Mechanical Technician – Industrial Millwright

Program Outline 2025-2026

PROGRAM INFORMATION

Academic Year: 2025-2026
Credential: Ontario College Diploma
Program Delivery: Full-Time
Duration: 2 years
Length: 4 Semesters
Program Code(s): T122 - Timmins Campus (PC)

DESCRIPTION

Offered as a two-year diploma or as a one-year top-up to our Mechanical Techniques – Industrial Millwright certificate and Northern's Mechanical Technician – Industrial Millwright diploma will set you up for a career as an in-demand mechanic on the front lines of industry.

From mining, aerospace, and auto assembly, to breweries, food processing, power stations, and more, you'll be able to diagnose, repair, maintain and install a full spectrum of industrial machinery and components. You'll reinforce fundamental skills through hands-on training. You'll tackle pneumatic, hydraulic, lubrication, cooling, exhaust, and fuel systems with confidence. You'll develop a level of craftsmanship that's guaranteed to set you apart from the competition, which is where you will want to be.

Upon successful completion, the student will have obtained all three levels of the in-school training for the apprenticeship requirements.

CAREER OPPORTUNITIES

Industrial Mechanics (Millwrights) work on industrial machinery and mechanical equipment and components. This equipment may include mechanical, pneumatic, hydraulic, fuel, lubrication, cooling, and exhaust systems. Some of the components they work on include pumps, fans, tanks, conveyors, presses, generators, and pneumatic and hydraulic controls.

Graduates may work in industries such as Aerospace, Automobile Assembly & Supply, Breweries, Food Processing, Mechanical Construction, Metal Fabrication, Mining & Forest Products, Nuclear & Fossil Power Stations, Pharmaceutical, Pulp & Paper, Steel Production, Wholesale Trading and more.

- Mechanical engineering technician
- Industrial millwright
- Employed by millwrighting contractors, manufacturing plants, utilities, and other industrial establishments.

VOCATIONAL LEARNING OUTCOMES

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 implement mechanical and manufacturing projects.
6. Analyze and solve mechanical problems by applying mathematics and fundamentals of mechanics.
7. Interpret, prepare, and modify mechanical drawings and other related technical documents.
8. Perform technical measurements accurately using appropriate instruments and equipment.
9. Manufacture, assemble, maintain, and repair mechanical components according to required specifications.
10. Contribute to the planning, implementation, and evaluation of projects.

PROGRAM COURSES

The following reflects the planned course sequence for full-time offerings of the program. Programs at Northern College are delivered using a variety of instruction modes. Courses may be offered in the classroom or lab, entirely online, or in a hybrid mode which combines classroom sessions with virtual learning activities.

Semester 1		**Hours**
EL1102	Electrical & Electronics Fundamentals	28
EN1592	Communication Fundamentals	28
GN1033	Health and Safety	42
GN1443	Indigenous Culture and Awareness	42
MA1002	Mathematics & Precision Measurement I	28
MM1002	Millwright Machining I	28
MM1004	Technical Drawings I	56
MM3003	Industrial Indoctrination	14
WE1092	Welding I	28
Semester 2		
EN1582	Applied Communications I	28
HD2003	Fluid Power I	42
MA2022	Mathematics & Precision Measurement II	28
MM1246	Bearings, Seals and Lubrication	70
MM1251	Power Transmission Systems	70
MM1275	Millwright Machining II	28
MM2004	Technical Drawings II	56
WE2092	Welding II	28

Semester 3

EL1021	General Education Elective	42
EL3013	Electrical Controls	42
HD3003	Fluid Power II	42
MM3012	Millwright Machining III	28
MM3014	Compressors, Pumps and Valves	56
MM3032	Precision Measurement III	28
WE3002	Welding III	28

Semester 4

BU4073	Entrepreneurship	42
EL1022	General Education Elective	42
MM4003	Millwright Machining IV	42
MM4005	Mechanical Theory and Practical	56
MM4022	Material Handling Systems	28
WE4002	Welding IV	28

PROGRAM PROGRESSION

The following reflects the planned progression for full-time offerings of the program.

Sem 1: Fall 2025
Sem 2: Winter 2026
Sem 3: Fall 2026
Sem 4: Winter 2027

ADMISSION REQUIREMENTS

- Ontario Secondary School Diploma (OSSD)
- Grade 12 English (C, U)
- Grade 11 Math (C, M, U)
- Or equivalent

Academic prerequisites for this program may be obtained free of charge through Academic Upgrading.

Applicants who do not have a high school diploma or equivalent and will have reached the age of 19 years on or before the start of the program must undergo academic testing and may be required to complete Prior Learning Assessment & Recognition (PLAR) process to demonstrate equivalency of admission requirements prior to admission into a program.

For more details, please contact the Admissions Office at 705-235-7222 or admissions@northern.on.ca.

Additional Requirements for International Students

In addition to the admission requirements, international students must have proof of English Proficiency and meet the requirements below.

1. Proof of Senior High School Diploma/Certificate
2. English Proficiency (we will require one of the following):
   - IELTS Academic International English Language Testing System: a minimum overall score of 6.0 must be achieved with no individual band score under 6.0; however, we will accept one band at 5.5.
   - TOEFL (Test of English as a Foreign Language) – Internet Based Test (iBT) overall minimum score of 79
   - PTE (Pearson Test of English) Academic – Graduate Diploma: 58+
   - Duolingo: 105+
3. CO-OP Work Permit is mandatory for this program to participate in unpaid program placements.

If your country of citizenship has English as its official language, we may accept alternate proof of English Proficiency. All educational documents must be submitted in English and will be dependent on the country of citizenship. For more information, please contact admissions@northern.on.ca.

PROGRAM SPECIFIC REQUIREMENTS & ADDITIONAL INFORMATION

Work Integrated Learning Opportunities

N/A

Articulation / Transfer Agreements

A number of articulation agreements have been negotiated with universities and other institutions across Canada, North America and internationally. These agreements are assessed, revised and updated on a regular basis. Please contact the program coordinator for specific details if you are interested in pursuing such an option. Additional information can be found at Articulation Agreements.

GRADUATION REQUIREMENTS

24 Program Courses
2 Communications Courses
4 General Education Courses

Graduation Eligibility

To graduate from this program, a student must attain a minimum of 60% or a letter grade of CR (Credit) in each course in each semester unless otherwise stated on the course outline. Students should consult departmental policies and manuals for additional details and exceptions.

Graduation Window

Students unable to adhere to the program duration of two years (as stated above) may take a maximum of four years to complete their credential. After this time, students must be re-admitted into the program and follow the curriculum in place at the time of re-admission.

CONTACT INFORMATION

For questions about being admitted into the program, please contact Northern College Admissions at admissions@northern.on.ca or by phone at 705-235-3211 ext. 7222. For questions about the content of the program, contact the Program Coordinator.

Paul Gasparetto, Program Coordinator
Tel: 705-235-3211 ext. 2181
Email: gasparettop@northern.on.ca

COURSE DESCRIPTIONS

Semester 1

EN1592 Communication Fundamentals
Communication Fundamentals will provide students with an opportunity to reinforce their use of Standard English, develop their abilities to communicate effectively in the workplace and improve their capabilities with computer technology, particularly in using Word, Excel and ProDemand to produce accurate and professional documents. As well, students will be required to use information technology like Blackboard and their own computing devices to research information online to learn about their trade pathway, find technical information using an industry system like ProDemand, and to complete course assignments.

EL1102 Electrical & Electronics Fundamentals
To develop the apprentice's basic knowledge of electrical and electronic theory, we start with basic safety procedures demonstrating good habits while working around electrical equipment. We cover ohm's law; basic series and parallel circuits calculation and design and the use of various measuring electrical instruments as it applies in the field of Industrial Mechanic – Millwright trade. Labs will be assigned to reinforce the theory taught during the semester.

GN1033 Health and Safety
This course introduces the student to health and safety in their home, in society and within an occupational setting. Students learn about the social and personal benefits of safe work practices and the methods to best prevent accidents or injuries. Students will review the role, rights and responsibilities of an individual in today's health and safety conscious world. Students also learn how to read and interpret the Occupational Act and Regulations.

GN1443 Indigenous Culture and Awareness
This general education course will provide students with an introduction to Canadian Indigenous Nations' history, sovereignty, land titles, cultural history and current critical issues. Topics addressed include the content of Indigenous rights, economic and social development, community and political processes, and business law and policies, justice & social services. Canadian Indigenous History and Relations is a general education course that has been incorporated into all programs at Northern College.

MA1002 Mathematics & Precision Measurement I
Students will learn the basic mathematics and measuring instruments needed in the repair trade for mechanics and will relate the basic math for measuring and problem solving in repair and maintenance.

MM1002 Millwright Machining I
This course will develop the knowledge of ferrous and non-ferrous metals, alloys and non-metallic materials, thread systems for specific applications; select and install nuts, bolts, screws, dowels required to specifications, heat treat, and stress relieve material if required.

MM1004 Technical Drawings I
The course will enable the student to interpret commonly used technical drawings and familiarize them with information typically found in manufacturing manuals. It will enable them to determine specifications, and identify drawing symbols, as well as draw and sketch using orthographic, isometric, and sectional views. There will be an introduction to schematic symbols and logic and flow diagrams to prepare them for later courses in electrical and fluid power.

MM3003 Industrial Indoctrination
This course will enable the student to protect self and others; comply with safety legislation under the Occupational Health and Safety Act, Workplace Hazardous Materials Information System (WHMIS); wear and maintain safety clothing and equipment; report all hazards; apply confined space safety procedures; apply machinery and equipment lock-out procedures; use correct body mechanics when lifting loads; communicate with fellow workers; report all accidents and respond to emergency situations. In addition, the student will be able to plan lifts; perform calculations using load charts; estimate load weights; select and use correct rigging/hoisting equipment; inspect and maintain rigging/hoisting equipment; use hand signals; control, balance and direct loads; disassemble all equipment safely.

WE1092 Welding I
This course is designed to assist beginning students with the basic principles of welding. The emphasis is placed on practical applications and to assist the student in developing more advanced skills. The course content will be shared between shop and classroom time at the discretion of the professor.

Semester 2

EN1582 Applied Communications I
This course is required in the second semester of the Motive Power Technician – Automotive Service, Heavy Equipment Techniques, Motive Power Technician – Heavy Equipment and Mechanical Technician and Techniques – Industrial Millwright and Mechanical Technician – Welding Fitter trades programs at Northern College. The purpose of this course is to give students an opportunity to develop and enhance basic communication skills as required in the workplace. Students will also be required to use a computer to complete assignments and other course work, work independently and collaboratively, follow instructions and complete assigned tasks on time.

HD2003 Fluid Power I
Students will be able to explain the fundamentals, rules and laws that govern fluid power systems. Students will perform mathematical calculations to find pressure, force, and area. Students will learn the symbols of components and be able to identify and explain the principles and purpose of the components found in a hydraulic circuit.

MA2022 Mathematics & Precision Measurement II
This course continues the development of knowledge and skills required to achieve success in the motive power industry. Students will review precision measurement and percent applications, as well as learn about ratios and proportions, geometry, and graphing.

MM1246 Bearings, Seals and Lubrication
This course will enable the student to identify and apply bearing materials, fits and tolerances, fit and maintain plain, journal, sleeve, radial and axial bearings, install and maintain bearing housings, fit and maintain anti-

friction axial, radial, ball, roller, needle, taper and spherical bearings, inspect and lubricate bearings, fit and maintain gasket, labyrinth, and mechanical seals, fit and maintain “0” ring and lip seals, select, install and remove packing, ensure that maintenance and installation procedures are to be prescribed standards.

MM1251 Power Transmission Systems
This course will enable the student to install and maintain power transmission systems, perform trade calculations on horsepower, torque, speed ratios, install and align belts, V- belts, and pulleys, chain drives and sprockets. They will install, align and perform maintenance functions on shafts, speed reducers, gears, brakes, clutches and drives. They will demonstrate the correct use of keys, splines and bushings, to ensure installation and maintenance to specifications.

MM1275 Millwright Machining II
This course will develop the theories and practices taught during MM1002 while furthering their knowledge on conventional machine tools such as engine lathes, drilling machines, saws, pedestal grinders and various hand tools. They will learn the parts, various operations, cutting tools and the relationship of speeds and feeds applied to milling machines. They will manufacture parts to specified tolerances which reflect field operations.

MM2004 Technical Drawings II
This is an introductory course designed to teach students the basics of using the AutoCAD drafting software to create 2 dimensional drawings. Lessons include using the draw, modify, layering and annotation commands.

WE2092 Welding II
This course is designed to assist beginning students with the basic principles of welding. The emphasis is placed on practical applications and to assist the student in developing more advanced skills. The course content will be shared between shop and classroom time at the discretion of the professor.

Semester 3

EL1021 General Education Elective
General Education Courses are selected online each semester by the student from a list provided and exposes students to a related area of study outside of their immediate academic discipline. Certain programs have predetermined electives.

EL3013 Electrical Controls
This course will introduce the student to basic principles and knowledge of Electrical Circuits and fundamentals. The scope and purpose of the Canadian Electrical code will be explained. Basic Electrical Installations will also be introduced to the students.

HD3003 Fluid Power II
This course will develop a more advanced level of hydraulics related to graphic symbols, calculations, fluids, conditioners, control valves and hydraulic pumps.

MM3012 Millwright Machining III
This course will develop the theories and practices taught during MM 1275 while furthering their knowledge of conventional machine tools such as engine lathes, milling machines, drilling machines, saws, pedestal grinders and various hand tools. They will manufacture parts to specified tolerances which reflect field operations.

MM3014 Compressors, Pumps and Valves
This course will develop various positive and non-positive displacement pumps. The students will also learn to assemble, disassemble, and maintain various pumps. They will identify, install, and maintain various types of valves and how to incorporate them into piping systems as well as identifying various pipe fittings and their uses.

MM3032 Precision Measurement III
Students will learn the care and use of commonly used precision measuring and alignment equipment and instruments, which are used for measuring, moving, setting up, and maintaining machinery to manufacturers' specifications and prescribed tolerances.

WE3002 Welding III
This course is designed to develop more advanced skills in Arc Welding by building on past skills of oxygen acetylene, arc welding and by progressing to the horizontal and vertical position. The emphasis is placed on practical applications. The course content will be shared between shop and classroom time at the discretion of the professor.

Semester 4

BU4073 Entrepreneurship
This course introduces students to the nature of business and entrepreneurship. Students will obtain an overview of entrepreneurship, and the entrepreneurial process then expands into key concepts including business types, customers, marketing, financials, and human resources. The options of franchising and purchasing existing businesses are also covered in this course. Students will outline and assess the components of a Business Plan.

EL1022 General Education Elective
General Education Courses are selected online each semester by the student from a list provided and exposes students to a related area of study outside of their immediate academic discipline. Certain programs have predetermined electives.

MM4003 Millwright Machining IV
The students will continue to apply the theories and practices taught during MM3012 while furthering their knowledge on conventional machine tools such as engine lathes, milling machines, drilling machines, saws, pedestal grinders and various hand tools. They will manufacture parts to specified tolerances which reflect field operations.

MM4005 Mechanical Theory and Practical
This course will enable the student to describe and demonstrate the knowledge and principles of applied mechanics and thermodynamics, as it pertains to the Industrial Mechanic (Millwright) trade. Students will also identify several types, applications and maintenance procedures of prime movers and ancillary equipment. Students will also describe the procedures, equipment used, and the benefits that accrue from a preventative and predictive maintenance program. Students may also be required to complete a two-week unpaid placement during weeks 13 & 14 to successfully complete this course. Students not obtaining a work placement will complete job tasks in the shop to meet the placement requirements.

MM4022 Material Handling Systems
This course develops knowledge of the types and principles of operation of various material handling systems. Students will also learn the functions and uses of fans and blowers. Lastly, students will learn about ventilation and pollution control systems.

WE4002 Welding IV
This course is designed to assist students with the principles of cutting and welding. The emphasis is placed on practical applications and to assist the student in developing more advanced skills. The course content will be shared between shop and classroom time at the discretion of the professor.