

## Dalhousie University 2017/2018 Sustainability Course Inventory

Listed below are *sustainability courses* and *courses that include sustainability* from Dalhousie University's 2017/2018 academic timetable, following the definitions outlined in STARS 2.1. *Sustainability courses* are courses in which the primary and explicit focus is on sustainability as an integrated concept having social, economic, and environmental dimensions. *Courses that include sustainability* have a primary focus other than sustainability but incorporate a unit or module about sustainability, or weave sustainability content into the course. The courses listed below were identified from the 2017/2018 academic timetable, which lists all courses being offered in the current academic year.

### Sustainability Courses

<b>Course</b>	<b>Title</b>	<b>Degree Level</b>	<b>Department</b>	<b>Faculty</b>	<b>Course Description</b>
SUST1000.06	Introduction to Environment, Sustainability and Society 1	UG	College of Sustainability	n/a	An interdisciplinary issues-based approach to environment, sustainability and society drawing on themes from across the faculties, this course introduces students to the conceptual frameworks underlying our understanding of the environment and sustainability. Topics include energy, water, climate change, human population, economics, policy, food, urbanization and equity.
SUST1001.06	Introduction to Environment, Sustainability and Society 2	UG	College of Sustainability	n/a	Drawing on themes from across the disciplines, diverse conceptual frameworks and analytical methods underlying our understanding of the environment and sustainability are explored. Topics include energy, water, climate change, human population, economics, policy, food, urbanization and equity.
SUST2000.06	Local Governance, Citizen Engagement and Sustainability	UG	College of Sustainability	n/a	People make decisions that influence the way the world changes and the way in which it stays the same. This course is about people and how their roles and actions affect social and natural environments at the local level. We explore the roles and actions of individuals as consumers, citizens and as activists, and groups of people who work in local government, the legal system, the corporate and entrepreneurial sectors and with non-governmental organizations. The course uses a Problem Based Learning (PBL) approach to help us think critically as we explore the connections between people, their actions, and the complex issues associated with environmental and social sustainability.
SUST2001.06	Environment, Sustainability and Governance: a Global Perspective	UG	College of Sustainability	n/a	An examination of the interface between human development and the environment at the global level using a problem based approach. Various perspectives are used to explore the link between environmental issues, poverty, consumption, population, economic globalization, urbanization and international organizations.

SUST3000.03	Environmental Decision Making	UG	College of Sustainability	n/a	The world is a product of countless individual and collective choices. Making decisions for a sustainable future requires that these decisions account for the uncertainty and complexity inherent to human development and be sensitive to ecological constraints and associated, often competing, human values. This course explores the key challenges and tools associated with environmental decision making
SUST3102.03	Coastal Change & Adaptation	UG	College of Sustainability	n/a	Human activities alter coastal environments directly and by influencing natural processes. We analyze the drivers of change and impacts on environment, economy and society. Mitigation and management strategies for sustainable adaptation are investigated. Lectures are integrated with student presentations, guest lectures and discussion of current coastal and marine research.
SUST3502.03	The Campus as a Living Laboratory	UG	College of Sustainability	n/a	In this course, the campus serves as a living laboratory for identifying, evaluating and assessing indicators of progress toward greater campus sustainability. Working in groups, students apply problem solving models to case studies using qualitative and quantitative research methods and make recommendations for improvements on campus based on their analyses.
SUST3701.03	The Community as a Living Laboratory	UG	College of Sustainability	n/a	This course introduces students to research, concepts and methods for analyzing community sustainability across a spectrum of perspectives. In this course, the Halifax community serves as a living laboratory for identifying, evaluating and assessing indicators of progress toward greater environmental, social and economic sustainability. Working in groups, students apply problem-solving models to case studies using qualitative and quantitative research methods to help community-based organizations grapple with real world problems. A variety of tools may be used including systems analysis, environmental audits, field surveys, questionnaires, interviews, and statistical analysis. Students then draw conclusions and make recommendations for improvements on the basis of their analysis.
SUST4125.03	Conflict Negotiation & Sustainability	UG	College of Sustainability	n/a	This course looks at local and global conflicts driven by: climate, politics, resource extraction, land use, and development. The class offers preparatory lectures followed by team-based simulated negotiations. Students learn techniques related to de-escalation, negotiation and debate tactics, through assuming and advocating various stakeholder perspectives.

AGRI 2000.03	Transition to Organic Agriculture	UG	Agriculture	Agriculture	This course is recommended for students looking for a general introduction to organic agriculture. The course consists of five stand-alone modules: Why organic?, Organic Certification, Planning the Farm System, Transition to Organic Crop Production, and Transition to Organic Livestock Production.
AGRI4001.03	Agriculture, Food and Well-being	UG	Agriculture	Agriculture	This case-based course investigates local, regional, and global issues related to agriculture, food, and well-being. Learners will work together to develop practical solutions for real life cases thus enhancing their understanding of global economic and political forces shaping agriculture. This course will help students enhance their critical thinking skills and systems analysis capacity. Students will explore how agriculture and food are related to, interconnected with or impacted by people, the land and environment, and ultimately social/economic well-being. The course is team taught with faculty from the following disciplines: animal science, plant science, environment science, engineering, food science and social sciences. Industry leaders also are involved as mentors.
AGRN2000.03	Organic Field Crop Management	UG	Agronomy	Agriculture	This course will introduce students to organic principles and practices applied to the production and management of field crops. The criteria for optimum yield and quality of field crops are presented within the context of organic farming principles, sustainable soil and nutrient management, and the requirements for organic certification.
AGRN2001.03	Cereal-Based Cropping Systems	UG	Agronomy	Agriculture	This course takes a systems approach to the study of crop and soil management in rotations involving the growing of the principal cereals, oilseeds, pulses, and other grains, and their relationship to other crops in a rotation. Through a whole-farm approach over time, it studies environmentally and economically sustainable methods for grain cash crops and grain-based animal feed production. It stresses soil and water conservation and an understanding of the principles and processes of the nutrient cycles, which are critical to improving the food production environment. Students will gain knowledge of grains as they relate to people and the environment, from soil to shelf, both in a Maritime temperate climate and in an international context.
AGRN2001.03	Forage-Based Cropping Systems	UG	Agronomy	Agriculture	Forage crop production, management, and use will be discussed in the context of agricultural ecosystems. Emphasis will be placed on beneficial management practices to reduce negative impacts on the environment, while maintaining profitability and sustainability of rural communities. Topics covered will include pasture, hay, and silage, as well as the role of perennial and annual forages in crop rotations.

ANSC2004.03	Organic Livestock Production	UG	Animal Science	Agriculture	This course provides information on organic livestock production in general, as well as more detailed analyses of organic beef and sheep, dairy, and swine and poultry production. An in-depth study of organic approaches to livestock health is included. The course is divided into five stand-alone modules: Introduction to Organic Livestock Production, Organic Beef and Sheep Production, Organic Dairy Production, Organic Swine and Poultry Production, and Health Management in an Organic Livestock System.
ANSC4007.03	Pastures in Sustainable Livestock Systems	UG	Animal Science	Agriculture	An advanced course that provides students with an overview of current sustainable pasture management practices in northern latitudes, with a focus on grassland ecology, the environmental impacts of livestock production, and applied pasture management. In addition to attending lectures and presenting material in class, students will participate in lab sessions on practical grazing management techniques as well as participate in investigative tours of local pasture producers.
APSC2002.03	Bioresource Systems Analysis	UG	Applied Science	Agriculture	The objective of this course is to introduce the concept of systems theory and analysis. The emphasis will be on the use of bioresource science principles applied to environmental and technological systems. Students will be exposed to case studies and special lectures focusing on bioresource science and systems analysis as an integrated problem-solving tool.
APSC2012.03	Introduction to Bioresource Science	UG	Applied Science	Agriculture	This course is an introduction to environmental science and engineering technology with a specific focus on agriculture, and consists of the ENVA 2000 lectures plus additional weekly tutorials and labs by the Engineering department. This combination provides an efficient means to provide the environmental science and the applied management of resources. The course is designed to provide an introduction to horizon topics in this rapidly developing field that are the subjects of specialized, upper-level courses available in the program, and it provides a solid foundation for some environmental science courses. Topics to be covered include: overviews of green-collar jobs and the new bioresource economy, and of sustainable agroecosystem management; introductions to the management of sustainable water and energy resources, collar jobs and the new bioresource economy, and of sustainable agroecosystem management; introductions to the management of sustainable water and energy resources, including alternative waste water, biosolids, and biofuels; introductions to materials life-sourcing; geographic information systems and precision agriculture, including alternative waste water, biosolids, and biofuels; introductions to materials life-sourcing; geographic information systems and precision agriculture.

APSC4004.03	Energy Conversion and Assessment	UG	Applied Science	Agriculture	This lecture-based course focuses on selected attributes of existing and renewable energy options, including the reserves and consumption of oil, coal and gas; fossil energy technologies for power generation; fundamental principles, applications and status of solar energy, biomass energy, wind energy and hydro-power; and outlook and evaluation of renewable energy.
APSC4005.03	Waterscape Ecology and Management	UG	Applied Science	Agriculture	This lecture-based, non-quantitative course focuses on selected basic attributes of land-water interactions and aquatic degradation as they relate to issues of waterside and watershed development in rural and (sub)urban environments. The course provides an introduction to a variety of aquatic principles and how they in turn are influenced by human activity, followed by an introduction to and review of the many management options available to land-use planners to mitigate development pressures. Broad latitude will be permitted in the subject areas of the assignments in order to appeal to individuals' interests and career aspirations in environmental engineering, environmental science, horticulture, international development, and environmental governance and sociology.
APSC4006.03	Wastewater Management	UG	Applied Science	Agriculture	This course gives an overview of sources of water pollution, particularly in the rural situation, and standard methods of treatment. Alternative approaches such as wetlands and filters will be discussed. Laboratory sessions will include field trips, methods of sampling, and some testing of water.
APSC0200.03	Environmental Management	UG	Applied Science	Agriculture	Students examine the major environmental issues and risks in agricultural production. The emphasis is on how agricultural activities impact the environment and how environmental issues, regulations, and programs impact the way agricultural activities are carried out. The course will enable the student to identify the legal and other requirements for reducing the environmental risks associated with production activities, and to work with an engineer or environmental specialist in determining ways to minimize environmental risk.
BIOA3001.03	Ecology	UG	Biology	Agriculture	An introduction to the principles and general concepts of ecosystem structure and function is presented. The dynamics of populations and community interactions are considered in relation to various biotic and abiotic environmental influences. The laboratory reinforces topics covered in the lectures and readings by emphasizing the importance of field observation and interpretation
BIOA3006.03	Aquatic Ecology	UG	Biology	Agriculture	The biology of aquatic species in marine and freshwater environments is discussed, with emphasis on biological systems involving farmed species, and organism interdependencies and interactions are examined. An introduction to the principles of ecology at the community and ecosystem level of integration is included.

BIOA4002.03	Conservation Biology	UG	Biology	Agriculture	This course has limited enrollment. This course will examine the ecological concepts underlying current issues in conservation biology. Topics covered include effects of agricultural habitat fragmentation on wildlife, conservation of biodiversity, stability and resilience of ecosystems, optimal design of nature reserves, and habitat heterogeneity.
ENGN2014.03	Bioresource Processing	UG	Engineering	Agriculture	This course deals with the technologies of converting biomass into upgraded fuels as well as direct combustion. Students are introduced to biomass conversion; physical conversion of biomass (drying, dewatering, densification); thermo-chemical conversion of biomass (torrefaction, pyrolysis, gasification, combustion); heat and power applications; biogas production (digester design and kinetic considerations); ethanol and bio-diesel conversion technologies; and environmental impacts.
ENGN2202.03	Fundamentals of Environmental Engineering	UG	Engineering	Agriculture	This course introduces Environmental Engineering by introducing principles, applications, and design concepts pertinent to water quality and pollution, drinking and waste water treatment, solid and hazardous waste management, and air pollution and control. The role of process engineering for the protection of the physical environment will be stressed. A quantitative technical approach will be used, as befitting an engineer in environmental infrastructure planning/designing.
ENVA2000.03	Environmental Studies I	UG	Environmental Science	Agriculture	This is the first of a two-semester course sequence that deals with environmental issues from both an agricultural and a socio-economic basis. The scientific principles of each issue will first be outlined and explained, and then the agricultural and socio-economic aspects of the issue will be examined. The topics to be emphasized in this course will include issues associated with population growth, the atmosphere, and the hydrosphere.
ENVA2001.03	Environmental Studies II	UG	Environmental Science	Agriculture	This is the second of a two-semester course sequence that deals with environmental issues from both an agricultural and a socio-economic basis. All aspects of the issues will be integrated to provide an overall view of each issue. The topics to be emphasized in this course will include issues associated with biodiversity, the lithosphere, waste management, and legal aspects of the environment. Students will be expected to show their understanding of the interplay between agriculture and environmental issues by writing a major term paper.

ENVA2002.03	Composting and Compost Use	UG	Environmental Science	Agriculture	Composting and the utilization of organic matter produced on the farm provide the basis for soil fertility in organic systems; however, potential benefits derived from compost use are often limited by the supply and quality of composts produced on-farm. The objective of this web-based course is to teach composting primarily by providing students with the opportunity to make their own compost over a period of 13 to 15 weeks. Students learn through five stand-alone modules*: Composting of Organic Materials (how the underlying principles of composting are applied when combining various feedstock materials for composting); Composting Process (how to evaluate and manage an actively working pile and troubleshoot to maintain optimum conditions for composting); On-Farm Composting (efficient and low cost composting methods for agricultural composting at various scales); Compost Quality (how to evaluate the quality of the finished compost, as well as the quality requirements of various standards, markets, and end uses for compost); and Compost Utilization and Marketing (considerations and requirements for the optimal use of compost in organic greenhouse crop production and organic farming systems, as well as factors which are important in the marketing of compost)
ENVA2003.03	Intro to Urban and Peri-Urban Agriculture	UG	Environmental Science	Agriculture	Long considered a sustenance necessity in the Global South, peri-urban and urban agriculture (UA) is experiencing a resurgence in popularity in developed nations, with thousands of projects being implemented in cities across North America, Europe, and Asia. This course will provide an introduction and overview to the science, society, design, and development of UA projects around the world. Topics to be considered include historical precedents (e.g. allotments and community gardens), foundations (e.g. food systems and food literacy, urban regeneration, aesthetics and design), and technical elements (e.g. soil and water management, municipal planning). This course will be taught on-line with weekly 'lab' meetings in which students are interlinked via the inter-campus AV networking system (so that no travel is required). Assignments will have enough latitude to appeal to students who are interested in any or all of the agriculture and food, sustainability and planning, international development and urban regeneration, and individual health and social well-being.
ENVA3000.03	Environmental Impact Assessment	UG	Environmental Science	Agriculture	An introduction to the study and assessment of environmental toxicity and ecotoxicology as they are used to predict the environmental impact of agricultural, industrial, and other xenobiotics and associated processes. The laboratory portion of the course will deal primarily with bioassay and assessment techniques.

ENVA3001 .03	Environmental Sampling and Analysis	UG	Environmental Science	Agriculture	This course will introduce students to the proper methods of sampling and experimental design for biological and chemical analyses, as well as for environmentally oriented surveys. Emphasis will be given to the actual collection of samples and their subsequent analysis
ENVA3002.03	Waste Management and Site Remediation	UG	Environmental Science	Agriculture	This course will examine the following topics: pollution from wastes, waste disposal and treatment, the use of wastes, wastes as resources, recycling, composting, waste reduction, incineration, biomass from wastes, biogas production, site remediation, and bioremediation. Agricultural wastes will be emphasized throughout the course.
ENVA3021.03	Ecohydrology	UG	Environmental Science	Agriculture	This course deals with the emerging green science and technology management tool of ecohydrology and the design of best management practices (BMPs) for water resource protection and use. Topics to be covered include: non-point source pollution, drainage and irrigation; soil erosion and deforestation; and the BMPs of buffer strips, nutrient entrapment, and runoff and wastewater management. Many topics for discussion deal with agricultural development in Canada and developing nations.
ENVA4006.03	Air, Climate, and Climate Change	UG	Environmental Science	Agriculture	This course examines the composition of our atmosphere, how it functions to create weather and climate, and its role in agricultural production. A fundamental understanding of chemistry and physics of atmospheric processes will provide the basis for an examination of micro-, regional- and global-scale meteorological processes. The expression of these meteorological processes will be examined over time and space as a means of examining climate and climate change. The role of weather and climate in agricultural production will be discussed. The global debate surrounding anthropogenic greenhouse gas emissions and climate change will be considered from scientific, social and political perspectives. Agricultural adaptation to climate change, both regionally and globally, will be considered. The laboratory portion of the class will examine the tools for measuring the composition of the atmosphere, the physical state of the atmosphere, the transfer of heat and mass to and within the atmosphere, and the use of weather and climate data in agricultural decision-making.
HORT2001.03	Principles of Organic Horticulture	UG	Horticulture	Agriculture	Study of the principles that form the basis for organic production of horticultural crops. Special attention is given to regulations, soil fertility, organic soil amendments, compost and mulches, crop rotation, plant health, management of diseases and pests, and companion planting. Students will apply their knowledge through an instructor-approved project that will be presented on-line using an appropriate multi-media venue



HORT3000.03	Environmental Processes and Natural Landscape Functions	UG	Horticulture	Agriculture	The structure, functions, and dynamics of landscapes that are altered by human design are discussed. Key ecological processes and their disruption, landscape modification, and landscape planning and management will be examined. Students are expected to participate in field work, and to engage in self-directed study.
IAGR3002.03	International Rural Development	UG	International Development	Agriculture	This course explores the history, defining characteristics, and diversity of developing societies, with a focus on the people and issues of rural communities. Students will explore the main issues facing rural communities in developing regions, as well as the many cultural, social, political and economic factors that can impact the success of development projects and initiatives at the community level. Students will be expected to develop an understanding of a variety of perspectives on international community development and also to develop an appreciation for the opportunities and challenges of sustainable development in different societies and cultures.
PHLA3000.3	Environmental and Agricultural Ethics	UG	Philosophy	Agriculture	This course offers a general introduction to environmental ethics with emphasis on agricultural issues. Students will be introduced to modern ethical theory and to techniques of philosophical reasoning, and will be provided with a general context for overall discussion by examining the origins of the modern world view (the rise of modern science, market economics, and liberalism).
RESM4000.03	Integrated Environmental Management Project Seminar I	UG	Research Methods	Agriculture	Students will study an operation (information gathering) and review management of technological, human, financial, and environmental resources.
RESM4001.03	Integrated Environmental Management Project Seminar II	UG	Research Methods	Agriculture	This is a continuation of RESM 4000, with a study and examination of identified problems within the operation. Working with industry representatives, the course will identify alternatives to solve current problems.
ARCH4212.03	Building Systems Integration	UG	Architecture	Architecture & Planning	
PLAN3001.03	Landscape Ecology	UG	Planning	Architecture & Planning	Landscapes reflect the interaction of natural and cultural processes. This course introduces the principles of ecology to landscape analysis. It explores relationships between environmental components in the landscape to inform community design and land use planning applications.

PLAN4001.03	Environmental Planning Studio	UG	Planning	Architecture & Planning	This course provides an applied context for analyzing landscape issues and exploring environmental planning options. Students provide a service to the community by working through projects where local community groups or agencies have identified real needs for information and advice.
PLAN4106.03	Transportation Planning	UG	Planning	Architecture & Planning	The course considers transportation trends, the transport needs associated with different activities, and the impact of transport facilities on land development to offer a critical analysis of the interplay between land uses and transportation. Technology, the costs of supplying transport facilities and the demand outlook for different modes are examined. The emphasis is on urban transportation, mobility demands and the supply of efficient and environmentally sound transport facilities.
PLAN4125.03	Negotiation and Conflict Management	UG	Planning	Architecture & Planning	This course explores the world of interpersonal communication, conflict and negotiation and the variety of approaches and range of skills needed to solve problems, reach agreements and maintain relationships. It will enable participants to understand the positive and negative dimensions of conflict, analyze the dynamics of formal and informal negotiations, and interact with others with greater awareness, intention and skill (cross listed with Conflict Negotiation and Sustainability).
CANA1103.03	Halifax and the World: Part II	UG	Canadian Studies	Arts	This course builds on INTD/CANA 1102.03 (Halifax and the World: Part I) with a continued focus on the connections between important global issues and your daily life as a student in Halifax. The course will focus on connections between life in Halifax and global development issues in other parts of the world. In particular, the course will highlight the 'commodity chains' that connect our daily consumption decisions to other people around the world who are involved in the life cycle of those commodities – from their production through to their disposal. The course will also specifically address the ethical questions and challenges that emerge from these connections and the practical ways in which we might respond to those questions.
CANA2410.03	Environmental Issues in Earth Science	UG	Canadian Studies	Arts	Geology underlies many of the environmental problems facing humanity today. Topics include environmental aspects of energy and mineral resource, geologic hazards, geologic connections to pollution and waste disposal, and the role that water plays in its various guises.

CANA3052.03	Indigenous Social Health and Environmental Issues	UG	Canadian Studies	Arts and Social Sciences	This course offers an interdisciplinary overview of contemporary social, health, and environmental issues impacting Canada's Indigenous Peoples. Topics will include an exploration of the human rights of Indigenous Peoples in Canada, social statistics, food security in northern communities, health and well-being in Indigenous communities, connection to place, impact of environmental degradation and land dispossession, Indigenous knowledge and the environment, politics and political activism, and the role of media.
GEOG2800.03	Climate Change	UG	Geography	Arts	Most models of the atmosphere predict that increasing concentrations of greenhouse gases will continue to warm the surface of the earth and the oceans in the twenty-first century. The magnitude of the warming and its consequences are still very controversial. This class will discuss, mainly from a nonmathematical viewpoint, the reasons for the greenhouse effect, the current warming in the context of the historical record of climate change, and sources of natural climate variability such as the El Nino Southern Oscillation. It will also review arguments that attribute the warming that has occurred in the Twentieth century to natural variability, and those that attribute the warming to increased human emission of greenhouse gases
GEOG3400.03	Human Health and Sustainability	UG	Geography	Arts	This course examines the relationships between the health of populations and health determinants in the context of environmental sustainability. Weekly laboratory exercises will teach students how geomatics (GIS, GPS, and remote sensing technologies) and epidemiological tools can be used to assess the links between the health of human populations and the health of the environment, and how to use these tools for environmental health research.
INTD3114.03	Environment and Development	UG	International Development	Arts	This seminar investigates the intersections between environmental science and development studies. Our primary focus will be to understand how the non-human environment impacts and constrains development interventions, both in the past and the present.
INTD4013.03	Environmental Conflict and Security	UG	International Development	Arts	This seminar seeks to unravel the origins of conflict in the Global South. It emphasizes the ecological dimension of conflict, by investigation the intersections between natural resources and political upheaval. We will trace the origins of a diverse set of conflicts evaluating the role the non-human environment plays in triggering upheaval, as well as possible steps to alleviate ongoing conflicts and prevent new ones.

PHIL2480.03	Environmental Ethics	UG	Philosophy	Arts	This course examines humanity's relation to nature from a philosophical perspective. Of particular importance will be the moral or ethical obligations which humanity may have towards the natural environment. Attention will be given to the historical sources of the attitudes and values which have given rise to current ecological problems in the environment, as well as to the question of how to remediate our relationship to nature. We will read from environmental holists, biocentrists, ecofeminists, deep ecologists, and others, and discuss issues concerning animal rights, environmental justice, and activism.
POLI3385.03	Politics of the Environment	UG	Political Science	Arts	This course examines competing perspectives on the political, social, and economic forces driving environmental degradation, as well as differing visions of the types of political change required for ecological sustainability. Topics include: competing perspectives on ideas of limits to growth and sustainable development; the links between poverty, North-South inequality, and environmental degradation; population growth; the promise and limits of technological solutions; consumerism and ecological degradation; market-based environmentalism; ecological modernization; and ecological critiques of capitalism.
POLI4380.03	Politics of Climate Change	UG	Political Science	Arts	This course examines the interactions between politics and a changing climate. Core questions include: What lies behind political disagreements over how to respond to climate change? What does climate change mean for various political, social, and economic projects? Topics include: the role of science and economics in climate politics; the new "climate capitalism"; non-capitalist alternatives that question growth and consumerism while emphasizing "climate justice"; Canada's particular difficulties in addressing climate change; climate politics at the personal level; international climate negotiations; and the politics of geo-engineering
SOSA2403.03	Food Activism	UG	Sociology & Anthropology	Arts	In this course, we will explore food movements and alternative food practices, especially in relation to the modern food system. We will discuss the key characteristics and critiques of the food system and focus on case studies of cultural practices and food activism from around the world which challenge or provide alternatives to the current food system.
SOSA3052.03	Indigenous Social Health and Environmental Issues	UG	Sociology & Anthropology	Arts and Social Sciences	This course offers an interdisciplinary overview of contemporary social, health, and environmental issues impacting Canada's Indigenous Peoples. Topics will include an exploration of the human rights of Indigenous Peoples in Canada, social statistics, food security in northern communities, health and well-being in Indigenous communities, connection to place, impact of environmental degradation and land dispossession, Indigenous knowledge and the environment, politics and political activism, and the role of media.

CIVL4200.03	Transportation Systems	UG	Civil Engineering	Engineering	This course covers urban transportation planning, transportation demand and supply, transportation management. The environmental impact of transportation systems such as noise and air pollution will be examined. Methods to measure, predict, and evaluate impact of transportation modes will be covered.
CPST3030.03	Engineering and Society	UG	Complementary Studies	Engineering	The course provides an overview of the concepts and interrelationships among sustainable development, environmental stewardship and public health and safety in relation to engineering practice. These concepts will be examined through historical examples and current theory and practice of the engineering profession. Lectures and discussion will consider global ecosystem functions, human interactions with the environment, methods of reducing human impacts; methods of achieving sustainability, engineering challenges to enhance sustainable development; and factors that influence occupational health and safety from engineering and management viewpoints. Students will be exposed to management methods and tools such as environmental auditing, ISO 14000, risk analysis and WHMIS and will be expected to consider class topics in relation to their own area of engineering specialization.
MINE4815.03	Mining and the Environment	UG	Mining Engineering	Engineering	This course covers environmental practices, problems and solutions in the mineral industry. Topics include regulations, reclamation, mine closure, acid rock drainage, surface subsidence, nuclear waste disposal and coal mine explosions. Case studies are used to highlight these topics. Class participation is emphasized through oral and written presentations.
ENVE3452.03	Soil and Water Conservation Engineering	UG	Environmental Engineering	Engineering	The prediction, nature, effects and control of natural surface and sub-surface waters and non-point source pollutants in catchments are considered. Design flood hydrograph, flood routing, porous media flow and soil erosion prediction techniques are presented. Energy dissipating structures used to control flood flows which are discussed include terraces, chutes, drop inlets, grassed waterways, culverts and small earth dams. An earth dam design project extends over the course duration.

ENVE3461.03	Environmental Measurement and Analysis	UG	Environmental Engineering	Engineering	This course will cover the fundamentals of characterizing and monitoring processes within environmental systems through measurement and analysis. The course will begin with an overview of transducers and the various types of sensors and data acquisition systems typically used in environmental monitoring. Students will learn how to properly measure fluid flow processes and sample for contaminants within surface water and ground water. In addition, the measurement and analysis of contaminants in soil and atmospheric media will be covered. Data presentation and the use of geographical information systems (GIS) and global positioning systems (GPS) will also be covered. Students will gain hands-on experience using environmental monitoring equipment and instrumental methods of analysis during field and laboratory classes.
ENVE3500.03	Air Quality	UG	Environmental Engineering	Engineering	This course covers sources, the impact on health and the environment, atmospheric chemistry, fate and transport and the measurement and modeling of atmospheric pollutants. The application of regulatory computer models to air quality case studies will be demonstrated in laboratory classes. In addition, field and laboratory classes will provide hands on experience of measuring and characterizing air pollutants. Problem solving sessions are used to illustrate the application of meteorology, measurements and models to determine the sources and impact of air pollutants at various receptors found both outdoors and indoors.
ENVE4123.05	Environmental Biotechnology	UG	Environmental Engineering	Engineering	This course outlines the principles and applications of environmental biotechnology. Quantitative tools for describing microbial stoichiometry and kinetics will be examined and related to reactors of interest to environmental engineering. Applications of biological treatment processes will be studied and may include the activated sludge process, lagoons, anaerobic treatment and bioremediation.

ENVE4707.03	Green Engineering: Principles and Implementation	UG	Environmental Engineering	Engineering	Management of today's environmental challenges requires rethinking of the traditional approaches of process development and product design. Efforts should be directed toward incorporating the quantitative sustainability tools into the engineering design. This course introduces the framework required for the assessment of products and processes with respect to their environmental impact and provides the foundation for environmentally conscious design of products and processes. The major sustainability challenges associated with the release of chemicals into the environment will be reviewed. Economic, environmental and social indicators of sustainability will be discussed. The criteria for evaluation of sustainable materials (e.g., biodegradability, toxicity, end of life options) and green processes (e.g., risk assessment and life cycle analysis) will be covered. Students will be provided with various opportunities throughout the course to evaluate the green attribute of alternative product and processes by applying the sustainability metrics.
ENVE4772.03	Environmental Assessment and Management	UG	Environmental Engineering	Engineering	This course examines the ecological impacts of human activities with regard to water, air and soil pollution. Ecological theory and practice are reviewed and methods of environmental regulation and management considered in the light of the concepts of sustainability and maintenance of biodiversity. Lectures will include presentations by government and corporate regulators and managers.
ENVE4872.03	Air Pollution Control	UG	Environmental Engineering	Engineering	This course deals with air pollution from the standpoint of its generation and control. Both gaseous and particulate matter emitted from combustion and industrial sources are considered.
PEAS2202.03	Fundamentals of Environmental Engineering	UG	Process Engineering	Engineering	This course provides an introduction to environmental engineering fundamentals. The application of environmental chemistry in understanding the environmental fate of contaminants are discussed. Principles of mass balance and reaction engineering in the context of movement of pollutants in the environment and designing treatment processes are examined. common approaches in water, wastewater and solid waste treatment and air pollution control are introduced.
MGMT1702.03	Ecosystem Goods and Services	UG	Management	Management	The course explores the ecosystem goods and services on which our societies and economies depend, and the environmental basis of those goods and services. The course will cover the nature and function of: matter, energy, ecosystems, primary producers, natural resources, biodiversity, ecological footprints, and feedback loops; and their importance for managers.

MGMT2702.03	Resource and Environmental Management	UG	Management	Engineering	This course provides an overview of principles and techniques embedded in the sustainable management of our resource sector operations, highlighting the relevance of sustainability within today's business and government leadership decision making processes. The course providing a framework for examining the issues involved in the extraction, manufacture, use and disposal of resources (materials, energy and products), and the tools available to optimally manage such systems.
MGMT3701.03	The Community as a Living Laboratory	UG	Management	Management	This course introduces students to research, concepts and methods for analyzing community sustainability across a spectrum of perspectives. In this course, the Halifax community serves as a living laboratory for identifying, evaluating and assessing indicators of progress toward greater environmental, social and economic sustainability. Working in groups, students apply problem-solving models to case studies using qualitative and quantitative research methods to help community-based organizations grapple with real world problems. A variety of tools may be used including systems analysis, environmental audits, field surveys, questionnaires, interviews, and statistical analysis. Students then draw conclusions and make recommendations for improvements on the basis of their analysis.
MGMT3702.03	Resource/Environmental Problem-Solving: Sustainable Industries	UG	Management	Management	The course introduces students to concepts and methods for analyzing industrial sustainability through an interdisciplinary lens that highlights the necessity of including economic, social and environmental considerations. It also intends to deepen their understanding of: a) the business case (short term and long term) for industrial/corporate sustainability; b) the tools, techniques and strategies necessary to decouple economic growth of our business sectors from resource use and environmental degradation; and c) the key role that business and industry play in the sustainable development agenda. Using examples from various industrial settings, a range of management and policy mechanisms for ensuring resource sustainability are explored.



MGMT4031.03	Economics for Resource and Environmental Management	UG	Management	Management	This course is designed as a one term introduction to economics for graduate students who do not have any or limited undergraduate economics training. However, it is also suitable for students with prior economics training who are interested in exploring the environment-economy relationship further. The course begins with a brief but intense guided tour of economics. We then focus on key topics in environmental economics, including among others: * the sustainable economy* theory of market failure, public goods and externalities* environmentalist critiques of economic thinking* environmental and natural resource accounting* economic valuation of the environment* time in economic/environmental analysis. The final part of the class explores the theory and practice of a new discipline which better integrates environmental and economic analysis; namely the field of "ecological economics". The course is open to students in other parts of the University who are interested in economy and environment.
MGMT4047.03	Biodiversity Conservation Systems and Management	UG	Management	Management	Biodiversity conservation systems are increasingly necessary as human activities dominate the landscape. Precise prescriptions for their design are evolving. The theory and practice of conservation system design are explored through lectures, student presentations, discussions and exercises, as an active learning module involving the students, the instructor and the broader community. Topics include ecological integrity, focal species, population viability, habitat suitability, private land conservation, and First Nation perspectives.
MGMT4205.03	Law and Policy for Resource and Environmental Management	UG	Management	Management	This course provides students with an overview of substantive and procedural aspects of Canadian law and policy related to natural resources and the environment. The course will involve lectures, guest speakers, seminar discussions and class participation. Strong emphasis is placed on the Canadian legislative and regulatory framework and the unique character of the regulated subject areas such as toxic substances, air and water quality, fisheries, forests, agriculture, minerals, parks and biodiversity. The role of the common law in preventing or redressing environmental degradation will also be addressed

MGMT4500.03	Socio-political Dimensions of Resource and Environmental Management	UG	Management	Management	The goal of this course is to introduce students to the social, cultural, and political dimensions regarding resource and environmental management. Key objectives are to introduce, analyze, and utilize a range of frameworks for understanding the human dynamics of resource and environmental management decision-making. Students are introduced to a range of tools and techniques for engaging stakeholders in environmental issues (e.g. key informant interviews; focus groups; surveys; community mapping; photo voice). Because this course is integrated with ENVI5205 (biophysical dimensions of resource and environmental management) and ENVI5505 (law/policy dimensions of resource and environmental management) in the same term as required for the MREM program, there is a focus on common case studies to demonstrate the interconnectedness of these dimensions. Student groups in this course undertake in-depth investigation of the socio-political elements of resource and environmental management cases in Atlantic Canada
MGMT4504.03	Management of Resources and the Environment	UG	Management	Management	Students explore key management concepts applied in managing natural resources and the environment. Topics include management paradigms, systems, principles, approaches, tools and institutions associated with a wide range of sectors such as fisheries, forests, agriculture, the coastal zone, oceans, parks and protected areas, energy, waste, water, and others. Case studies complement lectures, seminars and field trips.
MGMT4505.03	Biophysical Dimensions of Resource and Environmental Management	UG	Management	Management	This course will introduce students to techniques and tools employed in natural resource and environmental management programs and projects and engage students in case-based problem solving learning intended to understand how bio-physical information is utilized in assessing resource and environmental issues and contributing to effective decision-making. Some of the tools that will be reviewed are environmental impact assessment, environmental site assessment, life cycle analysis, environmental monitoring and adaptive environmental assessment and management.
MGMT4507.03	Environmental Informatics	UG	Management	Management	Environmental informatics refers to digital systems for environmental monitoring, analysis, communication and decision making. The course will cover: digital data and where to find it; how to access such data ethically and manage it intelligently; tools and techniques necessary for making best use of those data; and, a working knowledge of a subset of those datasets, tools and techniques, including census, spreadsheets, database management systems and geographic information systems
MGMT4705.03	Environmental Assessment	UG	Management	Management	Students explore all aspects of environmental assessment (EA), with a focus on EA processes in Canada. The course examines professional practice in scientific, procedural and political dimensions. Current cases are studied opportunistically.

BIOL3060.03	Environmental Ecology	UG	Biology	Science	The ecological effects of pollution, disturbance, and other stressors, both anthropogenic and natural. Major subject areas are air pollutants, toxic metals, acidification, eutrophication, oil spills, pesticides, forestry, warfare, urban ecology, risks to biodiversity, and resource degradation. The overarching context of the course is ecological sustainability of the human economy.
BIOL2060.03	Introductory Ecology	UG	Biology	Science	Ecology examines interactions of plants and animals, including humans, with each other and with their non-living world. Topics include population growth, competition, predation, food webs, metapopulation dynamics, biodiversity and ecosystem function. The course has a quantitative approach providing a foundation for further work in ecology, marine biology and environmental science.
BIOL3063.03	Resource Ecology	UG	Biology	Science	This course considers the ecology, utilization, and management of natural resources in fisheries, wildlife and forest management, agriculture and aquaculture. Topics include population dynamics, community interactions, and ecosystem support of resources as well as the history of resource utilization, practices of controlling production, pests, and predators, and sustainable management strategies.
BIOL3065.03	Conservation Biology	UG	Biology	Science	This course offers an introduction to conservation biology: the science of understanding and conserving biodiversity on Earth. Students learn how biodiversity change is assessed and what tools are used to prevent the extinction of species and the disruption of ecosystems. Tutorials involve oral presentations as well as a written essay, and an in-depth discussion of controversial topics.
BIOL3226.03	Economic Botany: Plants & Civilization	UG	Biology	Science	The story of the human use of plants for food, fibre and fuel including the botany, domestication, development, distribution, production, processing, history, economic and social impacts of the major world crops (cereals, fruits, vegetables, flowers and industrial crops) and the importance of parts in medicine and conservation.
BIOL3601.03	Nature Conservation	UG	Biology	Science	This interdisciplinary course explores relationships between humans and the natural world, including damage caused to species and ecosystems. The course looks at environmental ethics and world views, environmental philosophy, sustainability, the cultural expression of natural values (literature, music, art) and conservation science and actions, including the establishment of protected areas.
BIOL3623.03	Coastal Ecology	UG	Biology	Science	Impacts of anthropogenic inputs on the structure and function of coastal ecosystems. Through field trips and other classwork, students examine ecosystem health, e.g., in macroalgal communities on rocky shores, in seagrass beds on sedimentary shores, and learn basic experimental design, principles of environmental assessment and monitoring, and coastal habitat remediation

BIOL3626.03	Field Studies of Marine Mammals	UG	Biology	Science	Hands-on introduction to research on marine mammals. Lectures provide an overview of marine mammal adaptations, evolution, population biology, social organization, conservation, and management. Labs include a necropsy and techniques of photographic identification of individuals. On a several-day camping trip, students observe marine mammals from whale-watch boats and conduct research projects.
BIOL3633.03	GIS in Ecology	UG	Biology	Science	A hands-on approach to understanding and using spatial information, this course introduces students to Geographic Information Systems (GIS) as a tool to answer ecological questions. Together, students conduct a major field project, collecting data, creating maps using GIS, and interpreting spatial patterns, to address an applied problem in ecology.
BIOL3640.06	Tropical Ecology	UG	Biology	Science	Hands-on introduction to tropical ecology, biodiversity, and conservation. Includes 18-day field trip to Belize to visit a variety of tropical terrestrial, freshwater, and marine ecosystems, quantify habitats, identify species, study animal behavior, and examine ecological interactions. Evaluation includes lecture and field tests, field notebooks, presentations, reports, and an independent research project.
BIOL3664.03	Intertidal Ecology and Diversity	UG	Biology	Science	Hands-on, intensive introduction to ecological research on rocky shores, tidal flats, and sandy beaches. Relevant ecological concepts, sampling techniques for flora and fauna, and statistical skills are learned. Field sampling on day and camping trips is followed by lab work (e.g., identification of seaweeds, invertebrates), statistical analysis, and report preparation.
BIOL4001.03	Environmental Impact Assessment	UG	Biology	Science	This course provides an opportunity to explore all aspects of environmental impact assessment (EIA) as practiced in Canada and in other countries. The course traces the development of EIA over the past 30 years and critically examines the scientific, procedural and political dimensions.
BIOL4065.03	Sustainability and Global Change	UG	Biology	Science	Sustainability emphasizes equitable societies, protected environments, and robust economies. Most countries pursue Sustainable Development yet the concept remains controversial, and defined differently in the North and the South. The global trends focus on those that relate to environment and sustainability.
BIOL4323.03	Biologging in Ecology	UG	Biology	Science	This course explores the fundamentals and applications of biologging and biotelemetry: the use of electronic tags to study free-ranging animals and their environment. Students are introduced to the wide range of tags and their diverse applications in biology.

CHEM4595.03	Atmospheric Chemistry	UG	Chemistry	Science	Fundamental introduction to the physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur cycles. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.
ERTH1091.03	Geology II	UG	Earth Science	Science	Earth systems introduced in Geology I are explored in greater detail, with an emphasis on change through time, earth resources, and on geologic systems that are connected to human actions. This course provides a strong background to pursue further work in the environmental sciences and is the required course for Earth Sciences majors.
ERTH2410.03	Environmental Issues in Earth Science	UG	Earth Science	Science	Geology underlies many of the environmental problems facing humans today. Topics include environmental aspects of energy and mineral resource, geologic hazards, geologic connections to pollution and waste disposal, and the role that water plays in its various guises. Canadian examples are incorporated where appropriate.
ERTH3601.03	Global Biogeochemical Cycles	UG	Earth Science	Science	We currently face daunting environmental challenges at the global scale that are expected to worsen in the 21st century, including a global water crisis, climate change and pollution of our waters and atmosphere; this course examines the science behind these environmental issues from the multidisciplinary framework of global biogeochemical cycling. With the global scale as the focus, this course pulls together the many disparate fields that are encompassed by the broad reach of biogeochemistry. You will learn about the processes that drive the movement of carbon, water, nitrogen, phosphorus, and sulphur, through the earth system, and the residency of these elements in the atmosphere, soils, lithosphere, oceans and freshwaters. In the quantitative and analytical exercises, you calculate and compare the effects of industrial emissions, land clearing, agriculture, and rising population on the processes driving the Earth's chemical cycles. Weekly journal readings for discussion in laboratory group cover the latest developments in this exciting and rapidly changing field. This course provides an excellent framework for those interested in the science of global change.

ERTH4520.03	GIS Applications to Environmental and Geological Sciences	UG	Earth Science	Science	Geographic information systems (GIS) provide a rich set of new tools to the geologist and environmental scientist, not only to solve conventional problems, but also to explore questions not readily answered by other means. This course builds on the fundamentals of GIS taught in EARTH 3500.03 to explore analytical tools that aid in decision-making processes encountered in mineral exploration, hydrogeology, site selection, environmental assessment, and global change analysis. The course concentrates on case studies and problem solving, including those requiring multi-criteria and multi-objective decision making processes.
ECON2216.03	Economics of Global Warming	UG	Economics	Science	This course uses economic principles to investigate such questions as: What are the benefits and costs of various time paths for abating emissions? How do we value the well-being of future generations? How do we balance helping the poor with environmental sustainability? What policies can align incentives with environmental sustainability?
ECON3335.03	Environmental Economics	UG	Economics	Science	This course serves as an introduction to environmental economics. Topics include social decision making, externalities and public goods, regulatory approaches (standards, charges, tradable permits), forms of value derived from the environment and measurement techniques.
ECON3332.03	Resource Economics	UG	Economics	Science	This course focuses on intertemporal economics and the economics of market failure as they pertain to the use of natural resources. A selection of resource sectors will also be discussed. Fisheries, agriculture, forestry, and energy represent possibilities, but this will vary from year to year.
ECON4220.03	International Environmental Law for Scientists	UG	Environmental Science	Science	The problems posed by environmental issues are global requiring solutions that are only achievable through multi-lateral collaboration. Over 20 years, there has been an explosion of international agreements intended to either redress or avoid environmental disasters. Some of these are based on sound science, some on politics. How do these two elements mix at the international level? Can international law accommodate the inherent uncertainty in scientific hypotheses? Offered every even winter term.
ENVS1100.03	Foundations of Environmental Science: ecosystem, resources & sustainability	UG	Environmental Science	Science	This course introduces students to key topics in Environmental Science including science literacy, environmental ethics, principles of ecology, evolution, biodiversity, human population growth, soil, agriculture, forestry, and oceans and freshwater systems. Tutorials reinforce and supplement lectures and allow for small group discussion and debate.
ENVS1200.03	Current Environmental Challenges: Analysis and Solutions	UG	Environmental Science	Science	This course introduces current issues and challenges in Environmental Science including air pollution and climate change, non-renewable and renewable energy, waste, urbanization, environmental law, and sustainability and education.

ENVS2100.03	Environmental Informatics	UG	Environmental Science	Science	Environmental Informatics is the knowledge, skills and tools which enable information to be collected, managed and disseminated to support research in environmental science. Students develop skills for the analysis, evaluation and synthesis of knowledge in environmental science. Information systems, tools, and techniques are introduced and applied to current environmental challenges.
ENVS2310.03	Energy and the Environment	UG	Environmental Science	Science	The physical principles and limitations of renewable energy source utilization and energy conversion. A quantitative introduction to energy conversion and storage systems, including solar power and heating, wind, tidal, geothermal, hydroelectric, nuclear power, hydrogen technology, electrical and mechanical energy storage. The input of these energy options on the global climate and environment will be discussed.
ENVS2410.03	Environmental Issues in Earth Sciences	UG	Environmental Science	Science	Geology underlies many of the environmental problems facing humanity today. Topics include environmental aspects of energy and mineral resource, geologic hazards, geologic connections to pollution and waste disposal, and the role that water plays in its various guises. Canadian examples are incorporated where appropriate.
ENVS3200.03	Introduction to Environmental Law	UG	Environmental Science	Science	This course will take a look at how environmental law operates in Nova Scotia within the Federal framework and it will illustrate some of the multi-disciplinary aspects which make this area of law part science, part art and part soothsaying
ENVS3226.03	Economic Botany: Plants & Civilization	UG	Environmental Science	Science	The story of the human use of plants for food, fibre and fuel including the botany, domestication, development, distribution, production, processing, history, economic and social impacts of the major world crops (cereals, fruits, vegetables, flowers and industrial crops) and the importance of parts in medicine and conservation.
ENVS3301.03	Enterprise Sustainability	UG	Environmental Science	Science	Integration of sustainability into corporate environment is reviewed from perspectives of practical application of pollution prevention (P2). Tools for data collection, communication, analysis, and presentation will be taught.
ENVS3400.03	Environment and Human Health	UG	Environmental Science	Science	This course examines the relationships between the health of populations and health determinants in the context of environmental sustainability. Weekly laboratory exercises will teach students how geomatics (GIS, GPS, and remote sensing technologies) and epidemiological tools can be used to assess the links between the health of human populations and the health of the environment, and how to use these tools for environmental health research
ENVS3501.03	Environmental Problem Solving I	UG	Environmental Science	Science	This course introduces students to concepts and methods for analyzing environmental problems. Students will learn analytical approaches for problem solving that are appropriate for a wide range of environmental issues and apply these to the analysis of case studies.

ENVS3502.03	Environmental Problem Solving II: The Campus as a Living Laboratory	UG	Environmental Science	Science	In this course the campus serves as a living laboratory for identifying, evaluating and assessing indicators of progress toward greater campus sustainability. Working in groups, students apply problem solving models to case studies using qualitative and quantitative research methods and make recommendations for improvements on campus based on their analyses.
ENVS3601.03	Global Biogeochemical Cycles	UG	Environmental Science	Science	We currently face daunting environmental challenges at the global scale that are expected to worsen in the 21st century, including a global water crisis, climate change and pollution of our waters and atmosphere; this course examines the science behind these environmental issues from the multidisciplinary framework of global biogeochemical cycling. With the global scale as the focus, this course pulls together the many disparate fields that are encompassed by the broad reach of biogeochemistry. You will learn about the processes that drive the movement of carbon, water, nitrogen, phosphorus, and sulphur, through the earth system, and the residency of these elements in the atmosphere, soils, lithosphere, oceans and freshwaters. In the quantitative and analytical exercises you calculate and compare the effects of industrial emissions, land clearing, agriculture, and rising population on the processes driving the Earth's chemical cycles. Weekly journal readings for discussion in laboratory group cover the latest developments in this exciting and rapidly changing field. This course provides an excellent framework for those interested in the science of global change.
ENVS4001.03	Environmental Impact Assessment	UG	Environmental Science	Science	This courses provides an opportunity to explore all aspects of environmental impact assessment (EIA) as practiced in Canada and in other countries. The course traces the development of EIA over the past 30 years and critically examines the scientific, procedural and political dimensions
ENVS4003.03	Coral Reefs and Environmental Change	UG	Environmental Science	Science	Coral reefs are iconic marine ecosystems both biologically and economically. This class introduces students to the biology of both tropical and cold-water corals, key characteristics of their abiotic environments, human impacts at both local and global scales, and management options for sustainable resource use and the protection of biodiversity.
ENVS4004.03	Pathways to Sustainable Energy	UG	Environmental Science	Science	Students gain a practical understanding of how to move towards a low-carbon energy future. Students learn about international, national, and subnational policies that drive adoption of renewable energy, energy efficiency, and carbon capture and storage technologies and how the technologies work. The technological barriers to their widespread adoption and how to overcome these barriers are also discussed.



MGMT4041.03	Environmental Education	UG	Management	Management	This course provides a broad examination of the conceptual bases of learning and understanding the environment. It will consider current educational efforts to promote values, attitudes, and behaviors protective of environmental integrity. Topics covered will include environmental education in formal school programs, experiential environmental education, environmental literacy initiatives, continuing professional education, and the role of the media in environmental education.
MGMT4047.03	Conservation Systems Design	UG	Management	Management	Biodiversity conservation systems are increasingly necessary as human activities dominate the landscape. Precise prescriptions for their design are evolving. The theory and practice of conservation system design are explored through lectures, student presentations, discussions and a major term project, as an active learning module involving the students, the instructor and the broader community. Topics include ecological integrity, focal species, population viability, habitat suitability, road ecology, connectivity, and resilience in a context of climate change.
MGMT4125.03	Conflict Negotiations and Sustainability	UG	Management	Management	This course looks at local and global conflicts driven by: climate, politics, resource extraction, land use, and development. The class offers preparatory lectures followed by team-based simulated negotiations. Students learn techniques related to de-escalation, negotiation and debate tactics, through assuming and advocating various stakeholder perspectives.
MGMT4205.03	Law and Policy for REM	UG	Management	Management	This course provides students with an overview of substantive and procedural aspects of Canadian law and policy related to natural resources and the environment. The course will involve lectures, guest speakers, seminar discussions and class participation. Strong emphasis is placed on the Canadian legislative and regulatory framework and the unique character of the regulated subject areas such as toxic substances, air and water quality, fisheries, forests, agriculture, minerals, parks and biodiversity. The role of the common law in preventing or redressing environmental degradation will also be addressed.
MGMT4500.03	Socio-Political Dimensions of REM	UG	Management	Management	The goal of this course is to introduce students to the social, cultural, and political dimensions regarding resource and environmental management. Key objectives are to introduce, analyze, and utilize a range of frameworks for understanding the human dynamics of resource and environmental management decision-making. Students are introduced to a range of tools and techniques for engaging stakeholders in environmental issues (e.g. key informant interviews; focus groups; surveys; community mapping; photovoice). Because this course is integrated with ENVI5205 (biophysical dimensions of resource and environmental management) and ENVI5505 (law/policy dimensions of resource and environmental management) in the same term as required for the MREM program, there is a focus on common case studies to demonstrate the interconnectedness of these dimensions. Student groups in this course undertake in-depth

					investigation of the socio-political elements of resource and environmental management cases in Atlantic Canada
MGMT4504.03	Management of Resources and the Environment	UG	Management	Management	Students explore key management concepts applied in managing natural resources and the environment. Topics include management paradigms, systems, principles, approaches, tools and institutions associated with a wide range of sectors such as fisheries, forests, agriculture, the coastal zone, oceans, parks and protected areas, energy, waste, water, and others
MGMT4505.03	Biophysical Dimensions of REM	UG	Management	Management	This course will introduce students to techniques and tools employed in natural resource and environmental management programs and projects and engage students in case-based problem solving learning intended to understand how bio-physical information is utilized in assessing resource and environmental issues and contributing to effective decision-making. Some of the tools that will be reviewed are environmental impact assessment, environmental site assessment, life cycle analysis, environmental monitoring and adaptive environmental assessment and management.
MGMT4507.03	Environmental Informatics	UG	Management	Management	Environmental informatics refers to digital systems for environmental monitoring, analysis, communication and decision making. The course will cover: digital data and where to find it; how to access such data ethically and manage it intelligently; tools and techniques necessary for making best use of those data; and, a working knowledge of a subset of those datasets, tools and techniques, including census, spreadsheets, database management systems and geographic information systems.
MGMT4705.03	Environmental Impact Assessment	UG	Management	Management	Students explore all aspects of environmental assessment (EA), with a focus on EA processes in Canada. The course examines professional practice in scientific, procedural and political dimensions. Current cases are studied opportunistically. Students learn the materials through case studies, seminars, group projects and research papers
MARI3063.03	Resource Ecology	UG	Marine Biology	Science	This course considers the ecology, utilization, and management of natural resources in fisheries, wildlife and forest management, agriculture and aquaculture. Topics include population dynamics, community interactions, and ecosystem support of resources as well as the history of resource utilization, practices of controlling production, pests, and predators, and sustainable management strategies

MARI4003.03	Coral Reefs and Environmental Change	UG	Marine Biology	Science	Coral reefs are iconic marine ecosystems both biologically and economically. This course introduces students to the biology of both tropical and cold-water corals, key characteristics of their abiotic environments, human impacts at both local and global scales, and management options for sustainable resource use and the protection of biodiversity.
MARI4323.03	Biologging in Ecology	UG	Marine Biology	Science	This course explores the fundamentals and applications of biologging and biotelemetry: the use of electronic tags to study free-ranging animals and their environment. Students are introduced to the wide range of tags and their diverse applications in biology.
MARI4350.03	Cutting Edge in Marine Science	UG	Marine Biology	Science	This course focuses on current, often hotly debated topics in marine science. We discuss recently published papers and current research initiatives on urgent issues, including biodiversity, fisheries, conservation, management, climate change, and human-ocean interactions.
OCEA2800.03	Climate Change	UG	Oceanography	Science	See PHYC 2800.03
OCEA4000.03	Oceans and Global Change	UG	Oceanography	Science	This course examines the role and response of the Oceans to global change, including alterations in currents and circulation, increases in sea level and storm surges, changes in ocean chemistry, modification to the types and patterns of sediment deposition, alterations in the abundances and distributions of organisms, and overall productivity. The course will discuss means of predicting these changes and their effects.
PHYC 2310.03	Energy and the Environment	UG	Physics and Atmospheric Science	Science	The physical principles and limitations of renewable energy source utilization and energy conversion. A quantitative introduction to energy conversion and storage systems, including solar power and heating, wind, tidal, geothermal, hydroelectric, nuclear power, hydrogen technology, electrical and mechanical energy storage. The input of these energy options on the global climate and environment will be discussed
PHYC2800.03	Climate Change	UG	Physics and Atmospheric Science	Science	The workings of the Earth's climate system are examined and then applied to help understand contemporary climate change. The role of numerical climate models is discussed with the aim of interpreting climate change predictions for the coming decades. Finally, the impacts of climate change are studied with a focus on the various mitigation and adaptation strategies needed

AGRI5250.03	Soil Microbiology	G	Agriculture	Agriculture	This course is designed to provide an intensive study of the microbiology of soils and will emphasize nutrient cycling and biodegradation. Topics covered include the relationships between the abiotic and biotic components of soils; the microbial biochemistry of the carbon, nitrogen, sulphur, phosphorus, and selected micronutrient cycles; heavy metal cycling; and the microbial degradation of industrial wastes and pesticides. The laboratory classes will concentrate on techniques to monitor the microbial biomass in soil and the microbial components of nutrient cycles. These include new advances in bacterial taxonomy and identification, and the use of gas chromatography and high-performance liquid chromatography in quantitating nutrient cycling.
ARCH5210.03	Life Cycle Analysis	G	Architecture	Architecture & Planning	This course studies the range of environmental impacts associated with building materials and assemblies, from their raw state to the end of their useful life. It considers operating energy, embodied energy, and carbon sequestration, with particular attention to the structure and building envelope of wood framed heritage buildings.
BIOL5042.03	Marine Conservation Genetics	G	Biology	Science	We survey techniques of molecular genetic analysis and consider how they can be used to identify species, populations, sexes, individuals and family relationships, and study population attributes such as historical dispersal, contemporary connectivity, mating behaviour and effective population size.
BUSI6044.03	Industrial Sustainability; Patterns for Sustainable Industrial Development	G	Business Administration	Management	It is becoming increasingly obvious that human economies depend on the products and services provided by healthy, functioning ecological systems. By studying the flow of materials and energy through industrial systems, industrial ecology identifies economic ways to lessen negative environmental impacts - through pollution prevention, innovative waste management strategies, improved energy efficiency, design for the environment, and promoting sustainability - within the carrying capacity of the surrounding ecosystems. The course will also include the social dimensions relating to industrial ecology by focusing on the organizational management dimensions that are related to the reduction of industrial emissions, waste flows, energy use and usage of materials within in-company procedures and beyond the level of single organizations.
CIVL6139.03	Transportation Operations	G	Civil Engineering	Engineering	This course is an introduction to the operation of transportation services at the urban and regional levels. Surveys and data collection, development of computerized data bases, and elements of travel forecasting; trip generation, trip distribution, modal split, trip assignment are covered. Operational characteristics of public transportation, airports and freight distribution systems, and performance evaluation are discussed. Environmental, energy and safety implications of transportation systems, and existing policies are reviewed.

ERTH5520.03	GIS Applications to Environmental and Geological Sciences	G	Earth Science	Science	Geographic information systems (GIS) provide a rich set of new tools to the geologist and environmental scientist, not only to solve conventional problems, but also to explore questions not readily answered by other means. This course builds on the fundamentals of GIS taught in EARTH 3500.03 to explore analytical tools that aid in decision-making processes encountered in mineral exploration, hydrogeology, site selection, environmental assessment, and global change analysis. The course concentrates on case studies and problem solving, including those requiring multi-criteria and multi-objective decision making processes.
ERTH5600.03	Exploring GIS	G	Earth Science	Science	Geographic Information Systems (GIS), as a tool for the management of georeferenced data, have become indispensable for disciplines where location of objects and pattern of processes is important. GIS plays a significant role in a wide range of applications, from modeling, to analysis and predictions, to decision making. The course is aimed at a broad base of potential users and draws on examples of the role of GIS in global climate change, mineral exploration, preservation of biodiversity, coastal zone management, resource depletion, and many other present and future environmental issues. The course material will be of interest to those studying geoscience, environmental science, ecology, marine biology, oceanography, epidemiology, urban and rural planning, civil engineering, and any other field involving spatial data. Students are expected to complete and present a GIS project related to their field of research. Laboratory exercises emphasize the principles of raster and vector GIS, and the integration of databases and GPS (global positioning systems) data into GIS. Exercises draw on the diversity of GIS applications in a number of application areas.
ECON5516.03	Resource Economics	G	Economics	Science	This course is designed as an introduction to the theory and application of resource economics. Topics include: 1) interpersonal and intertemporal decision-making criteria; 2) the basic theory of nonrenewable resource exploitation (including Hotelling's theory of the mine); 3) a basic forestry model (i.e., the Faustmann model) including extensions which allow for benefits that arise from standing forests; and 4) the Gordon-Schaefer model of the fishery and optimal dynamic harvesting. Empirical applications of these models (from the current economic literature) will also be presented.

ECON5517.03	Environmental Economics	G	Economics	Science	This course is designed as an introduction to the theory and application of environmental economics. It includes the theoretical analysis of 1) interpersonal and intertemporal decision-making criteria; 2) public goods and externalities (such as pollution) and the advantages/disadvantages of regulatory mechanisms; 3) valuation of environmental benefits or damages (e.g., compensating and equivalent variations); 4) preference revelation (e.g., surveys, hedonic pricing, and travel-cost methods); and 5) anthropocentric valuation of the environment (e.g., existence value, access value, option value and quasi-option value) and the possibility of non-anthropocentric decision making.
ENVI5001.03	Environmental Assessment	G	Environmental Studies	Management	Students explore all aspects of environmental assessment (EA), with a focus on EA processes in Canada. The course examines professional practice in scientific, procedural and political dimensions. Current cases are studied opportunistically. Students learn the materials through case studies, seminars, group projects and research papers.
ENVI5021.03	Fisheries Management	G	Environmental Studies	Management	This interdisciplinary course focuses on the theory and practice of fishery management, with emphasis on Sustainable Fishery Systems. It will address the structure and dynamics of fisheries, and key themes in managing fisheries for sustainability and resilience, through class seminars and discussion, as well as attendance at related fisheries and coastal events.
ENVI5031.03	Economics for Resource and Environmental Management	G	Environmental Studies	Management	This course is designed as a one term introduction to economics for graduate students who do not have any or limited undergraduate economics training. However, it is also suitable for students with prior economics training who are interested in exploring the environment-economy relationship further. The course begins with a brief but intense guided tour of economics. We then focus on key topics in environmental economics, including among others: * the sustainable economy* theory of market failure, public goods and externalities* environmentalist critiques of economic thinking* environmental and natural resource accounting* economic valuation of the environment* time in economic/environmental analysisThe final part of the class explores the theory and practice of a new discipline which better integrates environmental and economic analysis; namely the field of “ecological economics”. The course is open to students in other parts of the University who are interested in economy and environment.

ENVI5041.03	Environmental Education	G	Environmental Studies	Management	This course provides a broad examination of the conceptual bases of learning and understanding the environment. It will consider current educational efforts to promote values, attitudes, and behaviors protective of environmental integrity. Topics covered will include environmental education in formal school programs, experiential environmental education, environmental literacy initiatives, continuing professional education, and the role of the media in environmental education.
ENVI5044.03	Patterns for Sustainable Industrial Development	G	Environmental Studies	Management	It is becoming increasingly obvious that human economies depend on the products and services provided by healthy, functioning ecological systems. By studying the flow of materials and energy through industrial systems, industrial ecology identifies economic ways to lessen negative environmental impacts - through pollution prevention, innovative waste management strategies, improved energy efficiency, design for the environment, and promoting sustainability - within the carrying capacity of the surrounding ecosystems. The course will also include the social dimensions related to industrial ecology by focusing on the organization and management dimensions that are related to the reduction of industrial emissions, waste flows, energy use and usage of materials within in-company procedures and beyond the level of single organizations.
ENVI5047.03	Biodiversity Conservation Systems Design	G	Environmental Studies	Management	Biodiversity conservation systems are increasingly necessary as human activities dominate the landscape. Precise prescriptions for their design are evolving. The theory and practice of conservation system design are explored through lectures, student presentations, discussions and a major term project, as an active learning module involving the students, the instructor and the broader community. Topics include ecological integrity, focal species, population viability, habitat suitability, road ecology, connectivity, and resilience in a context of climate change.
ENVI5204.03	Coastal Zone Management	G	Environmental Studies	Management	This seminar is designed to introduce students to the concepts, principles, approaches and issues associated with integrated management of coastal zones worldwide. Coastal zones are critical areas of transition between land and sea, involving complex overlaps between resource uses and government jurisdictions. This course will address the legal, policy and administrative frameworks prevailing in Canada, but will do so within the global context of coastal zone management. Case studies and examples from developed and developing countries will be used to present practical approaches to the management of multiple uses in coastal zone, including community-bases management models.

ENVI5205.03	Law and Policy for Resource and Environmental Management	G	Environmental Studies	Management	This course provides students with an overview of substantive and procedural aspects of Canadian law and policy related to natural resources and the environment. The course will involve lectures, guest speakers, seminar discussions and class participation. Strong emphasis is placed on the Canadian legislative and regulatory framework and the unique character of the regulated subject areas such as toxic substances, air and water quality, fisheries, forests, agriculture, minerals, parks and biodiversity. The role of the common law in preventing or redressing environmental degradation will also be addressed.
ENVI5500.03	Socio-political Dimensions of Resource and Environmental Management	G	Environmental Studies	Management	The goal of this course is to introduce students to the social, cultural, and political dimensions regarding resource and environmental management. Key objectives are to introduce, analyze, and utilize a range of frameworks for understanding the human dynamics of resource and environmental management decision-making. Students are introduced to a range of tools and techniques for engaging stakeholders in environmental issues (e.g. key informant interviews; focus groups; surveys; community mapping; photovoice). Because this course is integrated with ENVI5205 (biophysical dimensions of resource and environmental management) and ENVI5505 (law/policy dimensions of resource and environmental management) in the same term as required for the MREM program, there is a focus on common case studies to demonstrate the interconnectedness of these dimensions. Student groups in this course undertake in-depth investigation of the socio-political elements of resource and environmental management cases in Atlantic Canada
ENVI5504.03	Management of Resources and the Environment	G	Environmental Studies	Management	Students explore key management concepts applied in managing natural resources and the environment. Topics include management paradigms, systems, principles, approaches, tools and institutions associated with a wide range of sectors such as fisheries, forests, agriculture, the coastal zone, oceans, parks and protected areas, energy, waste, water, and others.
ENVI5505.03	Biophysical Dimensions of Resource and Environmental Management	G	Environmental Studies	Management	This course will introduce students to techniques and tools employed in natural resource and environmental management programs and projects and engage students in case-based problem solving learning intended to understand how bio-physical information is utilized in assessing resource and environmental issues and contributing to effective decision-making. Some of the tools that will be reviewed are environmental impact assessment, environmental site assessment, life cycle analysis, environmental monitoring and adaptive environmental assessment and management.



ENVI5507.03	Environmental Informatics	G	Environmental Studies	Management	Environmental informatics refers to digital systems for environmental monitoring, analysis, communication and decision making. The course will cover: digital data and where to find it; how to access such data ethically and manage it intelligently; tools and techniques necessary for making best use of those data; and, a working knowledge of a subset of those datasets, tools and techniques, including census, spreadsheets, database management systems and geographic information systems.
ENVI6100.03	Information in Public Policy and Decision Making	G	Environmental Studies	Management	This course addresses the role(s) of information in policy and decision-making at local, national, and international levels. Evidence-based policy making is relatively new and challenging. This course examines the research-policy interface, especially enablers and barriers to use of information of several domains, and uses case studies to illustrate concepts.
MGMT5000.06	Management Without Borders	G	Management	Management	This course places management in its broadest context and helps students from diverse disciplines understand the complex social, economic, ecological, political and technological forces shaping 21st century leadership in the public, private and non-profit sectors. Key themes explored in the course include systems thinking, responsible leadership, sustainable economic development, stakeholder theory, risk management and knowledge management.
MARA5001X.03	Contemporary Issues in Ocean Management and Development	G	Marine Management	Science	This course offers an introduction to the field of marine affairs and to the broad suite of contemporary issues confronting the ocean and coastal manager. As a foundation core course for MMM students, the course draws on examples from topical streams of the MMM degree program. Subject areas addressed include current governance approaches, negotiation and consensus building, managing and assessing risk to both the human and natural components of the ecosystem and protection and preservation of the coastal and marine environment and the communities that depend on them. The course employs interactive teaching techniques with a group work component.
MARA5001Y.03	Contemporary Issues in Ocean Management and Development	G	Marine Management	Science	See above
MARA5009.03	Coastal Zone Management	G	Marine Management	Science	This course is designed to introduce students to the concepts, principles, approaches, and issues associated with integrated management of coastal zones worldwide. It uses a systems approach to understand the global context of coastal zone management. Case studies and examples from developed and developing countries are used to present practical approaches to the management of multiple uses in the coastal zone, including community-based management models.

MARA5012.03	Community-Based Co-Management	G	Marine Management	Science	This course will critically examine the extent to which community-based co-management provides a viable approach to marine resource management in terms of its costs and benefits, opportunities for and barriers to its implementation, and conditions necessary for its long-term survival as a practical management tool.
MARA5013.03	Marine Protected Areas	G	Marine Management	Science	The role of MPAs around the world is continually evolving. From fully no-take marine reserves to multiple use marine parks, the range of options available to marine managers is explored. This course will provide the latest information on MPAs with a focus on the Canadian context with exploration of international experiences and best practices.
MARA5021.03	Fisheries Management	G	Marine Management	Science	This interdisciplinary course focuses on the theory and practice of fishery management, with emphasis on Sustainable Fishery Systems. It will address the structure and dynamics of fisheries, and key themes in managing fisheries for sustainability and resilience, through seminars and class discussion, as well as attendance at related fisheries and coastal events.
MECH6340.03	Energy Management I	G	Mechanical	Engineering	The purpose of this course is to introduce the concepts and techniques of energy management and conservation. The subjects that will be discussed are energy supply and demand, energy pricing, scope of the energy problem and approaches to provide solutions; energy auditing; improving energy utilization in space conditioning and steam, hot water and compressed air systems; energy saving opportunities in refrigeration and cooling systems; insulation; and electrical energy conservation. An interdisciplinary approach will be employed in this course to provide a wider understanding of the subject
OCEA5285.03	Marine Biogeochemical Processes	G	Oceanography	Science	This advanced course is designed for students interested in cutting-edge developments in marine biogeochemistry. Topics to be discussed include linkages between climate, marine biogeochemistry, carbon cycling on seasonal to glacial-interglacial time-scales, and their perturbations during the Anthropocene. Students will perform a guided literature survey and present selected topics during classes.
OCEA5595.03	Atmospheric Chemistry	G	Oceanography	Science	A fundamental introduction to the physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.

PHYC5595.03	Atmospheric Chemistry	G	Physics and Atmospheric Science	Science	A fundamental introduction to the physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.
PLAN6106.03	Transportation Planning	G	Planning	Architecture & Planning	This course analyses transportation trends, the transport needs associated with different activities and the impact of transport facilities on land development to offer a critical analysis of the interplay between land uses and transportation. Technology, the costs of supplying transport facilities and the demand outlook for different modes are examined. The emphasis is on urban transportation, mobility demands and the supply of efficient and environmentally sound transport facilities.
PLAN4125.03	Negotiation and Conflict Management	G	Planning	Architecture & Planning	This course explores the world of interpersonal communication, conflict and negotiation and the variety of approaches and range of skills needed to solve problems, reach agreements and maintain relationships. It will enable participants to understand the positive and negative dimensions of conflict, analyze the dynamics of formal and informal negotiations, and interact with others with greater awareness, intention and skill (cross listed with Conflict Negotiation and Sustainability).
POLI5380.03	Politics of Climate Change	G	Political Science	Arts	This course examines interactions between politics and a changing climate. Topics include: the role of science and economics in climate politics; the new 'climate capitalism' and non-capitalist alternatives; Canada's difficulties in addressing climate change; climate politics at the personal level; international climate negotiations; and climate as a security issue
LAWS2041.03	Coastal Zone Management	G	Law	Law	This course is designed to introduce students to the concepts, principles, approaches, and issues associated with integrated management of coastal zones worldwide. This course uses a systems approach to understand the global context of coastal zone management. Case studies and examples from developed and developing countries are used to present practical approaches to the management of multiple uses in the coastal zone, including community-based management models.

LAWS2051.03	International Environmental Law	G	Law	Law	The progression of international environmental law from “customary” co-existence to “conventional” cooperation is explored through nine topics: (1) State Responsibility and Liability for Transboundary Pollution; (2) “Soft Law” and Sustainable Development Principles: From Stockholm to Rio and Beyond; (3) The Legal Waterfront of Marine Environmental Protection; (4) The International Law of the Atmosphere: Climate Change; (5) The Conservation of Biodiversity; (6) The International Framework for Controlling Transboundary Movements of Hazardous Wastes and Toxic Chemicals; (7) The Protection and Management of International Watercourses; (8) Polar Regions and International Environmental Law; and (9) Free Trade and the Environment.
LAWS2104.03	Environmental Law I	G	Law	Law	Environmental laws in support of sustainable development are explored through nine class themes. The international law context for environmental law is briefly introduced, including the principles of precaution, polluter pays and public participation. The role of common law in preventing and redressing environmental degradation is considered. Constitutional realities and restrictions to environmental management are examined. The traditional command control approach to environmental regulation is critiqued and alternate approaches are introduced. Environmental impact assessment law and practice is covered. The course concludes with a number of more specific themes, such as enforcement, judicial review, biodiversity and climate change.
LAWS2133.03	Environmental Law II – Interdisciplinary Perspectives on Climate Change	G	Law	Law	This course takes an in depth interdisciplinary look at one of our greatest global environmental challenges, climate change. Climate change is used as a case study to explore the role of law in addressing such challenges. Current law and policy approaches to climate change are considered at global, regional, national and sub-national levels. Within this context, students will consider the role of science and economics among other disciplines in identifying the role of law.
LAWS2153.03	Business and Environmental Law	G	Law	Law	This course looks at the interrelationship between environmental issues and business issues and how they continue to evolve. Emphasis is placed on how environmental issues, especially those relating to liability for contaminated sites and pollution, impact on, and affect, business transactions and operations. This interrelationship is explored beginning with a legislative overview and transactional issues and then moves into the interplay between government and the private sector in regulating business operations. Issues covered include due diligence, contaminated sites and environmental consultants, stigma, regulatory liability, environmental claims and damages and emerging international/cross-border obligations.

### Courses That Include Sustainability

<b>Course</b>	<b>Title</b>	<b>Degree Level</b>	<b>Department</b>	<b>Faculty</b>	<b>Course Description</b>
AGRI1000.03	Agricultural Ecosystems	UG	Agriculture	Agriculture	This course is an introduction to agriculture and food systems. The principles of agricultural production as studied in the disciplines of animal science, plant science, agricultural engineering, and soil science will be integrated to give a comprehensive view of agricultural ecosystems. Course work will include lectures, laboratories, problem-solving exercises, and small-group work. The course will expose students to issues and raise questions to be considered during the remainder of their undergraduate careers. The goals of this course are to provide students with knowledge of the application of science to agriculture, and to assist students to understand the integrated nature of agriculture and food systems in both regional and global contexts. Associated course goals are to develop communication and independent learning skills and the ability to function effectively in team situations, and to stimulate students to think critically, logically, and quantitatively while respecting the values and ideas of others.
ANSC2005.03	Animal Agriculture	UG	Animal Science	Agriculture	Through a mixture of classroom lectures and exercises at Faculty of Agriculture, Dalhousie, this course will enable students to recognize common breeds of farm animals, to describe livestock production cycles and methods, and to understand the place of farm animals in the world food system. The course will provide introduction to subject matter covered in more senior animal science courses, such as nutrition, reproduction, behavior and welfare, animal anatomy, and environmental physiology. The interaction of livestock production with our environment will be examined.
ANSC4004.03	The Ecology of Milk Production in Ruminants	UG	Animal Science	Agriculture	. The objectives of this course are to examine the production of milk, from provision of feed for the animals to processing the milk into products, and the important contribution made by the dairy industry in providing sustainable food security for society. This course will challenge perceptions of students who will become future dairy farmers or consumers and thus will influence future policy.
APSC1003.03	Practices and Mechanics of Materials	UG	Applied Science	Agriculture	This course deals with the practices of selecting and working with materials, including considerations for green practices. Selection of materials is based on many properties depending on the application; usually strength, workability, durability, and costs are key concerns. Green practices during the construction of machines, structures and buildings will include traditional properties and their environmental and resource efficiency including their deconstruction. Using green materials and products promotes conservation of dwindling non-renewable resources and helps to reduce the environmental impacts associated with the extraction, transport, processing, fabrication, installation, reuse, recycling, and disposal of these source materials.
APSC3015.03	Irrigation and Drainage	UG	Applied Science	Agriculture	This course examines basic soil/water/plant/atmosphere relationships. It introduces students to soil and water conservation and management principles. The course covers irrigation and drainage of golf courses, athletic areas, parks, and residential landscapes.

APSC3020.03	Energy Production and Utilization	UG	Applied Science	Agriculture	This lecture-based course provides an overview of the whole energy system, focusing on selected attributes of energy. The assessment, management and remediation of energy production is a global issue, which will ultimately impact all walks of life, business, industry and future infrastructure. It includes an introduction to the energy supply chain, transmission and distribution systems, energy use, energy policy and the environment and methods of generation. It also includes an overview of renewable energy assessment techniques and feasibility tools.
BIOA1030.03	Biology for Engineers	UG	Biology	Agriculture	This course is intended to give engineers a biological/environmental perspective that is an essential element in all modern, successful engineering projects. It will focus on the complex interface between living systems and the human environment. This course includes a basic introduction to cell structure and function, hierarchies and ecology. Special topics will include biomimicry and environmental impacts as they apply to engineering design
BIOA3002.03	Weed Science	UG	Biology	Agriculture	This course deals with the principles of weed science. Included are discussions on weed recognition, and chemical and non-chemical approaches to controlling weeds in various agricultural crops and in lawns and non-crop areas. The selection, safe use, handling, and storage of herbicides are stressed, along with the environmental impact of the different methods of weed control.
ECOA1000.03	Principles of Microeconomics	UG	Economics	Agriculture	A course in comprehensive principles of microeconomic theory, covering the market system, producer and consumer theory, environmental and resource economics, and international trade policy. Emphasis in this course is on the application of economics to issues and problems facing many countries and their citizens today. The approach is practical and “real-world,” using microeconomic theory to develop an understanding of the issues and problems being discussed and the policy choices facing governments in dealing with these matters.
ECOA3002.03	Agricultural and Food Policy	UG	Economics	Agriculture	This course introduces students to the structure of the agri-food industry and the process of policy and implementation. A critical assessment of the institutions (organizations, programs, and policies) in agriculture is the main focus of the course. Through guest speakers, students’ presentations, interactive class discussions, and lectures, students will learn how policies are developed and who is involved in the policy development process. An historical appreciation for agricultural policy in Canada will be pursued with a critical assessment of these policies. In reviewing policy problems affecting the agri-food industry, students will examine possible solutions to these issues. Topics covered include: reasons for government intervention; historical development of agri-food policy in Canada; the policy process; players in agriculture and food policy; structure of provincial, federal, and cost-shared programs; consumers and food policy; resource and environmental policy; international agricultural and food policies; trade agreements; and agribusiness involvement in agriculture and food policy

ECO44004.03	Trade	UG	Economics	Agriculture	This course will provide students with an understanding of the factors that influence the exchange of products, with particular emphasis on trade interventions and institutions. Students will be introduced to trade theory, which they will use to evaluate trade policy issues. Students will learn how various government policy instruments and institutions affect international and interregional trade. Also, the complex set of rules and regulations governing international trade, such as the WTO, will be analyzed. The consequences of, and linkages among, international trade, the environment, and economic development will also be pursued.
ENVA3004.03	Principles of Pest Management	UG	Environmental Science	Agriculture	An investigation of the philosophy of pest management. Topics will include the study of different approaches to pest management and an assessment of the use of single versus integrated pest control options. Costs of pest control from economic, social, and environmental perspectives will be discussed.
ENVA4003.03	Advanced Weed Science	UG	Environmental Science	Agriculture	Deals with principles of weed science from an ecological perspective. Included are discussions on ecology and management of weeds in traditional agro-ecosystems as well as in low-input sustainable agricultural systems. The roles of biological, cultural, and chemical controls in these systems will be stressed.
GEOA3000.03	Rural Geography	UG	Geography	Agriculture	This course focuses on rural geographic problems in Canada and the Atlantic region. Discussion will include, for example, rural land use issues, settlement dynamics, rural resource problems, urban/rural interaction, agricultural change, rural well-being, and rural planning. The geographic perspective emphasizes spatial variability and human/land interactions.
HORT2007.03	Small Fruit Crops	UG	Horticulture	Agriculture	The course consists of the study of strawberry, blueberry, raspberry, cranberry, currant, gooseberry, kiwi, elderberry, Saskatoon berry, and grape production. Aspects of propagation through to harvesting and marketing of each crop is discussed. Some aspects of organic production of small fruits are included.
HORT2008.03	Residential Landscape Design and Construction	UG	Horticulture	Agriculture	This course introduces a systematic process for developing residential landscape designs. Emphasis is placed upon maximizing the usefulness of the property and developing it in an environmentally sound and sustainable manner. Grade changes, on-site storm water management, and the engineering use of plants in design is included. Students work with a residential design client from the development of the design brief to the final presentation. Studio exercises will utilize the computer as a design tool as well as manual graphic techniques.
IPHE2201.03	Aboriginal Health and Healing	UG	Interprofessional Health Education	Health	This course provides students the opportunity to learn about Aboriginal perspectives regarding health, as well as the multiple and complex challenges facing Aboriginal peoples with respect to key health issues, such as health and social inequities, the epidemiology of disease and culturally appropriate service provision.

SOSA2052	Contemporary Issues in Indigenous Studies	UG	Canadian Studies	Arts and Social Sciences	This course offers an interdisciplinary introduction to contemporary challenges faced by Indigenous peoples in Canada. Topics may include language and culture, land rights, economics, governance and treaty relationships, child welfare and education, health, social services, environmental issues, violence, criminal justice and self-determination, political mobilization and resistance, and decolonization.
PLSC4002.03	Plant Ecophysiology	UG	Plant Science	Agriculture	This course is designed to stimulate interest, critical thinking, and investigative processes for the understanding of growth, development, distribution, acclimation, and adaptation of crop plants that are influenced by their physiological ecology; the interaction with the climatological, physical, chemical, and biological environments; and the ecophysiological responses that are modulated by input and crop management factors. This course will also enhance knowledge of crop stress diagnostics, physiological mechanisms of acclimation, and adaptation to various challenging abiotic and biotic stress factors. Agricultural practices and agroecosystem management will be related to the economic and environmental responsibilities. This course will use several “Participatory Learning” techniques.
SOIL2000.03	Introduction to Soil Science	UG	Soil Science	Agriculture	General principles of soil science relating to the origin, development, and classification of soils; and the biological, physical, and chemical properties of soils and their relation to proper soil and crop management, land use, and soil conservation.
SOIL3000.03	Soil Fertility and Nutrient Management	UG	Soil Science	Agriculture	The study of the soil chemical environment as it affects crop production. The course investigates the biogeochemical cycling of nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, and micronutrients in crop production. It considers the use and management of supplemental nutrients in both conventional and certified organic production. Soil pH and other factors that influence soil fertility, directly or indirectly, are also discussed. Labs take the form of problem-solving tutorials on nutrient management.
ARCH3208	Building Technology	UG	Architecture	Architecture & Planning	This course studies aspects of building technology that mediate the relationship between interior and exterior environments. Building materials studies include structural and environmental properties, constructional implications, and principles of assembly and jointing. The principles of heat flow, air flow and moisture flow in building enclosures are presented. Students undertake a series of design exercises applying knowledge of topics studied in the course
PLAN1001.03	Introduction to Community Design I	UG	Planning	Architecture & Planning	This course introduces community design by exploring the characteristics of human and natural communities, the connections between them, and the types of interventions designers and planners can make to help people create good living environments. Community design involves applying scientific and creative approaches to helping communities accommodate human needs while respecting the environment



PLAN1002.03	Introduction to Community Design 2	UG	Planning	Architecture & Planning	This course builds on the lessons from Introduction to Community Design 1 by exploring how designers affect the form, structure, and character of human settlements. It examines principles of design, and helps students understand strategies and develop techniques for documenting, testing, and communicating ideas.
PLAN3002.02	Reading the City	UG	Planning	Architecture & Planning	Any city reflects the history of its topography, cultural traditions, and design interventions. This course introduces the principles, theories, and methods of urban form analysis in the local urban context. Students explore the local urban environment to interpret what the city means, and how it comes to take the shape it does.
PLAN3006.02	Reading the Landscape	UG	Planning	Architecture & Planning	Any landscape reflects its natural and cultural history. This course explores principles, theories, and methods of landscape interpretation. These approaches will be applied to community design problems in local landscapes.
CANA2052	Contemporary Issues in Indigenous Studies	UG	Canadian Studies	Arts and Social Sciences	This course offers an interdisciplinary introduction to contemporary challenges faced by Indigenous peoples in Canada. Topics may include language and culture, land rights, economics, governance and treaty relationships, child welfare and education, health, social services, environmental issues, violence, criminal justice and self-determination, political mobilization and resistance, and decolonization.
CHIN2290.03	Emerging Giants: The Economic Rise of China and India	UG	Chinese	Arts	This course examines the economic history, current issues, and future trends of China and India, answering such questions as: What explains China's and India's growth? How is climate change affected by this growth? How are global labour markets affected? Must growth lead to rising inequality? Is democracy required for development?
EMSP3000.06	The Study of Nature in Early Modern Europe	UG	Early Modern Studies	Arts	This course provides an overview of the major changes and continuities of representation of the natural world in the sixteenth, seventeenth and eighteenth centuries. It seeks to recover the Early Modern understanding that the study of nature is incomprehensible if isolated from new techniques and technologies and from the philosophical and artistic disciplines. Because developments in the study of nature in this period are relative to institutional place and national location, the principal elements of the social, economic, political and cultural contexts within which scientists and philosophers of nature worked will be considered. As well, the aesthetic representations of nature and its study will be a theme throughout the course.

GEOG3002.02	Reading the City	UG	Geography	Science	Any city reflects the history of its topography, cultural traditions, and design interventions. This course introduces the principles, theories, and methods of urban form analysis in the local urban context. Students explore the local urban environment to interpret what the city means, and how it comes to take the shape it does.
GEOG3006.03	Reading the Landscape	UG	Geography	Science	Any landscape reflects its natural and cultural history. This course explores principles, theories, and methods of landscape interpretation. These approaches will be applied to community design problems in local landscapes.
GEOG3500.03	Exploring Geographic Information Systems		Geography	Science	Geographic Information Systems (GIS), as a tool for the management of georeferenced data, have become indispensable for disciplines where location of objects and pattern of processes is important. GIS plays a significant role a wide range of applications, from modeling, to analysis and predictions, to decision making. The class is aimed at a broad base of potential users and draws on examples of the role of GIS in global climate change, mineral exploration, preservation of biodiversity, coastal zone management, resource depletion, and many other present and future environmental issues. The course material will be of interest to those studying geoscience, environmental science, ecology, marine biology, oceanography, epidemiology, urban and rural planning, civil engineering, and any other field involving spatial data.
GEOG4520.03	GIS Applications to Environmental and Geological Sciences	UG	Earth Science	Science	Geographic information systems (GIS) provide a rich set of new tools to the geologist and environmental scientist, not only to solve conventional problems, but also to explore questions not readily answered by other means. This course builds on the fundamentals of GIS taught in EARTH 3500.03 to explore analytical tools that aid in decision-making processes encountered in mineral exploration, hydrogeology, site selection, environmental assessment, and global change analysis. The course concentrates on case studies and problem solving, including those requiring multi-criteria and multi-objective decision making processes.
HSTC1801.03	Technology and Engineering: From the Industrial Age to the Cybernetic Age	UG	Complementary Studies	Engineering	Through case studies this course examines the co-development of technology and out social, political, and economic institutions of the past 200 years and how these relations shaped the various roles and responsibilities of Canadian professional engineers. Course content includes 1960s-70s green revolution, globalization, environmental justice, the energy crisis, and climate change.

PHIL2475.03	Justice in Global Perspective	UG	Philosophy	Arts	In this course, we will explore answers to the central question in philosophical ethics “How should we live our lives and interact with others?” in the context of the international community or “Global Village” in which we now live. The course will involve close concentration on analyses of liberal and non-liberal theorists from around the world on the subjects of: moral rights, the nature of justice, social welfare, human diversity and equality, and the nature of social responsibility. Specific topics may include: the impact of globalization on understanding of moral rights (human rights, labour rights, language rights, etc.), third world responses to western conceptualizations of rights, new conceptions of justice and social transformation including conceptions of restorative justice, conceptualizations of race and ethnicity and sources of personal and communal identity, the nature and importance of autonomy, the importance of different cultural constructions of gender and the problem of sexual violence in a global perspective, and frameworks for understanding shared agency and shared responsibility for poverty and environmental degradation.
POLI1065.03	Political Worlds: the Global Domain	UG	Political Science	Arts	This course, which builds on Political Science 1060, introduces you to key approaches, actors, and issues in the study of global politics. After discussion, the role of theory and history in understanding contemporary global politics, it considers the role of national governments, international and regional organizations (like the United Nations, the European Union, or the African Union), Non-governmental organizations (like the Red Cross or Greenpeace), and Multinational Corporations. It then looks at the Politics of Global Security and Human Rights, and the Politics of Global welfare (including trade, poverty alleviation, and environmental stress). The objective is to increase your global political ‘literacy’, to better understand contemporary global challenges and to prepare you for further study of international relations and comparative politics.
POLI4340	Approaches to Development	UG	Political Science	Arts	A survey of theories of and policies about dependence, underdevelopment and peripheral social formations. Particular emphasis on modernization, materialist, and alternative modes of analysis, and on orthodox and radical strategies of development. Topics include social contradictions (e.g. class, race and ethnicity), debt, structural adjustment, human development, human security, gender, technology, civil society, informal sectors, democratization and ecology.
SOSA2052	Contemporary Issues in Indigenous Studies	UG	Sociology	Arts and Social Sciences	This course offers an interdisciplinary introduction to contemporary challenges faced by Indigenous peoples in Canada. Topics may include language and culture, land rights, economics, governance and treaty relationships, child welfare and education, health, social services, environmental issues, violence, criminal justice and self-determination, political mobilization and resistance, and decolonization.

SOSA2503.03	Health and Society	UG	Sociology & Anthropology	Arts	This course examines the social foundations of health and illness, community responses to health problems, and the structure of health care in Canada and internationally. Topics to be covered include: morality and health, social inequality and the political economy of health and health care, the multinational pharmaceutical industry, environmental health, and the development of and 'crisis' in the Canadian Medicare system.
CIVL3451.03	Water Quality and Treatment	UG	Civil Engineering	Engineering	The course expands on the student's previous experience in aqueous chemistry and fluid mechanics. The course provides an Engineering perspective on: (i) water quality analysis, specifically on the physical, chemical and biological characteristics of water; (ii) significance and interpretation of water quality properties; (iii) modeling water quality in natural and engineered systems; and (iv) water treatment systems at the introductory level.
CIVL4431.03	Water Distribution and Sewerage Systems	UG	Civil Engineering	Engineering	This design-oriented introduction to municipal engineering is concerned with the hydraulic and hydrologic basis for our water-related urban infrastructure. Specifically, the design of potable water distribution systems, wastewater collection systems, and storm water management systems is presented. The minimization of the environmental impacts associated with the construction of a subdivision is also presented, both qualitatively and quantitatively
CIVL4440.03	Water and Wastewater Treatment	UG	Civil Engineering	Engineering	The focus of the course is on design of water treatment and municipal pollution control plants. Lectures and laboratory periods are on physical chemical and microbiological qualities of water and municipal wastewater. Lectures include various unit operations and unit processes of water and domestic wastewater treatment. Field visits to local and water and wastewater treatment plants are included.
CIVL4460.03	Solid Waste & Landfill Engineering	UG	Civil Engineering	Engineering	This course provides the students with an understanding of the types of solid waste generation, physical and chemical properties of solid waste, solid waste treatment and disposal alternatives, design and operation of a landfill (including landfill components and configuration, landfill sitting, liner system, leachate control and treatment, and gas collection and control system).
ENVE3251.03	Environmental and Industrial Microbiology	UG	Environmental Engineering	Engineering	The principles of microbial communities are applied to biological systems. Emphasis is placed on microbial populations in air, soil and water. Further investigation includes microorganisms found in food, aquaculture and mining industries. Applications of microbial ecology to agriculture, industry, biotechnology and environment are examined
ENGM4675.03	Risk Assessment and Management	UG	Engineering Mathematics	Engineering	This course introduces the risk assessment and system reliability methodologies, from classical event trees to simulation. Examples of risk-based decision making analyses will be covered, ranging from oil exploration to environmental site remediation. The student will carry out a risk assessment involving design decisions on a project of their own choosing.

ENGM4680.03	Ecosystem Modelling of Marine and Freshwater Environments	UG	Engineering Mathematics	Engineering	Students develop and apply mathematical models of marine and freshwater ecosystems to study biological production, biogeochemical cycling etc. Lectures provide theoretical background for coupling nutrient and plankton dynamics, including parameterizing biological processes and physical effects. Computer sessions provide hands-on modelling experience. Students also learn to critique modelling literature in a journal-club setting.
IENG4458.03	Project Management and Control	UG	Industrial Engineering	Engineering	This course identifies the common aspects and peculiarities of projects and then illustrates the application of analytical approaches to meet the challenges of achieving effective project management. The following topics are covered: feasibility studies, project planning, cost estimation, bidding, use of professional engineering and other types of consultants, organization and control, resource allocation and project life cycle concepts. The role of the professional engineer in society and the impact that engineering in all its forms makes on the environmental, social, economic and cultural aspirations of society are discussed
COMM2310.03	Business Ethics and Corporate Social Responsibility	UG	Commerce	Management	Business is a collection of private, commercially oriented organizations, whereas society is a broad group of people with varying traditions, values, institutions, and collective activities and interests. Hence, businesses operate in free markets but are subject to obligations to protect (or do no harm to) the common good. Their challenge is to marry ‘the freedom to be’ with responsibility for others and particularly for the vulnerable. Business ethics provides moral systems for aligning priorities amid what are regularly contradictory or inconsistent sets of goals. This course examines the nature of these challenges from the basis of business ethics, their effects on companies and managers, and the corporate social responsibility tools managers can use to better understand and address complex issues involving numerous stakeholders. Broad topic areas include: (a) the social-cultural context of economic activity, (b) fundamentals of business ethics, (c) corporate social responsibility, (d) corporate-stakeholder relations, (e) globalization and consumer protection, and (f) sustainability and social, civic, and political action.

MGMT2402.03	Marketing Applications in the Not-for-Profit Sector	UG	Management	Management	This course is intended to further the student's understanding of the ways in which the discipline of marketing can be applied to a number of public policy, environmental, professional and non-profit management areas. It will integrate the basic theory and concepts covered in the introductory marketing course with the knowledge gained in the introductory courses in environmental and public policy management or in introductory courses in a number of professional fields. The course will maintain an overall managerial perspective in examining the ways in which various constituencies fulfill their strategic organizational objectives through the application of marketing practices. Topic areas examined will be: micro-marketing (firm perspective) vs. macro-marketing (societal perspective); non-profit, cause-related, "green" and social marketing; de-marketing (e.g. anti-smoking, etc.); the use of marketing communications in the electoral and public policy-making process; ethics in marketing; marketing and development. The course may also examine the application of the discipline of marketing to a number of professional fields, such as sports/recreation and health sciences. Learning activities might include: lectures, videos, seminars, internet exercises, examinations and field assignments.
BIOL1011.03	Principles of Biology Part II	UG	Biology	Science	Biology 1011 broadens the background laid down in BIOL 1010 to include plant and fungi form and function, animal form and function, and ecology. An introduction to Biology as it relates to Engineering, including a basic understanding of cell structure and function, genetics, ecology, the relationship between living systems and the man-made environment, and the relevance of Biology to industrial and engineering applications. Part 1 includes ecosystem history and theory, complex systems and species interactions. Part 2 discusses community structure descriptors, interactions, stability, and food webs. Part 3 discusses the ecosystem approach, environmental management, ecosystem health and integrity, environmental indicators, ecological footprint, and resilience theory. The class examines selected topics on the ecology and evolution of marine and freshwater fishes. Topics include: phylogeny and systematics; functional morphology and physiology; population biology; life-history evolution; behavior; fisheries science; and conservation biology. An Introduction to using physical principles to explore the Earth's subsurface, with an emphasis on near-surface applications. Topics include seismic, gravity, magnetic, electrical, and electromagnetic surveying techniques, and their application in prospecting, hydrogeology, environmental assessments, and well-logging. An introduction to the principles of chemistry applied to geologic systems, including an overview of the chemistry of rocks and minerals, isotopes in the geologic environment, processes that control the release and mobility of contaminants in the environment, and the use of geochemical data in solving geologic and environmental problems.
BIOL1030.03	Biology for Engineers	UG	Biology	Science	
BIOL3061.03	Communities and Ecosystems	UG	Biology	Science	
BIOL3080.03	The Ecology and Evolution of Fishes	UG	Biology	Science	
ERTH2270.03	Introduction to Applied Geophysics	UG	Earth Science	Science	
ERTH2380.03	Geochemistry	UG	Earth Science	Science	

ECON1101.03	Principles of Microeconomics	UG	Economics	Science	How do you decide whether or not to go to university? Why does the price of pizza change so much less than the price of oil? What will better help prevent climate change: a carbon tax, or a cap-and-trade system? Microeconomic analysis, which considers the behaviour of individuals and businesses, can answer questions like these.
ECON2218.03	Canadian Economy in the New Millennium	UG	Economics	Science	Canada's economy today faces many problems: unemployment, productivity, income distribution, environmental protection, trade relations, federal-provincial fiscal relations, maintenance of social programs, etc. What are the most important economic policy issues that Canada now faces? What is the appropriate policy role for government?
ECON3231.03	Topics in Health Economics	UG	Economics	Science	This course comprises a survey of major topics in health economics and introduces the issues, theory and practice of health economics. The course frames health care as an input into the production of health. It thus differentiates the concepts of healthcare and health addressing both throughout the term. Contains a topic on "Health, Pollution and Climate Change".
ECON3330.03	International Trade	UG	Economics	Science	This course examines the theory and empirics of international trade, including standard historical trade theories, more recent theories, and evidence regarding these theories. The course investigate factor movements, the welfare effects of trade policies in both industrial and developing countries, and the institutions that have developed to regulate those policies. This course includes consideration of environmental issues in trade agreements.
ECON3319.03	Industrial Organization	UG	Economics	Science	The course provides an overview of the organization of production. Market structure, firm conduct, and performance affect each other in complex ways; the degree of horizontal and vertical integration affects the ability to set prices, for example. Governments regulate firms in order to reduce socially harmful anticompetitive behaviour. The topic of sustainable production systems is integrated into topics throughout this course.
ECON4317.03	Poverty and Inequality	UG	Economics	Science	Why are some people poor, while others are rich? Why do some nations have more poverty or inequality than others? What can or should be done? This course examines the extent of poverty and inequality in contemporary societies, and the theories underlying alternative measures and explanations.
SCIE1505X/Y.18	Integrated Science	UG	n/a	Science	This program provides comprehensive first-year preparation for science major or honours degrees and includes a full-year writing course and research project in the sciences. Concepts and techniques are taught in Biology, Earth Science, Psychology, and Statistics and are linked to material taught in separate Chemistry, Mathematics, and Physics courses.

MARI3080.03	The Ecology and Evolution of Fishes	UG	Marine Biology	Science	The course examines selected topics on the ecology and evolution of marine and freshwater fishes. Topics include: phylogeny and systematics; functional morphology and physiology; population biology; life-history evolution; behavior; fisheries science; and conservation biology.
MARI3602.03	Introduction to Aquaculture	UG	Marine Biology	Science	This course offers an introductory overview of aquaculture, the culturing of aquatic plants and animals. The following topics are covered with both a Maritimes and global perspective: overview physico-chemistry of water, engineering, culture techniques, health, nutrition, genetics, environmental and socio-economic considerations.
MARI4665.03	Hacking the blue planet: The scientific and social dimensions of ocean fertilization	UG	Marine Biology	Science	This course explores the biology, ecology, biogeochemistry and ethical and legal dimensions of purposeful ocean fertilization. Through lectures, discussion, case studies, and group projects, students consider the biological and oceanographic basis of ocean fertilization and its use as a 1) scientific tool and 2) controversial geoengineering strategy for climate change mitigation
OCEA2001X/Y.06	The Blue Planet	UG	Oceanography	Science	This course provides a general survey of oceanography. It is designed to develop an understanding of the ocean and of the science of oceanography. Students learn about the geological, chemical, physical and biological processes at work in the sea. Consideration is also given to human impacts See PHYC 4595.03
OCEA4595.03	Atmospheric Chemistry	UG	Oceanography	Science	
PHYC4595.03	Atmospheric Chemistry	UG	Physics & Atmospheric Chemistry	Science	A fundamental introduction to the physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.
ARCH5004.03	Urban Systems Studio	G	Architecture	Architecture & Planning	This studio examines the infrastructure of the metropolis and its influence on urban form and development. Topics may include systems for transportation, energy use, water distribution, civic institutions, spaces of social exchange, and ecology. Students develop urban infrastructure propositions with reference to innovative urban projects worldwide.
ARCH5104.03	Urban Systems	G	Architecture	Architecture & Planning	This course examines the infrastructure of the metropolis and its influence on urban form and development. It considers transportation, energy use, water distribution, civic institutions, spaces of social exchange, and ecological systems. It emphasizes new concepts of what is "urban" and what is "natural," referring to innovative urban designs worldwide.
BIOL5651.03	Evolutionary Ecology of Marine Mammals	G	Biology	Science	The course will examine the characteristics that mammals brought with them when they returned to the ocean, the evolution of the different groups of marine mammals, some of their special adaptations, the roles of marine mammals in oceanic ecosystems and general principles of the marine mammal population biology. Students will use information on the biology of marine mammals to explore conservation/management issues.



BIOL5665.03	Hacking the blue planet: The scientific and social dimensions of ocean fertilization	G	Biology	Science	This course explores the biology, ecology, biogeochemistry and ethical and legal dimensions of purposeful ocean fertilization. Through lectures, discussion, case studies, and group projects, students consider the biological and oceanographic basis of ocean fertilization and its use as a 1) scientific tool and 2) controversial geoengineering strategy for climate change mitigation.
BUSI6900	Corporate Responsibility, Ethics and Society	G	Business Administration	Management	This course introduces students to the relevance and importance of ethics and social responsibility in business. The ultimate intent of the course is to leave students better equipped to identify, think critically about, and resolve ethical issues that are encountered in one's working life at the individual, organizational, and societal levels.
CIVL6414	Environmental Systems Engineering	G	Civil Engineering	Engineering	This course discusses various operational research techniques and their applications to environmental systems planning and pollution control. Case studies are designed to deal with the planning, design, and operation issues of environmental systems. Uncertainty-based optimization will be discussed for addressing systems' variability and for making decisions with improved cost-effectiveness and efficiency.
CH&E6001.03	Environmental and Occupational Health	G	Community Health and Epidemiology	Health	Principles and concepts underlying environments and human health comprise the major focus of this course. The nature of a variety of agents, including chemical, physical, biological, ergonomic and radiation hazards, how these agents are dispersed and transformed in the environment, the pathways of human exposure to these agents, and characterization of the health effects resulting from exposure are reviewed. The course will also discuss human environments as a determinant of health and will consider dimensions of places, spaces and health as factors in the human environment. Two field trips are planned 1) Pockwok water treatment plant 2) Montague Historic Gold Mine. There will also be a laboratory teaching class (at the NRC-IMB) covering personal exposure to volatile organic compounds in the environment.
ECON5252.03	From Disaster Relief to Development	G	Economics	Science	This course introduces students to the growing literature built around comparative experiences of disaster prevention, mitigation, relief and sustainable development. Analytical frameworks for better understanding the reasons behind a cross-section of complex disasters are explored. Ways to improve development planning at both project and broader policy levels are examined. Main themes include food and clean water, (security, distribution, drought reduction); refugees, asylum seekers and settlements for sustainable development; early warning systems for hurricanes, volcanoes and famines - their integration into national development planning; emergency programming in the context of military, political and economic instability; issues of humanitarian law and peacekeeping. Case studies are routinely drawn from a number of World Bank, UN, EMO, NGO and the International Red Cross and Red Crescent experiences, as a part of the course's applied orientation. Internship experiences and follow-up research projects are facilitated as an extension of this course.

ECON5254.03	Development Economics II	G	Economics	Science	This course is one of the core courses of the Master of Development Economics (MDE) degree. It focuses on the theory and evidence of economic development, and from these draws out implications for policy and practice. Econ 5254 complements Econ 5253 with an examination of microeconomics issues including, the role of institutions, household behaviour and gender, the functioning of markets, health, education, evaluation, and the use of common property resources and policies for sustainable development.
IDIS6013.03	Environmental Health Engineering	G	Interdisciplinary Studies	Engineering	Radiological health, air pollution control, solid waste treatment, vector control, milk and food sanitation, industrial hygiene.
ENGM6675.03	Risk Assessment and Management	G	Engineering Mathematics	Engineering	This course introduces the risk assessment and system reliability methodologies, from classical event trees to simulation. Examples of risk-based decision making analyses will be covered, ranging from oil exploration to environmental site remediation. The student will carry out a risk assessment involving design decisions on a project of their own choosing.

ENGM6680.03	Ecosystem Modelling of Marine and Freshwater Environments	G	Engineering Mathematics	Engineering	Students develop and apply mathematical models of marine and freshwater ecosystems to study biological production, biogeochemical cycling etc. Lectures provide theoretical background for coupling nutrient and plankton dynamics, including parameterizing biological processes and physical effects. Computer sessions provide hands-on modelling experience. Students also learn to critique modelling literature in a journal-club setting.
HPRO5518.03	Women's Health and the Environment	G	Health Promotion	Health	This is a multi- and interdisciplinary seminar for graduate students in any faculty. The goal of the course is to explore the interconnections between women's health and the environment, with an emphasis on environmental contaminants, health, and public policy. The course will examine the evidence linking exposure to toxic chemicals and radiation to cancer, birth defects, and other manifestations of ill-health, as well as links between air and water pollution to human health. It will examine the current policy framework for addressing environmental health issues, with special attention to the tension between industry lobbies and public interest advocacy in the face of scientific uncertainty.
MARA5003.03	Marine Science and Technology	G	Marine Management	Science	This course provides a survey of marine science and technology (basic marine-basin geography and geology, physical, chemical and biological oceanography). Various fields and topics are addressed from a scientific research and technology application perspective. Where possible, and relevant, the application of the scientific findings to issues of management, resource exploitation and policy formation are addressed. Course content and assignments should help marine managers use science and technology to: 1) recognize /formulate problems; 2) identify relevant information necessary to address problems; 3) find relevant and reliable information/assistance; 4) reliably interpret the information to make objective management decisions. *Class includes lectures on the Anthropocene and Climate Change
MARA5589.03	Politics of the Sea	G	Marine Management	Science	The course will examine environmental, political and economic forces which affect contemporary ocean governance and management. Contemporary issues will be used to explore the geo-political ocean on a sectoral basis (transportation, fisheries and resources, military, etc.), as well as analyzing the evolution of national oceans policies and institutions.

OCEA5665.03	Hacking the blue planet: The scientific and social dimensions of ocean fertilization	G	Oceanography	Science	This course explores the biology, ecology, biogeochemistry and ethical and legal dimensions of purposeful ocean fertilization. Through lectures, discussion, case studies, and group projects, students consider the biological and oceanographic basis of ocean fertilization and its use as a 1) scientific tool and 2) controversial geoengineering strategy for climate change mitigation.
OCEA5680.03	Ecosystem Modelling of Marine and Freshwater Environments	G	Oceanography	Science	Students develop and apply mathematical models of marine and freshwater ecosystems to study biological production, biogeochemical cycling etc. Lectures provide theoretical background for coupling nutrient and plankton dynamics, including parameterizing biological processes and physical effects. Computer sessions provide hands-on modelling experience. Students also learn to critique modelling literature in a journal-club setting.
POLI5340.03	Approaches to Development	G	Political Science	Arts	A survey of theories of and policies about dependence, underdevelopment and peripheral social formations. Particular emphasis on modernization, materialist, and alternative modes of analysis, and on orthodox and radical strategies of development. Topics treated include social contradictions (e.g. class, race and ethnicity), debt, structural adjustment, human development, human security, gender, technology, civil society, informal sectors, democratization and ecology.
POLI5589.03	Politics of the Sea I	G	Political Science	Arts	The course will examine environmental, political and economic forces which affect contemporary ocean governance and management. Contemporary issues will be used to explore the geo-political ocean on a sectoral basis (transportation, fisheries and resources, military, etc), as well as analyzing the evolution of national and international oceans policies and institutions.
LAWS2020.03	Fisheries Law	G	Law	Law	This seminar is designed to acquaint students with the public and private law aspects of fishing and fishery management in Canada. While the central focus is on law and the regulatory framework, questions of policy frequently arise for discussion. The course is taught by a combination of questioning, lectures and guest speakers. Problems unique to fisheries regulation and methods of fishery management will be discussed to set the context in which the law operates. International considerations, constitutional problems, fisheries legislation, aboriginal rights, the interplay between private rights and public rights, and problems of enforcement and environmental protection are central topics.

LAWS2022.03	Law of the Sea	G	Law	Law	The adoption of the United Nations Law of the Sea Convention, 1982 was the result of the world's most ambitious law reform movements. The Convention is a comprehensive instrument functioning as a "Constitution of the Oceans." This course will undertake detailed analysis of the law of the sea by examining the Convention, related instruments and materials concerning its interpretation and enforcement, and recent initiatives to further develop the law of the sea. Particular attention will be given to navigational issues (territorial sea, international straits, archipelagoes), resource issues (exclusive economic zone, fisheries, non-living resources); maritime boundary delimitation; protection of the marine environment; marine scientific research; dispute settlement; and the role of international institutions in ocean governance.
LAWS2079.03	Oil and Gas Law	G	Law	Law	This course deals with the legal characterization of oil and gas, onshore and offshore, applicable constitutional and international law principles, basic rights transfer agreements, regulation, operator responsibilities, pipeline jurisdictional issues, aboriginal rights, rights of first refusal, environmental law, the Offshore Accords and their implementation and current regulatory issues.
LAWS2191.03	Animals and the Law	G	Law	Law	This seminar examines legal issues pertaining to non-human animals. It is concerned with how such entities have been conceptualized by the law and with how they should be. Should animals be viewed as objects (property), as legal subjects (rights holders), or as something else altogether? This debate will provide the context for examining the history of animal protection legislation and current issues relating to animals. These include the constitutional authority to legislate with respect to non-humans, animal cruelty (including such specific topics as experimentation on non-human animals, treatment of farmed animals, and hunting), endangered species legislation, standing in animal welfare/rights litigation, market-based approaches and civil disobedience by animal activists.
LAWS2214.03	Energy Law	G	Law	Law	The course offers a general introduction of global and national energy issues, including energy security, energy demand and supply, the range of energy sources available, and the social, economic and environmental consequences of the choices. Following this broad introduction, the course focuses on the production, distribution, sale and consumption of electricity. It considers a range of law and policy issues dealing with electricity, including the regulatory process, implications for environmental, aboriginal, property, and trade law issues