

PROGRAM INFORMATION

Academic Year	2024 - 2025
Credential	Ontario College Diploma
Program Delivery	Full - Time
Duration	2 Years
Length	4 Semesters
Program Code	T115 – Timmins Campus

DESCRIPTION

Turn your curiosity for how things work into a career.

With Northern's new two-year Computer Programming diploma you will be ready to create websites, apps, and improve the technology that we use in our everyday lives.

You will have developed and mastered skills for Linux server administration, database management systems like Oracle and SQL, as well as data analytics and network programming.

The first 2 semesters are offered at our Timmins Campus, offered in a hybrid format, while the final 2 semesters are offered in partnership with Algonquin College's AC Online Campus, allowing students maximum flexibility in their schedules while experiencing dynamic, real world instruction that matches the needs of the workplace.

The practical curriculum means you'll have extensive practice with programming software used in the most cutting-edge applications today. Even if you are a complete beginner in programming, this program will provide you with all the skills you need.

You'll also develop communications skills and develop strong project management and logical reasoning processes to make sure you are prepared to solve problems and create new solutions. This program prepares you with real world experience and networking through a final semester project with external partners.

CAREER OPPORTUNITIES

Graduates may work in a variety of different fields, as almost all sectors of industry require computer programmers. You may be employed as a (an):

- Software programmer
- Web programmer
- Business programmer
- Application programmer

Graduates may also find opportunities in database design and database administration.

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 computing 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 analysis and definition of software system specifications based on functional and non-functional requirements.
10. Contribute to the development, documentation, implementation, maintenance and testing of software systems by using industry standard software development methodologies based on defined specification and existing technologies/frameworks.
11. Apply one or more programming paradigms such as, object-oriented, structured or functional programming, and design principles, as well as documented requirements, to the software development process.
12. Model, design, implement, and maintain basic data storage solutions.
13. Contribute to the integration of network communications into software solutions by adhering to protocol standards.

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
CP1035	Database Management	70
IN1104	IT Essentials I	56
MA1100	Mathematics I	56
Semester 2		
CM2303	Communications for the Workplace	42
CP2004	Web Programming	56
CP2005	Intermediate Programming	70
CP2014	Database Systems	56
GN1443	Indigenous Culture and Awareness	42
IN3095	Linux Operating System Fundamentals	56
Semester 3		
CP3004	Systems Analysis and Design	56
CP3005	Network Programming	70
CP3014	Mobile Graphical Interface Programming	56
CP3015	Object Oriented Programming with Design Pattern	70
General Education Elective		42
Semester 4		
CP4002	Software Development Project	28
CP4005	Advanced Database Topics	70
CP4015	Enterprise Application Programming	70
CP4024	Programming Language Research Project	56
General Education Elective		42

PROGRAM PROGRESSION

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

Fall Intake

Sem 1: Fall 2024

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

N/A

ADMISSION REQUIREMENTS

- Ontario Secondary School Diploma (OSSD)
- Grade 12 English (C, U)
- Grade 12 Math (C, U)
- Or equivalent
- Or mature student status

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: 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

- 17 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.

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

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.

CP1035 Database Management

This course will present the essential skills for designing and working with Relational Databases. Students will become familiar with the functions of a Database Management System (DBMS) and its components in comparison with legacy systems and alternative information storage mechanisms. Students will use Structured Query Language (SQL) to create progressively complex queries on existing databases, including multi-table joins. Students will study and apply the principles of normalization and referential integrity in designing and implementing multi-table relational databases. Students will design and create databases that are maintainable, secure, and adaptable to change in business requirements.

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. Prerequisite: None.

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 for 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.

CP2004 – Web Programming

This course focuses on the basics of web programming, website design and implementation. JavaScript, HTML5, and PHP are used to explore web-based solutions to problems of increasing interactivity and complexity. Lectures are reinforced by practical assignments that encourage students to construct and maintain their own websites.

CP2005 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.

CP2014 Database Systems

Students acquire practical experience using market-leading object-relational database management systems like Oracle and MySQL. Students obtain hands-on experience with advanced engineering modeling tools along with SQL, SQL scripts and programming with Oracle's PL/SQL blocks. Database concepts covered include advanced SQL, case structures, rollup and cube operations, metadata manipulation, data storage and retrieval, security and transaction control and data warehousing. Open source database software is also explored.

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.

IN2015 Linux Operating System Fundamentals

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 set up of Fedora Linux operating system installations.

Semester 3

CP3004 Systems Analysis and Design

Guided by industry standard software engineering methodologies, students gain hands-on experience with case studies used to develop systems from inception through elaboration, construction and transition phases. Object-oriented design, modeling tools and techniques are used to produce system specifications. Project management principles are also used within team developed projects. Software methodologies discussed include the systems development life cycle (SDLC), agile approach, rational unified process (RUP) and rapid application development (RAD).

CP3005 Network Programming

Software programming in today's environment requires detailed knowledge of the underlying network topology, its implementation and programming support functions. Gaining an appreciation and perspective of this technology is imperative to developing good network programming applications. Students explore topics including the basic structure, design and layered communications models, with an emphasis on data communications, TCP/IP protocol suite, socket programming and multi-threading concepts. Labs include practical exercises in basic networking and using socket programming, along with multi-threading, in an environment rich with common networking tools for diagnosing and troubleshooting typical network programming problems.

CP3014 Mobile Graphical Interface Programming

Students explore graphical user interface programming in a mobile Android environment. Students learn how to program applications using the latest Android development tools. Topics include application architecture, interface design, network communication, and database integration.

CP3024 Object Oriented Programming with Design Pattern

Implement the best practices of object oriented program development with software design patterns. Apply UML program specifications in the Java programming language. Use embedded SQL through JDBC for developing and using data access objects. Course topics include refactoring, domain modelling, JDBC and multithreaded servlet programming. Students develop proficiency in creating, testing, debugging, deploying and documenting programs and servlets through practical application.

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.

Semester 4

CP4002 Software Development Project

Following the agile software engineering methodology, teams work with clients to analyze business needs, determine computer system requirements, model system designs, build prototypes, test code and deliver final products. Project management techniques are used to monitor progress and organize tasks. Outside of in-class requirements, teams must participate in interviews, technical reviews, presentations and the preparation of technical reports. The culmination of the course is a final presentation and technical review, followed by the delivery of the finished product.

CP4005 Advanced Database Topics

Teams and individuals explore advanced database topics: database administration (using Oracle), data governance, globalization, security and advances in database technology. Topic coverage includes business intelligence, data warehouses, data visualization, big data, NoSQL and graph databases. Database administration tasks requiring knowledge of database architecture are examined: relational vs. non-relational models, security, performance, database distribution, database sharing, backup and recovery.

CP4015 Enterprise Application Programming

With a focus on the IT Enterprise, students are introduced to the application enterprise environment using and extending the technologies learned in previous courses. Topics studied may include the Java enterprise environment (JEE), the Microsoft .NET environment, Enterprise Android programming, cloud computing, security and the corporate database repository.

CP4024 Programming Language Research Project

Learning a new programming language or framework on your own is a challenge faced by programmers on the job as part of their career. Students explore this process of self-study by applying project planning, applied research, testing, and implementation of basic and advanced concepts appropriate to the language or framework under study. Students develop major milestones and deliverables culminating in a project and reflective summary submission.

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.