Sustainability-Focused Courses

Department/Division	Course Name	Description
Ag & Bioresource Engineering	**ABE 309.3 Water Management**	Sustainable irrigation projects require management of irrigation water for profitable crop production without negatively altering the soil or depleting the source water resource. Water management topics discussed pertain to irrigation in the western Canadian prairie setting. Techniques of applying irrigation water to the soil-plant-atmosphere continuum to increase productivity and profitability are evaluated. Examples range from totally enclosed environments of greenhouses to the extra water in addition to natural precipitation of field crops. An appreciation is developed that irrigation projects increase regional growth and prosperity while operating within the bounds of societal control and regulation. Upon completion of this course, the student will be able to organize sustainable irrigation projects, choose the irrigation equipment required and recommend how to operate it.
Ag & Bioresource Engineering	**ABE 481.3 Sustainability and Environmental Assessment**	A study of the principles of sustainable development and the process of environmental impact assessment with emphasis on Prairie agricultural and industrial settings. Case studies are used to illustrate the EIA process in engineering design of environmental control measures. Concepts of integrated resource management are analyzed as the basis for making linkages between protecting the environment, economic development and public participation.
Environmental Engineering	**ENVE 201.3 Principles of Environmental Engineering**	Population, economic growth, industrialization, urbanization and energy-use, as causes of environmental pollution. Mass and energy balance for environmental engineering systems under steady state and unsteady state conditions. Contaminant partitioning and transport in air, water and solids. Application of environmental principles (technical and non-technical) to: water resource management, water and wastewater treatment, air pollution control, solid waste management, environmental impact assessment, and environmental ethics. Thermal pollution, noise pollution, greenhouse effect, acid precipitation, ozone depletion, air toxics, and ground-level ozone and fine particulates (photochemical smog). Sustainable development and life cycle analysis. Review of the principles of environmental quality objectives, standards and guidelines.
Animal Science	**ANSC 375.3 Animal Agriculture and the Environment**	Discusses the important role that domestic animals play in an environmentally appropriate land use strategy, in both extensive and intensive systems. The major focus will be to examine animal agriculture's ecological footprint including impact on riparian areas, nutrient cycling, climate change, ecological diversity including wildlife and human health. Sustainable agricultural practices including mitigation strategies for reducing the effects of animal agriculture on the environment will be covered.

Environmental Science	**EVSC 110.3 Renewable Resources and Environment**	Introduces students to renewable resources and their management. Emphasis will be on human use of surface water, groundwater, land and plant resources. The concepts of sustainable use and ecological goods and services will be explored for each resource. The role of each resource as an alternative energy source and the interaction between human use of the resource and global change will also be addressed. Critical assumptions that underlie human use of resources will be discussed in weekly tutorial sessions.
Food and Bioproduct Sciences	**FABS 432.3 Microbial Bioproducts in Agriculture**	The world's food, environmental and energy concerns require innovative bioproducts as natural and environmentally friendly solutions to reduce the usage of chemical pesticides and fertilizers, while enhancing crop yields and biomass production for biofuels. This course provides an overview of recent advances and discoveries in the area of microbial bioproducts such as inoculants biotechnology and formulation, genomics and proteomics, and their application to sustainable and organic agriculture systems.
Indigenous Peoples Resource Management	**IPRM 103.3 Environmental Studies II - Field Study**	Introduces students to principles of sustainable development of land, water and forests. Students will become familiar with basic components of soil and be able to recognize factors affecting productivity and land value as well as important environmental issues associated with managing a large land base. The course will investigate components of agricultural production systems and the relationship of agriculture to its environment, surface and subsurface water quantity and quality, forest ecology and sustainable forest management. Emphasis will be placed on methods of gathering information in addition to laboratory exercises and field trips.
Plant Science	**PLSC 401.3 Sustainable Crop Production**	Components of sustainable crop production systems will be examined from an ecological perspective. Students will evaluate the sustainability of cropping systems and develop crop production systems with greater ecological and economic sustainability. Laboratories will teach techniques used in crop scouting and diagnostics.
Plant Science	**PLSC 422.3 Rangeland Ecology and Management**	Principles of managing rangeland to ensure sustained productivity and multiple-uses. Inventory, evaluation and planning for multiple-use management. Plant morphology and physiology, palatability, energy flow, nutrient cycling and the hydrologic cycle are integrated and discussed in relation to impacts of grazing on the soil-plant-animal system and development of grazing systems.
Plant Science	**PLSC 822.3 Ecology and Management of Rangeland Resources**	Emphasizes the principles of managing rangeland to ensure sustained productivity. Plant morphology, physiology, palatability, nutritional value, energy flow, and nutrient cycling are integrated and emphasized in relation to the impacts of grazing on soil-plant-animal interactions. Inventory, evaluation, and manipulation of rangeland resources are also studied. Field trips are required.
Soil Science	**SLSC 273.3 Land Evaluation and Sustainable Management Practices**	The primary focus of this course is the examination of soil quality parameters and their application to land capability classification and sustainable production systems. Emphasis will be placed on management practices that enhance soil conservation and quality including special management practices that optimize production on problem soils. The environment impact(s) of various land management practices will also be discussed.

Applied Microbiology	**APMC 832.3 Microbial Bioproducts in Agriculture**	The world's food, environmental and energy concerns require innovative bioproducts as natural and environmentally friendly solutions to reduce the usage of chemical pesticides and fertilizers, while enhancing agricultural crop yields and biomass production for biofuels. This course provides an overview of recent advances and discoveries of microbial bioproducts, such as inoculant biotechnology and formulation, genomics and proteomics, and their application to sustainable and organic agriculture systems.
Biology	**BIOL 312.3 Life in the North**	Provides students with a greater understanding of the complexity of important concepts and issues related to the land and environment of the North. The course focuses on the impacts of ecological and physical changes of northern ecosystems on the peoples. Emphasis is given to the challenges of sustainability of ecosystems in the Circumpolar North, and to the need for long-term and international stewardship.
Geography	**GEOG 240.3 Sustainable Cities and Regions**	Uses the pillars of sustainable development- economic, social/cultural, environmental - as an organizing framework for the study of cities and regions in which they are embedded. Historical and contemporary thought in the fields of urban/economic, social/cultural, and environmental geography form the substance of this course.
Geography	**GEOG 442.3 Sustainable Land Use Planning**	A lecture-seminar course critiquing the past 50 years of North American urban development. The concept of sustainable development and its relationship to the urban environment will be examined. Course topics include the New Urbanism, transit-oriented development, innovations in wastewater treatment, energy efficiency, mixed-use development, sustainable transportation, greening the city, and alternative development standards.
Geography	**GEOG 446.3 Advanced Urban Design**	A lecture/seminar on analytical methods in urban design with an emphasis on energy-efficient subdivision design. Design for sustainable development and for pedestrian traffic in open space networks is discussed and analyzed. Issues in the spatial syntax of artificial environments are introduced, with an analysis of artificial object configuration in urban space. The workshop consists of design and discussion exercises and the use of CAD.
Educational Foundations	**EFDT 478.3 Urban Education**	This course focuses on the role of urban community-based experiential learning in contributing to decolonization and socio-ecological justice in the personal and pedagogical practices of educators and learners. The course models and addresses how to incorporate community-based education towards socio-ecological justice in educational practice, and in intersection with other learning objectives in K-12 or adult education.
Educational Foundations	**EFDT 479.3 Land-based Education**	This course focuses on the role of land-based experiential learning in contributing to decolonization and socio-ecological justice in the personal and pedagogical practices of educators and learners. The course models and addresses how to incorporate land-based education towards socio-ecological justice in educational practice, and in intersection with other learning objectives in K-12 or adult education.

Educational Foundations	**EFDT 481.3 Environment and Education**	This elective course is designed to prepare students to integrate environmental concerns into their teaching. Environmental education's history is traced and its theories explored. Issues involved in providing environmental education in schools are investigated.
School of Environment and Sustainability	**ENVS 801.3 Ecosystem Science and Sustainability**	An introduction to how principles and concepts of ecology and ecosystems science are applied to advance environmental sustainability. Students will gain a solid understanding of how natural systems function, and how scientists apply their understanding and confront uncertainties about ecosystems to address environmental management problems, and advance environmental sustainability.
School of Environment and Sustainability	**ENVS 802.3 Human Dimensions of Environmental Change**	Explores the past and present interactions between people and the natural world. It addresses ways that environment has molded human societies and ways that people have altered nature. Contemporary concerns for environmental sustainability are introduced by examining human entanglement with a range of natural and modified systems.
School of Environment and Sustainability	**ENVS 803.3 Research in Environment and Sustainability**	The purpose of this course is to introduce graduate students to conceptual, practical, and ethical issues in conducting interdisciplinary research about environment and sustainability. By the end of the course, students will have a research plan from which their proposal and research activities can be developed.
School of Environment and Sustainability	**ENVS 804.3 Decision making for Environment and Sustainability**	Intended to enhance students' professional and scholarly effectiveness, this course introduces an interdisciplinary approach to environmental conservation problems (from the policy sciences) that enables them to critically appraise and constructively engage with environmental and sustainability policy and processes, and develope functional understanding of conventional institutional approaches to environmental management and new emergent approaches.
School of Environment and Sustainability	**ENVS 805.3 Data Analysis and Management**	Environmental data management is complex because of its volume, qualitative and quantitative forms, and temporal and spatial characteristics. This course introduces students to statistical, qualitative, and visual methods of problem solving and data reduction and representation and describes methods for managing large and complex data sets.
School of Environment and Sustainability	**ENVS 821.3 Sustainable Water Resources**	Will rigorously explore water resource sustainability in western Canada from physical, chemical, biological, socio-economic, and technological perspectives. Biophysical influences on water abundance and quality, current threats to water resources, and efforts to provide for sustainable management of water resources will be examined.
School of Environment and Sustainability	**ENVS 831.3 Current Issues in Land Reclamation and Remediation**	Current issues in land reclamation and remediation are examined. The impact of human activity in a variety of environments is examined and strategies for reclamation and remediation are investigated. Biophysical factors are the emphasis of the course, however the context of social and economic issues are incorporated.