Electrical Engineering Technician

Program Outline 2026-2027

PROGRAM INFORMATION

Academic Year: 2026-2027
Credential: Ontario College Diploma
Program Delivery: Full-Time
Duration: 2 Years
Length: 4 Semesters
Program Code(s): T007 - Timmins Campus (PC)

DESCRIPTION

A skilled electrical engineering technician is always in demand. Featuring extensive hands-on instruction in our state-of-the-art labs, Northern's two-year Electrical Engineering Technician diploma will prepare you for tomorrow's economy.

With a broad focus that includes computers, digital circuits and renewable energy, you'll install, test, operate, repair and maintain modern industrial, electrical and electronic systems. Along the way, you'll master all the tools and instruments that are your 'eyes' on the job.

As a skilled technician, you'll find work in just about any industrial sector, from residential construction to power generation and distribution. You can pursue your dream job or stay at Northern for an extra year to graduate with an advanced diploma in Electrical Engineering Technology to make you even more sought after by high-paying employers. There are also pathways to a university degree. So, whatever direction you choose, it's definitely a solid career move.

Technicians maintain power generation stations and transmission lines, industrial telecommunications, electrical maintenance and installation, and control systems.

They will learn how to select, design, install, maintain, program and troubleshoot modern industrial, electrical and electronic systems.

Graduates from our Technician or Technology programs may obtain certification through the Ontario Association of Certified Engineering Technicians and Technologists (OACETT).

CAREER OPPORTUNITIES

Northern College graduates currently work in positions ranging from apprentice electricians to electrical department superintendents in all industrial sectors including public and private power utilities.

Graduates can expect to find employment in the following fields/positions: quality control, electrical design, research and technical laboratories.

Electrical engineering technicians are employed by electrical utilities, communications companies, manufacturers of electrical and electronic equipment, consulting firms and in government agencies in a variety of manufacturing, processing and transportation industries.

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VOCATIONAL LEARNING OUTCOMES

1. Interpret and produce electrical and electronics drawings including other related documents and graphics.
2. Analyze and solve routine technical problems related to electrical systems by applying mathematics and science principles.
3. Use, verify, and maintain instrumentation equipment and systems.
4. Assemble, test, modify and maintain electrical circuits and equipment to fulfill requirements and specifications under the supervision of a qualified person.
5. Install and troubleshoot static and rotating electrical machines and associated control systems under the supervision of a qualified person.
6. Verify acceptable functionality and apply trouble shooting techniques for electrical and electronic circuits, components, equipment, and systems under the supervision of a qualified person.
7. Analyze, assemble and troubleshoot control systems under the supervision of a qualified person.
8. Use computer skills and tools to solve routine electrical related problems.
9. Assist in creating and conducting quality assurance procedures under the supervision of a qualified person.
10. Prepare and maintain records and documentation systems.
11. Install, test and troubleshoot telecommunication systems under the supervision of a qualified person.
12. Apply health and safety standards and best practices to workplaces.
13. Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.
14. Configure installation and apply electrical cabling requirements and system grounding and bonding requirements for a variety of applications under the supervision of a qualified person.
15. Assist in commissioning, testing and troubleshooting electrical power systems under the supervision of a qualified person.
16. Select electrical equipment, systems, and components to fulfill the requirements and specifications under the supervision of a qualified person.
17. Apply project management principles to assist in the implementation 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**
CM1323	Professional Communications	42
EE1006	DC Fundamentals	84
EE3203	Measuring Instruments	42
GN1033	Health and Safety	42
GN1443	Indigenous Culture and Awareness	42
IT1024	Introduction to Physics	56
MA1100	Mathematics I	56

Semester 2

CM2303	Communications in the Workplace	42
EE1204	Residential Wiring and Methods	56
EE2043	AC Fundamentals	42
EE2206	Electronics Fundamentals	84
EL2021	General Education Elective	42
IN1224	Computer Aided Drafting (CAD) I	56
MA2104	Mathematics II	56

Semester 3

EE1034	Digital Circuits	56
EE3014	Three-Phase Theory	56
EE3114	Electrical Motor Control	56
EL1021	General Education Elective	42
IN3263	Embedded Programming and Networks	42
MA3105	Mathematics III	56

Semester 4

EE2014	Electrical Machines I	56
EE4013	Data Cabling	42
EE4043	Programmable Logic Control I	42
EE4103	Power Systems	42
EE5003	Instrumentation	42
MA4204	Calculus I	56
ME3004	Energy Systems I	56

PROGRAM PROGRESSION

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

Fall Intake
Sem 1: Fall 2026
Sem 2: Winter 2027
Sem 3: Fall 2027
Sem 4: Winter 2028

ADMISSION REQUIREMENTS

- Ontario Secondary School Diploma (OSSD)
- Grade 12 English (C, U)
- Grade 12 Math (C, U) (MCT4C preferred; MAP4C is accepted with a minimum GPA of 60%)
- 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 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+

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

22 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 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.

Marc Veilleux, Program Coordinator
Tel: 705-235-3211 ext. 2116
Email: veilleuxm@northern.on.ca

COURSE DESCRIPTIONS

Semester 1

CM1323 Professional Communications
In this course, students will learn essential skills for success in college and the workplace. This course focuses on developing and strengthening oral and written communication skills, and critical thinking ability. During this course, students will engage in a variety of forms of communication with a focus on upholding the principles of academic integrity. Students will develop the skills necessary to create discipline-specific documents, practice business etiquette and professionalism, and apply critical thinking strategies to practical scenarios. Upon successful completion of this course, students will be able to plan and draft concise, coherent and well-organized writing assignments that are tailored to specific audiences and purposes.

EE1006 DC Fundamentals
This course is the learner's first introduction to the world of electricity. Fundamental concepts are covered which are essential to the understanding of all concepts in the Electrical Engineering Technician and Technology programs. The course begins with an overview of physical quantities and measurement systems. The nature of charge, current, voltage, and resistance are then investigated. Finally, the relationships between these electrical quantities are used to develop circuit analysis techniques for direct current (DC) circuits.

Students will also begin to develop practical skills in the lab including reading and developing schematics and wiring diagrams, troubleshooting with a multimeter, and prototyping circuits on a breadboard.

EE3203 Measuring Instruments
This is an introductory course for third semester Technician and Technology students. Most common measuring instruments, including voltmeter, ammeter, ohmmeter, wattmeter, meggers and oscilloscope will be studied and some will be designed. Measuring Instruments are the eyes of the electrician. An understanding of how measuring instruments operate is very important to anyone working in the electrical field. They provide the electrician with the ability to evaluate problems in the job through the use of technical tools. They also enable an electrician to correctly determine electrical values of voltage, current, resistance, power and many others. In this course, D'Arsonval meter movement and digital display will be used to design different types of meters. The loading of different instruments and their high frequency characteristics will be discussed.

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.

IT1024 Introduction to Physics
This course is an introductory course into the study of physics. It consists of 6 theory units and a corresponding laboratory component. The topics covered include: measurement, motion, forces, work and energy, fluids and heat. The lab component gives students the opportunity to connect with the acquired theory.

MA1100 Mathematics I
This course covers basic algebra properties, graphing the straight line, basic geometry and trigonometry, and solving a system of equations graphically and algebraically. It also covers vector addition by components and by the cosine and sine laws.

Semester 2

CM2303 Communications in the Workplace
In this course, students will develop professional communication skills required for success in the workplace. Students will continue to develop and strengthen their oral and written communication skills and critical thinking abilities. During this course, students will use various modes of communication to complete assignments designed to meet program and professional expectations. Students will utilize a variety of technologies for the purpose of creating a professional presence in a digital environment. Students will develop the necessary skills to create polished workplace documents such as letters, resumes, cover letters and reports tailored to specific

audiences. Students will learn to conduct themselves with professionalism in both workplace interviews and job searches. Upon successful completion of this course, students will be able to create clear, concise and coherent workplace and employment documents that are error-free and designed for specific audiences and purposes.

EE1204 Residential Wiring and Methods
This course introduces students to the installation & design of various residential circuits used in a common household. Also, students will be working on actual installations of basic household circuits and electrical services used in the workplace. Topics include: introduction to the electrical code, symbols, service calculations, & installations, wiring methods, grounding.

EE2043 AC Fundamentals
This course revisits the circuit analysis techniques learned in DC Fundamentals and expands upon them to cover alternating current (AC) circuits. Complex number analysis is employed to provide a deep understanding of AC theory. This sets the student up for success in the later courses. In the lab, students will construct, test, troubleshoot, and analyze basic AC circuits.

EE2206 Electronics Fundamentals
This is an introductory course in electronics in which students learn the operation of electronic devices and their applications in circuits. Devices studied are diodes of all types, bipolar junction transistors, silicon controlled rectifiers, TRIACs, operational amplifiers, and field effect transistors. In the lab, students will construct, test, troubleshoot, and analyze basic electronic circuits such as and basic amplifier circuits.

EL2021 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.

IN1224 Computer Aided Drafting (CAD) I
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 comman

MA2104 Mathematics II
MA2104 is the second course in the math stream for students in an Engineering Technician / Technology program. The emphasis of this course is on solving equations relating to quadratics, logarithms, exponentials, with sections on factoring, fractional equations, manipulating exponent and radical expressions, and complex numbers, and for some programs studying systems of linear equations and determinants. Applications of the basic concepts, to particular fields of study, will be covered. The second semester Mathematics course is designed to give the student the mathematical tools required to function in his/her special field of study. Students are encouraged to seek help after class hours if problems are encountered in the course. Every effort will be made to identify problem areas for the student, but in the final analysis, it is the responsibility of the student to ask for help. Prerequisite: MA1100 – Mathematics I (with 60%)

Semester 3

EE1034 Digital Circuits

The concepts involved in Digital Circuits are fundamental to the understanding of our digital world. Familiarity with different numbering systems and logical operations is key to understanding a broad range of topics including PLCs, digital communications, protection and control, electrical motor control, and others. This course will prepare the student to use the tools of logic to solve problems and optimize their solutions.

EE3014 Three - Phase Theory
This course extends upon the concepts learned in Electrical and Electronics Fundamentals and establishes the core material required for power systems and protection & control courses. The course covers fundamental concepts in AC power, transformers and three-phase circuits. Topics include a review in complex numbers; three-phase theory ideal transformer, transformer losses and testing methods, special transformers such as distribution transformers, autotransformer, current and potential transformers and three phase transformers.

EE3114 Electrical Motor Control
This course is intended to help the students understand the principal operation of many control components and circuits used by industry. This course will provide the students with the basic knowledge required for the PLC course being delivered in the winter semester.

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.

IN3263 Embedded Programming and Networks
The first part of this course introduces the learner to the fundamentals of computers and how they are networked. Topics include a basic overview of computer/network equipment, networking fundamentals and standards, and network design. The second part of the course provides the learner with an introduction to computer programming using embedded systems. Topics covered include syntax, variables, equations, data types, loops, conditional statements, logical statements, and ADC interfacing.

MA3105 Mathematics III
This course covers topics such as: graphs of trigonometric functions; trigonometric identities and equations; the study of analytic geometry and the study of inequalities. The students will also be introduced to the rate of change and its relation to graphs and the tangent line. Prerequisite: MA2104

Semester 4

EE2014 Electrical Machines I
This course covers the fundamental principles of operations of DC and AC motors and generators. Topics include: DC generators, DC motors, efficiency and heating of electrical machines, electrical machine maintenance, three-phase induction motors, synchronous motors/generators, and single-phase motors.

EE4013 Data Cabling
The course focuses on cabling issues related to data, voice, video communications and provides an understanding of the industry and its worldwide standards, types of media and cabling, physical and logical networks, as well as signal transmission. Cabling and networking equipment and consumable bundles are used to teach the hands-on portion of the curriculum. This provides the student with a basic understanding of

networking and telecommunication cabling, communication standards, and how to properly plan and understand the different uses of technology examples (Power over ethernet, understanding connecting wireless networks, Fiber networking), install and test the data/telecommunication mediums and different types of networking equipment.

EE4043 Programmable Logic Control I
This course will introduce the student to the control of motors, through the use of programmable logic controllers. The course will demonstrate the differences between mechanical relaying and computer relaying. It will show the student why this type of motor control is in such demand in industry. The student will gain exposure to PLCs through troubleshooting and design exercises.

EE4103 Power Systems
This course builds a profound understanding of various utility power systems and renewable energy systems used in Ontario. The students will learn the principal operation and components of the generating stations followed by learning the fundamentals of distribution systems and high voltage transmission system and its challenges. Then we look at the cost of electricity and DC transmission systems. This course introduces the student to electrical power systems and is designed to cover generation, distribution and transmission of electric power.

EE5003 Instrumentation
This is an introductory course in instrumentation and process control. Transducers and their application in pressure, flow, level and temperature systems is discussed. Basic instrumentation theory, equations and calculations are introduced in order to understand the interaction between physical processes and their transducers.

MA4204 Calculus I
This is a basic introductory course in Calculus. Students learn the language of calculus and apply the rules to simple engineering problems. The course includes the derivative of algebraic functions with applications to trajectory motion and minimum and maximum problems. An introduction to integration, with algebraic functions, is also taught with some basic applications to area, volumes of revolution, displacement-velocity-acceleration and other applied engineering problems.
Prerequisite: Mathematics III (MA3105 or MA3033) with 60%

ME3004 Energy Systems I
The skyrocketing demand for clean, abundant energy has resulted in a need for comprehensive information that can be used by builders, technicians, energy industry professionals, and anyone else that wants to learn about alternative forms of energy and their everyday uses. This course explores solar, wind, and other sources and the technology available to harness them. Students will gain a better understanding of how these systems work as well as how they are put together.