

Master's in Environment & Sustainability Degree (course based)

The Master's in Environment and Sustainability program creates graduates that can work on interdisciplinary teams and who can take leadership in solving the challenges posed by societal changes related to the environment and ecological demands. The program is designed to focus and develop the intellectual and practical skills for the application and advancement of environmental sciences and sustainability in scientific, business, industrial and policy sectors. The program is designed for students who have sufficient formal education at the undergraduate and possibly graduate level and/or work experience. With this depth of knowledge, students in the program seek to better understand the interdisciplinary and complex nature of environmental programs through course work, professional development workshops, and job skills. A consulting program will challenge students with the complex nature of a specific project on the environment or sustainability – from inception through analysis, documentation, and presentation. In the final (summer) term, a cooperative education (co-op) placement provides a first-hand opportunity at learning on the job.

Course Requirements (total of 7.5 course credits):

Foundations of Sustainability

EnvrSust 9011: Foundations of Sustainability (1.0 course credit)

Pillars of Environment & Sustainability

EnvrSust 9012: Planning and Management (0.5 course credit)

EnvrSust 9013: Sustainable Business Practices (0.5 course credit)

EnvrSust 9014: Ecosystem Health (0.5 course credit)

EnvrSust 9015: Engineering Solutions (0.5 course credit)

Critical Skills of an Environmental Professional

Inter-Active Seminars:

Express Yourself!

Introduce Yourself in Professional Settings!

Write for Professional Audiences!

Complete Life Cycle Assessments!

Professional Development Workshops:

EnvrSust 9101: Understanding Leadership (0.25 course credit)

EnvrSust 9102: Understanding Project Team Management (0.25 course credit)

EnvrSust 9103: Legislation and Certification Systems (0.25 course credit)

EnvrSust 9104: Measuring Change in the Environment and Sustainability (0.25 course credit)

Consulting Project (1.0 course credit)

EnvrSust 9200: Consulting Project

Cooperative Education Experience (2.5 course credit)

EnvrSust 9300: Cooperative Education Experience (Co-op)

Foundations of Sustainability

EnvrSust 9011 (Master's) and EnvrSust 9111 (PhD) (1.0 course credit)

Foundations of Sustainability

Dr. Tima Bansal and Dr. Charles Trick

This is a seminar based course that will meet once weekly over both semesters. Each week a new view on sustainability will be presented and class discussion will be moderated by an authority on the topic. Students will be assigned readings, which must be completed prior to class. There are three components to the course grade. The first is a weekly reflection paper: a one page written document analyzing the assigned readings. The objectives of the reflection papers are to help guide class discussion, develop students' writing and analysis skills, and ensure good preparedness for class. The second is the contributions students make to the collective learning of the class. As a result, attendance and participation are mandatory. If a student misses more than two classes, s/he will fail the course. The third component is a creative video on distinct issues of sustainability. This will be created during the winter term – for “opening night” presentations in March.

Course objectives:

- to understand the meaning of sustainability from different disciplinary lenses;
- to identify the key issues and questions which are raised within the different disciplines; and
- to gain insight into the ways in which these issues and questions are approached.

Four Pillars of Environment and Sustainability

EnvrSust 9012 (0.5 credit) **Planning and Management** **Dr. Dan Shrubsole**

This course considers the concept and practice of sustainability in the context of environment and resource management. After an introduction to resources, resource management and the legal framework in Canada, the course pays particular attention to different forms of planning and techniques used in environment and resource management, such as benefit-cost analysis and impact assessment. Some time of the course will be devoted to the role of bargaining in resource and environmental management. Particular approaches as to how we address the change, uncertainty, complexity and conflict (associated with many types of environmental issues) are explored. Student projects on a variety of case studies will provide further insight into the practice of planning and management.

Course objectives:

- to introduce students to the change, complexity, uncertainty and conflict associated with a variety of resources and environmental issues;
- to encourage critical thinking about the nature and solutions to current problems;
- to consider how planning can contribute to solving problems; and
- to understand the theory and practice of selected approaches to resource and environmental management.

EnvrSust 9013 (0.5 credit) **Sustainable Business Practices** **Mr. Tom Ewart**

This course builds on the foundations of sustainability concepts to consider the combination of environmental, social, and economic issues from a management perspective. As these are difficult challenges, students will not be presented with either easy questions or simple answers. Exploring these issues tends to generate active and heated scientific, social, and economic debate..

This course is designed to foster in-depth discussion and equip students with the concepts and tools to develop an interesting, insightful project that explores sustainable development into practice. The course will examine one firm in detail during each weekly session, supplemented with other readings or activities. There will be group presentations in mid-December.

By the end of this course, you should have gained tools, skills, and intuition that will enable you to:

- characterize the drivers of current social and environmental issues in business;
- integrate financial, social and environmental performance within a general business model; and
- formulate effective approaches to make progress toward improving the triple bottom line.

EnvrSust 9014 (0.5 credit)
Ecosystem Health

Sustainable development and environmental sciences deal directly with the environmental determinants of health. Projects, contacts, or initiatives undertaken by MES practitioners will likely start with an assessment of the general health of an ecosystem or a population and then be required to maintain or remediate the situation back to the unperturbed, balanced natural state. Thus you are making judgments on the “health” of an ecosystem or population. In “Ecosystem Health” we will explore the theory and practice of measuring and implementing projects that deal with the interrelationships between humans and all aspects of their environment, including disease, health and well being. In this context, the health of all parts and individual species of the ecosystem is important, particularly where illness is due to exposures to pollutant chemicals or biological agents in the environment.

By the end of this course you should be able to:

- review and critique modern determinants of health, with an emphasis on problems that lead to human illness or community health issues;
- create an assessment of the wellness and sustainability of specific environmental projects;
- actuate the concept of community research partnerships into research projects on the environment and sustainability; and
- implement a multi-disciplinary or trans-disciplinary approach to the study of complex environmental problems associated with community or human health issues.

EnvrSust 9015 (0.5 credit)
Engineering Solutions
Dr. Argyrios Margaritis

This course aims to provide students with an understanding of the basic fundamentals of environmental science and engineering and their synergistic role for the maintenance of a healthy and sustainable environment. Several case studies will be studied and analyzed, including carbon dioxide emissions, global warming, air and water pollution control, solid waste management and treatment, renewable energy resources, world population and environmental sustainability issues.

By the end of this course you will have an understanding of:

- population growth kinetics and environmental sustainability;
- problem solving with respect to calculations of energy and mass balances;
- problem solving with respect to waste-water treatment and applications;
- problem solving with respect to pollution emissions and reduction strategies and technologies;
- opportunities to use biological wastes as raw materials in biochemical processes to produce value-added commercial products; and
- opportunities to use biological processes and economic analysis for the production of renewable energy and biofuels (e.g., bioethanol, biodiesel, methane, hydrogen gas).

Critical Skills of an Environmental Professional: Inter-Active Seminars

Express Yourself! **Ms. Diane Eastman**

Wrack your brain, stretch your mind and meet new people as we explore that most sustainable of natural resources, our own creativity. Review the steps of the creative process (preparation; incubation; illumination; implementation and revision) and try using it to solve some real-life environmental problems. Articulate your own vision for the environment along the way and put that infernal internal critic on notice as we gear up for the academic year. Bring a notebook or journal, pen or pencil and a willingness to engage.

Key outcomes from this workshop will include: knowledge of the creative process; students having a better sense of themselves and each other; and be better able to deal with issues and challenges that will confront them throughout the program and at work.

Introduce Yourself in Professional Settings! **Ms. Nanda Dimitrov**

Join us for an interactive training session to practice networking with scholars at academic conferences and learn to explain your academic interests clearly and concisely. During the session, you will develop effective ways to introduce yourself, refine your interpersonal communication skills and prepare to network with colleagues at academic conferences through playful learning activities (such as the “Academic cocktail party” and the “Research Speed Dating” exercise) designed to improve academic communication competence. Come prepared with a one minute description of your academic background and a one minute description of your interest in Environmental Sustainability.

Write for Professional Audiences! **Mr. Johnston Miller and Ms. Janet Roukema**

As environmental professionals, your communication skills will strongly influence your success. In most cases, written word is still the most effective way to communicate to different audiences. This workshop will use lectures and activities to: review the qualities of effective writing; and, discuss writing for general versus expert audiences, including the differences between academic and industry writing.

Complete a Life Cycle Assessment! **Mr. Diego Velasquez**

In the recent years society has become more aware and concerned about the issues of resource depletion and environmental degradation. As a response to this awareness, private companies, organizations and government institutions are looking for tools and methodologies to assess the environmental performance of their activities in a holistic manner. Life Cycle Assessment (LCA) is a tool that can effectively be used to investigate the impacts of a product, system or service throughout their entire life cycle. In general, LCA is a “cradle to grave” approach, including extraction of raw materials, processing, manufacturing, distribution, use, reuse, maintenance and disposal processes. In this session, students will become familiar with the Life Cycle Assessment methodology standardized by the ISO 14041 series. Through the use of lectures, class activities, software and a final project the students will develop the necessary skills to undertake the task of assessing the total environmental impact of a product or service using this tool.

The session will allow students to:

- learn theoretical underpinnings of Life Cycle Assessments; and
- conduct a Life Cycle Assessment using the computer aided software, Sigma Pro 7 LCA.

Critical Skills of an Environmental Professional: Professional Development Workshops

EnvrSust 9101 (0.25 credit)

Understanding Leadership

Dr. Peggy Roffey and Ms. Nancy Stewart

In this workshop, students will be given their own "Team Management Profile" (generated from their responses to an online questionnaire). They will then explore work style differences and understand the potential for both conflict and synergy within these differences and learn how to engage the strengths of different styles. Using reflection, dialogue, video examples and exercises, students will explore Kouzes and Posner's "Five Leadership Practices" and identify ways to make these practices part of their daily interactions as emerging leaders in the area of Environmental Sustainability.

This workshop will allow students to:

- explore work style preferences and strategies for capitalizing on work style differences within teams; and
- learn five core leadership practices applicable to multiple interpersonal situations.

At the end of this session, participants will form their project teams, mindfully incorporating different strengths.

EnvrSust 9102 (0.25 credit)

Understanding Project Team Management

Dr. Peggy Roffey and Ms. Nancy Stewart

In this workshop, students will be introduced to Dr. Thomas Gordon's Leader Effectiveness Training (LET) Communication Model: learning and practising the skills of active listening, identifying problem-ownership, facilitating problem-solving, and asserting gently, respectfully and firmly to resolve conflicts and increase collaboration.

This workshop will teach students to:

- build interpersonal relationship and communications skills for working productively with individuals and teams; and
- deepen self-knowledge, increase self-management, and expand emotional intelligence.

EnvrSust 9103 (0.25 credit)

Legislation and Certification Systems

Ms. Sandra Tavares

This workshop provides students with an understanding of environmental compliance as a social responsibility principle and required element of management systems and the tools in place to go beyond compliance. Exercises will be completed based on material presented in-class and reference material read prior to some of the classes. These exercises will guide class discussion, improve analytical skills and equip the student with the concepts and tools to conduct insightful analyses and make recommendations for improvement.

The course will outline:

- the environmental legislative framework (i.e. federal, provincial and municipal) and key pieces of legislation;
- the link between compliance and management systems in the areas of environment, health & safety, quality, social responsibility, etc.;
- objectives of environmental legislation (i.e. trends in pollution reduction);
- the 'Plan-Do-Check-Act' system;
- management system standards (including integration of various disciplines) and certification; and

- auditing practices (i.e. roles and responsibilities, principles of auditing, managing an audit program, audit activities and competence and evaluation of auditors) with a special focus on the environment (i.e. types of environmental audits, tips for auditing environmental legislation, etc.).

By the end of this course, students should have gained awareness and practice of tools and skills needed to:

- understand the tools available to go beyond compliance and implement best practices;
- understand the skills needed to perform an environmental audit;
- conduct primary and secondary research;
- work as a member of an auditing team to collectively plan and carry out auditing, writing and presenting tasks;
- plan and organize time in co-ordination with others (i.e. working on deadlines as in client situations); and
- identify and make recommendations to enable processes to become more efficient.

EnvrSust 9104 (0.25 credit)

Measuring Changes in the Environment and Sustainability of Ecosystems

Dr. Argyrios Margaritis

The workshop covers the basic principles that are used to measure and quantify the changes in the environment and sustainability of ecosystems.

The following topics will be covered:

- definition and use of units of measurement as they apply to environmental pollution and sustainability changes;
- units conversion;
- mass balances in ecosystems;
- energy balances in ecosystems;
- mass balances and chemical/biochemical reactions;
- kinetics of chemical and biochemical reactions as they apply to environmental and sustainability of ecosystems;
- basic concepts of flow sheet of chemical and biochemical processes;
- economic considerations and cost analysis of chemical and biochemical processes used to solve pollution problems (i.e., air, water, solid); and
- quantitative measures of environmental pollution and sustainability changes

Consulting Project

EnvrSust 9200 (1.0 credit)
Interdisciplinary Consulting Project
Dr. Irena Creed

The purpose of this course is to give students an opportunity to work with the Client in a non-academic, applied setting. Members of each Consulting Group will jointly undertake environmental research. Upon completion of the course, each Consulting Group will make a formal presentation of their research findings and recommendations and will provide their Client with a professional quality report.

Success in this course requires each student to undertake both secondary and primary research. Secondary research is defined here as a review of data, including documents, that has been published in some form, such as scholarly books and articles, industry or government reports, and newspaper articles. Primary research means the collection and analysis of quantitative and/or qualitative data, including verbal or written statements from people, or from governmental or other documents.

The course Instructor will present the projects and students will compete for the projects.

By the end of the course, you should have gained experience to:

- work with a Client in a non-academic setting;
- work as a member of a research team that collectively plans and carries out research and writing tasks;
- plan and organize use of your time in co-ordination with others;
- define/negotiate a research question, hypothesis and/or terms of reference with the Client and course Instructor;
- conduct detailed and comprehensive research of the secondary literature on a given topic;
- develop a methodology for primary research that will augment the secondary literature;
- conduct primary research;
- plan and write a report that presents secondary and primary research findings, analysis and recommendations based upon those findings;
- present a verbal report to the Client; and
- carry a major written document through all the stages of organization, drafting, revisions, editing, copy-editing, formatting and printing.

Cooperative Education Experience

EnvrSust 9300

Cooperative Education Experience (the “Co-op”)

Manager Co-op Program, Iwona Ciesielka-Reed

Cooperative education (co-op) is a program through which students gain professional work experience related to their Masters of Environment & Sustainability graduate program and career objectives. The MES co-op is a mandatory component of the MES Program, and carries a 2.5 credit weight. The MES co-op provides students with skills and experience needed to compete for an entry-level position as an environmental professional in industry, a non-governmental organization, or a government department. Students will be employed between May 1 and August 30th. Upon completion of the MES co-op, students will be required to present their technical experiences to representatives of the MES program through the submission of a written technical report, followed by an oral presentation. In addition, students will also have the opportunity to reflect and learn from each other's work placements through recounting their overall experience.

In this course, students will:

- develop cover letter and resume writing skills;
- learn about different interview styles and how to prepare for them;
- improve technical writing and presentation skills; and
- apply environmental science knowledge to an employment setting.