COURSE ENR3020: CONVENTIONAL OIL/GAS 2 (RECOVERY & PRODUCTION)

Level: Advanced

Prerequisite: ENR2020: Conventional Oil/Gas 1 (Resource Exploration)

Description: Students examine specific recovery and production techniques within the context of Alberta's conventional oil and/or gas industry, and they explain related career opportunities.

Parameters: Access to conventional oil/gas recovery and production industry.

Access to a science laboratory.

This module requires off-campus learning experiences and should be combined with relevant work study, work experience and/or modules from the Career Transitions strand; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the Off-Campus Education Guide for Administrators, Counsellors and Teachers (Alberta Education) for further information regarding off-campus learning.

Supporting Courses: CTR2210 Workplace Safety (Practices) [Career Transitions Strand]; recommended for off-campus learning

Students must have a general knowledge of potential hazards and accepted safety practices relevant to specific recovery and production sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C of this Guide for further information regarding student safety.

Outcomes: The student will:

1. describe techniques used to complete and service a conventional oil or gas well

- 1.1 outline steps that are taken to prepare a successful oil or gas well for production; e.g., installation of production casing and tubing, cementing, installation of wellhead, well perforation and safety considerations such as first aid, clothing and equipment, government/industry regulation, lifting/hoisting techniques.
- 1.2 describe well-site production equipment and surface facilities and their function in production, maintenance and safety; e.g., service rig (blowout preventers, rig tank, tongs, wellhead), flare line, accumulators
- 1.3 describe and compare natural flowing wells with wells that depend upon artificial lift
- 1.4 explain well stimulation treatments used to ensure underground movement of conventional oil or gas to the well bore; e.g., acidizing, fracturing.
- 1.5 describe primary methods used to extract conventional oil or gas; e.g., natural water displacing oil, expansion of natural gas, and gravity drainage resulting from the movement of oil within the reservoir from the upper to the lower parts
- 1.6 explain environmental assessment and management practices conducted by industry throughout recovery and production operations

1.7 describe technological advances used to address environmental concerns throughout recovery and production; e.g., directional wells, land reclamation, control of sulphur, emissions
1.8 research well completion practices and production equipment used in frontier operations; e.g., arctic, off-shore

2. explain applications of enhanced oil recovery technology in maximizing recovery rates for conventional oil or gas

2.1 identify physical factors that determine the portion of oil in a reservoir that can be produced naturally through primary recovery methods; e.g., density and viscosity of the oil, porosity and permeability of the rock, pressure in the reservoir
2.2 explain applications of infill drilling to improve oil or gas recovery rates; e.g., directional wells
2.3 explain secondary methods of enhanced oil recovery; e.g.: water injection, natural gas reinjection, gas lift, beam pumps, electrical submersible pumps,
2.4 explain tertiary methods of enhanced oil recovery; e.g., carbon dioxide flooding, miscible flooding, steam injection, fire flooding, horizontal drilling
2.5 identify social and economic factors that influence the life of an oil and/or gas well
2.6 describe techniques used to estimate recoverable oil and gas reserves (proved reserve, probable reserve, and established reserve)
2.7 describe future sources of oil and gas supplies; e.g., unrecovered oil in existing reservoirs, frontier production, oil sands, coalbed methane. Consider factors that determine estimates of recoverability and producibility; e.g., reservoir characteristics, economic considerations, regulatory limitations

3. describe field gathering facilities and distribution systems used in the conventional oil or gas industry

3.1 describe well-site and satellite facilities used for dehydration, separation, heating and measurement processes; e.g., surface and underground
3.2 describe different types of field storage facilities; e.g., pipeline systems, tankers, and barges
3.3 research distribution networks used to move conventional oil or gas from well-site to market (or refinery); e.g.: rail systems, trucking systems, tanker systems
3.4 illustrate the layout of a pipeline system used for transporting conventional oil or gas; e.g.: gathering lines, trunk lines, gas transmission systems
3.5 explain the function of pump stations, compressor stations, and electronic inspection devices in moving oil or gas along transmission lines

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
- 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 value

5.1 identify short-term and long-term goals

5.2 identify steps to achieve goals

COURSE ENR3030: OIL SANDS/HEAVY OIL/COAL 2 (RECOVERY & PRODUCTION)

Level: Advanced

Prerequisite: ENR2030: Oil Sands/Heavy Oil/Coal 1 (Resource Exploration)

Description: Students examine specific recovery and production techniques within the context of Alberta's oil sands, heavy oil or coal deposits; and they explain related career opportunities.

Parameters: Access to industry involved in the recovery and production of nonconventional hydrocarbon resources.

Access to a science laboratory.

This module requires off-campus learning experiences and should be combined with relevant work study, work experience and/or modules from the Career Transitions strand; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the Off-Campus Education Guide for Administrators, Counsellors and Teachers (Alberta Education) for further information regarding off-campus learning.

Supporting Courses: CTR1010: Safety Systems and Career Planning [Career Transitions Strand]; recommended for off-campus learning

Students must have a general knowledge of potential hazards and accepted safety practices relevant to specific recovery and production sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C of this Guide for further information regarding student safety.

Outcomes: The student will:

1. describe techniques used to recover a nonconventional hydrocarbon resource

- 1.1 describe infrastructures necessary in the recovery and production of a nonconventional hydrocarbon resource; e.g., extraction, processing, transportation, and safety considerations such as: first aid, clothing and equipment, government/industry regulations, lifting/hoisting, techniques
- 1.2 research techniques used to extract the hydrocarbon; e.g., surface mining (strip, openpit), underground mining (shaft, slope), in situ ("in place") techniques (steam injection, solvent injection, firefloods)
- 1.3 describe surface and underground equipment used in resource extraction; e.g., heavy machinery (including excavators, scrapers, bulldozers and draglines); blasting, drilling and cutting equipment; augers, conveyor belts, and trucks; hand tools and safety equipment
- 1.4 identify factors that affect the recovery potential for heavy oil, oil sands or coal deposits; e.g., nature and depth of the overburden, density and viscosity of oil, porosity and permeability of rock structures, economic viability
- 1.5 research technologies used to process the hydrocarbon; e.g., separating, cleaning, upgrading

1.6 explain environmental assessment and management practices conducted by industry throughout recovery and production operations; e.g., environmental standards, enforcement of safe operating procedures
1.7 describe technological advances used to address environmental concerns throughout recovery and production; e.g., tailing ponds, sulphur emission, water drawdown
1.8 describe basic reclamation activities undertaken by industry; e.g., recovery/production, area restoration, strip-mine restoration

2. describe field gathering facilities and distribution systems used in the oil sands, heavy oil or coal industry

2.1 describe recovery-site and satellite facilities used for separation, cleaning and upgrading processes
2.2 describe different types of field storage facilities
2.3 research distribution networks used to move bitumen, heavy oil or coal from recovery-site to market (or refinery); e.g., pipeline systems, tankers and barges, rail and trucking systems
2.4 identify and describe challenges associated with the gathering and transmission of bitumen and heavy oil, and technologies developed to assist in these processes

3. explain current and emerging applications of technology in maximizing recovery of heavy oil, bitumen or coal in Alberta

3.1 explain technologies used to maximize resource recovery; e.g., horizontal drilling, extraction and separation processes
3.2 describe special drilling techniques, core description and geophysical logging for oil sands deposits
3.3 research public and private agencies responsible for developing new technology to assist in the recovery of nonconventional hydrocarbon resources; e.g., Alberta Research Council, Alberta Oil Sands Technology and Research Authority, Office of Coal Research and Technology
3.4 explain the economic, social and environmental significance of Alberta's nonconventional hydrocarbon resources

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 value

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

COURSE ENR3040: METALS/NONMETALS 2 (RECOVERY & PRODUCTION)

Level: Advanced

Prerequisite: ENR2040: Metals/Nonmetals 1 (Resource Exploration)

Description: Students examine specific recovery and production techniques within the context of a metallic and/or nonmetallic mineral deposit, and they explain related career opportunities.

Note: Industry often refers to a third category of minerals called "structural materials"; i.e., minerals used primarily in construction, including sand and gravel, decorative and building stone, cement, clay and limestone. Modules ENM2040 and ENM3040 include structural materials within the broader category of nonmetallic minerals.

Parameters: Access to industry involved in the recovery and production of metallic and/or non-metallic minerals.

Access to a science laboratory.

This module requires off-campus learning experiences and should be combined with relevant work study, work experience and/or modules from the Career Transitions strand; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the Off-Campus Education Guide for Administrators, Counsellors and Teachers (Alberta Education) for further information regarding off-campus learning.

Supporting Courses: CTR1010: Safety Systems and Career Planning [Career Transitions Strand]; recommended for off-campus learning

Students must have a general knowledge of potential hazards and accepted safety practices relevant to specific recovery and production sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C of this Guide for further information regarding student safety.

Outcomes: The student will:

1. **describe techniques used to recover metallic and nonmetallic commodities from mineral deposits**
   - 1.1 describe infrastructures necessary in the recovery of commodities from rock and mineral deposits; e.g., extraction, processing, transportation, and safety considerations such as: first aid, clothing and equipment, government/industry regulations, lifting/hoisting, techniques
   - 1.2 research basic techniques used to extract metallic and nonmetallic mineral deposits; e.g., placer mining, surface mining, underground mining, and other extraction methods (drilling, borehole mining)

1.3 describe surface and/or underground equipment used in resource extraction; e.g., heavy machinery (including excavators, scrapers, bulldozers and draglines); blasting, drilling and cutting equipment; augers, conveyor belts, and trucks; hand tools and safety equipment
1.4 identify factors that affect the recovery potential for a mineral deposit; e.g., depth of overburden, size and nature of the deposit, economic viability, environmental impact
1.5 research technologies used to process a metallic, nonmetallic or structural mineral; e.g., crushing/screening, separating/dressing, cleaning/roasting, upgrading/smelting
1.6 explain environmental assessment and management practices conducted by industry throughout recovery and production operations; e.g., environmental standards, enforcement of safe operating procedures
1.7 describe technological advances used to address environmental concerns throughout recovery and production
1.8 describe basic reclamation activities undertaken by industry; e.g., recovery/production area restoration, strip-mine restoration

2. describe field gathering facilities and distribution systems used in the mineral industry

2.1 describe recovery-site and satellite facilities used for separation, cleaning and upgrading processes
2.2 describe different types of field storage facilities
2.3 research distribution networks used to move metallic or industrial minerals from recovery-site to market (or refinery); e.g., tankers and barges, rail and trucking systems

3. explain current and emerging applications of technology in enhancing recovery methods for mineral deposits

3.1 explain applications of technology in enhanced recovery methods; e.g., drilling and blasting techniques, rock bolting and screening machines, video technology and remote control, innovations in separation technology
3.2 identify methods used for the exploration of “hidden” or “blind” deposits
3.3 describe techniques used to estimate recoverable mineral deposits in Alberta; e.g., computing techniques, assays, mathematical modeling
3.4 research public and private agencies responsible for developing new technology to assist in the recovery of Alberta’s mineral resources; e.g., Alberta Research Council, National Research Council
3.5 explain the current and potential significance of Alberta’s mineral resources

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 & tasks

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

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

COURSE ENR3060: PETROCHEMICALS

Level: Advanced

Prerequisite: ENR2060: Refining Hydrocarbons

Description: Students investigate the conversion of hydrocarbons into consumer products within a petrochemical industry, and they explain related career opportunities.

Parameters: Access to a petrochemical industry.

Access to a science laboratory.

This module requires off-campus learning experiences and should be combined with relevant work study, work experience and/or modules from the Career Transitions strand; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the Off-Campus Education Guide for Administrators, Counsellors and Teachers (Alberta Education) for further information regarding off-campus learning.

Supporting Courses: CTR1010 Safety Systems and Career Planning [Career Transitions Strand]; recommended for off-campus learning

Students must have a general knowledge of potential hazards and accepted safety practices relevant to specific recovery and production sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C of this Guide for further information regarding student safety.

Outcomes: The student will:

1. **explain how petroleum molecules are sorted, broken apart and reassembled at petrochemical plants**
   - 1.1 describe and model petroleum molecules as strings and rings of carbon and hydrogen atoms; e.g., methane, paraffin
   - 1.2 describe basic fractionating processes used to sort petroleum molecules
     - 1.2.1 explain how petroleum molecules are broken apart, reassembled and blended through the processes of cracking, polymerization and isomerization
     - 1.2.2 address the role of temperature, pressure and catalysts in sorting and rearranging petroleum molecules
2. **describe technologies used to manufacture a petrochemical product**
   - 2.1 identify specific hydrocarbon feedstocks used in the manufacturing process
   - 2.2 describe techniques employed to sort, break apart, reassemble and/or blend petroleum molecules
   - 2.3 research the conversion of a hydrocarbon into a petrochemical product within one of Canada's petrochemical industries (plastic, polyethylene, detergent, fertilizer); e.g., fractionating, cracking, polymerization, isomerization
   - 2.4 explain applications of electronic equipment and computer technology in monitoring and controlling manufacturing operations

2.5 describe storage facilities and distribution systems within the industry, and their impact on industry location and product costs
2.6 describe and illustrate the path of a hydrocarbon from recovery-site to finished product
2.7 explain environmental assessment and management practices conducted by industry throughout manufacturing operations; e.g., environmental standards and the enforcement of safe, operating procedures throughout manufacturing operations
2.8 describe industry initiatives: that respond to environmental concerns; that address occupational health and safety requirements; in re-refining and reprocessing to ensure a life-cycle approach to chemicals management; e.g., waste treatment, emission control., odour scrubbers, noise suppressants, water purification

3. identify consumer and industrial products made available through petrochemical processes

3.1 identify and describe important petroleum feedstocks used in the petrochemical industry; e.g., crude oil, natural gas, ethane, propane, butane, naphtha gas oil
3.2 identify the primary groups of petrochemicals obtained from petroleum feedstocks and subsequently processed into intermediate and finished products; e.g., methanol, benzene, toluene and xylene, butadiene and butylene, propylene, ethylene
3.3 identify and describe intermediate and finished products that are derived from petrochemicals; e.g., plastics, synthetic clothing fibres, medicines, paints, detergents, fertilizers and, pesticides
3.4 identify and describe major consuming industries for Canada's petrochemical products; e.g., forest products, transportation, textiles, electronics, cosmetics, pharmaceuticals, and agriculture
3.5 describe the social, economic and environmental significance of Canada's petrochemical industries

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 value

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

COURSE ENR3070: INDUSTRIAL MATERIALS (PRIMARY MANUFACTURING)

Level: Advanced

Prerequisite: ENR2070: Refining Rocks & Minerals

Description: Students investigate technologies used to convert petroleum and mineral resources into industrial (stock) materials used in secondary manufacturing processes, and they explain related career opportunities.

Parameters: Access to a primary manufacturing industry.

Access to a science, construction or fabrication laboratory.

This module requires off-campus learning experiences and should be combined with relevant work study, work experience and/or modules from the Career Transitions strand; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the Off-Campus Education Guide for Administrators, Counsellors and Teachers (Alberta Education) for further information regarding off-campus learning.

Supporting Courses: CTR1010 Safety Systems and Career Planning [Career Transitions Strand]; recommended for off-campus learning

Students must have a general knowledge of potential hazards and accepted safety practices relevant to specific recovery and production sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C of this Guide for further information regarding student safety.

Outcomes: The student will:

1. **describe relationships between the molecular structure, properties and applications of an industrial (stock) material**
   - 1.1 describe and model the molecular structure of a metallic, polymeric, ceramic and composite material; e.g., atoms and molecules, molecular arrangement, attractions and connections
   - 1.2 determine the properties of an industrial (stock) material through investigation and/or observation; e.g., mechanical (strength, elasticity and plasticity, malleability and ductility, hardness.), chemical and thermal (conductivity, melting/freezing point, combustibility, rate of expansion), electrical and magnetic (conductivity, resistivity, permeability), optical (opacity, reflectivity, colour)
   - 1.3 relate the properties of an industrial (stock) material to its molecular structure
   - 1.4 explain how the properties of an industrial (stock) material determine its
   - 1.5 applications in product design and secondary manufacturing processes

2. **describe industrial (stock) materials produced through primary manufacturing processes**
   - 2.1 describe primary manufacturing and the major categories of nonrenewable resources (raw materials) used in primary manufacturing; e.g., petroleum, natural gas, metallic ores, nonmetallic ores
   - 2.2 identify and describe major types of industrial (stock) materials produced through primary manufacturing processes; e.g., metallic (ferrous, nonferrous), structural (sand, gravel, crushed stone), polymeric (thermoplastic, thermoset), ceramic (clay-based, refractory, glass, abrasive), composite (layered, fibre-reinforced, particle)
   - 2.3 describe standard forms for each type of industrial (stock) material; e.g., plate, bar and rod; sheet, roll and film; pellet and powder
   - 2.4 describe major consuming industries for stock materials produced in Canada; e.g., secondary manufacturing, construction, consumer/domestic use
3. **explain technologies used to manufacture a metallic, polymeric, ceramic or composite material**
   - 3.1 identify specific mineral ores and/or petroleum feedstocks and describe techniques employed to manufacture the stock material; e.g., thermal, chemical, mechanical, electrical
   - 3.2 describe and illustrate the major stages in the manufacturing process including: inputs, processes, outputs and feedback systems
   - 3.3 research the conversion of a nonrenewable resource into an industrial (stock) material within one of Canada's primary manufacturing industries
   - 3.4 explain applications of electronic equipment and computer technology in monitoring and controlling manufacturing operations
   - 3.5 describe storage facilities and distribution systems within the industry, and their impact on industry location and product costs
   - 3.6 explain environmental assessment and management practices conducted by industry throughout manufacturing operations; e.g., environmental standards and the enforcement of safe operating procedures throughout manufacturing operations
   - 3.7 describe industry initiatives: that respond to environmental concerns (waste treatment, emission control.); that address occupational health and safety requirements(odour scrubbers, noise suppressants water purification).; in reprocessing and recycling to ensure a life-cycle approach to chemicals management
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 value**
   - 5.1 identify short-term and long-term goals
   - 5.2 identify steps to achieve goals

COURSE ENR3080: ENERGY DESIGNS/SYSTEMS 2 (PRACTICAL APPLICATIONS)

Level: Advanced

Prerequisite: ENR2080: Energy Designs/Systems 1 (Basic Principles)

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

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

Outcomes: The student will:

1. **describe energy use within a residential/commercial environment or transportation sector**
   - 1.1 conduct an inventory of energy use within a residential/commercial environment or transportation sector
   - 1.2 analyze energy efficiency within the residential/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 research technologies and/or strategies that can be used to achieve the target level of energy efficiency
2. **design a residential/commercial structure or transportation technology that uses energy conservation and efficiency**
   - 2.1 identify an energy design problem relevant to a residential/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 research design technologies available to respond to the situation
   - 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/designing, 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 value

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

COURSE ENR3910: ENR PROJECT D

Level: Advanced

Prerequisite: None

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

Parameters: This course must make connections with a minimum of 2 CTS courses, one of which must be at the advanced level and the other must be at least at the intermediate level.

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 two or more CTS courses being linked to this course**
   - 1.1. justify the connection
   - 1.2. identify key outcomes
2. **propose, manage and assess a project and/or performance**
   - 2.1. identify project and/or performance:
     - 2.1.1. prepare a plan
     - 2.1.2. clarify the purposes
     - 2.1.3. define deliverables
     - 2.1.4. specify timelines
     - 2.1.5. explain terminology, tools and processes consistently throughout
     - 2.1.6. define 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 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 project and/or performance and make necessary adjustments
   - 3.3. present the project and/or performance:
     - 3.3.1. outcomes attained
     - 3.3.2. relationship to goals set originally
   - 3.4. evaluate the project and/or performance:
     - 3.4.1. processes and strategies used
     - 3.4.2. recommendations for how the project and/or performance could have been improved
4. **demonstrate basic competencies**
   - 4.1. fundamental skills
     - 4.1.1. communicate

4.1.2. manage information
4.1.3. use numbers
4.1.4. think & solve problems

4.2. personal management skills
4.2.1. demonstrate positive attitudes & behaviours
4.2.2. be responsible
4.2.3. be adaptable
4.2.4. learn continuously
4.2.5. work safely

4.3. teamwork skills
4.3.1. work with others
4.3.2. participate in projects & tasks

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

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

COURSE ENR3920: ENR PROJECT E

Level: Advanced

Prerequisite: None

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

Parameters: This course must make connections with a minimum of 2 CTS courses, one of which must be at the advanced level and the other must be at least at the intermediate level.

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 two or more CTS courses being linked to this course**
   - 1.1. justify the connection
   - 1.2. identify key outcomes
2. **propose, manage and assess a project and/or performance**
   - 2.1. identify project and/or performance:
     - 2.1.1. prepare a plan
     - 2.1.2. clarify the purposes
     - 2.1.3. define deliverables
     - 2.1.4. specify timelines
     - 2.1.5. explain terminology, tools and processes consistently throughout
     - 2.1.6. define 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 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 project and/or performance and make necessary adjustments
   - 3.3. present the project and/or performance:
     - 3.3.1. outcomes attained
     - 3.3.2. relationship to goals set originally
   - 3.4. evaluate the project and/or performance:
     - 3.4.1. processes and strategies used
     - 3.4.2. recommendations for how the project and/or performance could have been improved
4. **demonstrate basic competencies**
   - 4.1. fundamental skills
     - 4.1.1. communicate

4.1.2. manage information
4.1.3. use numbers
4.1.4. think & solve problems

4.2. personal management skills
4.2.1. demonstrate positive attitudes & behaviours
4.2.2. be responsible
4.2.3. be adaptable
4.2.4. learn continuously
4.2.5. work safely

4.3. teamwork skills
4.3.1. work with others
4.3.2. participate in projects & tasks

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

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