



# Design and Manufacturing Engineering Technology

## PLAR Candidate Guide

Prior Learning Assessment and Recognition (PLAR)

### Copyright

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### Prior learning credit options at Saskatchewan Polytechnic

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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

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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

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

- A. [PLAR fees](#)
- B. [PLAR eligibility and options](#)
- C. [Dates when PLAR assessment is available](#)
- D. [Special directions for this program](#)
- E. [PLAR contact person](#)
- F. [Self-rating course outlines](#)

## A. PLAR fees

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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

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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 corequisites for each course. Discuss with your [PLAR contact person](#) how to deal with courses with co-requisites.

### 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

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

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

## D. Special directions for this program

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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** a detailed Assessment Plan with your assigned assessor.
7. **Complete** assessment before your PLAR registration expires.

## E. PLAR contact person

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Contact the person below to arrange a consultation **after** you have read this guide and [general PLAR information](#) and rated yourself for each course (see next session). 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.

**Tim Muench**

Design Manufacturing Engineering Technology

Saskatchewan Polytechnic

Phone: 306- 659-4361

Email: [muench@saskpolytech.ca](mailto:muench@saskpolytech.ca)

## F. Self-rating course outlines

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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
<a href="#">CAD 101</a>	CAD Drafting	
<a href="#">COMP 113</a>	Spreadsheets for Engineering Technology	
<a href="#">DRFT 290</a>	Basic Drafting	
<a href="#">ENGM 191</a>	Applied Mechanics: Statics	
<a href="#">MAT 110</a>	Mathematics for Engineering Technologies	<a href="#">Arts &amp; Sciences</a>
<a href="#">SEM 101</a>	Technology Seminars	
<a href="#">CAD 104</a>	Parametric Part Modelling	
<a href="#">ENGM 101</a>	Strength of Materials	
<a href="#">ENGM 180</a>	Materials of Engineering	
<a href="#">MAT 111</a>	Calculus for Engineering Technologies	<a href="#">Arts &amp; Sciences</a>
<a href="#">TCOM 110</a>	Workplace Communications	<a href="#">Arts &amp; Sciences</a>
<a href="#">THER 101</a>	Thermo-Fluid Fundamentals	
<a href="#">CAD 105</a>	Advanced Drafting and Assembly Modelling	
<a href="#">CAD 200</a>	Assembly Modeling and Project	

<b>COURSE CODE</b>	<b>COURSE NAME</b>	<b>Delivered by another department/program</b>
<a href="#">MACH 191</a>	Machine Shop Technology	<a href="#">MET -Diploma</a>
<a href="#">SHOP 186</a>	Mechanical Components and Systems Lab	<a href="#">MET - Diploma</a>
<a href="#">TCOM 111</a>	Technical Communication	<a href="#">Arts &amp; Sciences</a>
<a href="#">WELD 387</a>	Welding for Technologists	<a href="#">MET - Diploma</a>
<a href="#">DSGN 280</a>	Mechanical Design 1	
<a href="#">ENGM 193</a>	Applied Mechanics - Dynamics	
<a href="#">MANU 290</a>	Manufacturing 1 - Metals	
<a href="#">MTRX 200</a>	Manufacturing Networking Systems	
<a href="#">THER 200</a>	Thermo-Fluid Systems 2	
<a href="#">DSGN 282</a>	Mechanical Design 2	
<a href="#">MANU 202</a>	Manufacturing 2-Plastics	
<a href="#">MANU 203</a>	Quality Assurance	
<a href="#">MANU 291</a>	Advanced Manufacturing	
<a href="#">PROJ 287</a>	Project Management	
<a href="#">CAD 298</a>	Engineering Seminars	
<a href="#">CLTR 200</a>	Culture and Diversity	<a href="#">Arts &amp; Sciences</a>
<a href="#">DSGN 208</a>	Concurrent Engineering 2	
<a href="#">DSGN 283</a>	Mechanical Design Project	
<a href="#">MAU 204</a>	Advanced Manufacturing Project	
<a href="#">PROJ 218</a>	Capstone Project	

## CAD 101 – CAD Drafting

You will focus on the concepts of computer-assisted drafting (CAD). Extensive hands-on training and lecture sessions will provide the knowledge you need to produce industrial standard CAD drawings, use 2D drafting and draw from 3D models. You will follow standard conventions while improving your skill and efficiency in using a CAD system.

**Credit unit(s):** 3.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** CAD 181

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine computer-assisted drafting (CAD) software environment.			
2. Construct drawings to conform to CAD Standards.			
3. Perform basic editing and drawing creation techniques.			
4. Demonstrate annotation techniques for engineering drawings.			
5. Construct templates for standardization of drawing output.			
6. Perform advanced editing and drawing creation techniques.			
7. Apply advanced drawing techniques.			
8. Manage CAD generated data.			
9. Create 3D drawings.			

## COMP 113 – Spreadsheets for Engineering Technology

You will gain an intermediate knowledge of electronic spreadsheets. You will use spreadsheet functions and tables to process information, construct charts based on engineering data, solve advanced numerical problems, and implement custom functions.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	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.			

## DRFT 290 – Spreadsheets for Engineering Technology

You will apply the basic theory and skills needed to generate graphic representation of an idea, concept, or entity. You will apply descriptive geometry and its applications to develop orthographic drawings, dimensioning and pictorial drafting. You will construct auxiliary views and sectional views

**Credit unit(s):** 4.0  
**Pre and Co Requisites:** None  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** DRFT 174 DRFT 181 GRPH 190

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Identify basic drafting concepts.			
2. Introduce descriptive languages used to describe objects.			
3. Plan engineering drawing title blocks.			
4. Discuss file management strategies.			
5. Complete freehand engineering sketches.			
6. Generate orthographic drawings.			
7. Construct engineering drawings.			
8. Apply dimensions to engineering drawings.			
9. Construct sectional view drawings.			
10. Apply Fit tolerances.			
11. Produce fastener drawings.			
12. Construct auxiliary views.			

## ENGM 191 – Applied Mechanics: Statics

You will study how to use basic algebra and trigonometry to determine the forces in stationary machine and equipment members. The course content includes force systems, center of gravity, static friction and moment of inertia, and the application of these principles to engineering problems.

**Credit unit(s):** 3.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** ENGM 190, ENGM 191CE, MECA 120

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
7. Demonstrate the solution method for engineering problems.			
8. Analyze forces, vectors, and resultants.			
9. Calculate the magnitude and direction of moments and couples.			
10. Evaluate unknown forces in two-dimensional equilibrium problems.			
11. Evaluate unknown forces in static structures and machines.			
12. Evaluate unknown forces in three-dimensional equilibrium problems.			
13. Determine the centroid and center of gravity of objects.			
8. Calculate the moment of inertia of objects.			
9. Evaluate unknown forces in frictional equilibrium problems.			



## 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 101, MAT 110CE, MATH 182, MATH 193

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

## 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):** ENGM 181 ETHC 183 ORTN 120 SEM 104

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

## CAD 104 – Parametric Part Modelling

You will produce part drawings using three-dimensional (3-D) Computer Aided Drafting (CAD). You will study solid model construction methods.

**Credit unit(s):** 2.0  
**Prerequisites:** CAD 101, DRFT 290  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe methods of constructing a three-dimensional (3-D) model.			
2. Develop models using sketched features.			
3. Generate placed features.			
4. Create advanced parts.			
5. Demonstrate editing and modifying features.			
6. Construct drawings to conform to Computer Aided Drafting (CAD) standards using 3-D modelling software.			

## ENGM 101 – Strength of Materials

You will study the relationship between the external applied loads and the induced internal stresses in various structural members. You will also learn design and analysis techniques of axially loaded members, and beams. You will learn design and analysis techniques for torsionally loaded members, columns, and pressure vessels. You will consider the impact of multiple loading situations on the stress of structural members.

**Credit unit(s):** 4.0  
**Prerequisites:** ENGM 191, ENGM 180  
**Corequisites:** none  
**Equivalent course(s):** ENG 192, ENGM 289

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine basic concepts of strength of materials.			
2. Design members under direct stress.			
3. Calculate deformation under axial loads and thermal stress.			
4. Calculate shearing forces and bending moments in beams.			
5. Analyze stresses and deflections in beams due to bending.			
6. Design members for torsional shear stress and torsional deflection.			
7. Analyze general combined stress states and Mohr’s circle.			
8. Analyze stress and buckling loads in columns.			
9. Analyze the design of pressure vessels.			
10. Design bolted connections to provide appropriate strength for structural members.			

## ENGM 180 – Materials of Engineering

You will develop a practical understanding of the fundamental structure, properties, and supplied forms of common engineering materials. The course content will assist you in the evaluation and selection of materials suitable for given design requirements. You will focus on iron and iron alloys (steels), complimented with examination of other metals / alloys (aluminum, copper, etc.), ceramics, polymers, composite, and hybrid materials. You will also include areas and applications such as material corrosion, as well as non-destructive examination and material testing.

**Credit unit(s):** 4.0  
**Prerequisites:** ENGM 191  
**Corequisites:** ENGM 101  
**Equivalent course(s):** ENG 191 ENGM 288

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe how material structure, prior treatment, and operating environment determines and / or influences engineering material properties.			
2. Apply material properties (physical, mechanical, and chemical) in representative engineering (industrial, manufacturing, construction, etc.) situations.			
3. Differentiate common supplied forms of engineering materials.			
4. Identify the properties, application, and nomenclature of iron and iron alloys (steels).			
5. Identify the properties, application, and nomenclature of non-iron metals and alloys.			
6. Identify the properties, application, and nomenclature of polymeric materials.			
7. Identify the properties, application, and nomenclature of ceramic materials.			
8. Identify the properties, application, and nomenclature of composite and hybrid materials.			
9. Examine common corrosion mechanisms, and methods of corrosion protection.			
10. Describe non-destructive examination methods for material evaluation.			
11. Select materials for an application based on product or design requirements.			

## 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 181, CALC 190, MAT 111CE, MAT 246

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	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 110 – Workplace Communications

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

**Credit unit(s):** 1.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** TCOM 102

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Apply job-related interpersonal and oral communication strategies.			
2. Apply workplace writing skills.			
3. Use job search skills.			

## ThER 101 – Thermo-Fluid Fundamentals

You will study typical primary thermal-fluid systems and their associated mechanical components. You will study media properties, pressure, energy, efficiency, and performance. You will assess the implication of energy transfer or specific systems configuration and design as seen through developed pressure, volume, force, or temperature changes. You will examine devices such as motors, engines and measuring devices.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe fundamental thermal-fluid system concepts, including unit systems.			
2. Examine fluid pressure.			
3. Use media properties for pure substances and mixtures.			
4. Calculate forces, stability, and equilibrium conditions within thermal-fluid systems.			
5. Examine the primary modes of heat transfer.			
6. Analyze non-flow processes and systems from the perspective of conservation of energy principles.			



## CAD 105 – Advanced Drafting and Assembly Modelling

You will create customized part and assembly drawings. You will create customized annotation in drawings. You will create assembly models and verify that they operate properly. You will create assemblies with proper tolerances and fits. You will use software tools to create advanced parts.

**Credit unit(s):** 2.0  
**Prerequisites:** CAD 104  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Demonstrate advanced annotation features.			
2. Prepare Geometric Dimensions and Tolerances.			
3. Create a three-dimensional (3-D) model of an assembly.			
4. Prepare assembly model documentation.			
5. Create advanced parts using design modelers.			
6. Analyze a design.			

## CAD 200 – Assembly Modeling and Project

You will create assigned assembly models and a student selected project and then learn the various ways to document assembly/disassembly procedures. You will apply Geometric Dimensions and Tolerances to the project you have selected. You will produce a set of drawings that would allow for the building of this project. You will produce an animation of the project.

**Credit unit(s):** 3.0  
**Prerequisites:** CAD 104, CAD 105  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Use naming and file structure for engineering drawing project.			
2. Construct organization of project from part to subassembly to assembly.			
3. Construct plastic parts and freeform surface models.			
4. Prepare fully documented drawing set for project.			
5. Prepare animation of project.			

## MACH 191 – Machine Shop Technology

You will gain an understanding of machine shop principles and practices. This course will serve as a foundation for further studies in manufacturing. In addition to lectures and demonstrations, you will receive extensive hands-on experience.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Apply principles of metrology.			
2. Perform machine shop operations.			
3. Describe machining processes.			
4. Describe computer numerical control machining.			
5. Explain machining costs.			

## SHOP 186 – Mechanical Components and Systems Lab

You will focus on the application and operation of the components and systems rather than their use in the design process. You will work with and disassemble or assemble some of the components (others will be demonstrated for you). Some of the items you will investigate include bearings, shafts, chain belt and gear drives, hydraulic pumps, motors and cylinders, pneumatic systems, conveyors, and pneumatic and hydraulic flow and pressure control valves.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe bearings and seals.			
2. Install bearings and seals.			
3. Describe drives, pneumatics, and conveyors.			
4. Describe hydraulics.			
5. Assemble hydraulics.			

## TCOM 111 – Technical Communication

You will develop technical research, writing, and presentation skills. This course will establish understanding and appropriate application of scientific and technical writing standards (e.g.: IEEE Citation Reference, IEEE Editorial Style Manual). You will examine and produce a variety of technical documents.

**Credit unit(s):** 2.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** TCOM 103

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

## WELD 387 – Welding for Technologists

You will observe and perform welding, thermal cutting and metal forming operations. You will develop an understanding of processes rather than skill. Supervised hands-on training will help you develop an understanding of Shielded Metal Arc Welding, Gas Metal Arc Welding, Flux Cored Arc Welding, Gas Tungsten Arc Welding, Oxy-Fuel Welding and Submerged Arc Welding. Your metal cutting activities will include Oxy-fuel Cutting and Plasma Arc Cutting. You will perform metal forming activities on a plate roll, press brake and structural roll.

**Credit unit(s):** 2.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** WELD 102

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe the oxy-fuel processes and their applications.			
2. Describe the gas metal arc welding process and its applications.			
3. Describe the flux cored arc welding process and its applications.			
4. Describe the shielded metal arc welding process and its applications.			
5. Describe the gas tungsten arc welding process and its applications.			
6. Describe the submerged arc welding process and its application.			
7. Describe the plasma arc cutting process and its applications.			
8. Describe press brake procedures.			
9. Describe plate rolling procedures.			
10. Describe procedures for rolling structural members.			

## DSGN 280 – Mechanical Design 1

You will learn the techniques of design, analysis and selecting various machine components including belt and chain drive components, wire rope, springs, fasteners, bolted connections, welded joints and combined stresses. You will learn traditional design methods and then use computer solutions extensively to augment the design process.

**Credit unit(s):** 3.0  
**Prerequisites:** COMP 113, ENGM 101, CAD 105, SHOP 186  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe the mechanical design process.			
2. Design members for fatigue strength for mechanical drive systems.			
3. Select belt drives for mechanical drive systems.			
4. Select chain drives for mechanical drive systems.			
5. Select wire rope drives for mechanical drive systems.			
6. Select fastener and bolted connections.			
7. Design helical springs.			

## ENGM 193 – Applied Mechanics -Dynamics

You will focus on kinematics and kinetics. In kinematics, you will analyze the geometry of rectilinear, circular and general plane motions. In kinetics, you will analyze the forces and movements associated with motion using Newton’s laws, the work-energy-power method, and the impulse-momentum method. You will learn how to solve engineering problems involving motion only and the forces causing that motion. You will analyze machine element linkages and vibrations using manual methods and computer software.

**Credit unit(s):** 4.0

**Prerequisites:** ENGM 191

**Corequisites:** none

**Equivalent course(s):** ENGM 290

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Analyze rectilinear motion of bodies.			
2. Analyze angular motion of bodies.			
3. Calculate values for velocity, distance, and acceleration of moving bodies in plane motion.			
4. Use Newton's three laws of motion to describe inertia.			
5. Analyze moving bodies using the concept of work, energy and power.			
6. Analyze moving bodies using the method of impulse and momentum.			
7. Analyze motions involving linkages using computer software.			
8. Discuss mechanical vibration.			



## MANU 290 – Manufacturing 1 - Metals

You will study the merits and limitations of the manufacturing and fabrication industry. You will study the use of engineering principles to solve manufacturing and fabrication problems. You will tour various manufacturing operations to gain a broad view of the different types of manufacturing.

**Credit unit(s):** 4.0  
**Prerequisites:** ENGM 101, ENGM 180, MACH 191, WELD 387  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe the fabrication processes used in producing metal and plastic products.			
2. Use measurement techniques, tolerances, and statistical analysis in the application of quality control.			
3. Analyze quality and manufacturing problems using normal distribution.			
4. Mold design and casting processes.			
5. Calculate the forces involved in hot metal forming processes.			
6. Compare cold metal forming techniques to other fabrication techniques.			
7. Compare various types of cold metal working machines and tools.			
8. Calculate the forces and power involved in cold metal forming processes.			
9. Compare basic metal machining processes and where they would be used.			
10. Calculate machining time.			
11. Compare basic metal welding processes and where they would be used.			
12. Design fillet welds.			

## MTRX 200 – Manufacturing Networking Systems

You will study background theory of networking fundamentals and the basics of managing engineering documentation. You will examine Ethernet technology in relation to its use in the Industrial Internet of Things (IIoT). You will learn the requirements to manage a system of computers in an engineering and manufacturing environment.

**Credit unit(s):** 4.0  
**Prerequisites:** ELTR 287, MTRX 101  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss introductory networking concepts.			
2. Discuss networking terminology and devices.			
3. Discuss the Open Systems Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) models to the transport level.			
4. Set up Local Area Network (LAN) cabling and wireless connectivity.			
5. Set up switching and wireless routing.			
6. Employ network security to wired and wireless networks.			
7. Manage engineering documentation using both traditional and Computer Aided Drafting (CAD) based methods.			
8. Estimate software and hardware requirements for an engineering environment system.			
9. Select hardware and software for engineering projects.			
10. Configure an operational engineering environment system in a networked environment.			
11. Manage an engineering environment system in a networked environment.			
12. Set up a file server based network.			

## THER 200 – Thermo-Fluid Systems 2

You will study flowing fluids and typical flow thermal-fluid systems. You will analyze piping systems and evaluate their associated components and equipment. You will compare heat engines and refrigeration performance. You will study concepts and devices in hydraulics and pneumatics.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe the characteristics and properties of flowing fluids.			
2. Analyze flow processes and systems from the perspective of conservation of energy principles.			
3. Calculate power requirements for a series piping systems.			
4. Analyze convective and transient heat transfer for industrial settings.			
5. Discuss operation of heat engines and refrigeration systems.			
6. Describe industrial pneumatic and hydraulic systems.			

## DSGN 282 – Mechanical Design 2

You will learn the techniques of design, analysis and selecting various machine components. You will study bearings, shafts, springs, couplings, gears, clutches, brakes, and cams. You will examine traditional design methods and then use computer solutions extensively to augment the design process.

**Credit unit(s):** 4.0  
**Prerequisites:** DSGN 280  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Select plain bearings for mechanical drive systems.			
2. Select rolling contact bearings for mechanical drive systems.			
3. Select couplings for mechanical drive systems.			
4. Select spur gears for mechanical drive systems.			
5. Select clutches and brakes for mechanical drive systems.			
6. Determine dimensions for shafts.			
7. Select motors for mechanical drive systems.			

## MANU 202 – Manufacturing 2-Plastics

You will learn different processes for the manufacture of plastics. You will learn the preferred method of post processing once a product is made. You will select the best process for types of products.

**Credit unit(s):** 2.0  
**Prerequisites:** CAD 287, ENGM 101, MANU 201, MANU 290  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe polymer casting processes.			
2. Describe polymer molding processes.			
3. Describe polymer additive and subtractive manufacturing processes.			
4. Select an appropriate process for material and economic considerations.			
5. Describe post processing of polymers.			

## MANU 203 – Quality Assurance

You will study quality assurance in a manufacturing environment. You will use statistical sampling and analysis tools used to achieve and verify quality goals.

**Credit unit(s):** 3.0  
**Prerequisites:** MAT 111, MANU 290  
**Corequisites:** none  
**Equivalent course(s):** MANU 293

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss customer-focused basic quality concepts.			
2. Discuss quality standards.			
3. Examine quality management.			
4. Solve quality problems using statistical calculations.			
5. Analyze chronic problems using continuous improvement problem solving techniques.			
6. Design for quality.			
7. Analyze quality using Statistical Process Control (SPC).			
8. Analyze supply chain management principles.			
9. Evaluate acceptance based on inspection results.			

## MANU 291 – Advanced Manufacturing

You will develop an understanding of flexible automation using robotics. You will discuss the technology, observe videos of several industrial applications, and attend industry tours to observe robotic systems in industry. You will learn how to program an industrial robot to perform various tasks. To gain an overall understanding of robotics, you will investigate end-of-arm tooling, parts presentation, and cost justification. You will receive an introduction to other related technology including machine vision systems, industrial sensors, and data acquisition and control.

**Credit unit(s):** 2.0  
**Prerequisites:** WELD 387, CAD 105, MTRX 101, MTRX 102  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Assess suitability of robotic applications.			
2. Apply sensors and data acquisition in robotic systems.			
3. Recognize machine vision applications.			
4. Design structured robot programs.			
5. Design jigs, fixtures, and clamping.			
6. Design a robotic part fabrication system.			

## PROJ – 287 – Project Management

You will be introduced to project management. You will examine the basic theory of project planning and control, from project initiation to project close out. You will apply research techniques and various tools to practice project management theory in a variety of projects. You will practice skills using project management software.

**Credit unit(s):** 2.0  
**Prerequisites:** none  
**Corequisites:** none  
**Equivalent course(s):** MGMT 222

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss project management concepts.			
2. Explain the process to initiate a project.			
3. Create a project plan using project management software.			
4. Explain the methods used to execute a project plan.			
5. Explain monitoring requirements of a project.			
6. Discuss closing requirements of a project.			



## CAD 298 – Engineering Seminars

You will investigate advanced features of Computer Aided Drafting (CAD) software used in the program and in local industry. You will attend presentation with local users that will share their product expertise. You will be introduced to incremental upgrades to software. You will receive an introduction to other relevant software.

**Credit unit(s):** 2.0  
**Prerequisites:** CAD 105  
**Corequisites:** none  
**Equivalent course(s):** CAD 286

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Implement advanced features for Parametric Modellers.			
2. Operate current software applications.			
3. Discuss new ideas and current trends in the Computer Aided Drafting (CAD) and Computer Aided Manufacturing (CAM) industry.			

## 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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss how cultural dimensions shape the diversity of Canada.			
2. Discuss the prominent dimensions of culture in Canadian society such as tradition, familial relations, and employment.			
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.			

## DSGN 208 – Concurrent Engineering 2

You will fabricate a product prototype that was designed in the Concurrent Engineering course. You will complete an engineering report and prepare and present a final oral presentation of your project.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Develop product prototype.			
2. Develop methods of Design for Manufacturing and Assembly (DFMA).			
3. Present a project.			

## DSGN 283 – Mechanical Design Project

You will learn how to develop and evaluate several components in the design of a machine. You will select and integrate bearings, shafts, springs, couplings, gears, clutches, brakes, and cams into a comprehensive project.

**Credit unit(s):** 3.0  
**Prerequisites:** DSGN 282  
**Corequisites:** none  
**Equivalent course(s):** none

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Select components of a mechanical, gear type power transmission system.			
2. Design the interface fit for multiple components.			
3. Generate component tolerances and limit dimensions on key dimensions.			
4. Verify final design for its intended purpose.			
5. Prepare assembly drawings of project.			
6. Design components not considered in earlier analysis.			
7. Prepare the technical report.			

## MANU 204 – Advanced Manufacturing Project

You will integrate the knowledge from the Advanced Manufacturing course into a design project where a fabricated metal part will be produced. Your project will include part layout for laser cutting, design and fabrication of jigs, robot programming, costing, and weld jobs.

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

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Implement structured robot programs.			
2. Fabricate jigs, fixtures, and clamping.			
3. Specify cost justification.			
4. Implement a robotic part fabrication system.			

## PROJ 218 – Capstone Project

You will focus on the application of basic knowledge in the design of "real life" engineering problems from local industries. Based on your knowledge of several previous and concurrent courses, you will learn how to select and define a technical project, find design solutions for the problem and then, prepare and present your technical solutions to the industrial client.

**Credit unit(s):** 4.0

**Prerequisites:** Year 1 - Semester 1, Year 1 - Semester 2, Year 1 - Semester 3, Year 2 - Semester 4, Year 2 - Semester 5, CAD 298(concurrent), CLTR 200(concurrent), DSGN 208(concurrent), DSGN 283(concurrent), MANU 204(concurrent)

**Corequisites:** none

**Equivalent course(s):** CAD 285

<p><b>Use a checkmark (✓) to rate yourself as follows for each learning outcome</b></p> <p><b>Competent:</b> I can apply this outcome without direction or supervision.  <b>Learning:</b> I am still learning skills and knowledge to apply this outcome.  <b>None:</b> I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Select an industrial project.			
2. Conduct a feasibility study on alternate solutions.			
3. Create a solution to an industrial project.			
4. Prepare a set of working drawings.			
5. Produce a technical report to communicate the solutions to the industrial client.			
6. Outline project solutions in an oral presentation.			