COURSE ENS1010: INTRODUCTION TO STEWARDSHIP

Level: Introductory

Prerequisite: None

Description: Students develop an understanding of the social, economic and political significance of environmental stewardship by creating a personal definition of *environmental stewardship* and examine the historical context of environmental stewardship.

Outcomes: The student will:

1. **define *environmental stewardship***
   - 1.1 define *environmental stewardship* based on research and legislation
   - 1.2 analyze personal experiences and interests in environmental stewardship; e.g., personal inventory
   - 1.3 create a definition based on personal experience and relationship with the natural and built environment
2. **describe ways in which human intervention has affected the environment**
   - 2.1 identify environmental factors influenced by human intervention; e.g., land-use practices, soil, water and air quality, wildlife habitat and natural areas
   - 2.2 analyze and describe one or more justifications for human intervention; e.g., compare and contrast philosophies of conservation and preservation, declining reserves, environmental impact
3. **describe the nature of and approaches and areas of interest in environmental stewardship**
   - 3.1 describe the historic and global development of environmental stewardship since the mid 19th century
   - 3.2 describe the implementation of legislation and policies that impact environmental stewardship provincially, nationally and internationally
   - 3.3 discuss different cultural views with regard to environmental stewardship; e.g., First Nations, Métis and Inuit, French Canadian, immigrant populations
   - 3.4 describe various social, economic and political impacts of environmental stewardship
4. **demonstrate basic competencies**
   - 4.1 demonstrate fundamental skills to:
     - 4.1.1 communicate
     - 4.1.2 manage information
     - 4.1.3 use numbers
     - 4.1.4 think and solve problems
   - 4.2 demonstrate personal management skills to:
     - 4.2.1 demonstrate positive attitudes and behaviours
     - 4.2.2 be responsible
     - 4.2.3 be adaptable
     - 4.2.4 learn continuously
     - 4.2.5 work safely
   - 4.3 demonstrate teamwork skills to:
     - 4.3.1 work with others
     - 4.3.2 participate in projects and tasks
5. **make personal connections to the cluster content and processes to inform possible pathway choices**
   - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
   - 5.2 create a connection between a personal inventory and occupational choices

COURSE ENS1020: FOSTERING STEWARDSHIP

Level: Introductory

Prerequisite: None

Description: Students examine the management and conservation of the environment and local, provincial, national and international stewardship organizations and propose individual and shared actions that foster environmental stewardship.

Parameters: Access to government, industry and community organizations responsible for environmental stewardship.

Outcomes: The student will:

1. **identify trends in the consumption and use of resources and issues related to the effects of resource consumption and use on the environment and investigate possible solutions**
   - 1.1 identify the demands and trends of resource consumption and use in Canada and Alberta; e.g., residential, commercial, industrial, transportation, recreational, sustainable development, economic diversification and expansion
   - 1.2 research and make predictions regarding environmental change at global levels caused by resource consumption
   - 1.3 identify short- and long-term environmental benefits and costs related to the consumption of resources
   - 1.4 investigate solutions that promote the sustainable management of the environment; e.g., waste and emission control, soil, water and air quality sampling, wildlife and habitat protection, site reclamation, compliance with environmental policy, research and development
2. **identify current local, provincial, national and international environmental stewardship actions and organizations**
   - 2.1 investigate a local organization that identifies itself as a stewardship organization by:
     - 2.1.1 examining the background of the organization; e.g., history, meetings, member fees
     - 2.1.2 reviewing a successful stewardship project or initiative of the organization
     - 2.1.3 describing the potential for individuals and groups to access programs and funding from this organization
   - 2.2 investigate a provincial organization that identifies itself as a stewardship organization by:
     - 2.2.1 examining the background of the organization; e.g., history, meetings, member fees
     - 2.2.2 reviewing a successful stewardship project or initiative of the organization
     - 2.2.3 describing the potential for individuals and groups to access programs and funding from this organization
   - 2.3 investigate a national organization that identifies itself as a stewardship organization by:
     - 2.3.1 examining the background of the organization; e.g., history, meetings, member fees
     - 2.3.2 reviewing a successful stewardship project or initiative of the organization
     - 2.3.3 describing the potential for individuals and groups to access programs and funding from this organization
   - 2.4 investigate an international organization that identifies itself as a stewardship organization by:
     - 2.4.1 examining the background of the organization; e.g., history, meetings, member fees
     - 2.4.2 reviewing a successful stewardship project or initiative of the organization
     - 2.4.3 describing the potential for individuals and groups to access programs and funding from this organization

3. **propose shared and personal actions that foster sustainable management of the environment**
   - 3.1 identify specific goals of departments and agencies involved in the sustainable management of a resource; e.g., local, national, international
   - 3.2 compile an inventory of personal attitudes, actions and lifestyle choices related to sustainable management of the environment
   - 3.3 identify constructive ways in which individuals can influence public opinion and policy regarding sustainable environmental management; e.g., voting, lobbying, seeking office, supporting compatible interest groups
   - 3.4 investigate, develop, present and implement a sustainable environmental management strategy; e.g., school-wide campaign, debate, personal strategies, establishing consensus, addressing local issues
4. **demonstrate basic competencies**
   - 4.1 demonstrate fundamental skills to:
     - 4.1.1 communicate
     - 4.1.2 manage information
     - 4.1.3 use numbers
     - 4.1.4 think and solve problems
   - 4.2 demonstrate personal management skills to:
     - 4.2.1 demonstrate positive attitudes and behaviours
     - 4.2.2 be responsible
     - 4.2.3 be adaptable
     - 4.2.4 learn continuously
     - 4.2.5 work safely
   - 4.3 demonstrate teamwork skills to:
     - 4.3.1 work with others
     - 4.3.2 participate in projects and tasks
5. **make personal connections to the cluster content and processes to inform possible pathway choices**
   - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
   - 5.2 create a connection between a personal inventory and occupational choices

COURSE ENS1030: CONSUMERISM

Level: Introductory

Prerequisite: None

Description: Students develop an understanding of consumerism and consumption rates, their complexity and how they impact sustainable development.

Outcomes: The student will:

1. **identify and discuss the effects of consumerism on sustainable development**
   - 1.1 define *consumption*
   - 1.2 define *consumerism*
   - 1.3 define *sustainable development*; e.g., provincial, federal and United Nations definitions
   - 1.4 analyze consumption rates for a sector of the economy; e.g., food, petroleum, automobiles
   - 1.5 discuss how changes in consumption rates affect sustainable development in an economic sector
2. **investigate personal consumption rates and patterns**
   - 2.1 determine individual and family consumer patterns (e.g., daily, weekly, monthly, yearly) for a number of products (e.g., food items, clothing, electronics)
   - 2.2 estimate the life span of personal purchases
   - 2.3 record and evaluate personal consumer patterns
3. **investigate and assess impacts throughout the life cycle of a personal consumer product; e.g., denim jeans, newspapers, smartphone, mp3 player, LCD television, computer**
   - 3.1 investigate the life cycle of a personal consumer product, considering:
     - 3.1.1 raw material production
     - 3.1.2 manufacture
     - 3.1.3 distribution
     - 3.1.4 use
     - 3.1.5 disposal
   - 3.2 assess the environmental and social impacts of each phase of a product's life cycle; e.g., raw material production: land use; manufacturing: fair trade; distribution: greenhouse gases; use: depletion of fossil fuels; disposal: habitat destruction
4. **explore and evaluate methods of reducing personal consumption rates**
   - 4.1 consider the materials and energy used to produce packaging for products
   - 4.2 determine energy requirements for transporting personal purchases
   - 4.3 determine the geographic origins of staple and luxury consumer goods; e.g., bread, milk, gas, smartphone, designer jeans, diamond ring
   - 4.4 assess your personal ecological footprint; e.g., online ecological calculator
   - 4.5 investigate alternative means of personal consumption; e.g., barter, swapping, salvage, dematerializing, recycling, zero waste
5. **demonstrate basic competencies**
   - 5.1 demonstrate fundamental skills to:
     - 5.1.1 communicate
     - 5.1.2 manage information
     - 5.1.3 use numbers
     - 5.1.4 think and solve problems

5.2 demonstrate personal management skills to:
    5.2.1 demonstrate positive attitudes and behaviours
    5.2.2 be responsible
    5.2.3 be adaptable
    5.2.4 learn continuously
    5.2.5 work safely
5.3 demonstrate teamwork skills to:
    5.3.1 work with others
    5.3.2 participate in projects and tasks

6. make personal connections to the cluster content and processes to inform possible pathway choices

6.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
6.2 create a connection between a personal inventory and occupational choices

COURSE ENS1040: LIVING WITH THE ENVIRONMENT

Level: Introductory

Prerequisite: None

Description: Students develop an understanding of how humans interact with their natural and built environments. Students also investigate methods to monitor and measure the quality of natural and built environments in order to maintain healthy and sustainable environments.

Outcomes: The student will:

1. **investigate and describe relationships between humans and their environments**
   - 1.1 identify the basic human needs; e.g., subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom
   - 1.2 illustrate how natural and built environments meet human needs
   - 1.3 describe examples of interactions and interdependencies within natural and built environments
   - 1.4 identify examples of human impacts on natural and built environments and the reasons for them based on human wants and needs
   - 1.5 analyze how attitudes, skills and knowledge are used to inform personal and public decisions regarding human impacts on natural and built environments; e.g., scientific, economic, political, cultural
2. **investigate and describe the role of different biological and chemical factors that impact environments**
   - 2.1 identify examples of common biological and chemical factors that are needed to maintain healthy natural and built environments; e.g., bacteria in soil, oxygen in water, humidity indoors
   - 2.2 describe and illustrate how materials enter a system and their impacts on living things in natural and built environments and how their concentrations are changed
   - 2.3 identify concerns when deciding what substances and what quantities of a substance can be released into natural and built environments to ensure sustainability
3. **analyze and evaluate processes affecting the distribution of potentially harmful substances within environments; e.g., wind and water currents, soil porosity**
   - 3.1 describe processes that transfer materials through air, soil and water in natural and built environments
   - 3.2 describe processes for and factors affecting biodegradation
   - 3.3 analyze and interpret information on the impacts of hazardous materials in natural and built environments
   - 3.4 describe and evaluate a method to transport, store, dispose of and neutralize a hazardous substance
4. **demonstrate processes for measuring and monitoring the quality of air, soil and water in environments**
   - 4.1 identify common biological and chemical factors that affect the quality of air, water and soil in natural and built environments
   - 4.2 describe and participate in the use of biological and chemical monitoring to determine environmental quality

5. **describe the relationship between attitudes, skills, knowledge, decisions and actions in maintaining healthy environments**
   - 5.1 identify intended and unintended consequences of human activities within natural and built environments; e.g., forest fire and controlled burns, land reclamation
   - 5.2 describe and interpret examples of scientific investigations used to inform environmental decision making
   - 5.3 discuss the limits of scientific and technological knowledge in making decisions regarding natural and built environments
6. **demonstrate basic competencies**
   - 6.1 demonstrate fundamental skills to:
     - 6.1.1 communicate
     - 6.1.2 manage information
     - 6.1.3 use numbers
     - 6.1.4 think and solve problems
   - 6.2 demonstrate personal management skills to:
     - 6.2.1 demonstrate positive attitudes and behaviours
     - 6.2.2 be responsible
     - 6.2.3 be adaptable
     - 6.2.4 learn continuously
     - 6.2.5 work safely
   - 6.3 demonstrate teamwork skills to:
     - 6.3.1 work with others
     - 6.3.2 participate in projects and tasks
7. **make personal connections to the cluster content and processes to inform possible pathway choices**
   - 7.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
   - 7.2 create a connection between a personal inventory and occupational choices

COURSE ENS1110: NATURAL RESOURCES

Level: Introductory

Prerequisite: None

Description: Students analyze the nature and extent of Alberta's natural resource, including air, water, soil, land, hydrocarbons, minerals, forests and wildlife and present the results of research on one or more issues related to sustainable resource development.

Parameters: Access to community and government agencies responsible for sustainable resource management.

Outcomes: The student will:

1. **analyze the nature and extent of Alberta's water resources**
   - 1.1 describe the nature and extent of water resources in different regions of Alberta and their potential to support development
   - 1.2 identify physical, chemical and biological characteristics of water that determine its suitability for use in a variety of industries
   - 1.3 describe the effects of industry practices on water quality; e.g., agriculture, recovering and processing hydrocarbons and minerals
2. **analyze the nature and uses of Alberta's air resources**
   - 2.1 describe the nature and composition of air
   - 2.2 identify the physical properties of air that determine its suitability for use in a variety of industries
   - 2.3 describe the effects of industry practices on air quality; e.g., agriculture, processing hydrocarbons and minerals, transportation, energy production
3. **analyze the nature and uses of soil and land in Alberta**
   - 3.1 describe the nature and composition of soils present in different regions of Alberta and their potential to support industry
   - 3.2 identify physical, chemical and biological characteristics of soil that determine its suitability for use in industry
   - 3.3 describe different uses of soil and land in rural and urban Alberta; e.g., resource development, urban development, recreation and/or protected and natural areas, transportation corridors
   - 3.4 explain the impacts of soil and land quality on industry and the environment
4. **analyze the nature and uses of hydrocarbons and minerals in Alberta**
   - 4.1 describe the nature and extent of hydrocarbon and mineral resources in different regions of Alberta and their potential to support development
   - 4.2 identify physical and chemical characteristics of hydrocarbons and minerals that determine their suitability for use in a variety of industries
   - 4.3 describe the effects of industry practices on environment quality in Alberta
5. **analyze the nature and uses of forests in Alberta**
   - 5.1 describe the nature and extent of forests in different regions of Alberta and their potential to support development
   - 5.2 identify physical and biological characteristics of forests that determine their suitability for use in industry
   - 5.3 describe the effects of industry practices on forest and forest environmental quality in Alberta

6. **analyze the nature and uses of wildlife species in Alberta**
   - 6.1 describe the nature and extent of wildlife species in different regions of Alberta and their potential to support development
   - 6.2 identify physical and biological characteristics of wildlife species that determine a species' suitability for use in a variety of industries
   - 6.3 describe the effects of industry practices on wildlife species in Alberta
7. **present alternatives and consequences associated with one or more issues involving air, water, soil, land, hydrocarbon, mineral, forest and/or wildlife use in Alberta**
   - 7.1 define and give examples of multiple use, conservation and sustained yield within the context of water, soil and land use
   - 7.2 present the results of research on an issue involving water, soil or land use in an industry by:
     - 7.2.1 identifying major viewpoints and stakeholders
     - 7.2.2 distinguishing among facts, opinions and beliefs
     - 7.2.3 outlining alternatives and consequences
   - 7.3 explain the issue by analyzing information gathered
8. **discuss different ethno-cultural views regarding the nature and use of natural resources (e.g., First Nations, Métis and Inuit; French Canadian; immigrant populations)**
9. **demonstrate basic competencies**
   - 9.1 demonstrate fundamental skills to:
     - 9.1.1 communicate
     - 9.1.2 manage information
     - 9.1.3 use numbers
     - 9.1.4 think and solve problems
   - 9.2 demonstrate personal management skills to:
     - 9.2.1 demonstrate positive attitudes and behaviours
     - 9.2.2 be responsible
     - 9.2.3 be adaptable
     - 9.2.4 learn continuously
     - 9.2.5 work safely
   - 9.3 demonstrate teamwork skills to:
     - 9.3.1 work with others
     - 9.3.2 participate in projects and tasks
10. **make personal connections to the cluster content and processes to inform possible pathway choices**
    - 10.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
    - 10.2 create a connection between a personal inventory and occupational choices

COURSE ENS1115: RESOURCE MANAGEMENT

Level: Introductory

Prerequisite: ENS1110: Natural Resources

Description: Students describe the practices used to manage air, water, soil and land use, hydrocarbons and minerals, forests and wildlife and present the results of their research on one or more issues related to resource development.

Parameters: Access to community and government agencies responsible for sustainable resource management.

Outcomes: The student will:

1. **analyze water resource management practices in Alberta**
   - 1.1 research techniques used to manage limited and excess water supplies in a variety of industries, including:
     - 1.1.1 irrigation, diversion
     - 1.1.2 storage, conservation
     - 1.1.3 recycling, reuse
     - 1.1.4 drainage, flood control
   - 1.2 describe examples of legislation used to manage water resources in Alberta
   - 1.3 explain the impacts of limited, excessive or inappropriate water supplies on humans, industry, wildlife and ecosystems
   - 1.4 propose strategies for managing water within a specific rural, urban and/or industrial environment
2. **analyze air resource management practices in Alberta**
   - 2.1 describe how Alberta's air resource practices have changed over time
   - 2.2 describe examples of legislation used to manage air resources in Alberta
   - 2.3 explain the role of public and private organizations in Alberta in managing and protecting Alberta's air resources
3. **analyze soil and land use management practices in Alberta**
   - 3.1 describe the advantages and disadvantages of different soil conservation practices, including:
     - 3.1.1 salinity management, acidity control, mineralization
     - 3.1.2 vegetative cover, erosion control
     - 3.1.3 beneficial soil organisms, prevention and remediation of soil contamination
     - 3.1.4 cultivation practices, no-tillage practices
     - 3.1.5 crop rotation and resting land
   - 3.2 propose strategies for managing soil within a specific rural, urban and/or indoor environment
   - 3.3 describe the advantages and disadvantages of different land conservation practices, including:
     - 3.3.1 land reclamation and ecological restoration
     - 3.3.2 conservation easements and land trusts
     - 3.3.3 flood prevention
   - 3.4 describe legislation and policies used to manage land in Alberta, including:
     - 3.4.1 land zoning and classification
     - 3.4.2 environmental impact assessment
     - 3.4.3 Alberta's *Land-use Framework*, *Public Lands Act*

3.5 identify appropriate uses for land, considering:
    3.5.1 soil characteristics and topography
    3.5.2 water and climate
    3.5.3 market value of other resources
    3.5.4 environmental stewardship

4. analyze hydrocarbon and mineral resource management practices in Alberta

4.1 describe how Alberta's hydrocarbon and mineral resource practices have changed over time
4.2 describe government legislation and policies that influence the development of Alberta's hydrocarbon and mineral resources

5. analyze forest management practices in Alberta

5.1 describe how Alberta's forest resources are managed
5.2 describe legislation and policies that influence the use of Alberta's forest resources
5.3 describe methods for allocating forest resources

6. analyze wildlife and habitat management practices in Alberta

6.1 explain the role of protected spaces in managing ecosystems at the provincial level; e.g., parks, wildlife and wilderness areas, migratory bird sanctuaries, ecological reserves, World Heritage Sites, private landowners, grazing reserves
6.2 explain the role of public and private organizations in managing and protecting wildlife in Alberta; e.g., government, industry, environmental and other organizations
6.3 compare policies and philosophies regarding the sustainable management of wildlife and habitats in Alberta with other provinces in Canada

7. discuss different ethno-cultural views regarding the sustainable use of natural resources (e.g., First Nations, Métis and Inuit; French Canadian; immigrant populations)

8. present alternatives and consequences associated with one or more issues involving the use of Alberta's natural resources

8.1 identify major viewpoints and stakeholders
8.2 distinguish among facts, opinions and beliefs
8.3 outline alternatives and consequences
8.4 explain the issue by analyzing information gathered
8.5 present the results of research on an issue involving the use of natural resources

9. demonstrate basic competencies

9.1 demonstrate fundamental skills to:
    9.1.1 communicate
    9.1.2 manage information
    9.1.3 use numbers
    9.1.4 think and solve problems
9.2 demonstrate personal management skills to:
    9.2.1 demonstrate positive attitudes and behaviours
    9.2.2 be responsible
    9.2.3 be adaptable
    9.2.4 learn continuously
    9.2.5 work safely
9.3 demonstrate teamwork skills to:
    9.3.1 work with others
    9.3.2 participate in projects and tasks

10. make personal connections to the cluster content and processes to inform possible pathway choices

10.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
10.2 create a connection between a personal inventory and occupational choices

COURSE ENS1910: ENS PROJECT A

Level: Introductory

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Introductory project courses must connect with a minimum of two CTS courses, one of which must be at the introductory level and be in the same occupational area as the project course. The other CTS course(s) can be either at the same level or at the intermediate level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

1. **identify the connection between this project course and two or more CTS courses**
   - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
   - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
2. **propose the project and/or performance**
   - 2.1 identify the project and/or performance by:
     - 2.1.1 preparing a plan
     - 2.1.2 clarifying the purposes
     - 2.1.3 defining the deliverables
     - 2.1.4 specifying time lines
     - 2.1.5 explaining terminology, tools and processes
     - 2.1.6 defining resources; e.g., materials, costs, staffing
   - 2.2 identify and comply with all related health and safety standards
   - 2.3 define assessment standards (indicators for success)
   - 2.4 present the proposal and obtain necessary approvals

The student will:

3. **meet goals as defined within the plan**
   - 3.1 complete the project and/or performance as outlined
   - 3.2 monitor the project and/or performance and make necessary adjustments
   - 3.3 present the project and/or performance, indicating the:
     - 3.3.1 outcomes attained
     - 3.3.2 relationship of outcomes to goals originally set
   - 3.4 evaluate the project and/or performance, indicating the:
     - 3.4.1 processes and strategies used
     - 3.4.2 recommendations on how the project and/or performance could have been improved

4. **demonstrate basic competencies**
   - 4.1 demonstrate fundamental skills to:
     - 4.1.1 communicate
     - 4.1.2 manage information
     - 4.1.3 use numbers
     - 4.1.4 think and solve problems
   - 4.2 demonstrate personal management skills to:
     - 4.2.1 demonstrate positive attitudes and behaviours
     - 4.2.2 be responsible
     - 4.2.3 be adaptable
     - 4.2.4 learn continuously
     - 4.2.5 work safely
   - 4.3 demonstrate teamwork skills to:
     - 4.3.1 work with others
     - 4.3.2 participate in projects and tasks
5. **make personal connections to the cluster content and processes to inform possible pathway choices**
   - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
   - 5.2 create a connection between a personal inventory and occupational choices

COURSE ENS2030: ECOLOGICAL ECONOMICS

Level: Intermediate

Prerequisite: ENS1030: Consumerism

Description: Students examine the economic effects of local, provincial, national and international environmental policies and look at issues such as the costs and benefits of alternative environmental policies to deal with air pollution, water quality, toxic substances, solid waste and global warming.

Outcomes: The student will:

1. **explore basic economic systems**
   1.1 define market, planned and mixed economic systems
   1.2 compare and contrast market, planned and mixed economic systems
2. **compare and contrast ecological and neoclassical (e.g., supply and demand, Keynesian) economic models, considering:**
   - **natural capital**
   - **human capital**
   - **manufactured capital**
   - **sustainability**
   - **externalities (indirect or external costs or benefits)**
   - **cost-benefit analysis**
   - **economic analysis and valuation**
3. **use ecological and neoclassical economic models to evaluate a local, provincial or national environmental policy (e.g., environmental regulations, quotas on pollution, taxes and tariffs on pollution, property rights), considering:**
   - **natural capital**
   - **human capital**
   - **manufactured capital**
   - **sustainability**
   - **cost-benefit analysis**
   - **ethics**
   - **externalities (indirect or external costs or benefits)**
4. **investigate and discuss Alberta's current economic influences regarding sustainable development**
   4.1 determine the primary economic influences in Alberta
   4.2 identify policies that affect Alberta's economic and environmental sustainability
   4.3 identify actions that affect Alberta's economic and environmental sustainability
5. **demonstrate basic competencies**
   5.1 demonstrate fundamental skills to:
      5.1.1 communicate
      5.1.2 manage information
      5.1.3 use numbers
      5.1.4 think and solve problems

5.2 demonstrate personal management skills to:
    5.2.1 demonstrate positive attitudes and behaviours
    5.2.2 be responsible
    5.2.3 be adaptable
    5.2.4 learn continuously
    5.2.5 work safely
5.3 demonstrate teamwork skills to:
    5.3.1 work with others
    5.3.2 participate in projects and tasks

6. identify possible life roles related to the skills and content of this cluster

6.1 recognize and then analyze the opportunities and barriers in the immediate environment
6.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2040: ENVIRONMENTAL HEALTH & SAFETY

Level: Intermediate

Prerequisite: ENS1040: Living with the Environment

Description: Students identify issues related to environmental health and safety that result from activities within Alberta industries and describe specific environmental monitoring and management practices adapted by Alberta government and industry.

Outcomes: The student will:

1. **identify environmental health and safety issues relevant to one of Alberta's industries**
   - 1.1 identify environmental health and safety issues relevant to an industry, including but not limited to:
     - 1.1.1 air and water pollution; e.g., odour, particulates, phosphates
     - 1.1.2 blowouts, spills and runoff, and fires; e.g., herbicide and pesticide runoff from farms, controlled burns
     - 1.1.3 emission of sulphur dioxide, carbon dioxide and nitrogen oxide
     - 1.1.4 noise level
     - 1.1.5 disposal of waste
     - 1.1.6 land disturbance; e.g., mining, seismic testing
     - 1.1.7 degradation of wildlife habitat; e.g., monoculture forest and pine beetle infestation
     - 1.1.8 biodiversity
     - 1.1.9 hydrologic cycle
   - 1.2 research current environmental health and safety theories, including but not limited to:
     - 1.2.1 global climate change
     - 1.2.2 emissions of greenhouse gases
     - 1.2.3 the effects of chemical spills on food chains
     - 1.2.4 biodiversity and habitat loss
   - 1.3 collect and report data on a specific environmental health and safety issue
   - 1.4 explain how environmental health and safety concerns relevant to an Alberta industry are addressed through the process of environmental planning, including but not limited to:
     - 1.4.1 land-use management
     - 1.4.2 environmental impact surveys
     - 1.4.3 by-product (waste) management
     - 1.4.4 spill containment, clean up and recovery
     - 1.4.5 monitoring and maintaining air and water quality
     - 1.4.6 rehabilitation, reclamation and restoration
2. **describe environmental policies and legislation that influence operations within an Alberta industry**
   - 2.1 explain how industry, government and other stakeholders work together to resolve environmental concerns
   - 2.2 examine provincial and federal legislation regarding protection of the environment; e.g., *Land Stewardship Act*, *Land-use Framework*, *Canadian Environmental Protection Act*
   - 2.3 identify specific legislative requirements that relate to operations within an Alberta industry
   - 2.4 describe construction and operating approvals required for a specific industry operation
   - 2.5 outline strategies for public involvement in environmental law-making
   - 2.6 propose changes to existing legislation or suggest new legislation regarding an environmental health and safety concern; e.g., sulphur dioxide and carbon dioxide emissions, water treatment, toxic waste management

3. explain environmental monitoring and management practices conducted by an Alberta industry

- 3.1 describe the goals and techniques of environmental monitoring within an Alberta industry
- 3.2 explain operating practices and guidelines within the industry that relate to specific legislative requirements
- 3.3 describe major aspects of land management within the industry
- 3.4 examine containment and recovery techniques
- 3.5 describe the mandates and responsibilities of non-government organizations (NGOs), industry and government in spill control, remediation, restoration and reclamation; e.g., well sites, brownfields (unused or underused industrial sites)
- 3.6 explain the planning process; e.g., public consultation, permits and approvals, impact assessment
- 3.7 examine theories and techniques relevant to by-product management within the industry
- 3.8 examine current and emerging technologies that address environmental health and safety issues and promote sustainable development within the industry

4. demonstrate basic competencies

- 4.1 demonstrate fundamental skills to:
  - 4.1.1 communicate
  - 4.1.2 manage information
  - 4.1.3 use numbers
  - 4.1.4 think and solve problems
- 4.2 demonstrate personal management skills to:
  - 4.2.1 demonstrate positive attitudes and behaviours
  - 4.2.2 be responsible
  - 4.2.3 be adaptable
  - 4.2.4 learn continuously
  - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
  - 4.3.1 work with others
  - 4.3.2 participate in projects and tasks

5. identify possible life roles related to the skills and content of this cluster

- 5.1 recognize and then analyze the opportunities and barriers in the immediate environment
- 5.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2050: ENVIRONMENTAL ETHICS

Level: Intermediate

Prerequisite: None

Description: Students will investigate environmental ethics and identify methods for environmental advocacy.

Supporting Course: ENS1020: Fostering Stewardship

Outcomes: The student will:

1. **analyze environmental worldviews in a variety of cultures, communities and societies**
   - 1.1 define *environmental worldview*s in terms of beliefs and values
   - 1.2 investigate ethical principles used to determine environmental behaviour
   - 1.3 identify the differences between instrumental (utilitarian) and intrinsic (inherent) values
   - 1.4 investigate major human-centred environmental worldviews; e.g., no-problem, free-market, spaceship-Earth
2. **compare and contrast life-centred and earth-centred environmental worldviews**
   - 2.1 analyze life-centred worldviews (stewardship), considering but not limited to:
     - 2.1.1 protection of species and spaces
     - 2.1.2 sustainable development
     - 2.1.3 Earth's ecological services; e.g., population control, nutrient recycling, climate control, pollution control, waste treatment, biodiversity, pest and disease control
   - 2.2 analyze earth-centred worldviews (environmental wisdom), considering but not limited to:
     - 2.2.1 existence of nature for all species
     - 2.2.2 availability and utility of resources
     - 2.2.3 imitation of natural processes (biomimicry)
   - 2.3 analyze other related worldviews; e.g., deep ecology, ecofeminism
3. **explore whether a life-centred or an earth-centred environmental worldview can build a more environmentally sustainable and just society, and defend the position**
   - 3.1 identify some of the main components of an environmentally literate society; e.g., respect for all life, understanding and knowledge of Earth's ecological services, evaluation of environmental consequences
   - 3.2 identify methods of acquiring and developing environmental wisdom
   - 3.3 investigate how lifestyle changes and choices can affect environmental sustainability and social justice
4. **demonstrate basic competencies**
   - 4.1 demonstrate fundamental skills to:
     - 4.1.1 communicate
     - 4.1.2 manage information
     - 4.1.3 use numbers
     - 4.1.4 think and solve problems
   - 4.2 demonstrate personal management skills to:
     - 4.2.1 demonstrate positive attitudes and behaviours
     - 4.2.2 be responsible
     - 4.2.3 be adaptable
     - 4.2.4 learn continuously
     - 4.2.5 work safely

4.3 demonstrate teamwork skills to:
    4.3.1 work with others
    4.3.2 participate in projects and tasks

5. identify possible life roles related to the skills and content of this cluster

5.1 recognize and then analyze the opportunities and barriers in the immediate environment
5.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2120: WATER MANAGEMENT 1

Level: Intermediate

Prerequisite: ENS1115: Resource Management

Description: Students will examine water as a vital resource and the need to manage it. Areas of investigation include the uses of and stresses on this resource as well as ways in which water is managed.

Outcomes: The student will:

1. **describe the hydrologic cycle**
   - 1.1 define *hydrologic cycle*
   - 1.2 describe the roles of evaporation, precipitation, run-off and infiltration in the hydrologic cycle
   - 1.3 explain physical, chemical and biological changes in water as it cycles in the natural environment
2. **identify and explain factors that stress water resources, including:**
   - **population growth**
   - **increased affluence**
   - **expansion of business activity**
   - **rapid urbanization**
   - **climate change**
   - **depletion of aquifers**
   - **pollution**
3. **identify and explain the major components of a water management plan**
   - 3.1 identify and illustrate elements of water management, including:
     - 3.1.1 conservation
     - 3.1.2 preservation
     - 3.1.3 monitoring
     - 3.1.4 treatment
   - 3.2 research forms of water ownership and legal aspects of water control, including:
     - 3.2.1 public, private and deeded ownership
     - 3.2.2 government controls on pollution
   - 3.3 explain how water management programs and policies are developed through political, social, economic and scientific decisions
   - 3.4 identify and describe basic steps involved in developing a water management plan; e.g., state goals and objectives, collect data and conduct research, gather government and nongovernment input, consider alternatives, consequences and potential conflicts, select a course of action, implement the action plan, monitor and evaluate outcomes, make recommendations and revisions
4. **identify industrial, personal and environmental water management legislation and policies in Alberta**
   - 4.1 identify government agencies and community groups that are involved with water management in the province; e.g., Alberta Environment
   - 4.2 research the policies that guide water management in Alberta; e.g., *Land-use Framework*, pioneer water ownership, First Nation water rights, navigation water rights
   - 4.3 identify current water challenges experienced in Alberta; e.g., Athabasca River Basin, Bow River, Milk River

5. analyze current issues involving water resource management considering alternatives and consequences

5.1 describe a variety of issues affecting water resource management; e.g., preservation versus conservation, problems with an "ecosystem management" approach, political boundaries and the water systems and people involved, legislation versus no legislation, public perception of water management, the value of water, environmental impact assessment plans and legislation

5.2 explain how philosophies and goals of different water management practices are sometimes incompatible with each other, and how conflicts and compromises may develop

6. demonstrate basic competencies

6.1 demonstrate fundamental skills to:

- 6.1.1 communicate
- 6.1.2 manage information
- 6.1.3 use numbers
- 6.1.4 think and solve problems

6.2 demonstrate personal management skills to:

- 6.2.1 demonstrate positive attitudes and behaviours
- 6.2.2 be responsible
- 6.2.3 be adaptable
- 6.2.4 learn continuously
- 6.2.5 work safely

6.3 demonstrate teamwork skills to:

- 6.3.1 work with others
- 6.3.2 participate in projects and tasks

7. identify possible life roles related to the skills and content of this cluster

7.1 recognize and then analyze the opportunities and barriers in the immediate environment

7.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2130: RENEWABLE & NONRENEWABLE ENERGY RESOURCES

Level: Intermediate

Prerequisite: ENS1110: Natural Resources

Description: Students examine current and potential renewable and nonrenewable energy production, the contributions of each to sustainable energy development, and the effects of these forms of energy production on the environment.

Outcomes: The student will:

1. **describe current and potential sources of energy**
   - 1.1 identify direct and indirect (e.g., wind, hydroelectricity and biomass) forms of solar energy
   - 1.2 identify renewable and nonrenewable forms of commercial energy
   - 1.3 research the basic theories and/or principles regarding an energy technology
   - 1.4 describe current and emerging applications of an energy technology
2. **analyze the potential environmental and economic impacts of a variety of current and future renewable and nonrenewable energy sources (e.g., conventional oil, oil sands, hydrogen, direct solar, hydro, nuclear, wind, geothermal, biomass, waste, biofuels), considering but not limited to:**
   - **net energy and/or energy returned on energy invested (EROEI)**
   - **availability of source**
   - **cost to develop, phase in and use**
   - **governmental incentives**
   - **national and global economic and political security**
   - **facilities and equipment essential to energy production**
   - **basic steps, including safety measures, involved in energy production**
   - **effects of extraction, transportation and use on the environment**
3. **evaluate the potential of energy efficiency in the development of sustainable energy resources**
   - 3.1 analyze the net energy efficiency of a variety of energy sources
   - 3.2 identify ways to improve energy efficiency
4. **evaluate local, provincial and national government strategies for developing a sustainable energy future**
   - 4.1 research government policies that encourage the use of selected energy resources
   - 4.2 research government policies that encourage energy efficiency
   - 4.3 research industry policies that encourage the use of selected energy resources
   - 4.4 research other policies that encourage energy efficiency
5. **demonstrate basic competencies**
   - 5.1 demonstrate fundamental skills to:
     - 5.1.1 communicate
     - 5.1.2 manage information
     - 5.1.3 use numbers
     - 5.1.4 think and solve problems
   - 5.2 demonstrate personal management skills to:
     - 5.2.1 demonstrate positive attitudes and behaviours
     - 5.2.2 be responsible
     - 5.2.3 be adaptable
     - 5.2.4 learn continuously
     - 5.2.5 work safely

5.3 demonstrate teamwork skills to:
    5.3.1 work with others
    5.3.2 participate in projects and tasks

6. identify possible life roles related to the skills and content of this cluster

6.1 recognize and then analyze the opportunities and barriers in the immediate environment
6.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2140: BY-PRODUCT MANAGEMENT

Level: Intermediate

Prerequisite: ENS1115: Resource Management

Description: Students examine the by-product (waste) management of natural and manufactured materials and identify its relationship to sustainable development.

Parameters: Access to government-, industry- and/or community-sponsored waste management facilities and systems.

Access to a science laboratory.

Outcomes: The student will:

1. **present a rationale for by-product (waste) management**
   - 1.1 describe societal trends in the consumption of material goods and the generation of by-product material
   - 1.2 examine problems and alternatives associated with the disposal of by-product materials at local and global levels
   - 1.3 analyze economic and environmental trade-offs that occur through the by-product management of natural or manufactured materials; e.g., compost, wood, rubber, plastic, paper
   - 1.4 identify and explain current legislation that supports by-product management
2. **describe the four Rs of by-product management: reduce, reuse, recycle and recover**
   - 2.1 explain the four Rs as an environmental hierarchy of options for conserving resources and managing by-products
   - 2.2 identify potential benefits and costs associated with the four Rs of by-product management; e.g., use of energy and other natural resources, impact on pollution, litter and the environment, cost related to collecting and processing materials, storage of toxic and radioactive materials
   - 2.3 illustrate one example of by-product management in Alberta that uses at least one of the four Rs
3. **identify opportunities related to managing by-products**
   - 3.1 describe products or services that may be developed from the management of organic and inorganic by-products; e.g., glass, scrap metal, plant material, paper, recycling depots, transportation, manufacturing, haz-mat crews
   - 3.2 explore systems that have the potential to reduce energy consumption and/or by-product generation; e.g., cogeneration, methane capture, use of waste heat
   - 3.3 identify and locate by-product management facilities and systems currently used in Alberta; e.g., landfills, recycling depots, Swan Hills Treatment Centre, compost, community sorting centres, landfill gas recovery
   - 3.4 explain techniques used to control quality within the by-product management industry; e.g., inspection and sorting of raw materials, product quality and uniformity
   - 3.5 identify a strategy for personal involvement in the by-product management of an organic or inorganic material; e.g., glass, metal, cellulose, petrochemical

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:

- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

4.2 demonstrate personal management skills to:

- 4.2.1 demonstrate positive attitudes and behaviours
- 4.2.2 be responsible
- 4.2.3 be adaptable
- 4.2.4 learn continuously
- 4.2.5 work safely

4.3 demonstrate teamwork skills to:

- 4.3.1 work with others
- 4.3.2 participate in projects and tasks

5. identify possible life roles related to the skills and content of this cluster

5.1 recognize and then analyze the opportunities and barriers in the immediate environment

5.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2210: SUSTAINABLE BUILDING DESIGN & CONSTRUCTION

Level: Intermediate

Prerequisite: ENS1020: Fostering Stewardship

Description: Students investigate sustainable building trends to reduce energy consumption, resource consumption and waste production. Areas of investigation include building techniques, material usage and life cycle management.

Supporting Courses: DES3095: Architectural Design
DES3115: Industrial Design
DES3125: Interior Design
DES3135: Landscape Design

Outcomes: The student will:

1. **describe the impact of built environments on the natural environment, considering:**
   - **use of energy, water, air, land, forest and mineral resources**
   - **occupant health and productivity**
   - **waste, pollution and environmental degradation**
   - **effects on biodiversity**
2. **identify and describe the elements of a built environment's life cycle, including but not limited to:**
   - **location, sighting and design**
   - **construction**
   - **operation and maintenance**
   - **renovation**
   - **deconstruction and/or demolition**
3. **investigate and analyze trends in sustainable building design and construction**
   - 3.1 identify and describe building trends that consider occupant health; e.g., exposure to natural light, floor plans, air quality and flow, acoustics, materials
   - 3.2 explain the effects of volatile organic compounds (VOCs) and the off-gases they produce; e.g., finishing paints, carpets, plastics
   - 3.3 describe ergonomic interior design; e.g., counter heights, illumination location, step heights
   - 3.4 analyze efficient building practices that consider energy and water usage; e.g., solar collection, climate specific vegetation, natural air currents, rain water collection
   - 3.5 identify and describe new technologies in building design; e.g., centralized water usage systems, helical wind turbines, photovoltaic materials
   - 3.6 investigate, explain and analyze sustainable building and design certifications (e.g., LEED, the Green Globes system, high performance building), considering:
     - 3.6.1 efficient use of energy, water, land and other resources
     - 3.6.2 protecting occupant health and increasing productivity
     - 3.6.3 reducing waste, pollution and environmental degradation
     - 3.6.4 effects on biodiversity

4. **investigate and illustrate alternatives and consequences associated with current issues involving sustainable building design and construction**
   - 4.1 analyze a variety of issues and problems affecting building design and construction; e.g., legislation versus no legislation, public perception of sustainable building design and construction, the value of sustainability, environmental impact assessment plans and legislation
   - 4.2 explain how philosophies and goals of different sustainable building design and construction practices are sometimes incompatible with each other, and how conflicts and trade-offs may occur
5. **create, present and defend a sustainable building design, considering:**
   - **the building's life cycle**
   - **occupant health**
   - **recycling, reducing and reusing waste**
   - **ergonomic interior design**
   - **efficient energy and water usage**
   - **new technologies in building design**
   - **conservation and preservation of biodiversity**
   - **reclamation of brownfield land (unused and underused commercial and industrial land)**
   - **community revitalization**
6. **demonstrate basic competencies**
   - 6.1 demonstrate fundamental skills to:
     - 6.1.1 communicate
     - 6.1.2 manage information
     - 6.1.3 use numbers
     - 6.1.4 think and solve problems
   - 6.2 demonstrate personal management skills to:
     - 6.2.1 demonstrate positive attitudes and behaviours
     - 6.2.2 be responsible
     - 6.2.3 be adaptable
     - 6.2.4 learn continuously
     - 6.2.5 work safely
   - 6.3 demonstrate teamwork skills to:
     - 6.3.1 work with others
     - 6.3.2 participate in projects and tasks
7. **identify possible life roles related to the skills and content of this cluster**
   - 7.1 recognize and then analyze the opportunities and barriers in the immediate environment
   - 7.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2220: ENERGY CONSERVATION PRINCIPLES

Level: Intermediate

Prerequisite: None

Description: Students investigate the basic principles of energy conservation and efficiency and relate them to energy designs and systems used in residential, commercial or transportation sectors.

Outcomes: The student will:

1. **explain basic principles of energy conservation and efficiency**
   - 1.1 identify basic forms of energy (radiant, chemical, thermal, mechanical, electrical, nuclear) and describe the applications of each form
   - 1.2 illustrate or represent how the sun is the source of various forms of energy
   - 1.3 distinguish between energy and power
   - 1.4 distinguish between kinetic and potential energy
   - 1.5 provide a rationale for energy conservation and efficiency based on economic and environmental factors
   - 1.6 cite examples of energy technologies used to convert one form of energy into another useful form; e.g., turbines, generators, motors, electric bulbs
   - 1.7 demonstrate an understanding and explain the applications of the first law of thermodynamics and the second law of thermodynamics
   - 1.8 define energy efficiency and explain its application in determining how well a technology converts energy from one form to another
2. **demonstrate applications of energy technologies in the residential, commercial or transportation sectors**
   - 2.1 identify energy sources and illustrate the flow of energy for an existing residential or commercial structure or transportation system
   - 2.2 demonstrate an understanding of the functions of technology in converting energy into useful forms within one structure or system, including component parts and principles of operation
   - 2.3 illustrate and/or describe applications of energy conservation and efficiency evident in one structure or system design; e.g., mechanical efficiency, volumetric efficiency, thermal efficiency
   - 2.4 explain design principles incorporated to transfer energy throughout one structure or system
   - 2.5 research methods used to measure energy and power within one structure or system; e.g., British thermal unit and calorie, joules, kilowatt hours, watts, horsepower, torque
   - 2.6 perform simple efficiency calculations and compare energy input and output for components within one structure or system; e.g., windows, lighting, wall structure, insulation, mechanical devices
   - 2.7 evaluate energy use within one structure or system based on total system efficiency, cost of operation and environmental and social effects, considering such things as land use, atmospheric emissions, health, convenience and aesthetics
3. **demonstrate basic competencies**
   - 3.1 demonstrate fundamental skills to:
     - 3.1.1 communicate
     - 3.1.2 manage information
     - 3.1.3 use numbers
     - 3.1.4 think and solve problems

3.2 demonstrate personal management skills to:
    3.2.1 demonstrate positive attitudes and behaviours
    3.2.2 be responsible
    3.2.3 be adaptable
    3.2.4 learn continuously
    3.2.5 work safely
3.3 demonstrate teamwork skills to:
    3.3.1 work with others
    3.3.2 participate in projects and tasks

4. identify possible life roles related to the skills and content of this cluster

4.1 recognize and then analyze the opportunities and barriers in the immediate environment
4.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2910: ENS PROJECT B

Level: Intermediate

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Intermediate project courses must connect with a minimum of two CTS courses, one of which must be at the intermediate level and be in the same occupational area as the project course. The other CTS course(s) can be at any level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

1. **identify the connection between this project course and two or more CTS courses**
   - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
   - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
2. **propose the project and/or performance**
   - 2.1 identify the project and/or performance by:
     - 2.1.1 preparing a plan
     - 2.1.2 clarifying the purposes
     - 2.1.3 defining the deliverables
     - 2.1.4 specifying time lines
     - 2.1.5 explaining terminology, tools and processes
     - 2.1.6 defining resources; e.g., materials, costs, staffing
   - 2.2 identify and comply with all related health and safety standards
   - 2.3 define assessment standards (indicators for success)
   - 2.4 present the proposal and obtain necessary approvals

The student will:

3. **meet goals as defined within the plan**
   - 3.1 complete the project and/or performance as outlined
   - 3.2 monitor the project and/or performance and make necessary adjustments
   - 3.3 present the project and/or performance, indicating the:
     - 3.3.1 outcomes attained
     - 3.3.2 relationship of outcomes to goals originally set

3.4 evaluate the project and/or performance, indicating the:
    3.4.1 processes and strategies used
    3.4.2 recommendations on how the project and/or performance could have been improved

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:
    4.1.1 communicate
    4.1.2 manage information
    4.1.3 use numbers
    4.1.4 think and solve problems
4.2 demonstrate personal management skills to:
    4.2.1 demonstrate positive attitudes and behaviours
    4.2.2 be responsible
    4.2.3 be adaptable
    4.2.4 learn continuously
    4.2.5 work safely
4.3 demonstrate teamwork skills to:
    4.3.1 work with others
    4.3.2 participate in projects and tasks

5. identify possible life roles related to the skills and content of this cluster

5.1 recognize and then analyze the opportunities and barriers in the immediate environment
5.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2920: ENS PROJECT C

Level: Intermediate

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Intermediate project courses must connect with a minimum of two CTS courses, one of which must be at the intermediate level and be in the same occupational area as the project course. The other CTS course(s) can be at any level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

1. **identify the connection between this project course and two or more CTS courses**
   - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
   - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
2. **propose the project and/or performance**
   - 2.1 identify the project and/or performance by:
     - 2.1.1 preparing a plan
     - 2.1.2 clarifying the purposes
     - 2.1.3 defining the deliverables
     - 2.1.4 specifying time lines
     - 2.1.5 explaining terminology, tools and processes
     - 2.1.6 defining resources; e.g., materials, costs, staffing
   - 2.2 identify and comply with all related health and safety standards
   - 2.3 define assessment standards (indicators for success)
   - 2.4 present the proposal and obtain necessary approvals

The student will:

3. **meet goals as defined within the plan**
   - 3.1 complete the project and/or performance as outlined
   - 3.2 monitor the project and/or performance and make necessary adjustments
   - 3.3 present the project and/or performance, indicating the:
     - 3.3.1 outcomes attained
     - 3.3.2 relationship of outcomes to goals originally set

3.4 evaluate the project and/or performance, indicating the:
    3.4.1 processes and strategies used
    3.4.2 recommendations on how the project and/or performance could have been improved

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:
    4.1.1 communicate
    4.1.2 manage information
    4.1.3 use numbers
    4.1.4 think and solve problems
4.2 demonstrate personal management skills to:
    4.2.1 demonstrate positive attitudes and behaviours
    4.2.2 be responsible
    4.2.3 be adaptable
    4.2.4 learn continuously
    4.2.5 work safely
4.3 demonstrate teamwork skills to:
    4.3.1 work with others
    4.3.2 participate in projects and tasks

5. identify possible life roles related to the skills and content of this cluster

5.1 recognize and then analyze the opportunities and barriers in the immediate environment
5.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS2950: ENS INTERMEDIATE PRACTICUM

Level: Intermediate

Prerequisite: None

Description: Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation.

Parameters: This practicum course, which may be delivered on- or off-campus, should be accessed only by students continuing to work toward attaining a recognized credential/credentials or an articulation offered by an external organization. This course must be connected to at least one CTS course from the same occupational area and cannot be used in conjunction with any advanced (3XXX) level course. A practicum course cannot be delivered as a stand-alone course, cannot be combined with a CTS project course and cannot be used in conjunction with the Registered Apprenticeship Program or the Green Certificate Program.

Outcomes: The student will:

1. **perform assigned tasks and responsibilities, as required by the organization granting the credential(s) or articulation**
   - 1.1 identify regulations and regulatory bodies related to the credential(s) or articulation
   - 1.2 describe personal roles and responsibilities, including:
     - 1.2.1 key responsibilities
     - 1.2.2 support functions/responsibilities/expectations
     - 1.2.3 code of ethics and/or conduct
   - 1.3 describe personal work responsibilities and categorize them as:
     - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
     - 1.3.2 non-routine tasks; e.g., emergencies
     - 1.3.3 tasks requiring personal judgement
     - 1.3.4 tasks requiring approval of a supervisor
   - 1.4 demonstrate basic employability skills and perform assigned tasks and responsibilities related to the credential(s) or articulation
2. **analyze personal performance in relation to established standards**
   - 2.1 evaluate application of the attitudes, skills and knowledge developed in related CTS courses
   - 2.2 evaluate standards of performance in terms of:
     - 2.2.1 quality of work
     - 2.2.2 quantity of work
   - 2.3 evaluate adherence to workplace legislation related to health and safety
   - 2.4 evaluate the performance requirements of an individual who is trained, experienced and employed in a related occupation in terms of:
     - 2.4.1 training and certification
     - 2.4.2 interpersonal skills
     - 2.4.3 technical skills
     - 2.4.4 ethics

3. demonstrate basic competencies

3.1 demonstrate fundamental skills to:

- 3.1.1 communicate
- 3.1.2 manage information
- 3.1.3 use numbers
- 3.1.4 think and solve problems

3.2 demonstrate personal management skills to:

- 3.2.1 demonstrate positive attitudes and behaviours
- 3.2.2 be responsible
- 3.2.3 be adaptable
- 3.2.4 learn continuously
- 3.2.5 work safely

3.3 demonstrate teamwork skills to:

- 3.3.1 work with others
- 3.3.2 participate in projects and tasks

4. identify possible life roles related to the skills and content of this cluster

4.1 recognize and then analyze the opportunities and barriers in the immediate environment

4.2 identify potential resources to minimize barriers and maximize opportunities

COURSE ENS3030: THE GREEN ECONOMY

Level: Advanced

Prerequisite: ENS2030: Ecological Economics

Description: Students will investigate the impact of the emerging green economy and how it will influence provincial, national and global economic patterns.

Supporting Courses: ENS2050: Environmental Ethics
ENS3040: Energy & the Environment
ENS3050: Environmental Politics

Outcomes: The student will:

1. **evaluate how ecological and neo-classical economic models monitor economic progress**
   - 1.1 identify methods of evaluating environmental and human well-being
   - 1.2 research how monetary value (e.g., existence value, aesthetic value, bequest or option value) can be assigned to nontraded resources or ecological services (e.g., population control, nutrient recycling, climate control, pollution control, waste treatment, biodiversity, pest and disease control)
   - 1.3 investigate how estimates of future value (discount rates) affect environmental sustainability and economic progress
2. **analyze how ecological and neo-classical economic models assess the value of externalities (indirect or external costs or benefits)**
   - 2.1 identify types of externalities, positive and negative, that could occur in economic transactions
   - 2.2 investigate how the full cost of a product or service can be reflected in market prices (full-cost pricing)
3. **assess the effects of full-cost pricing on environmental quality**
   - 3.1 investigate the effects of subsidies on environmental quality and resource management
   - 3.2 investigate the effects of taxes and fees related to pollution and resource use on environmental quality and resource management
   - 3.3 identify and describe local, provincial and national policies, laws and regulations aimed at improving environmental quality, encouraging innovation and reducing resource waste
4. **explore whether there is a link between the reduction of poverty and the improvement of environmental quality and human well-being, and defend a position**
   - 4.1 investigate the general distribution of wealth in global economic growth
   - 4.2 investigate the effects of international debt on poverty and the improvement of environmental quality and human well-being
   - 4.3 identify local, provincial and national policies aimed at reducing poverty
5. **develop, present and defend a plan to transition Alberta to a more environmentally sustainable economy, considering:**
   - **biomimicry (the imitation of ecological services)**
   - **full-cost pricing**
   - **resource management**
   - **environmental management**
   - **innovative practices**
   - **policies and legislation in other jurisdictions**

6. demonstrate basic competencies

6.1 demonstrate fundamental skills to:

- 6.1.1 communicate
- 6.1.2 manage information
- 6.1.3 use numbers
- 6.1.4 think and solve problems

6.2 demonstrate personal management skills to:

- 6.2.1 demonstrate positive attitudes and behaviours
- 6.2.2 be responsible
- 6.2.3 be adaptable
- 6.2.4 learn continuously
- 6.2.5 work safely

6.3 demonstrate teamwork skills to:

- 6.3.1 work with others
- 6.3.2 participate in projects and tasks

7. create a transitional strategy to accommodate personal changes and build personal values

7.1 identify short-term and long-term goals

7.2 identify steps to achieve goals

COURSE ENS3040: ENERGY & THE ENVIRONMENT

Level: Advanced

Prerequisite: None

Description: Students assess the social, economic and environmental benefits and costs of resource development and demonstrate personal and shared actions that foster energy conservation and environmental stewardship.

Supporting Courses: ENS1020: Fostering Stewardship
ENS2030: Ecological Economics
ENS2050: Environmental Ethics
ENS3050: Environmental Politics

Parameters: Access to relevant government, industry and community resources.

Outcomes: The student will:

1. **describe the social, economic and environmental significance of energy development**
   - 1.1 describe the social, economic and environmental significance of an energy development; e.g., a hydro dam (Brazeau and Bighorn dams), windfarms (Pincher Creek), coal or gas fired power plant (Keephills)
   - 1.2 analyze the relationship between an energy development and the environment; e.g., greenhouse gases, acid deposition, ecosystem destruction, resource depletion, ozone depletion, smog, water pollution
   - 1.3 describe actions taken by industry to reduce or eliminate the environmental impacts of an energy development; e.g., development practices, reclamation technologies, environmental monitoring procedures, capture and recovery technologies
   - 1.4 evaluate government policy and regulation at provincial and national levels intended to respond to social, economic and environmental concerns regarding an energy development; e.g., royalty legislation, Kyoto Protocol, Montreal Protocol, land-use policies, environmental legislation
   - 1.5 describe public consultation and consensus procedures that respond to social, economic and environmental concerns; e.g., town hall meetings, round table discussions, focus group discussions
2. **plan and implement a strategy for personal action that promotes an environmentally sustainable lifestyle**
   - 2.1 conduct a personal energy audit; e.g., maintain a log, chart or graph of personal energy use
   - 2.2 identify personal needs and wants based on the energy audit
   - 2.3 evaluate the impact of your personal energy use and lifestyle factors on the environment
   - 2.4 describe and implement a strategy that enables an environmentally sustainable lifestyle
   - 2.5 evaluate the social, economic and environmental consequences of implementing your strategy
   - 2.6 revise your strategy according to environmental, social and economic outcomes
3. **plan and implement a group action campaign that fosters environmental awareness, energy conservation and energy efficiency; e.g., class, school, community**
   - 3.1 identify and assess opportunities for reducing the environmental impacts of energy use within the classroom, school and/or community; e.g., conduct a cost-benefit analysis of an energy-saving technology and/or activity
   - 3.2 identify potential obstacles to group action aimed at reducing environmental impacts

3.3 plan and implement a classroom, school and/or community campaign that promotes environmental awareness and energy conservation; e.g., develop a marketing campaign to increase public awareness
3.4 identify constructive ways in which individuals can influence group decisions that affect energy consumption and the environment; e.g., voting, lobbying, seeking office, supporting compatible interest groups
3.5 design a social, economic and/or environmental impact assessment and consultation process for a proposed energy project

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:
- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

4.2 demonstrate personal management skills to:
- 4.2.1 demonstrate positive attitudes and behaviours
- 4.2.2 be responsible
- 4.2.3 be adaptable
- 4.2.4 learn continuously
- 4.2.5 work safely

4.3 demonstrate teamwork skills to:
- 4.3.1 work with others
- 4.3.2 participate in projects and tasks

5. create a transitional strategy to accommodate personal changes and build personal values

5.1 identify short-term and long-term goals
5.2 identify steps to achieve goals

COURSE ENS3050: ENVIRONMENTAL POLITICS

Level: Advanced

Prerequisite: None

Description: Students will investigate the relationships and roles of the local, provincial and federal governments with respect to the environment. Students will also examine the global community's role and the cooperation between international governments in working toward a sustainable world.

Supporting Course: ENS2050: Environmental Ethics

Outcomes: The student will:

1. **identify a variety of current and potential environmental and political challenges, including:**
   - **biodiversity**
   - **shift from local to global concerns**
   - **climate change**
   - **pollution and poverty in developing nations**
   - **effects of industrial chemicals and food additives**
   - **globalized world and economy**
2. **analyze challenges in developing, influencing and implementing environmental policies**
   - 2.1 identify how government structure affects developing, influencing and implementing environmental policies
   - 2.2 describe a variety of principles that guide the development and implementation of environmental policies; e.g., humility principle, precautionary principle, public participation principle, human-rights principles, environmental justice principle
   - 2.3 assess the impact of individual actions on developing and implementing environmental policy
   - 2.4 investigate trends in the structure of organizations (e.g., businesses, governments, NGOs) that positively affect the development and implementation of environmental policies
3. **assess the impact of the legal system in developing, influencing and implementing environmental laws**
   - 3.1 define *environmental law*
   - 3.2 identify a variety of environmental laws, considering:
     - 3.2.1 statutory laws
     - 3.2.2 administrative laws
     - 3.2.3 common law
   - 3.3 assess the effectiveness of environmental lawsuits
4. **analyze the roles of environmental groups and organizations in developing, influencing and implementing environmental policies**
   - 4.1 assess the roles of major environmental organizations; e.g., monitoring environmental activities, lobbying for environmental laws, regulations and policies, collaboration with industries
   - 4.2 assess the roles of grassroots environmental groups; e.g., monitoring environmental activities, lobbying for environmental laws, regulations and policies, partnership with industries
   - 4.3 investigate the success of environmental groups and organizations in developing, influencing and implementing environmental policies
   - 4.4 identify the goals and roles of groups opposing the development and implementation of environmental policies

5. **assess the possibility of global environmental policies**
   - 5.1 analyze the validity of "environmental security" in relation to national security and economic security
   - 5.2 explore the roles of international environmental organizations in the development and implementation of global environmental policies; e.g., United Nations Environmental Programme, UN Development Programme, World Bank, World Conservation Union
   - 5.3 investigate the ability of international trade agreements to encourage sustainable development
6. **explore whether it is possible to transition Alberta to a more environmentally sustainable political system in the near future and defend a position**
   - 6.1 identify some of the main components of an environmentally literate political system; e.g., respect for all life, understanding and knowledge of Earth's ecological services, evaluation of environmental consequences
   - 6.2 identify methods for acquiring and developing environmental wisdom
   - 6.3 investigate lifestyle changes and choices that can affect environmentally sustainable political systems
7. **demonstrate basic competencies**
   - 7.1 demonstrate fundamental skills to:
     - 7.1.1 communicate
     - 7.1.2 manage information
     - 7.1.3 use numbers
     - 7.1.4 think and solve problems
   - 7.2 demonstrate personal management skills to:
     - 7.2.1 demonstrate positive attitudes and behaviours
     - 7.2.2 be responsible
     - 7.2.3 be adaptable
     - 7.2.4 learn continuously
     - 7.2.5 work safely
   - 7.3 demonstrate teamwork skills to:
     - 7.3.1 work with others
     - 7.3.2 participate in projects and tasks
8. **create a transitional strategy to accommodate personal changes and build personal values**
   - 8.1 identify short-term and long-term goals
   - 8.2 identify steps to achieve goals

COURSE ENS3110: INTEGRATED RESOURCE MANAGEMENT

Level: Advanced

Prerequisite: ENS1115: Resource Management

Description: Students will develop and present an integrated plan for sustainable development that incorporates the supply side and the demand side of natural resource management and integrated land use.

Supporting Courses: ENS3120: Water Management 2
ENS3130: Sustainable Energy

Outcomes: The student will:

1. **describe basic principles of resource management**
   - 1.1 describe principles of supply-side resource management and demand-side resource management by citing examples of each within Alberta
   - 1.2 compare principles of integrated land use with principles of multiple use management by citing examples of each within Alberta
   - 1.3 explain sustainable development and resource management within the context of Alberta's natural resources
   - 1.4 examine local opportunities for consultation and public involvement in resource management decisions; e.g., community associations, industry, local government, provincial departments and/or agencies
2. **describe government legislation and policies that influence the development of a natural resource**
   - 2.1 explain the mandate and responsibilities of key government departments and agencies in managing natural resources within provincial boundaries; e.g., disposition of mineral rights, regulation of exploration and development, development of conservation practices and environmental standards, collection of fair returns from resource development
   - 2.2 explain current and potential opportunities for industry, NGO and public interest group involvement in managing natural resources within provincial boundaries
   - 2.3 examine the role of important federal and provincial legislation in managing exploration and development activities within one of Alberta's natural resource industries
   - 2.4 evaluate the short- and long-term effects of one or more government legislations and regulations on one of Alberta's natural resources
3. **explain methods of allocating land and resources for the exploration and development of natural resources**
   - 3.1 explain how approvals (in the form of permits, licenses, leases and other legal agreements) are used to grant exploration and/or development rights
   - 3.2 identify factors that determine the nature of approvals required for a development activity; e.g., resource ownership (public or private), type of resource to be developed
   - 3.3 identify criteria taken into consideration when reviewing development applications and granting project approvals; e.g., sustainable development, reclamation of land, environmental protection, market demands and fluctuations, estimated returns and production life, integrated use of land
   - 3.4 examine departments and/or agencies that have the authority to grant approval for a selected development project
   - 3.5 examine the intent of different permits, licenses and/or agreements required prior to commencing the development project

3.6 examine requirements for the renewal and/or extension of different permits, licenses and agreements
3.7 explain the role of consultation with stakeholders (other resource users and public) in allocating land and resources for development, and in balancing interests among key stakeholder groups

4. present a plan for the sustainable development and integrated use of a land resource

4.1 identify short- term and long-term goals for the management of land on an integrated basis; e.g., social, economic, environmental
4.2 identify scientific, economic, environmental, and social factors to be addressed in a resource management plan; e.g., the objectives of different stakeholders, relevant government legislation and/or regulations, an inventory of existing resources, appropriate development and production techniques, market characteristics and trends, applications of research and technology
4.3 identify alternatives regarding supply-side and demand-side management, and select the preferred alternatives; e.g., recreational, environmental, industrial, agricultural
4.4 survey the views of different stakeholders in the land resource and resolve conflicts that may arise (e.g., recreational; environmental; First Nations, Métis and Inuit; industrial; agro-forestry)
4.5 incorporate consultation with other resource users, non-governmental organizations (NGOs) and public involvement in the planning process
4.6 identify permits, licenses or other legal agreements that may be required
4.7 develop a set of actions and present the management plan; e.g., a general description of the resource and proposed developments, long-term and short-term management objectives, proposed management standards and guidelines, a schedule of short-term development activities
4.8 create a representation and elaborate on the management plan, considering physical features, location of resources, history of past development, proposed development, activities, supply and distribution networks, and interactions with other sectors
4.9 describe techniques for monitoring resource use and management outcomes and resolving potential conflicts

5. demonstrate basic competencies

5.1 demonstrate fundamental skills to:
- 5.1.1 communicate
- 5.1.2 manage information
- 5.1.3 use numbers
- 5.1.4 think and solve problems

5.2 demonstrate personal management skills to:
- 5.2.1 demonstrate positive attitudes and behaviours
- 5.2.2 be responsible
- 5.2.3 be adaptable
- 5.2.4 learn continuously
- 5.2.5 work safely

5.3 demonstrate teamwork skills to:
- 5.3.1 work with others
- 5.3.2 participate in projects and tasks

6. create a transitional strategy to accommodate personal changes and build personal values

6.1 identify short-term and long-term goals
6.2 identify steps to achieve goals

COURSE ENS3120: WATER MANAGEMENT 2

Level: Advanced

Prerequisite: ENS2120: Water Management 1

Description: Students explain the principles of water management and establish appropriate water management practices for industrial, personal and environmental use.

Supporting Course: ENS3110: Integrated Resource Management

Outcomes: The student will:

1. **identify water sources important for industrial, personal and environmental use in Alberta**
   - 1.1 describe the main sources of water resources, including:
     - 1.1.1 ground water
     - 1.1.2 surface water
     - 1.1.3 precipitation
   - 1.2 describe systems used to collect and distribute water for industrial, personal and environmental use
   - 1.3 describe the characteristics of water important for industrial, personal and environmental use, considering:
     - 1.3.1 physical characteristics; e.g., turbidity, temperature, odour and taste
     - 1.3.2 chemical characteristics; e.g., dissolved oxygen, pH, mineral content
     - 1.3.3 biological characteristics; e.g., bacteria, viruses, algae and plankton
   - 1.4 perform tests to determine the characteristics of water and its suitability for industrial, personal and environmental use
2. **explain how industrial, personal and environmental uses affect water resources**
   - 2.1 explain how industrial, personal and environmental practices may affect the water resource at local, regional and global levels, including but not limited to:
     - 2.1.1 land clearing and soil cultivation
     - 2.1.2 use of chemical fertilizers and pesticides
     - 2.1.3 irrigation and draining practices
     - 2.1.4 overgrazing and animal wastes
     - 2.1.5 resource processing
     - 2.1.6 depletion of aquifers
     - 2.1.7 residential and commercial heating and cooling
   - 2.2 describe the effects of erosion and siltation on water quality
   - 2.3 relate specific industrial, personal and environmental practices to physical, chemical and biological changes that occur in a water resource
   - 2.4 debate an issue regarding the impacts of industrial, personal or environmental use on water supply and/or water quality
3. **identify techniques used to monitor and manage water quality for the benefit of industrial, personal and environmental uses**
   - 3.1 describe and assess techniques used to manage limited and excess water supplies for industrial, personal and environmental use, including:
     - 3.1.1 irrigation
     - 3.1.2 storage
     - 3.1.3 recycling
     - 3.1.4 diversion
     - 3.1.5 drainage
     - 3.1.6 flood control

3.2 identify treatments for enhancing water quality both before and after industrial, personal or environmental use
3.3 describe and assess industrial, personal or environmental practices aimed at maintaining water quality; e.g., crop rotation and conservation tillage, management of animal wastes, optimal fertilizer and pesticide management, industrial water recycling, grey water and sewage treatment
3.4 explain how the maintenance of wetlands contributes to water management
3.5 describe strategic alliances developed among government, environmental and user groups to address environmental impacts

4. identify water management practices for industrial, personal and environmental uses

4.1 investigate and compare water challenges that exist and could potentially be found in different regions of Alberta; e.g., irrigation, competition for supply
4.2 research successful examples of water management in multiple regions of Alberta; e.g., steam-assisted gravity drainage (SAGD)
4.3 determine the impact of poor water management in Alberta; e.g., contamination of the Athabasca River Basin by oil sands development, Bow River, Milk River, financial implications, food production

5. demonstrate basic competencies

5.1 demonstrate fundamental skills to:
- 5.1.1 communicate
- 5.1.2 manage information
- 5.1.3 use numbers
- 5.1.4 think and solve problems

5.2 demonstrate personal management skills to:
- 5.2.1 demonstrate positive attitudes and behaviours
- 5.2.2 be responsible
- 5.2.3 be adaptable
- 5.2.4 learn continuously
- 5.2.5 work safely

5.3 demonstrate teamwork skills to:
- 5.3.1 work with others
- 5.3.2 participate in projects and tasks

6. create a transitional strategy to accommodate personal changes and build personal values

6.1 identify short-term and long-term goals
6.2 identify steps to achieve goals

COURSE ENS3130: SUSTAINABLE ENERGY

Level: Advanced

Prerequisite: ENS2130: Renewable & Nonrenewable Energy Resources

Description: Students examine opportunities for planning renewable energy development and conserving and reducing conventional energy use.

Supporting Courses: ENS3040: Energy & the Environment
ENS3110: Integrated Resource Management

Outcomes: The student will:

1. **identify renewable and nonrenewable energy possibilities in Alberta**
   - 1.1 determine renewable and nonrenewable energy possibilities in Alberta
   - 1.2 identify Alberta regions that currently harvest or have potential to harvest nonrenewable energy resources
   - 1.3 identify organizations in Alberta that exhibit leadership in the sustainable use and development of renewable and/or nonrenewable energy
2. **identify issues involving current and future energy supply and demand**
   - 2.1 describe recent applications of technology in renewable and nonrenewable energy development; e.g., technologies designed to improve production and lessen environmental impacts
   - 2.2 examine social, economic and environmental perspectives regarding renewable and nonrenewable energy supply; e.g., trends in energy conservation, efficiency and lifestyle choices
   - 2.3 describe applications of renewable energy in reducing demand on nonrenewable energy sources; e.g., domestic and industrial heating, transportation
   - 2.4 research forecasts regarding future energy supply and demand and options for ensuring a sustainable energy future
3. **describe the benefits and obstacles associated with demand-side energy management**
   - 3.1 describe basic principles of demand-side energy management; e.g., controlling need, levelling consumption, developing energy alternatives, saving conventional sources for their ideal use
   - 3.2 evaluate benefits and obstacles associated with demand-side energy management
   - 3.3 suggest advantages of demand-side energy management over supply-side energy management in planning future energy development; e.g., energy efficiency and conservation, environmental quality, energy costs
   - 3.4 describe ways in which society can support, adapt to and overcome common obstacles of demand-side energy management; e.g., change people's habits to save energy and reduce waste, use design and technology to increase energy efficiency, develop awareness of long-term benefits, low energy prices, lack of energy standards for buildings and vehicles, government interventions
4. **investigate and identify energy transmission challenges**
   - 4.1 determine the cost to develop the infrastructure required to transmit energy from its source to areas of need
   - 4.2 identify environmental concerns in the development of energy transportation
   - 4.3 investigate and review environmental policies and agencies involved in the production and transmission of energy
5. **present a plan for sustainable energy development**
   - 5.1 provide a definition and examples of sustainable energy development
   - 5.2 compare the roles of renewable and nonrenewable technologies in sustainable energy development

5.3 cite examples of sustainable energy path development that involve least-cost combinations and efficient use of both renewable and nonrenewable energy sources, considering that sustainable energy path development involves matching the "quality" of the energy provided to the "quality" of the energy required
5.4 suggest a rationale for sustainable energy development that addresses social, economic and environmental perspectives
5.5 propose changes to current social values and political structures that may facilitate sustainable energy development; e.g., consumer practices, government policy, technology
5.6 develop and present a plan for sustainable energy path development that includes supply-side management solutions and demand-side management solutions
5.7 evaluate the plan on the basis of predicted social, economic and environmental consequences

6. demonstrate basic competencies

6.1 demonstrate fundamental skills to:
- 6.1.1 communicate
- 6.1.2 manage information
- 6.1.3 use numbers
- 6.1.4 think and solve problems

6.2 demonstrate personal management skills to:
- 6.2.1 demonstrate positive attitudes and behaviours
- 6.2.2 be responsible
- 6.2.3 be adaptable
- 6.2.4 learn continuously
- 6.2.5 work safely

6.3 demonstrate teamwork skills to:
- 6.3.1 work with others
- 6.3.2 participate in projects and tasks

7. create a transitional strategy to accommodate personal changes and build personal values

7.1 identify short-term and long-term goals
7.2 identify steps to achieve goals

COURSE ENS3210: SUSTAINABLE COMMUNITY PLANNING & DESIGN

Level: Advanced

Prerequisite: ENS2210: Sustainable Building Design & Construction

Description: Students examine existing examples of community planning, evaluate different aspects of planning, investigate promising practices for sustainability and design a sustainability plan for the community they live in.

Supporting Courses: ENS3030: The Green Economy
ENS3050: Environmental Politics

Outcomes: The student will:

1. **analyze urbanization and urban growth provincially, nationally and globally**
   - 1.1 research the major causes of urban growth, including:
     - 1.1.1 natural growth (ratio of births to deaths)
     - 1.1.2 push factors; e.g., poverty, lack of agricultural land, low employment, famine
     - 1.1.3 pull factors; e.g., jobs, food, housing
   - 1.2 identify patterns or trends in provincial, national and global urbanization and urban growth
   - 1.3 assess the effects on urban life caused by urbanization and urban growth
   - 1.4 define *urban sprawl* and identify its effects on quality of life and sustainable development
2. **research urban resource and environmental challenges caused by urbanization and urban growth**
   - 2.1 describe advantages of urbanization and urban growth; e.g., job opportunities, access to health care and education
   - 2.2 describe disadvantages of urbanization and urban growth; e.g., sustainability, concentration of pollutants, lack of biodiversity
   - 2.3 identify potential solutions to the challenges of urbanization and urban growth
3. **assess the effects of transportation systems on urbanization and urban growth**
   - 3.1 investigate the effects of land availability and transportation systems on urbanization and urban growth
   - 3.2 identify the role of motor vehicles and their effects on North American urbanization and urban growth
   - 3.3 identify and assess policies designed to reduce motor vehicle use in urban environments
   - 3.4 identify and assess alternative transportation systems
4. **evaluate the effects of urban land-use planning and control policies and legislation**
   - 4.1 identify conventional land-use planning and control policies and legislation
   - 4.2 compare and contrast zoning and smart growth policies and legislation in land-use planning and control
   - 4.3 illustrate a variety of alternative methods for sustainable urban development and the preservation and conservation of land resources
5. **design, present and defend a sustainable urbanization and urban growth plan for a community, considering:**
   - **sustainable transportation systems; e.g., walking and cycling, mass transit**
   - **recycling, reducing and reusing waste**
   - **food production**
   - **conservation and preservation of biodiversity**
   - **reclamation of brownfield land (unused or underused commercial and industrial land)**
   - **community revitalization**

6. demonstrate basic competencies

6.1 demonstrate fundamental skills to:

- 6.1.1 communicate
- 6.1.2 manage information
- 6.1.3 use numbers
- 6.1.4 think and solve problems

6.2 demonstrate personal management skills to:

- 6.2.1 demonstrate positive attitudes and behaviours
- 6.2.2 be responsible
- 6.2.3 be adaptable
- 6.2.4 learn continuously
- 6.2.5 work safely

6.3 demonstrate teamwork skills to:

- 6.3.1 work with others
- 6.3.2 participate in projects and tasks

7. create a transitional strategy to accommodate personal changes and build personal values

7.1 identify short-term and long-term goals

7.2 identify steps to achieve goals

COURSE ENS3220: ENERGY CONSERVATION APPLICATIONS

Level: Advanced

Prerequisite: ENS2220: Energy Conservation Principles

Description: Students analyze energy-saving technologies and systems and design a residential or commercial structure or transportation technology that demonstrates the principles of energy conservation and efficiency.

Parameters: Access to a construction, fabrication, mechanics or science laboratory.

Supporting Course: ENS2210: Sustainable Building Design & Construction

Outcomes: The student will:

1. **describe energy use within a residential or commercial environment or transportation sector**
   - 1.1 conduct an inventory of energy use within a residential or commercial environment or transportation sector
   - 1.2 analyze energy efficiency within the residential or commercial environment or transportation sector
   - 1.3 establish a target level of energy efficiency and determine potential savings that may result from achieving this target
   - 1.4 investigate technologies and/or strategies that can be used to achieve the target level of energy efficiency
2. **design a residential or commercial structure or transportation technology that uses energy conservation and efficiency**
   - 2.1 identify an energy design problem relevant to a residential or commercial structure or transportation technology; e.g., size and/or weight, topographic and/or climatic factors, energy transfer and/or conversion, comfort and practical use, and cost limitations
   - 2.2 identify limitations present in the design problem
   - 2.3 investigate design technologies available to respond to the problem
   - 2.4 examine similar structures or technologies that incorporate energy efficient design suitable for the context
   - 2.5 generate alternatives regarding the design, select the most appropriate alternative and plan a sequence of tasks to create the structure or technology
   - 2.6 create a representation of the structure or technology based upon the plan that has been selected; e.g., drawing or constructing models
   - 2.7 evaluate the strengths and limitations of the energy design and consider alternatives that may improve the process and/or outcomes; e.g., original needs and intentions, efficient use of resources, human and environmental safety
3. **demonstrate basic competencies**
   - 3.1 demonstrate fundamental skills to:
     - 3.1.1 communicate
     - 3.1.2 manage information
     - 3.1.3 use numbers
     - 3.1.4 think and solve problems

3.2 demonstrate personal management skills to:
    3.2.1 demonstrate positive attitudes and behaviours
    3.2.2 be responsible
    3.2.3 be adaptable
    3.2.4 learn continuously
    3.2.5 work safely
3.3 demonstrate teamwork skills to:
    3.3.1 work with others
    3.3.2 participate in projects and tasks

4. create a transitional strategy to accommodate personal changes and build personal values

4.1 identify short-term and long-term goals
4.2 identify steps to achieve goals

COURSE ENS3910: ENS PROJECT D

Level: Advanced

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Advanced project courses must connect with a minimum of two CTS courses, one of which must be at the advanced level and be in the same occupational area as the project course. The other CTS course(s) must be at least at the intermediate level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

1. **identify the connection between this project course and two or more CTS courses**
   - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
   - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
2. **propose the project and/or performance**
   - 2.1 identify the project and/or performance by:
     - 2.1.1 preparing a plan
     - 2.1.2 clarifying the purposes
     - 2.1.3 defining the deliverables
     - 2.1.4 specifying time lines
     - 2.1.5 explaining terminology, tools and processes
     - 2.1.6 defining resources; e.g., materials, costs, staffing
   - 2.2 identify and comply with all related health and safety standards
   - 2.3 define assessment standards (indicators for success)
   - 2.4 present the proposal and obtain necessary approvals

The student will:

3. **meet goals as defined within the plan**
   - 3.1 complete the project and/or performance as outlined
   - 3.2 monitor the project and/or performance and make necessary adjustments
   - 3.3 present the project and/or performance, indicating the:
     - 3.3.1 outcomes attained
     - 3.3.2 relationship of outcomes to goals originally set

3.4 evaluate the project and/or performance, indicating the:
    3.4.1 processes and strategies used
    3.4.2 recommendations on how the project and/or performance could have been improved

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:
    4.1.1 communicate
    4.1.2 manage information
    4.1.3 use numbers
    4.1.4 think and solve problems
4.2 demonstrate personal management skills to:
    4.2.1 demonstrate positive attitudes and behaviours
    4.2.2 be responsible
    4.2.3 be adaptable
    4.2.4 learn continuously
    4.2.5 work safely
4.3 demonstrate teamwork skills to:
    4.3.1 work with others
    4.3.2 participate in projects and tasks

5. create a transitional strategy to accommodate personal changes and build personal values

5.1 identify short-term and long-term goals
5.2 identify steps to achieve goals

COURSE ENS3920: ENS PROJECT E

Level: Advanced

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Advanced project courses must connect with a minimum of two CTS courses, one of which must be at the advanced level and be in the same occupational area as the project course. The other CTS course(s) must be at least at the intermediate level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

1. **identify the connection between this project course and two or more CTS courses**
   - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
   - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
2. **propose the project and/or performance**
   - 2.1 identify the project and/or performance by:
     - 2.1.1 preparing a plan
     - 2.1.2 clarifying the purposes
     - 2.1.3 defining the deliverables
     - 2.1.4 specifying time lines
     - 2.1.5 explaining terminology, tools and processes
     - 2.1.6 defining resources; e.g., materials, costs, staffing
   - 2.2 identify and comply with all related health and safety standards
   - 2.3 define assessment standards (indicators for success)
   - 2.4 present the proposal and obtain necessary approvals

The student will:

3. **meet goals as defined within the plan**
   - 3.1 complete the project and/or performance as outlined
   - 3.2 monitor the project and/or performance and make necessary adjustments
   - 3.3 present the project and/or performance, indicating the:
     - 3.3.1 outcomes attained
     - 3.3.2 relationship of outcomes to goals originally set
   - 3.4 evaluate the project and/or performance, indicating the:
     - 3.4.1 processes and strategies used
     - 3.4.2 recommendations on how the project and/or performance could have been improved

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:

- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

4.2 demonstrate personal management skills to:

- 4.2.1 demonstrate positive attitudes and behaviours
- 4.2.2 be responsible
- 4.2.3 be adaptable
- 4.2.4 learn continuously
- 4.2.5 work safely

4.3 demonstrate teamwork skills to:

- 4.3.1 work with others
- 4.3.2 participate in projects and tasks

5. create a transitional strategy to accommodate personal changes and build personal values

5.1 identify short-term and long-term goals

5.2 identify steps to achieve goals

COURSE ENS3950: ENS ADVANCED PRACTICUM

Level: Advanced

Prerequisite: None

Description: Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation.

Parameters: This practicum course, which may be delivered on- or off-campus, should be accessed only by students continuing to work toward attaining a recognized credential/credentials or an articulation offered by an external organization. This course must be connected to at least one CTS course from the same occupational area and cannot be used in conjunction with any introductory (1XXX) level course. A practicum course cannot be delivered as a stand-alone course, cannot be combined with a CTS project course and cannot be used in conjunction with the Registered Apprenticeship Program or the Green Certificate Program.

Outcomes: The student will:

1. **perform assigned tasks and responsibilities, as required by the organization granting the credential(s) or articulation**
   - 1.1 identify regulations and regulatory bodies related to the credential(s) or articulation
   - 1.2 describe personal roles and responsibilities, including:
     - 1.2.1 key responsibilities
     - 1.2.2 support functions/responsibilities/expectations
     - 1.2.3 code of ethics and/or conduct
   - 1.3 describe personal work responsibilities and categorize them as:
     - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
     - 1.3.2 non-routine tasks; e.g., emergencies
     - 1.3.3 tasks requiring personal judgement
     - 1.3.4 tasks requiring approval of a supervisor
   - 1.4 demonstrate basic employability skills and perform assigned tasks and responsibilities related to the credential(s) or articulation
2. **analyze personal performance in relation to established standards**
   - 2.1 evaluate application of the attitudes, skills and knowledge developed in related CTS courses
   - 2.2 evaluate standards of performance in terms of:
     - 2.2.1 quality of work
     - 2.2.2 quantity of work
   - 2.3 evaluate adherence to workplace legislation related to health and safety
   - 2.4 evaluate the performance requirements of an individual who is trained, experienced and employed in a related occupation in terms of:
     - 2.4.1 training and certification
     - 2.4.2 interpersonal skills
     - 2.4.3 technical skills
     - 2.4.4 ethics

3. demonstrate basic competencies

3.1 demonstrate fundamental skills to:

- 3.1.1 communicate
- 3.1.2 manage information
- 3.1.3 use numbers
- 3.1.4 think and solve problems

3.2 demonstrate personal management skills to:

- 3.2.1 demonstrate positive attitudes and behaviours
- 3.2.2 be responsible
- 3.2.3 be adaptable
- 3.2.4 learn continuously
- 3.2.5 work safely

3.3 demonstrate teamwork skills to:

- 3.3.1 work with others
- 3.3.2 participate in projects and tasks

4. create a transitional strategy to accommodate personal changes and build personal values

4.1 identify short-term and long-term goals

4.2 identify steps to achieve goals