Engineering Design and Drafting Technology Diploma

PLAR Candidate Guide

Prior Learning Assessment and Recognition (PLAR)

Prior learning credit options at Saskatchewan Polytechnic

See Get Credit for What you Know for important information about all options to get credit for prior learning at Sask Polytech, including PLAR, transfer credit, Canadian Armed Forces credit, and equivalency credit.

How to navigate this document

This document contains links to other document sections or webpages. To return to where you were from another section in this document, press the *ALT* key and *left arrow* key at the same time. To return to this webpage from another webpage, close the other webpage or click back on the browser tab for this document.

Contents of this guide

This guide contains the following specific PLAR information and tools for this program

A. PLAR fees

Fees for PLAR challenges are set to cover our costs for consultation, assessment, and related administrative tasks. PLAR fees are non-refundable and non-transferrable.

The PLAR fees policy is subject to change for each new academic year. Please see the **Cost** section on the PLAR webpage for current fee information.

B. PLAR eligibility and options

To be eligible for PLAR for courses in this program, you must first apply for admission and be accepted into the program. You must also consult with the PLAR contact person and be approved for PLAR assessment.

Course prerequisites and corequisites

Some courses have one or more other courses that must be completed first (prerequisite) or at the same time (corequisite). See course outlines in this guide to identify any pre- or co-requisites for each course. Discuss with your PLAR contact person how to deal with courses with corequisites.

Block assessment

Some programs may assess a cluster of courses together in one block, which may save you time and effort. Ask the PLAR contact person whether there are any block assessment options in this program.

C. Dates when PLAR assessment is available

PLAR assessment for this program is available from Sept 1 to June 15 in each academic year.

All PLAR assessments must be completed by June 15 of each academic year.

D. Special directions for this program

1. **Review** the PLAR process and FAQs and the information in this guide.
2. **Self-rate** your learning for each course using the Course Outlines in this guide.
3. **Consult** with the PLAR contact person for PLAR approval. Be prepared to provide your resume, course self-ratings (see section F), and a partially completed PLAR application. If you are approved for PLAR, the contact person will sign your PLAR application and explain next steps.
4. Apply for admission to the program. See directions for applying.
5. **Register** for PLAR at Registration/Enrolment Services once you have signed approval on your PLAR Application Form. The PLAR fee will be added to your student account.
6. **Finalize** an assessment plan with your assigned assessor**.**
7. **Complete** assessment before your PLAR registration expires.

E. PLAR contact person

Contact one of the Program Heads below to arrange a consultation **after** you have read this guide and general PLAR information **and** rated yourself for each course (see next section). Consultation may be by phone, online, or in person. Be prepared to provide your resume, course self-ratings, and a partially completed PLAR application. If agreement is reached to go ahead with PLAR, the contact person will sign approval on your PLAR application and explain the next steps. Admission to the program is required before you can register for PLAR.

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F. Self-rating course outlines

Clicking on a course code below opens a page where you can rate yourself on the knowledge and skills assessed for PLAR credit. For Arts & Sciences courses, clicking on the course code opens another PLAR guide. The PLAR contact person for this program will refer you to another person to discuss PLAR for courses delivered by Arts & Sciences or another program/department.

COURSE CODE	COURSE NAME	Delivered by another department/program
Semester 1		
BIM 100	Building Information Modeling (BIM) 1	
CADD 120	Computer Aided Drafting 1	
COMP 106	Spreadsheets for Engineering Technology	
CADD 126	Computer Aided Drafting Management	
DRFT 106	Drafting Applications 1	
MAT 110	Mathematics for Engineering Technologies	Arts & Sciences
PHYS 104	Physics for Engineering Technologies	Arts & Sciences
SEM 101	Technology Seminars	
TCOM 102	Workplace Communication	Arts and Sciences
Semester 2		
CADD 127	Architectural Drafting	
CADD 128	Manufacturing Drafting	

COURSE CODE	COURSE NAME	Delivered by another department/program
CADD 211	Computer Aided Drafting 2	
CLTR 200	Culture and Diversity	Arts & Sciences
DRFT 205	Mechanical Drafting Fundamentals	
ENG 100	Applied Theory of Structures	
MAT 111	Calculus for Engineering Technologies	Arts & Sciences
TCOM 103	Technical Communication	Arts & Sciences
Co-operative Work Term 1		
Semester 3		
CVEN 198	Civil Design Fundamentals	
ELEC 217	Basic Electricity	
ENG 200	Applied Fluid Mechanics	
ENG 201	Applied Mechanics of Materials	
GEOM 100	Geographic Information System Applications and Mapping Concepts	
MECH 200	Industrial Mechanical and Piping Drafting 1	
SRVY 104	Survey Data Interpretation for Design and Drafting	
STRU 104	Structural Drafting	
Semester 4		
CVEN 199	Civil Design 2	
CVEN 200	Civil Design Applications	
ENG 202	Steel Design	
ENG 203	Concrete and Timber Design	
MANU 209	Product Manufacturing Drafting	
MECH 201	Industrial Mechanical and Piping Drafting 2	

COURSE CODE	COURSE NAME	Delivered by another department/program
MGMT 212	Project Management	
STAT 200	Statistics for Technology	Arts & Sciences
Semester 5		
BIM 300	Building Information Modelling (BIM) 2	
CVEN 201	Civil Design Project	
ENG 300	Industrial Building Mechanical Design	
MECH 202	Industrial Mechanical and Piping Project	
PROJ 206	Capstone Project	
STRU 202	Structural Design Project	
TCOM 104	Applied Research in Technology	Arts & Sciences
Co-operative Work Term - 2 Of 3		
COOP 101	Co-operative Work Term	
COOP 201	Co-operative Work Term	
COOP 301	Co-operative Work Term	

BIM 100 - Building Information Modelling (BIM) 1

You will study the terminology associated with the process of Building Information Modeling (BIM) as a technology. You will discuss the BIM cycle from execution plans through to model handoff. As well, you will define BIM processes and standards in relation to software uses.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome **Competent:**I can apply this outcome without direction or supervision. **Learning:**I am still learning skills and knowledge to apply this outcome. **None:**I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss Building Information Modeling (BIM).			
2. Explain BIM standards and practices.			
3. Explain various BIM applications.			
4. Discuss design liability and ownership.			
5. Discuss collaboration, contracts, insurance, liability, and risk.			
6. Discuss a BIM execution plan.			

CADD 120 - Computer Aided Drafting 1

You will develop fundamental computer aided drafting (CAD) skills using industry-standard software. You will construct two-dimensional geometric construction, dimensioning and drawing output.

Credit unit(s): 3.0
Prerequisites: none
Corequisites: none
Equivalent course(s): DRFT 105

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Demonstrate the Computer Aided Drafting (CAD) software and drawing environment.			
2. Demonstrate the use of foundational commands of CAD software.			
3. Construct basic geometric objects and annotations.			
4. Apply file management techniques and drawing templates.			
5. Perform editing techniques.			
6. Create drawings for output.			
7. Construct basic blocks.			
8. Employ hatching.			
9. Manage raster images.			

COMP 106 - Spreadsheets for Engineering Technology

You will gain an intermediate knowledge of electronic spreadsheets. You will determine when to use a spreadsheet and when to use a database.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): COAP 172, COAP 197

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Examine spreadsheet software environment.			
2. Use spreadsheet functions to process information.			
3. Construct charts using engineering data.			
4. Solve advanced numerical problems.			
5. Use table functionality to store and manipulate data.			
6. Implement customized functionality.			

CADD 126 - Computer Aided Drafting Management

You will study Computer Aided Drafting and Design (CADD) management. You will construct drafting standards and demonstrate use of digital communication and time management tools. You will study file management and quality assurance/quality control processes.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: CADD 120
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Identify a design and drafting standard.			
2. Construct a design and drafting standard.			
3. Discuss quality assurance and quality control in a drawing set.			
4. Demonstrate file management.			
5. Demonstrate the use of digital communication tools.			
6. Demonstrate the use of time management tools.			

DRFT 106 - Drafting Fundamentals

You will be introduced to orthographic and isometric drafting. You will develop skills in sketching, geometric construction, orthographic projections, dimensioning, views, and descriptive geometry through the production of drawings. You will use software such as Autodesk AutoCAD to an essential skill level.

Credit unit(s): 4.0
Prerequisites: none
Corequisites: CADD 120
Equivalent course(s): DRFT 121

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Demonstrate freehand sketching techniques.			
2. Discuss alphabet of lines.			
3. Create drawing to scale.			
4. Interpret orthographic drawings.			
5. Produce orthographic drawings.			
6. Apply miter line projection to orthographic drawings.			
7. Interpret isometric drawings.			
8. Create isometric drawings.			
9. Apply descriptive geometry.			
10. Create solutions to given parameters using descriptive geometry.			

MAT 110 - Mathematics for Engineering Technologies

You will gain foundational knowledge of mathematical topics applicable to engineering technologies. You will study formula manipulations, factoring of algebraic expressions, geometry and trigonometry, exponents and logarithms, and functions and their graphs. This course is intended to build problem solving and critical thinking skills, and to prepare you for studies in calculus.

Credit unit(s): 4.0
Prerequisites: none
Corequisites: none
Equivalent course(s): MAT 100, MAT 101, MATH 182, MATH 193

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Examine measurements, formulas, and functions.			
1. Practice mathematical operations with algebraic expressions.			
2. Apply principles of geometry.			
3. Analyze trigonometric functions and vectors.			
4. Examine systems of linear equations.			
5. Examine algebraic equations and functions.			
6. Analyze exponential and logarithmic functions.			

PHYS 104 - Physics for Engineering Technologies

You will apply vectors and Newton's laws of motion to force systems. You will study work, power, and the conservation of mechanical energy. You will study momentum and collisions. You will study the properties of static and dynamic fluids, thermal energy and heat. This course is also intended to build critical thinking and problem-solving skills.

Credit unit(s): 3.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Apply methods of vector addition to concurrent and non-concurrent force systems.			
1. Apply Newton's laws to dynamic and static force systems.			
2. Analyze work, power, and the conservation of mechanical energy.			
3. Examine the conservation of momentum in collisions.			
4. Solve problems involving static and dynamic fluids.			
5. Solve problems involving temperature, thermal energy and heat.			

SEM 101 - Technology Seminars

Your orientation will include discussions regarding the role of technicians/technologists in the workplace and society. You will study time management skills, diversity in the workplace, principles of sustainability and safety requirements.

Credit unit(s): 1.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Develop study and time management skills.			
1. Recognize diversity in the workplace.			
2. Recognize principles of sustainability to work.			
3. Discuss professional ethics, responsibility, and accountability.			
4. Discuss the impact of technology on society.			
5. Describe workplace safety procedures.			

TCOM 102 - Workplace Communication

You will examine the employability skills required in the workplace. You will discuss the communication process, and practice effective interpersonal communication techniques and conflict resolution. You will use workplace writing and job search skills.

Credit unit(s): 3.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Examine fundamentals of workplace communication.			
1. Discuss conflict resolution techniques.			
2. Apply job-related interpersonal and oral communication strategies.			
3. Apply workplace writing skills.			
4. Use job search skills.			

CADD 127 - Architectural Drafting

You will be introduced to architectural building modelling. You will create an intelligent model of a building while practicing foundational commands and applying digital transformation principles. You will also be introduced to the National Model Codes of Canada. You will use software such as Autodesk Revit to an essential skill level.

Credit unit(s): 3.0
Prerequisites: CADD 120
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Identify prescriptive requirements of the National Model Codes of Canada.			
2. Describe the advantages of intelligent models and digital transformation.			
3. Prepare a project management charter for a building.			
4. Draw levels and grids.			
5. Construct basic floor plans and interior spaces.			
6. Construct stairs and railings plans.			
7. Construct ceilings and roofs plans.			
8. Produce schedules for building components.			
9. Produce a drawing set.			

CADD 128 - Manufacturing Drafting

You will study 3D parametric modeling and drafting and produce 2D drawing documentation for product design and manufacturing. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk Inventor to an essential skill level.

Credit unit(s): 3.0
Prerequisites: CADD 120
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss parametric modeling for product design and manufacturing.			
2. Discuss manufacturing and workflow processes.			
3. Demonstrate how to incorporate library or downloaded components into drawings.			
4. Apply constraints to sketches and models.			
5. Construct part models and assembly models.			
6. Apply basic dimensions and annotations to parts.			
7. Prepare augmented reality parts.			
8. Construct 3D printed parts.			
9. Produce product design and manufacturing drawing.			

CADD 211 - Computer Aided Drafting 2

Building on your computer aided drafting skills (CAD), your studies will focus on intermediate and advanced 2D CAD drafting. You will develop drawing sets and produce annotative objects.

Credit unit(s): 4.0
Prerequisites: CADD 120
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Create blocks.			
1. Create dynamic blocks.			
2. Create attributes.			
3. Apply advanced selection methods.			
4. Perform advanced editing techniques.			
5. Manipulate external references drawings and raster images.			
6. Develop drawings sets for managing, printing, and publishing.			
7. Produce annotative objects.			

CLTR 200 - Culture and Diversity

Your studies will focus on the many dimensions of culture and approaches to promoting inclusion and innovation. You will explore culture in Canadian society as it pertains to Indigenous and immigrant populations. You will also examine the correlation between culture and diversity.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss how cultural dimensions shape the diversity of Canada.			
2. Discuss how cultural dimensions shape the diversity of Canada.			
3. Describe the interrelationships produced when the dimensions of various cultures interact.			
4. Describe the dimensions of culture as it relates to Indigenous and immigrant populations.			
5. Discuss the correlation between culture, diversity, and innovation.			

DRFT 205 - Drafting Applications 2

You will study 2D drafting and 3D modeling. You will sketch and measure using precision measuring instruments. You will generate 3D models and 2D drawings of mechanical parts. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk AutoCAD to an essential skill level.

Credit unit(s): 3.0
Prerequisites: DRFT 106
Corequisites: CADD 211
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Apply document and file management.			
2. Develop orthographic and isometric views.			
3. Develop detail, section, and auxiliary views.			
4. Apply dimensions and annotations.			
5. Apply geometric dimensions, and tolerances.			
6. Apply welding symbols to weld joints.			
7. Create parts and bill of material lists.			
8. Create 3D parts and assembly models.			
9. Produce mechanical drawings.			

ENG 100 - Applied Theory of Structures

You will solve problems involving work, equilibrium of cantilevers, beams, trusses, and frames. Your studies will include a basic understanding of how simple beams, frames, and trusses will respond from externally applied forces.

Credit unit(s): 4.0
Prerequisites: PHYS 104, MAT 110
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Solve problems involving frictions and pulleys.			
2. Solve problems involving coplanar, non-concurrent forces.			
3. Determine the support reactions for a cantilever and simple beam.			
4. Determine the force in each member and section of a truss.			
5. Determine member end forces in frames.			
6. Determine moment at joints in frames.			
7. Determine beam deflections.			
8. Determine lateral deflection in frames.			
9. Perform calculations using spreadsheet software.			
10. Perform numerical simulation in solid mechanics.			

MAT 111 - Calculus for Engineering Technologies

You will gain knowledge of calculus topics applicable to engineering technologies. You will study derivatives, integrals and differential equations, and their applications. This course is intended to further build problem solving and critical thinking skills, and to demonstrate the importance of calculus in engineering practices.

Credit unit(s): 4.0
Prerequisites: MAT 110
Corequisites: none
Equivalent course(s): CALC 100, CALC 181, CALC 190, MAT 246

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Examine the derivative through the study of slopes and limits.			
2. Calculate derivatives of functions.			
3. Use first and second derivatives to graph functions.			
4. Analyze technical problems involving rates of change and optimization.			
5. Examine the indefinite and definite integral.			
6. Calculate integrals of functions.			
7. Analyze technical problems with integration.			
8. Solve first-order differential equations.			

TCOM 103 - Technical Communication

You will use research skills to find technical information and cite it correctly. You will conduct effective meetings and produce supporting documents. As well, you will discuss technical report purposes and formats, write short technical reports and present technical information.

Credit unit(s): 3.0
Prerequisites: TCOM 102 or COM 170
Corequisites: none
Equivalent course(s): COMM 181, COMM 190, TCOM 106, TCOM 123, TCOM 141, TCOM 190

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Conduct research for a technical report.			
2. Use correct grammar and technical style.			
3. Create technical reports.			
4. Conduct meetings.			
5. Present technical information.			

CVEN 198 - Civil Drafting 1

You will be introduced to civil engineering and design concepts. Your studies will include urban transportation design, site grading, project planning, and digital transformation for civil infrastructure. You will create intelligent civil infrastructure models that will be used to produce a drawing set. You will use software such as Autodesk Civil 3D to an essential skill level.

Credit unit(s): 4.0
Prerequisites: CADD 211
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss civil design.			
2. Apply engineering concepts in civil infrastructure design and documentation software.			
3. Prepare and maintain a project management charter for a civil project.			
4. Apply digital transformation concepts to urban design.			
5. Construct an urban roadway model.			
6. Construct a subdivision grading model.			
7. Construct a storm water retention pond model.			
8. Produce a drawing set.			

ELEC 217 - Basic Electricity

You will be introduced to the fundamentals of direct current (DC) and alternating current (AC) measurement, circuitry (including Ohm's Law, power and series and parallel circuits) and variable frequency drives (VFD's). A laboratory program is an integral part of this course.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): ELEC 279

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Analyze electrical circuits utilizing the three electrical properties of voltage, current and resistance.			
2. Identify the power and energy in an electrical circuit.			
3. Identify series circuits.			
4. Identify parallel circuits.			
5. Differentiate high voltage and multiphase scenarios.			
6. Describe variable frequency drives (VFD).			

ENG 200 - Applied Fluid Mechanics

You will apply the principles of the steady flow energy equation. You will study buoyancy, forces acting on submerged objects, pipe sizing, and pump selection. You will determine pumping requirements for series piping systems by manual calculation and numerical simulation.

Credit unit(s): 3.0
Prerequisites: ENG 100
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Solve basic fluid properties problems.			
2. Solve fluid pressure and fluid pressure measurement problems.			
3. Calculate the resultant force exerted by a fluid acting on a plane submerged surface.			
4. Solve buoyancy problems.			
5. Solve flow of fluids in pipes problems.			
6. Apply the steady flow energy equation to series piping systems.			
7. Determine the total loss in a piping system due to pipe friction, valves, elbows, and pipe fittings.			
8. Determine appropriate pump solutions for various piping systems.			
9. Perform numerical simulation in fluid mechanics and basic laboratory activities.			

ENG 201 - Applied Mechanics of Materials

You will study the concepts of stress and strain and properties and behaviors of various materials. You will use manual calculations and perform numerical simulation to determine stress and deformation resulting from axial loads, direct shear and torsional loads, shear force and bending moment diagrams, as well as bending and transverse shear stress. You will be introduced to basic concepts related to various jointed connections.

Credit unit(s): 3.0
Prerequisites: ENG 100
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe the basic structure of materials.			
2. Explain the concept of stress and strain.			
3. Examine the mechanical properties of materials.			
4. Calculate stress and deformation for direct and torsional loading.			
5. Analyze bending members.			
6. Draw shear force and bending moment diagrams.			
7. Explain the concept of axially loaded members.			
8. Explain the concept of mechanical fasteners of jointed connections.			
9. Perform numerical simulation in solid mechanics.			

GEOM 100 - Geographic Information System Applications and Mapping Concepts

You will be introduced to mapping fundamentals by working with hardcopy maps and digitally using Geographic Information System (GIS) software and web-based mapping applications. You will study scale, direction, coordinate reference systems, projections, and datums. You will be introduced to vector and raster data structures and will become familiar with SQL queries and applying cartographic design principles to create thematic maps. You will use software such as ArcGIS to an essential skill level.

Credit unit(s): 3.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe the elements of a map.			
2. Demonstrate proficiency using topographic data.			
3. Compare the evolution of spatial boundaries within Canada.			
4. Describe the concepts and applications of a Geographic Information System (GIS).			
5. Explain geospatial data characteristics, data representations, methods of data input and editing, and data organization and management in GIS.			
6. Use web-based mapping services and GIS applications.			

MECH 200 - Industrial Building Mechanical Drafting 1

You will be introduced to industrial building mechanical systems. You will produce 2D drawings and 3D parametric models. You will prepare basic building mechanical system drawings. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk Revit to an intermediate skill level.

Credit unit(s): 3.0
Prerequisites: DRFT 205, CADD 126
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe building mechanical systems and workflow processes.			
2. Assess software for mechanical systems.			
3. Prepare a project management charter for an industrial building mechanical system.			
4. Produce a heating, ventilation and air conditioning (HVAC) model.			
5. Produce a fire sprinkler model.			
6. Produce an electrical model.			
7. Produce a plumbing model.			
8. Produce a mechanical system solution for a building within given parameters.			
9. Create schedules and material takeoffs for building mechanical systems.			
10. Produce building mechanical system drawings from 3D models.			

SRVY 104 - Survey Data Interpretation for Design and Drafting

You will be introduced to the basics of surveying and the use of 2D and 3D coordinate systems in surveying. You will relate survey data to engineering design, including an introduction to levelling, total stations, Global Positioning Systems (GPS) and 3D scanning. Your studies will focus on understanding how surveying techniques generate data to be applied in an engineering drafting scenario.

Credit unit(s): 3.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe the purpose of cadastral surveying.			
2. Define the procedure for interpreting organized field notes.			
3. Describe the Western Canada Dominion Land Survey system.			
4. Identify the systematic and random errors associated with distance measurement.			
5. Perform differential levelling.			
6. Measure angles and distances with a total station instrument.			
7. Compute traverse calculations.			
8. Solve basic Coordinate Geometry survey problems.			
9. Describe the fundamental principles of satellite positioning.			
10. Use 3D laser scanning data.			
11. Discuss safe working practice.			

STRU 104 - Structural Drafting

You will study to Canadian Standards Association (CSA), Canadian Institute of Steel Standards (CISC), and Resources Information Standards Committee (RISC) standards. You will prepare engineering design drawings, shop drawings and steel reinforced concrete drawings. You will apply Building Information Modelling (BIM) software and techniques to your assignments and project.

Credit unit(s): 4.0
Prerequisites: DRFT 205
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe steel frame construction.			
2. Prepare structural steel engineering drawings.			
3. Prepare structural steel shop drawings.			
4. Create steel reinforcement placement drawings.			
5. Apply Computer Aided Drafting (CAD) best practices to create sets of structural plans.			
6. Apply Level-of-Detail for Building Information Model (BIM) representation of a 3D skeletal frame.			

CVEN 199 - Civil Design

You will study the analysis, planning, and design of municipal infrastructure. You will calculate requirements for municipal infrastructure using design guidelines. You will study the requirements of site grading, storm sewer, sanitary sewer, and water distribution networks.

Credit unit(s): 2.0
Prerequisites: CVEN 198
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss zoning bylaws for municipal development.			
2. Calculate future utility use using forecasting methods.			
3. Calculate water distribution requirements.			
4. Calculate design flows for storm sewers.			
5. Calculate design flows for sanitary sewers.			
6. Calculate overland storm flow and ponding requirements.			

CVEN 200 - Civil Drafting 2

You will study site planning, site grading, and underground utilities for municipal infrastructure. You will develop a project plan, create intelligent models, and apply digital transformation concepts. You will produce a civil drawing set applying these concepts. You will use software such as Autodesk Civil 3D to an intermediate skill level.

Credit unit(s): 4.0
Prerequisites: CVEN 199
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Interpret design calculations for municipal infrastructure.			
2. Prepare a project management plan.			
3. Produce an urban roadway network model.			
4. Produce a storm water collection system model.			
5. Produce a sanitary collection system model.			
6. Produce a water supply and distribution system model.			
7. Create a federated model.			
8. Prepare quantity take offs.			
9. Prepare surface volume calculations.			
10. Produce a drawing set.			

ENG 202 - Steel Design

You will study Canadian codes and standards in the design of basic steel structures. You will calculate loads using limit states principles in the design of steel members. You will also design steel beams and columns, and detail basic steel connections.

Credit unit(s): 3.0
Prerequisites: ENG 201
Corequisites: none
Equivalent course(s): STRU 200

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Explain the structural design process.			
2. Calculate loads on building elements.			
3. Choose appropriate tension member sizes using Canadian Standards Association (CSA) and Canadian Institute of Steel Construction (CISC) standards.			
4. Choose appropriate compression member sizes using CSA and CISC standards.			
5. Choose appropriate bending member sizes using CSA and CISC standards.			
6. Choose appropriate members subject to combined loading using CSA and CISC standards.			
7. Develop member connection details.			
8. Perform computer aided structural design.			

ENG 203 - Concrete and Timber Design

You will study Canadian codes and standards in the design of timber and concrete members. You will calculate loads using limit states principles in the design of timber and concrete members. You will detail timber connections, and detail concrete beams and footings.

Credit unit(s): 3.0
Prerequisites: ENG 201
Corequisites: none
Equivalent course(s): STRU 201

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe the structural properties of timber.			
2. Choose appropriate timber joists and beams using Canadian Standards Association (CSA) and Canadian Wood Council (CWC) standards.			
3. Describe the structural properties of concrete.			
4. Design a reinforced concrete beam using CSA Standards and Reinforcing Steel Institute of Canada (RSIC) manual.			
5. Design a reinforced concrete column/pedestal using CSA Standards and RSIC manual.			
6. Design a reinforced concrete suspended and slab-on-grade using CSA Standards and RSIC manual.			
7. Design a reinforced concrete foundation using CSA Standards.			
8. Perform computer aided structural design.			

MANU 209 - Product Manufacturing Drafting

You will study intermediate 3D modeling and drafting. You will apply intermediate skills to create documentation for product design and manufacturing. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk Inventor to an intermediate skill level.

Credit unit(s): 4.0
Prerequisites: CADD 128
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss intermediate features of parametric modeling for product design and manufacturing.			
2. Apply manufacturing and workflow processes.			
3. Create styles and standard templates.			
4. Apply intermediate constraints to sketches and models.			
5. Create intermediate part and assembly models.			
6. Create sheet metal parts.			
7. Create a weldment model.			
8. Apply intermediate dimensions and annotations to assemblies.			
9. Construct augmented reality assemblies.			
10. Create 3D printed parts and assemblies.			
11. Prepare and maintain a project plan for a product design and manufacturing project.			
12. Create product design and manufacturing drawings.			

MECH 201 - Industrial Mechanical and Piping Drafting 2

You will create advanced 3D parametric model mechanical systems to prepare 2D drawings. You will study multidisciplinary mechanical systems solutions and create drawings with reference to best practices and technical standards. You will use software such as Autodesk Revit to an intermediate skill level.

Credit unit(s): 3.0
Prerequisites: MECH 200
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Prepare and maintain a project management plan for an industrial building mechanical system.			
2. Construct an intermediate heating ventilation and air conditioning (HVAC) model.			
3. Construct an intermediate fire sprinkler model.			
4. Construct an intermediate electrical model.			
5. Construct an intermediate plumbing model.			
6. Prepare an intermediate mechanical system solution for a building within given parameters.			
7. Prepare schedules and material takeoffs for building mechanical systems.			
8. Prepare advanced building mechanical system drawings from 3D models.			

MGMT 212 - Project Management

You will study project management theory, terms and concepts. You will study the project life cycle and discuss managing a successful project from pre-implementation to completion. You will be introduced to project management topics such as resources, costs, time constraints, project scope, and risk management. You will also prepare a bid package for a small project.

Credit unit(s): 4.0
Prerequisites: none
Corequisites: none
Equivalent course(s): MGMT 207

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss the importance of a project life cycle in project management.			
2. Discuss project initiation.			
3. Develop planning and scheduling elements in a project.			
4. Discuss an execution plan.			
5. Apply monitoring and control techniques.			
6. Examine project close-out.			
7. Discuss risk management.			
8. Discuss health, safety, and environment leadership in a project.			
9. Discuss stakeholder relations, negotiations, and dispute resolution.			
10. Discuss stakeholder relations, negotiations, and dispute resolution.			
11. Use project management software to plan a project.			

STAT 200 - Statistics for Technology

You will gain knowledge of statistical concepts and techniques applicable to technologies. You will study descriptive statistics, measures of central tendency and dispersion, basic probability, the Central Limit Theorem, and linear regression. This course is intended to build problem solving and critical thinking skills, and to demonstrate the importance of statistics in professional practices.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Define statistical terminology and procedures.			
2. Apply measures of central tendency to technical problems.			
3. Apply measures of dispersion and the Central Limit Theorem to descriptive statistics.			
4. Examine basic probability.			
5. Analyze paired statistical data using simple linear regression.			

BIM 300 - Building Information Modelling (BIM) 2

You will study Building Information Modeling (BIM) as well as Project Management. You will study how BIM is used in Project Management and how intelligent models are integrated into an overall project. You will study how to develop project schedules, create a bill of materials, and create a federated project model.

Credit unit(s): 3.0
Prerequisites: BIM 100
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Discuss project management using Building Information Modelling (BIM).			
2. Discuss the use of models in a project.			
3. Construct a project schedule and sequencing.			
4. Use project models to create a bill of materials.			
5. Create a federated model.			
6. Examine federated model for clash detection.			
7. Test federated model for energy analysis.			
8. Test federated model for structural analysis.			

CVEN 201 - Civil Design Project

You will complete a civil drafting project. You will prepare a project plan based upon the needs of a client that will include site design, site grading, and underground utilities. You will apply digital transformation to create intelligent models. Using those models, you will create a materials take-off list as well as a drawing set. You will use software such as Autodesk Civil 3D to an intermediate skill level.

Credit unit(s): 4.0
Prerequisites: CVEN 199, CVEN 200
Corequisites: BIM 300
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Design a project plan based on design constraints and client needs.			
2. Evaluate the suitability of a project site.			
3. Prepare a Plan of Proposed Subdivision.			
4. Create site layout drawings.			
5. Create site grading drawings.			
6. Create underground utility drawings.			
7. Create schedules and material takeoffs for municipal infrastructure.			
8. Create a drawing set.			

ENG 300 - Industrial Building Mechanical Design

You will apply codes and standards related to the design and selection of storage tanks, pumps, and boilers. You will study how to analyze and apply process flow to mechanical equipment based on your preliminary design and system layouts. You will also study how to select and design complementary elements including pipe supports, walkways, and stairs in an industrial setting.

Credit unit(s): 3.0
Prerequisites: ENG 200, ENG 201
Corequisites: none
Equivalent course(s): MECH 210

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Describe the process flow.			
2. Apply various code standards in the design of mechanical equipment.			
3. Apply the energy equation to pipe flow in a mechanical process.			
4. Calculate solutions for mechanical systems.			
5. Determine storage tank dimensions.			
6. Select pumps and piping elements.			
7. Determine dimensional requirements for air handling unit ducting systems.			
8. Determine appropriate pipe sizes for fire sprinkler systems.			
9. Design complementary mechanical elements.			

MECH 202 - Industrial Mechanical and Piping Project

You will complete an industrial building mechanical drafting project. You will create 3Dmodels to prepare 2D mechanical drawings. You will prepare and maintain a project management plan and create advanced models of mechanical systems. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk Revit to an intermediate skill level.

Credit unit(s): 4.0
Prerequisites: MECH 201
Corequisites: BIM 300
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Apply a Building Information Modeling (BIM) management plan for industrial building mechanical systems.			
2. Maintain a project management plan for an advanced industrial building mechanical system.			
3. Analyze requirements to determine solutions for industrial building mechanical systems.			
4. Plan a building mechanical systems model.			
5. Create an intermediate Heating Ventilation and Air Conditioning (HVAC) model.			
6. Create an intermediate fire sprinkler model.			
7. Create an intermediate electrical model.			
8. Create an intermediate plumbing model.			
9. Create an intermediate mechanical system design for a building within given parameters.			
10. Create schedules and material takeoffs for building mechanical systems.			
11. Create mechanical system drawings from 3D models.			

PROJ 206 - Capstone Project

You will apply the engineering concepts and principles to develop a significant initiative or project. Working individually or in small groups, you will use interpersonal, problem solving, and project management skills to propose, conceptualize, design, and demonstrate an engineering project that is both significant and relevant to your field of practice. You will manage and schedule the project with minimal direction. You will develop a presentation appropriate for an industry client and demonstrate the communication skills necessary to defend the technical specifications and the relevance of project in relation to the initial engineering problem.

Credit unit(s): 2.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Propose a project and research the technical and design aspects required to complete the project.			
2. Manage scheduling to ensure timely completion of the project.			
3. Collect data required per the project proposal.			
4. Analyze the project and provide solutions to project design.			
5. Prepare a final report.			
6. Defend project conclusions in a technical presentation.			

STRU 202 - Structural Design Project

You will complete an industrial building structural steel drafting project. You will create 3D models to prepare 2D drawings. You will create structural steel and reinforced concrete design and drawings. You will create drawings with reference to best practices and technical standards. You will use software such as Autodesk Revit to an intermediate skill level.

Credit unit(s): 4.0
Prerequisites: STRU 104, STRU 200, STRU 201
Corequisites: BIM 300
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Apply a Building Information Modeling (BIM) management plan for building structural components.			
2. Maintain a project management plan for an advanced structural steel building and reinforced concrete system.			
3. Analyze requirements to determine solutions for structural steel and reinforced concrete.			
4. Create structural steel models.			
5. Create reinforced concrete models.			
6. Create schedules and material takeoffs for structural steel.			
7. Create schedules and material takeoffs for reinforced concrete.			
8. Create structural steel drawings from 3D models.			
9. Create reinforced concrete drawings from 3D models.			

TCOM 104 - Applied Research in Technology

You will develop a technical proposal and apply advanced research skills to a technical problem. You will use the technical problem-solving process in an applied research project and present your research findings in a written report and oral presentation.

Credit unit(s): 2.0
Prerequisites: TCOM 103 or ENGL 101
Corequisites: none
Equivalent course(s): COMM 115, COMM 182, COMM 290, TCOM 239

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Develop a technical proposal.			
2. Apply advanced research skills.			
3. Describe the technical problem-solving process.			
4. Employ the problem-solving process in an applied research project.			
5. Present research findings.			

COOP 101 - Co-operative Work Term

Your co-operative education term will provide you with the opportunity to consolidate theoretical and practical concepts learned in the classroom and gain valuable experience in a work setting.

Credit unit(s): 0.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Develop personal employment search skills.			
2. Communicate in the workplace.			
3. Work as a member of the team.			
4. Demonstrate effective work habits.			
5. Become familiar with safe work practices.			
6. Develop personal management skills.			
7. Identify roles and responsibilities of personnel in the workplace.			
8. Assimilate learned theories and concepts in a workplace setting.			
9. Demonstrate essential skills.			

COOP 201 - Co-operative Work Term

Your second co-operative education term will build on the experience gained during your first work placement and provide you with additional opportunities to develop skills and techniques related to your field of studies in a real work setting.

Credit unit(s): 0.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Participate in a personal employment search.			
2. Communicate effectively in the workplace.			
3. Contribute as a member of the team.			
4. Demonstrate effective work habits.			
5. Demonstrate safe work practices.			
6. Display personal management skills.			
7. Identify roles and responsibilities of personnel in the workplace.			
8. Apply learned skills and techniques in the workplace.			
9. Apply essential skills in the workplace.			

COOP 301 - Co-operative Work Term

Your third co-operative education work term will round out the work term experience by adding related work knowledge through the application of theories and practices relevant to your field of studies.

Credit unit(s): 0.0
Prerequisites: none
Corequisites: none
Equivalent course(s): none

Use a checkmark (✓) to rate yourself as follows for each learning outcome **Competent:** I can apply this outcome without direction or supervision. **Learning:** I am still learning skills and knowledge to apply this outcome. **None:** I have no knowledge or experience related to this outcome.	**Competent**	**Learning**	**None**
1. Demonstrate personal employment search skills.			
2. Display effective communication skills.			
3. Work as a member of the team.			
4. Apply effective work habits.			
5. Perform safe work practices.			
6. Master personal management skills.			
7. Understand roles and responsibilities of personnel in the workplace.			
8. Apply relevant theories and techniques.			
9. Perform effectively in the workplace.			