PROGRAM OVERVIEW

The Mechanical Engineering Technician - Manufacturing program is designed to provide you with the knowledge and skills required to pursue a rewarding career as a Mechanical Technician in the steel, mining, and wind-energy industry. You will receive a strong foundation in a wide variety of industrial applications including how to assist in preparing conventional and computer-assisted design (CAD) engineering designs, drawings and specifications; carry out mechanical tests and analysis of machines, components and materials; help with the design of material handling, drives and maintenance equipment for use in manufacturing processes; assist in the inspection of mechanical installations and conduction projects; and participate in the installation, repair and maintenance of machinery and equipment.

If you are a Canadian citizen or permanent resident and currently unemployed, you may qualify for second career funding for this program! To learn more about your options and how to get started, contact us at studentrecruitment@saultcollege.ca.

PROGRAM OUTCOMES

A graduate of the Mechanical Engineering Technician Program at Sault College will reliably demonstrate the ability to:

1. complete all work in compliance with current legislation, standards, regulations and guidelines.
2. apply quality control and quality assurance procedures to meet organizational standards and requirements.
3. comply with current health and safety legislation, as well as organizational practices and procedures.
4. apply sustainability best practices in workplaces.
5. use current and emerging technologies to support the implementation of mechanical engineering projects.
6. analyze and solve mechanical problems by applying mathematics and fundamentals of mechanical engineering.
7. interpret, prepare and modify mechanical engineering drawings and other related technical documents.
8. contribute to the design and the analysis of mechanical components, processes and systems applying fundamentals of mechanical engineering.
9. manufacture, assemble, maintain and repair mechanical components according to required specifications.
10. verify the specifications of materials, processes and operations to support the design and production of mechanical components.
11. contribute to the planning, implementation and evaluation of projects.
12. develop strategies for ongoing personal and professional development to enhance work
performance.

Reference
Ministry of Training, Colleges and Universities Mechanical Engineering Technician Program Standards (MTCU 51007), September 2010.

ADMISSIONS

MINIMUM ACADEMIC REQUIREMENTS
Ontario Secondary School Diploma with Grade 12 English (C) ENG4C, and Grade 12 Foundations for College Math (C) MAP4C, or equivalent, or mature student status.

CAREER PATHS
As a graduate of this two-year program, you may work in a broad range of facilities associated with industries such as steel, mining, pulp and paper, lumber, automotive, food processing and others. You may also pursue further education or apprenticeship training. If you wish to pursue an apprenticeship, you should contact the local office of the Ministry of Colleges & Universities, Apprenticeship Branch at 705.945.6815.

Mechanical engineering technicians perform some or all of the following duties:

• Assist in preparing conventional and computer-assisted design (CAD) engineering designs, drawings and specifications.
• Carry out a limited range of mechanical tests and analyses of machines, components and materials.
• Assist in the design of moulds, tools, dies, jigs and fixtures for use in manufacturing processes.
• Assist in inspection of mechanical installations and construction projects.
• Participate in the installation, repair and maintenance of machinery and equipment.

MANDATORY FEES

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These fees are for the 2020-2021 academic year (year 1 of study) and are subject to change. Please visit your Student Portal to view your Schedule of Fees.

OTHER INFORMATION
For more information contact Donovan Kennedy at 705.759.2554 ext 2581 or email Donovan.Kennedy@saultcollege.ca.
PROGRAM OF STUDY

SEMESTER 1
CMM115-3 Communications I
DRF105-3 Drafting and Blueprint Reading
ENV102-3 Industrial Health and Safety
MCH121-3 Machine Shop Theory and Measurement
MCH134-2 Materials and Fasteners
MCH144-4 Machine Shop Practical I
MTH145-4 Mathematics
WLD121-2 Welding

SEMESTER 2
ELR111-1 Electric and Electronic Controls
MCH141-3 Power Transmission Systems
MCH142-3 Pumps, Valves, Piping and Compressors
MCH145-4 Machine Shop Practical II
MCH244-4 Manufacturing Process
MCH253-2 Bearings, Seals and Lubrication
MET207-3 Metallurgy
RIG101-2 Rigging and Hoisting
GEN100-3 Global Citizenship

SEMESTER 3
CAD225-3 AutoCAD/Drawing and Schematics
ELR213-1 Electrical/Electronic Controls II
MCH110-4 Applied Mechanics
MCH258-4 Pneumatics and Hydraulics
MCH259-3 Machine Shop Practical III
MTH146-4 Mathematics
TNY130-3 Technology in Society

SEMESTER 4
CAD401-2 Advanced Computer Aided Design
MCH103-3 Strength of Materials
MCH125-3 Mechanics of Fluids
MCH254-2 Preventive/Predictive Maintenance
MCH256-3 Introductory Thermodynamics
MCH257-3 Machine Technology

Select one of the following:
GEN110: Student Selected General Education

Note: *This student-selected general education course code indicates a general-education course is taken in this semester. Students will choose from a selection of courses (details) prior to the semester in which the student-selected general education course is to be taken.

Course Descriptions

Semester 1

Communications I (CMM115) (3 credits)

This course is designed to help students develop the skills necessary to communicate effectively in their programs and at the college level. Students will think critically to capture the meaning messages and
respond appropriately; produce coherent, clear paragraphs; and purposively research and responsibly integrate credible sources into their own writing. Emphasis is placed on the writing process, from planning to revising, while providing opportunities to explore various modes of communication.

**Drafting and Blueprint Reading** (DRF105) (3 credits)
In a hands-on environment students will learn blueprint reading, geometric dimensioning and tolerancing (G.D. & T.) and be introduced to AutoCAD. The course will commence with skill development in blueprint reading. These skills shall be applied to the machinist’s trade and related areas. New information has been added to explain computer-aided design, new dimensioning practices, and assembly drawing interpretation. Using common shop terminology, industrial prints will be interpreted. G.D. & T. includes reading dimensional drawings in fractions, decimals and in metric units. AutoCAD is taught so that upon completion students can create computerized, mechanical drawings.

**Industrial Health and Safety** (ENV102) (3 credits)
This is an introductory course for all those interested in industrial practices from the standpoint of industrial hygiene and industrial health and safety. Students will become familiar with pertinent legislation, industry and workers rights and responsibilities, recognition, evaluation and control methods and safe working practices.

**Machine Shop Theory and Measurement** (MCH121) (3 credits)
This course is designed to give the students an understanding of the theoretical aspects of machining and manufacturing including feeds, speeds, threading and gear cutting formulas. This course is also designed to strengthen the student’s ability to measure and inspect to precise tolerances. Tools using micrometer and vernier scales for linear and angular measurement will be used. There will be a basic introduction to Statistical Process Control (SPC), including interpretation and recording of data.

**Materials and Fasteners** (MCH134) (2 credits)
To provide students with a working knowledge of the theory behind the procedures that are used in the heat treating and machining of carbon steels, aluminum and its alloys. Practical lab/shop activities will be used to enhance and/or demonstrate theoretical concepts where possible.

**Machine Shop Practical I** (MCH144) (4 credits)
A study of shop machines, safety, and tool care, measurements and layout, bench work and hard tools, material identification, heat treatment and testing, basic lathe, saws, drill presses, shapers, grinder, and milling machine, theory and practices, speeds, feeds, tapers, threads.

**Mathematics** (MTH145) (4 credits)
This first level mathematics course for engineering technology programs begins with a review of fundamental concepts including arithmetic operations and concepts in measurement. This is followed by several algebra topics including linear equations, factoring, fractions and quadratic equations. A treatment of trigonometry of right triangles, the trigonometric functions of any angle and of oblique triangles is also included.

The goals of this course are, first, to show that mathematics does play a most important role in the development and understanding of the various fields of technology and, secondly, to ensure that students acquire the mathematical and critical thinking skills necessary to analyze and solve engineering technology problems.

**Welding** (WLD121) (2 credits)
A trades curriculum that has been designed to provide students with a combination of theoretical knowledge and hands-on skill in relation to the safe use and operation of both OFG/SMA welding, cutting and heating equipment.

**Semester 2**
Electric and Electronic Controls (ELR111) (1 credits)
This course will provide students with the basic knowledge of electric and electronic theory. Students will learn about the purpose, scope of electrical codes, purpose and function of electrical components, selection and safe use of electrical instruments and electric and electron principles. They will also understand and be able to apply OHM’s law including units and relationships.

Power Transmission Systems (MCH141) (3 credits)
A trades course designed to provide students with knowledge of power transmission systems such as belt drives, chains, gears, shafts and couplings.

Pumps, Valves, Piping and Compressors (MCH142) (3 credits)
In this course, the student will learn about the different applications, installation, maintenance and types of pumps, valves, piping, compressors and ancillary equipment.

Machine Shop Practical II (MCH145) (4 credits)
This course will continue to build on the study of shop machines, safety, and tool care, measurements and layout, bench work and hard tools, material identification, heat treatment and testing, basic lathe, saws, drill presses, grinder, and milling machine, theory and practices, speeds, feeds, tapers, and threads.

Manufacturing Process (MCH244) (4 credits)
A job planning course to cover shop organization costing, routing and scheduling, various processes as to viability and methods including foundry processes, hard mould casting, die casting, plastics and rubbers, primary metal working, welding, forging and comparisons as to quality, economics and feasibility.

Bearings, Seals and Lubrication (MCH253) (2 credits)
Students will learn about selecting, installing and maintaining friction/plain and rolling element bearings and static and dynamic seals. They will learn to interpret ISO charts and bearing catalogues. Students will also learn about bearing lubricants and their proper application.

Metallurgy (MET207) (3 credits)
A combination of lab and theory designed to provide Mechanical Drafting Technicians with the basics of metallurgy. More specifically, it deals with the production of iron and steel; heat treating methods and surface treatments; the shaping and forming of metal; as well as the properties of metals.

Rigging and Hoisting (RIG101) (2 credits)
This course is designed to provide the student with the knowledge and understanding of correct lifting and hoisting procedures and the safe use of all equipment.

Global Citizenship (GEN100) (3 credits)
The world we are living in is one in which local, national and international issues are interwoven, and the need for us to understand the impact these issues can have on our lives has never been greater! Using a socio-cultural, political and environmental lens, students will view how the world is changing and how to become active agents of change from the local to international level. Important issues such as social injustice, poverty, environmental protection, resource scarcity, sustainability, and health will be addressed. Global citizenship is an opportunity to ‘Be the Change’. This course meets the Civic Life and Social and Cultural Understanding General Education themes.

Semester 3

AutoCAD/Drawing and Schematics (CAD225) (3 credits)
Students will learn to effectively use manufacturers manuals, sketch and draw machine component parts, including sectional views. This course will introduce the student to the fundamentals of computer assisted drafting using AutoCAD.
**Electrical/Electronic Controls II** (ELR213) (1 credits)
Students will learn the basic knowledge of electric and electronic controls. Students will learn about safely removing and resetting electrical and electronic devices such as fuses, circuit breakers and about lockouts and shut off procedures. The student will also learn about diagnostic testing and application of electronic devices used in control systems.

**Applied Mechanics** (MCH110) (4 credits)
This course entails a thorough study of statics, providing fundamental skill for further development in mechanical studies. Topics include: force vectors, components, resultants, moments, couples, equilibrium in force systems, trusses and frames, centroids, friction laws, impeding motion.

**Pneumatics and Hydraulics** (MCH258) (4 credits)
Students will learn to identify and explain pneumatic and hydraulic system components, and understand the basic principles of operation. Circuit diagrams will be used as an aid for assembling and troubleshooting hydraulic systems.

**Machine Shop Practical III** (MCH259) (3 credits)
This course will continue to build on the study of shop machines, with emphasis on the use of milling machines.

**Mathematics** (MTH146) (4 credits)
This course is a continuation of MTH145 for engineering and technology students. Topics of study include geometry, exponents and radicals, exponential and logarithmic functions, variation, plane analytic geometry, statistics, and graphs of trigonometric functions. This course is suitable for students studying at the technician level.

**Technology in Society** (TNY130) (3 credits)
This course will introduce students to the impact that technological change has on society. Illustrations and examples will be drawn from the students discipline. Potential topics include the social and economic impact of new technology, responsibilities and ethics, privacy, liability and technology-based crime, and emerging trends.

It is designed to provide students from varied programs and backgrounds with a particularly relevant and timely appreciation of the impact technology and technological advances have made on every aspect of society. Technology and its implementation in society have strengths, weaknesses, opportunities and threats. This course investigates the social, legal, and ethical issues the use of technology raises.

**Semester 4**

**Advanced Computer Aided Design** (CAD401) (2 credits)
The students will learn modern computer aided design using some of the various programs available that are used in industry today. This course will build on the students knowledge and enable them to produce workable CAD drawings ready for industry.

**Strength of Materials** (MCH103) (3 credits)
Basic concepts, stress and strain, Hooke’s law, Young's modulus, temperature stresses, thin walled cylinders, factor of safety, structural shapes, riveted and bolted connections, first and second moment of areas, and shear and bending diagrams are studied.

**Mechanics of Fluids** (MCH125) (3 credits)
This course is an introduction to fluids their properties and coherent units of measurement, pressure, vapour pressure, vacuum, Pascal’s Law with an emphasis on pressure measuring devices; buoyancy,
Bernoulli’s equation, flow of fluids, velocity and flow measuring instruments

**Preventive/Predictive Maintenance** (MCH254) (2 credits)
The student will learn about the procedures, equipment used and the processes associated with a preventive/predictive maintenance program. Topics include the various approaches to maintenance, and vibration monitoring and analysis.

**Introductory Thermodynamics** (MCH256) (3 credits)
This course covers the basic principles of thermodynamics. Topics include heat transfer, specific heat, thermal expansion and conductive, convective and radiant heat.

**Machine Technology** (MCH257) (3 credits)
In this course, students will develop knowledge of material handling systems, prime movers, fans and blowers. The principles of operation, applications, installation and maintenance will be covered.

**Student Selected General Education** (GEN110) (3 credits)
For Transfer Credit Purposes only.