

PROGRAM INFORMATION

Academic Year	2024 - 2025
Credential	College Certificate
Program Delivery	Full - Time
Duration	1 year
Length	2 Semesters
Program Code	T093 (PC) – Timmins Campus

DESCRIPTION

Maintain the machines that power our economy.

With Northern's Heavy Equipment Techniques certificate, you'll become a critical player in maintaining the heavy-duty machinery that keeps our economy on track. From order systems and preventive maintenance to customer service and repairs, you'll master every aspect of the motive power industry along the way. In a hands-on environment focused on teamwork, personal safety and problem solving, you'll learn to diagnose and service a variety of power system problems – including hydraulic, electrical, electronic, fuel, braking, steering, suspension, and more. You'll gain confidence through practice. And after just one year, graduate with a level of skill and craftsmanship that will give you an edge in the workplace. This program can help you identify basic heavy duty equipment power system problems, inspect and test basic heavy duty equipment components and systems, and use a variety of test equipment and schematics to support heavy duty equipment operation and maintenance. This program provides a basis for you to:

- Develop desirable work attitudes and a keen sense of responsibility, particularly with regard to personal safety.
- Acquire sound theoretical training to meet the challenges of today's increasingly complex work environments.
- Reinforce fundamental skills of the trade through exposure to practical applications.
- Develop high standards of craftsmanship, problem solving skills and personal pride in your trade.

CAREER OPPORTUNITIES

- Heavy-duty equipment mechanic
- Employed by companies that own and operate heavy equipment, heavy equipment dealers, rental and service establishments, railway transport companies, and urban transit systems.

VOCATIONAL LEARNING OUTCOMES

1. Identify basic heavy duty equipment system problems using critical thinking skills and strategies and by applying fundamental knowledge of heavy-duty equipment operation, components and their interrelationships.
2. Identify, inspect, and test basic heavy duty equipment engine components and systems in compliance with manufacturers' recommendations.
3. Identify, inspect, and test basic heavy-duty equipment electrical and electronic components and systems in compliance with manufacturers' recommendations.

4. Identify, inspect, and test basic power train components and systems in compliance with manufacturers' recommendations.
5. Identify, inspect, test and maintain basic suspension, steering, and brake components and systems in compliance with manufacturers' recommendations.
6. Disassemble and assemble heavy duty equipment components to required specifications.
7. Use a variety of test equipment and schematics to assess basic heavy duty equipment fuel systems and subsystems.
8. Inspect and test basic heavy duty equipment systems and subsystems using basic knowledge of hydraulics and pneumatics.
9. Use information technology and computer skills to access data concerning repair procedures and manufacturers' updates.
10. Prepare logs, records, and documentation to appropriate standards.
11. Apply communication skills to improve customer service.
12. Complete all assigned work in compliance with occupational, health, safety, and environmental law; established policies and procedures; codes and regulations; and in accordance with ethical principles.

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
EL1143	Electrical & Electronics I	42
EN1592	Communication Fundamentals	28
GN1033	Health and Safety	42
GN1443	Indigenous Culture and Awareness	42
IN1092	Computer Methods Trades Software	28
MA1002	Mathematics & Precision Measurement I	28
MP1004	Trade Practices and Applications Motive Power	56
MP1015	Drive Train Systems I	70
WE1092	Welding I	28
 Semester 2		
EN1582	Applied Communications I	28
HD2003	Fluid Power I	42
HD2004	Fuels I	56
MA2022	Mathematics & Precision Measurement II	28
MP1005	Engines I	70
MP2003	Motive Power Electrical II	42
MP2025	Steering, Suspension and Brakes I	70
WE2092	Welding II	28

PROGRAM PROGRESSION

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

Fall Intake

Sem 1: Fall 2024

Winter Intake

Sem 2: Winter 2025

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](#).

ADDITIONAL INFORMATION

N/A

PROGRAM SPECIFIC REQUIREMENTS

To be completed if applicable.

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 general 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+

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.

GRADUATION REQUIREMENTS

- 15 Program Courses
- 2 Communications Courses
- 2 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 detail 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.

Matt Dupuis, Program Coordinator
Tel: 705-235-3211 ext. 2196
Email: dupuism@northern.on.ca

COURSE DESCRIPTIONS

Semester 1

EL1143 Electrical & Electronics I

Students learn the fundamentals of DC electrical and electronic systems, using problem solving techniques and circuit board testing. Topics include basic electrical and electronic theory, problem solving using Ohm's Law and use of Digital Multimeters.

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.

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.

IN1092 Computer Methods Trades Software

This course introduces students to careers in the motive power sector. Students will also use various service information systems required to successfully inspect, test and repair motive power vehicles. Students will access online service information to create work orders, research motive power system operations, identify component locations and electrical diagrams, and locate service information to aid in diagnostics and repairs.

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.

MP1004 Trade Practices and Applications Motive Power

Topics include shop safety and safe working habits, proper vehicle lifting practices, hand, shop and power tool identification and selection, use of precision tools, learn about fasteners, torque, bearing and seals. The students will put into practice what they have studied in theory class.

MP1015 Drive Train Systems I

This course is designed to give students an understanding of how the power from the engine reaches the vehicles drive wheels. Students will be able to explain the purpose and function of the clutch assembly, manual transmissions, drive and axle shafts, and single reduction final drives and differentials. Students will also be able to inspect, diagnose and recommend repair procedures on the clutch, transmission, and drive axle assembly.

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.

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.

HD2004 Fuels 1

This course is designed to introduce students to the diesel fuel system. Students will learn about the properties of diesel and alternative fuels and be able to map the fuel system and explain the purpose of each component of the fuel system. The students will have the opportunity to identify and describe systems, demonstrate the use of diagnostic tools and repair various problems as it relates to the engine fuel system and its component.

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.

MP1005 Engines I

This course is designed to provide students with a fundamental understanding of the operating principles, types, and designs of the modern internal combustion engine. Students will be able to explain how the engine produces torque and identify short block and cylinder head components. Students will have the opportunity to practice the skills learned using special tools and measuring instruments in the practical section of the course.

MP2003 Motive Power Electrical II

This course continues the development of knowledge and skills required to maintain and diagnose motive power electrical systems. The subjects of study include the following systems: electromagnetic devices, wiring and wire repairs, advanced circuit diagnosis, electrical schematics, flooded batteries, and starter motors. The students will have the opportunity to identify and describe systems, demonstrate the use of diagnostic tools, and recognize and solve problems using a strategy-based approach.

MP2025 Steering, Suspension and Brake Systems I

Students are introduced to motive power type steering, suspension, and braking systems. The subjects of study include the fundamentals of steering systems and components, tires, wheels, hubs, and hydraulic braking systems. Students will have the opportunity to practice the skills learned in the practical section of the course.

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.