Computer Engineering Technician
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): T100 - Timmins Campus (PC) - Fall Intake
T100W - Timmins Campus (PC) - Winter Intake
T103 - Kirkland Lake Campus (KL) - Fall Intake - Unavailable
T103W - Kirkland Lake Campus (KL) - Winter Intake - Unavailable

DESCRIPTION

With Northern's two-year Computer Engineering Technician diploma, you'll emerge as an IT professional whose high-end skills support the technologies that now run every aspect of our economy and daily lives. The hands-on curriculum means you'll literally assemble and configure a computer.

On a broader spectrum, you'll learn to develop, maintain and optimize networks, systems and software. You'll also develop core programming skills, and you'll master web development, cybersecurity and database management. Along the way, you'll be challenged to solve complex issues and master the latest and emerging technology to make sure you're prepared for the problems and solutions of the future. This program prepares students to write exams for certifications such as Cisco (CCNA), Cisco Certified CyberOps Associate or Cisco CyberOps Associate, Networks +, A+ Certification, Server+ and Linux + Certification.

CAREER OPPORTUNITIES

Northern College graduates are able to develop and maintain networks, systems and programs for both business and industry. Graduates can expect to find employment in the following fields/positions:
- Programmer / Analyst
- Computer engineer
- Computer systems engineer
- Employed by computer and telecommunication hardware manufacturers, engineering, manufacturing and telecommunications firms, IT consulting firms, and government, educational and research institutions in the private and public sectors

VOCATIONAL LEARNING OUTCOMES

1. Identify, analyze, develop, implement, verify, and document the requirements for a computing environment.
2. Contribute to the diagnostics, troubleshooting, documenting, and monitoring of technical problems using appropriate methodologies and tools.
3. Implement and maintain secure computer environments.
4. Implement robust computing system solutions through validation testing that aligns with industry best practices.
5. Communicate and collaborate with team members and stakeholders to ensure effective working relationships.

6. Select and apply strategies for personal and professional development to enhance work performance.
7. Apply project management principles and tools when working on projects within a computing environment.
8. Adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems.
9. Support the integration of multiple software and hardware components using appropriate systems, methodologies, and connection protocols.
10. Install, configure, troubleshoot, and maintain a variety of computing devices and networked systems (software or hardware) in accordance with documented functional requirements and standards.
11. Apply principles of digital and analog circuits to troubleshoot computing devices, including embedded components and systems.
12. Contribute to the analysis, building, testing, implementation, and maintenance of embedded (including IoT) devices and applications.
13. Contribute to the development and maintenance of software applications for systems integration.

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
CP1025	Introduction to Programming	70
GN1033	Health and Safety	42
IN1045	Cisco Networking I	70
IN1104	IT Essentials I	56
MA1100	Mathematics I	56

Semester 2 | |
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CM2303 | Communications in the Workplace | 42
IN2034 | Cisco Networking II | 56
IN2054 | Windows Server Administration | 56
IN2343 | Intermediate Programming | 42
IN4064 | Cisco Cyber Ops | 56
MA2104 | Mathematics II | 56

Semester 3 | |
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EE4013 | Data Cabling | 42
EL1021 | General Education Elective | 42
GN1443 | Indigenous Culture and Awareness | 42
IN3033 | Markup Languages | 42
IN3084 | Cisco Networking III | 56
IN3094 | Linux Server Administration | 56
IN3193 | Database Management | 42

Semester 4

EL1022	General Education Elective	42
IN2004	Systems Security	56
IN2104	IT Essentials II	56
IN4023	Virtual Systems Administration	42
IN4074	Internet Programming	56
IN6003	Systems Analysis	42

PROGRAM PROGRESSION

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

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

Winter Intake
Sem 1: Winter 2026
Sem 2: Summer 2026
Sem 3: Winter 2027
Sem 4: Summer 2027

ADMISSION REQUIREMENTS

- Ontario Secondary School Diploma (OSSD)
- Grade 12 English (C, U)
- Grade 12 Math (C, 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: 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

Program device requirements can be found by going to the Northern College IT Support Page. Please follow the device recommendations for Engineering Technology. Technology Support – Northern College.

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

19 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 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.

Neal McNair, Program Coordinator
Tel: 705-235-3211 ext. 2127
Email: mcnairn@northern.on.ca

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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.

CP1025 Introduction to Programming
This course provides an introduction to programming using Java. The course will focus on core programming concepts that are universal to all modern programming languages. Students will learn to write programs using proper algorithm design, logic, data types, variables, control structures and functions (methods). The goal of the course is to provide a solid foundation of core programming skills that will allow students to further their learning in a variety of development environments.

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.

IN1045 Cisco Networking I
Cisco Networking I is the first course of the Cisco Networking Academy CCNAv7 curriculum titled Introduction to Networks (ITN). Introduction to Networks is one of three courses that are aligned to the CCNA Certification Exam. ITN contains 17 modules, each with a series of topics. In Introduction to Networks, the student will gain a basic understanding of the way networks operate. They will learn about network components and their functions, as well as how a network is structured, and the architectures used to create networks, including the

internet. ITN is about more than learning networking concepts. By the end of this course, the student will be able to build local area networks (LANs), configure basic settings on routers and switches, and implement internet protocol (IP). In ITN, every concept that the student learns and skills that they develop will be used in the rest of the CCNA curriculum.

IN1104 IT Essentials I
This course covers the fundamentals of computer hardware, software and advanced concepts such as security, networking, and the responsibilities of an IT professional. Students learn how to assemble and configure a computer, install operating systems and software, and finally troubleshoot hardware and software problems. In addition, chapters on networks and communication skills are included. This course helps students prepare for CompTIA's A+ certification.

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.

IN2034 Cisco Networking II
This is the second course in the CCNA curriculum series, which focuses on Switching, Routing, and Wireless Essentials (SRWE). It focuses on switching technologies and router operations that support small-to-medium business networks and includes wireless local area networks (WLAN) and security concepts. In addition to learning key switching and routing concepts, learners will be able to perform basic network configuration and troubleshooting, identify and mitigate LAN security threats, and configure and secure a basic WLAN.

IN2054 Windows Server Administration
An operating system is an organized collection of programs and data designed to manage the resources of a computer system and provide a base upon which applications can be developed and run. This course is designed to build a foundation in basic server administration. It covers all of the critical Windows Server 2019 features, including the features unique to this operating system. The students will learn how to choose the right server edition for their needs, and learn how to install, configure, customize, manage, and troubleshoot their server.

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IN2343 Intermediate Programming
This course covers intermediate level programming concepts using the Java programming language. Using a project-based approach, students will learn and apply Object Oriented Design (OOD) principles in solving computer programming problems.

IN4064 Cisco Cyber Ops
Cisco CyberOps Associate covers knowledge and skills needed to successfully handle the tasks, duties, and responsibilities of an associate-level Security Analyst working in a Security Operations Center (SOC).

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.

Semester 3

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.

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.

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.

IN3033 Markup Languages
This course provides an introduction to markup languages and their use in web publishing. The focus will be on HTML, CSS, and the most current techniques for front-end web development with an emphasis on creating

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web interfaces that work seamlessly on mobile devices. Students will learn through a combination of research and applied projects and will apply the current standards in HTML5 and CSS3.

IN3084 Cisco Networking III
The focus of this course is to learn about WANs (wide area networks) along with new technologies for improving the functionality of these networks using virtualization and automation. You will use the skills and knowledge gained from your previous networking courses in order to successfully configure, secure, verify and troubleshoot enterprise network devices. This will be achieved by incorporating your newly acquired knowledge of application programming interfaces and network configuration management and monitoring applications.

IN3094 Linux Server Administration
Demand for Linux technical expertise is growing rapidly in IT departments. Linux is being adopted by many companies for numerous services once provided by other varieties of UNIX and Microsoft Windows operating systems. The course will introduce students to the most common methods, hardware and software used to achieve a useful and secure Linux computer system. This course helps students prepare for CompTIA's Linux+ certification and the LPIC-1 certification through the study of the configurations used in the setup of Fedora Linux operating system installations.

IN3193 Database Management
This course will present the essential skills for designing and working with relational databases. Students will acquire a solid foundation in Structured Query Language (SQL) by working on a series of existing databases. Techniques for the design and implementation of databases will be presented following the principles of normalization and referential integrity.

Semester 4

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.

IN2004 Systems Security
The course provides an introduction to the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network devices to maintain the integrity, confidentiality, and availability of data and devices.

IN2104 IT Essentials II
This course provides a foundation of the basic information required for network operating system administration and other network administration tasks. The course is intended for students who want to pursue a career in information technology. The configuration and administration of both the Windows Server and Linux Fedora operating systems is studied. Also, how to troubleshoot operating system issues is practiced. This course helps students prepare for CompTIA's A+ certification.

IN4023 Virtual Systems Administration
This course will teach the students about virtualization as it combines theories and concepts with practical hands-on activities and projects that allows the student to apply the concepts learned to real world scenarios.

This course will provide the student with a working knowledge of the leading virtualization products, including Oracle VirtualBox, VMware Workstation, Microsoft Hyper-V, and VMware vSphere. In addition to learning how to install and use the products, the student will learn how to apply virtualization technology to create virtual data centers that use clusters for high availability, use management software to administer multiple host systems, implement a virtual desktop environment, and leverage cloud computing to build or extend the data center and provide disaster recovery services. By the time they finish this course the student will have a solid base in virtualization concepts and products that you can use to build your IT career.

IN4074 Internet Programming
This course provides a hands-on introduction to web application development. Students will design and implement a series of projects that reflect the current trends in web applications. Sample projects include social media sites, shopping cart systems, and content management systems. Students will gain experience with web scripting languages and enabling database-driven content.

IN6003 Systems Analysis
This course provides an overall examination of systems analysis as it applies to all phases of the Systems Development life Cycle (SDLC). The actual components of these phases, in theory and in practice, are explored in relation to completing assigned projects. The projects will involve the planning, analysis, & design of a system. The course also introduces some concepts of Critical Thinking & Problem Solving.