- **ERST 3502H: Environment and Communication: Writing and Reporting**
  Develops skills for plain-language communication of environmental science to non-scientific audiences (general public, community groups, decision-makers, media, and interdisciplinary workplace groups). Public science literacy, evolving media, and new communications technologies are examined. Written assignments in popular formats are emphasized. Prerequisite: 9.0 university credits including ERSC 1010H and 1020H (or 1000Y) and 1.0 additional science credit.
- **ERSC 3510H: Ecology and Management of Wetland Systems (Sc)**
  Involves intensive first-hand study of wetland ecosystems in natural and culturally degraded states. Wetlands occur at the interface of terrestrial and aquatic ecosystems. Wetland management thus requires understanding of overlapping ecological processes and management practices common to most of Canada. Field trip fee: $30. Prerequisite: ERSC-BIOL 2260H or ERSC 2240H or 2210H or both ERST-CAST 2520H and 2525H.
- **ERSC 3551H: Pollution Ecology (Sc)**
  The ecological and human health effects of environmental contaminants are examined as they relate to water, air, and soil pollution. Emphasis is on science but social issues are also addressed. Knowledge of biology and chemistry is useful. Prerequisite: One of ERSC 2210H, 2230H, 2240H, or ERSC-BIOL 2260H. Excludes ERSC 3550Y, 3570H, 3580H.
- **ERSC-GEOG-SAFS 3560H: Soil Science (Sc) (see Geography)**
- **ERSC-CHEM 3600H: Aqueous Environmental Geochemistry (Sc) (see Chemistry)**
- **ERST-IDST-POST-SAFS 3602H: Environment and Development**
  Examines environmental issues and conflicts in developing countries, applying a critical political ecology perspective to a range of current topics, including oil production, biodiversity conservation, and resource conflicts. There is also a special focus on agriculture and food systems. Prerequisite: IDST 2000Y or ERST-POST 2100H or ERST-CAST 2520H or POST 2200Y. Excludes ERST-IDST-POST 3601Y.

» **ERST-IDST-POST 3603H: Environmental Justice**
Examines the dimensions and implications of the unequal global distribution of environmental benefits and harms, including its relation to colonial and post-colonial economic exploitation, and responses by scholars and activists. A range of cases are considered, including resource extraction, toxic materials, and climate change. Prerequisite: IDST 2000Y or ERST-POST 2100H or ERST-CAST 2520H or POST 2200Y. Excludes ERST-IDST-POST 3601Y.

» **ERSC-CHEM 3610H: Ocean and River Chemistry (Sc) (see Chemistry)**

» **ERST-IESS-INDG 3631H: Issues in Indigenous Environmental Studies (see Indigenous Studies)**

» **ERST-IESS-INDG 3632H: Global Issues in Indigenous Environmental Studies (see Indigenous Studies)**

» **ERST-IESS-INDG-SAFS 3634H: Introduction to Indigenous Food Systems (see Indigenous Studies)**

» **ERSC-GEOG-SAFS 3650H: Soil Management and Conservation (Sc)**
Soils represent one of the most important natural resources from the point of view of sustainable agriculture and forestry, and protection of habitat. This course explores the scientific basis and management options for conservation of soil resources. Prerequisite: ERSC 2210H or ERSC 2240H or GEOG 2400Y or GEOG 2401H or GEOG 3520H or both GEOG 2540H and 2560H. Recommended: ERSC-GEOG-SAFS 3560H.

» **ERSC 3661H: Biological Effects of Electromagnetic Fields (BEEF) (Sc)**
Deals with the biological effects of electromagnetic fields ranging in frequency from static to radio frequency radiation generated by technology (technofields), by the earth and sun (geofields), and by other living organisms (biofields). Students conduct major research in an area of their choice. Prerequisite: 9.0 university credits including ERSC 1010H and 1020H (or 1000Y). Recommended: PHYS 1002H (or 1000Y). Excludes ERSC 3660Y.

» **ERSC-ANTH 3680H: Environmental Archaeology (Sc) (see Anthropology)**

» **ERSC 3701H: Introduction to Environmental Toxicology and Chemistry (Sc)**
Introduces students to the chemical, physical, and toxicological properties of organic and inorganic toxicants in aquatic and terrestrial environments. Students are also introduced to the principles of contaminant modelling as tools for predicting the fate and toxic effects of contaminants in the environment. Prerequisite: BIOL 1020H and 1030H; and ERSC 2230H or 2210H or 1.0 CHEM credit at the 1000 level. Excludes ERSC 3700Y, 3750H.

» **ERSC 3702H: Chemical Hazards in the Environment (Sc)**
Focuses on examining the impacts of chemical contaminants on human health, as well as the effects of exposure to contaminants on organisms and ecosystems. The course is organized into a case history format. Students are also introduced to the principles of ecological risk assessment. Prerequisite: ERSC 3701H. Excludes ERSC 3700Y, 3750H.

» **ERSC-PSYC 3710H: Environmental Health (Sc)**
Examines environmental risk factors that affect human health and well-being, including diet and lifestyle, water and food security, exposure to chemicals, climate change, and the relationship between human and environmental health. Some principles of epidemiology are covered. Current topics in environmental health are examined in tutorial sessions. Prerequisite: ERSC 1010H and 1020H (or 1000Y); and one of ERSC 2230H or ERSC-INDG 2150H or ERST-INDG 2601Y or ERSC-BIOL 2701H (or 2700Y).

» **ERST-CAST-GEOG 3720H: Urban Environments (see Geography)**

» **ERSC/ERST-IESS-INDG 3730Y: Indigenous Peoples, Health, and the Environment**
Provides an introduction to the multidisciplinary field of environmental health and its application to understanding health among Indigenous peoples. Students gain an understanding of the concepts, theories, and methods used in environmental health, and apply this knowledge to the investigation of the changing health status of Indigenous populations. This course may be taken as a science credit by successfully undertaking an appropriate technical assignment. Prerequisite: One of ERSC 2240H or ERST-INDG 2601Y or ERSC-INDG 2150H; or NURS 1000H, 1002H, and 1010H.

» **ERST-INDG 3740H: Circumpolar Peoples, Health, and The Environment**
Introduces students to the multidisciplinary subject area of circumpolar health with an emphasis on environment and its changing nature as a determinant of health for Indigenous and non-Indigenous residents of the North. Prerequisite: GEOG 1045H and INDG 3745H or permission of the instructor.

» **ERST-HIST 3756H: The Environmental Crisis: From the Atomic Bomb to Global Warming (see History)**

» **ERST-CAST 3780H: Canadian Renewable Resource Economics and Project Planning**
Introduces students to the economic theory of renewable resources in the Canadian social, political, and regulatory context, and also to professional project planning and management. Students are introduced to project components such as scoping, scheduling, budgeting, communications, team and risk management, and environmental sustainability. Prerequisite: 1.0 ERST or CAST credit at the 2000 level or beyond.

» **ERST-ANTH-IDST-SAFS 3800D: Community Development (see International Development Studies)**

» **ERSC-ECON 3810H: Environmental Economics (Sc) (see Economics)**

» **ERSC 3850Y, 3860H, 3870H, 3880H: Field Course (Sc)**
Spring and summer courses are offered through the Ontario Universities Program in Field Biology. Prerequisite: A minimum cumulative average of 60%.

» **ERSC/ERST 3900Y, 3901H, 3902H: Reading Course**
A research course on a specific topic. Only open to Environmental & Resource Science/Studies majors or joint-majors. Prerequisite: 9.0 university credits and a minimum average of 75% in ERSC/ERST courses. Written permission must be obtained from the appropriate instructor and the chair of the program before registration.

» **ERSC/ERST 3905Y, 3906H: Field Course Research Project**
An opportunity for students to take a non-university credit field course offered by an external provider, then return to Trent and for credit write one or more reports on research that they undertook during the field course. Prerequisite: 9.0 university credits and a minimum average of 75% in ERSC/ERST courses; or permission of the chair.

» **ERSC/ERST 4010Y/4020D: Thesis**
Design, implementation, and dissemination of a major research project in environmental science or studies featuring independent work under the supervision of a faculty supervisor. ERSC/ERST 4020D is a double credit in ERSC/ERST. ERSC/ERST 4010Y is a single credit because the same thesis is submitted to the other program in a joint-major. Prerequisite: 14.0 university credits and a minimum average of 75% in ERSC/ERST courses. Students must find a faculty member who is agreeable to supervise their project. Applications are available from the TSE office, and should be submitted in the academic year before enrolment in the course.

» **ERSC-BIOL 4030H: Research Design and Data Analysis (Sc) (see Biology)**

» **ERSC-GEOG 4040H: Hydrochemical Fluxes in the Hydrosphere (Sc) (see Geography)**

» **ERSC-BIOL-GEOG 4060H: The Geochemistry of Natural Waters (Sc)**
Examines the chemistry of freshwater systems. Chemical and physical processes that lead to changes in water quality are discussed. The emphasis is on the concentrations and distributions of contaminants. Topics include watershed contributions of chemicals, acidification and the carbonate system, weathering, redox chemistry, trace metals, and synthetic organic contaminants. Prerequisite: ERSC 2230H or ERSC-CHEM 2620H (or 2600Y).

» **ERSC-BIOL-GEOG 4070H: The Fate of Contaminants in the Aquatic Environment (Sc)**
Discusses approaches to predicting the fate of contaminants in aquatic systems. Basic assumptions and algorithms of fate models for toxic metals and organic xenobiotics are examined and students get hands-on experience in applying recent models to case studies. Prerequisite: ERSC-GEOG-BIOL 4060H.

» **ERST-GEOG 4140H: Climate and Energy Policy**
An interdisciplinary inquiry into social, political, institutional, and technical change as it relates to climate and energy policy. Themes for inquiry include policy and technology innovation and low-carbon energy transitions. Efforts are made to translate theory into practical action and intervention through community-based study. Prerequisite: One of GEOG 2460H, ERSC 2300H, ERST 2100H, 3120H, or 3250H. Excludes ERST 3130H, 4130H.

» **ERSC-AHCL-ANTH 4180H: Collapse of Complex Societies (Sc) (see Anthropology)**

» **ERSC-AHCL-ANTH 4185H: Human Impact on Ancient Environments (Sc) (see Anthropology)**

» **ERSC-BIOL 4240H: Fisheries Assessment and Management (Sc)**
Principles and practices of fisheries assessment and management, including an examination of management problems in freshwater and marine fisheries from ecological, socio-economic, and policy perspectives. Topics include stock assessment techniques, stocking and fertilization, management of warmwater and coldwater species, and local management initiatives. Prerequisite: 10.0 university credits including one of ERSC-BIOL 2260H or ERSC 2210H or 2240H. Recommended: One of ERSC 3510H or BIOL 3050H or 3140H. Students who have successfully completed ERST-CAST 2520H and 2525H may take the course, but must be prepared to do additional background reading.

» **ERST 4250H: Environmental Law and Regulation**
Provides students with a practical and detailed examination of the enactment, enforcement, and limitations of environmental law and policy. The course emphasizes Ontario's environmental regime and focuses on a recent case study. Prerequisite: 10.0 university credits including ERST 3250H or permission of instructor.

» **ERSC-BIOL-GEOG-SAFS 4270H: Integrated Nutrient Management for Sustainable Agriculture (Sc) (see Sustainable Agriculture & Food Systems)**

» **ERSC-BIOL 4330H: Global Change of Aquatic Ecosystems (Sc) (see Biology)**

» **ERSC 4350H: Climatic Change (Sc)**
Examines the meteorological principles, measurements, and models that are the basis of current understanding of climatic change. It addresses, in particular, the biological impacts of climatic changes and the ways in which these biological changes might affect human resources and the process of climatic change itself. Prerequisite: 10.0 university credits including ERSC 1010H and 1020H (or 1000Y); or GEOG 1040H; or PHYS 1002H (or 1000Y); or BIOL 1020H and 1030H.

» **ERSC-BIOL 4390H: Conservation Biology (Sc) (see Biology)**

» **ERSC-CHEM 4410H: Fundamentals and Applications of ICP-MS (Sc) (see Chemistry)**

» **ERSC-GEOG 4450H: Spatial Modelling with GIS (Sc) (see Geography)**

» **ERSC 4520H: Restoration Ecology (Sc)**
The science of restoring and rehabilitating ecosystems. Principles, applications, and practical case studies are covered. No regular field or laboratory work is scheduled but some required field site visits are planned. Field trip fee: $20. Prerequisite: 10.0 university credits including ERSC-BIOL 2260H or ERSC 2240H or 2210H or both ERST-CAST 2520H and 2525H.

» **ERSC 4530H: Remediation and Reclamation of Sites (Sc)**
Examines conventional and emerging techniques used to reclaim and remediate degraded sites. Canadian cases are used to illustrate the relationship between principles of science, management, and policy. Prerequisite: 10.0 university credits including two of ERSC 2230H, 2240H, ERST-CAST 2520H, ERSC-BIOL 2260H.

» **ERST-IDST-POST-SAFS 4610H: Global Environmental Policy**
Focuses on perspectives, actors, institutions, and economic relationships as they relate to global environmental policy and instruments. The aim is to provide students with a solid understanding of linkages between the global political system and the natural environment. Prerequisite: 10.0 university credits. Recommended: One of ERST-IDST-POST 3602H or 3603H (or 3601Y) or POST 2200Y.

» **ERST-IESS-INDG 4630H: Indigenous Environmental Research Protocol and Ethics (See Indigenous Studies)**

» **ERSC-GEOG 4640H: Integrated Watershed Management: Approaches and Methods (Sc)**
Integrated ecosystems management is the focus of this course. It deals, first, with the methodological and practical aspects of watershed assessment, planning, decision-making, and management. Then, it examines comparatively the management of watersheds in the developing world, introducing students to strategies for planning and managing watersheds through case studies. Prerequisite: 10.0 university credits including ERSC 2210H or 2240H or ERSC-BIOL 2260H or both ERST-CAST 2520H and 2525H or GEOG 2540H and one of 2560H or 3520H.

» **ERST-CAST-HIST 4670H: Environmental History**
Examines how and why our environment and our relationship with it have changed over time. Topics include how to do environmental history, shifts in ideas about natural resources and wilderness, the history of the Trent and Peterborough environments, the urban environment (particularly Toronto), and the history of environmental science and environmental politics. Prerequisite: 10.0 university credits.

» **ERSC-GEOG-WASC 4703H: Senior Seminar in Earth and Environmental Science (Sc)**
Students examine the fundamental concepts of scientific research, including the role of research in managing environmental issues. A range of topics will be covered through guest seminars, group discussions, and an individual research project. In the project, students evaluate the scientific literature on an emerging environmental issue of their choosing. Prerequisite: Two 3000-level ERSC or GEOG courses and a minimum average of 75% in ERSC/ERST courses or GEOG courses. Excludes ERSC 4702Y.

» **ERST-POST 4704H: Senior Seminar in Environmental Politics**
Advanced topics in the cultural, political, and social evaluation of environmental issues and problems. Each year a specific theme is covered, such as environmental professional practice, the normal and the pathological in ecology, or environmental sociology. Core topics include environmental standards, political ecology, and complex systems theory. Prerequisite: ERSC 1010H and 1020H (or 1000Y), 1.0 3000-level POST credit, and a minimum average of 75% in ERSC/ERST courses. Recommended: ERSC/ERST 3311H and 3312H (3310Y). Excludes ERST 4701Y.

» **ERST-PHIL 4705H: Environmental Aesthetics and the Environmental Imagination**
This senior seminar in environmental philosophy examines the theme of environmental imagination. Topics include the use of artistic expression in environmental representation, environmental aesthetics, the theory of the environmental sublime, romanticism, and transcendental nature philosophy. Prerequisite: A minimum average of 75% in ERSC/ERST courses and one of ERST-PHIL 3301H or 3302H (or 3300Y) or 1.0 3000-level PHIL credit. Excludes ERST-PHIL 4700Y.

» **ERST-IESS-INDG 4730Y: Sustainable Indigenous Communities (see Indigenous Studies)**

» **ERSC/ERST-IESS-INDG-NURS 4740Y: Critical Investigations in Indigenous Peoples' Health and the Environment (see Indigenous Studies)**

» **ERSC/ERST 4801H: Greening the Campus: Restoring and Sustaining Green Infrastructure**
Institutional approaches to sustaining the natural, naturalized, and cultivated environment and their uses at Trent University are investigated through applied field research projects and comparative experience in the literature. Prerequisite: 10.0 university credits including ERSC 2240H or ERST-GEOG 2510H, and a minimum average of 75% in ERSC/ERST courses, or permission of the instructor. Excludes ERSC/ERST 4800Y.

» **ERST/ERSC 4802H: Greening the Campus: Reimagining Use of the Built Environment**
Institutional approaches to sustaining the Trent University environment through management of the human-built abiotic features and their uses. Prerequisite: 10.0 university credits including ERSC 2240H or ERST-GEOG 2510H, and a minimum average of 75% in ERSC/ERST courses, or permission of the instructor. Excludes ERSC/ERST 4800Y.

» **ERST 4810H: Ecological Design**
Explores design process and ecological design principles related to human use of the land and sustainability. Lectures include design theory and communication, storm-water management, stream bio-engineering, developing site analysis skills for design, green buildings, and urban design strategies. Students apply lecture knowledge to a term-long project. Prerequisite: 10.0 university credits including one of ERSC 2240H, ERST-CAST 2520H, 2525H, ERSC-BIOL 2260H.

» **ERSC/ERST 4830Y: Community-Based Research Project**
Students are placed in research projects with community organizations in the Peterborough or Haliburton area. Each placement is supervised jointly by a faculty member and a representative of a community organization. Prerequisite: 14.0 university credits and a minimum cumulative average of 75%. For details see Community-Based Research Program (p. 406).

» **ERSC 4850Y, 4860H, 4870H, 4880H: Field Course (Sc)**
Spring and summer courses are offered through the Ontario Universities Program in Field Biology. Students wishing to count OUPFB field courses as capstone courses require permission of program chair. Prerequisite: A minimum cumulative average of 60%.

» **ERSC/ERST 4900Y, 4901H, 4902H: Reading Course**
This is a research course on a specific topic. Only open to Environmental & Resource Science/Studies majors or joint-majors in the program. Prerequisite: 14.0 university credits and a minimum average of 75% in ERSC/ERST courses. Written permission must be obtained from the appropriate instructor and chair of the program before registration.

» **ERSC/ERST 4905Y, 4906H: Field Course Research Project**
This course is an opportunity for students to take a non-university credit field course offered by an external provider, then return to Trent and for credit write one or more reports on research that they undertook during the field course. Prerequisite: 14.0 university credits and a minimum average of 75% in ERSC/ERST courses; or permission of the chair.

» **ERST-WMST 4990H: Gender and Environmental Justice (see Gender & Women's Studies)**