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