Construction Engineering Technician

PROGRAM INFORMATION

Academic Year	2024 - 2025
Credential	Ontario College Diploma
Program Delivery	Full - Time
Duration	2 Years
Length	4 Semesters
Program Code	T067 (PC) - Timmins Campus

DESCRIPTION

A solid foundation for any construction project.

Thanks to Northern's two-year Construction Engineering Technician diploma, you'll graduate with the precision skills required to work in the construction and infrastructure industries.

In a program that combines architecture with civil, structural, and mechanical engineering, you'll learn how every aspect of the building process fits together – all in preparation for a rewarding career in consulting, construction, management, maintenance, and beyond. You'll learn to interpret drawings and survey data. You'll master computer-assisted drafting.

From materials and techniques to estimates, contracts and building plans you'll also gain practical experience in the working world through a work placement. Along the way, you'll improve your knowledge of the laws and building codes that will be critical to your success.

CAREER OPPORTUNITIES

Students graduating from this program may find employment in construction management, contracting, estimating, sales, government services and consulting.

VOCATIONAL LEARNING OUTCOMES

1. Develop and use strategies to enhance professional growth and ongoing learning in the construction engineering field.
2. Comply with workplace health and safety practices and procedures in accordance with current legislation and regulations.
3. Complete duties and assist in monitoring that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes, and ethical practices in the construction engineering field.
4. Carry out sustainable practices in accordance with contract documents, industry standards and environmental legislative requirements.
5. Collaborate with the project team and communicate effectively with project stakeholders to support construction projects.
6. Collect, process, and interpret technical data to produce written and graphical project-related documents.
7. Contribute to the collecting, interpreting, and applying of survey/geomatics and layout information to implement construction projects.

8. Identify and use industry-specific electronic and digital technologies to support the design and construction of projects.
9. Contribute to the resolution of technical problems related to the design and implementation of construction projects by applying engineering concepts, basic technical mathematics and building science.
10. Assist in the scheduling and monitoring of the progression of construction projects by applying principles of construction project management.
11. Assist in the preparation of accurate estimates of time, cost, quality and quantity, tenders and bids.
12. Perform quality control testing and monitoring of equipment, materials and methods involved in the implementation and completion of construction projects.
13. Apply teamwork, leadership and interpersonal skills when working individually or within multidisciplinary teams to complete work on construction projects.

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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**
AR1016	Methods and Materials I/Detailing	84
CM1323	Professional Communications	42
GN1033	Health and Safety	42
IN1224	Computer Aided Drafting (CAD) I	56
MA1100	Mathematics I	56
MI1103	Surveying Principles I	42

Semester 2		
AR2063	Construction Management and Law	42
AR4213	Methods and Materials II	42
CM2303	Communications for the Workplace	42
EN1016	Engineering Materials and Testing	84
GN1443	Indigenous Culture and Awareness	42
IN2353	CAD II for Construction Engineering	42
SU3010	Municipal Engineering	28

Semester 3		
AR2024	Estimating I	56
AR3016	Construction Management Placement	84
CV2213	Plans Examination and Building Studies	42
General Education Elective		42
General Education Elective		42
SU2003	Plane Survey I	42

Semester 4		
AR2023	Project Documentation	42
AR2206	Ontario Building Code II	84
AR3004	Estimating II	56
AR3034	Mechanical/Electrical Installations I	56
MA6023	Statistics	42
SU1003	GIS	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
Sem 3: Fall 2025

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Sem 4: Winter 2026

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) (MCT4C preferred; MAP4C is accepted with a minimum GPA of 60%)
- Grade 12 Physics (C, U) recommended
- 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: 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

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.

Tina Thibault-Lambert, Program Coordinator
Tel: 705-235-3211 ext. 2298
Email: lambertt@northern.on.ca

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COURSE DESCRIPTIONS

Semester 1

AR1016 Methods and Materials I/Detailing
This course describes in detail the materials and construction techniques required for residential construction. Topics include sustainable design, soils, and foundations, framing and the building envelope. Various options are discussed for each topic. Students will also use sketching and drafting techniques to complete various construction details.

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.

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.

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 commands.

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.

MI1103 Surveying Principles I
This course is an introduction to the basic principles of Plane Surveying. The theory and use of theodolites/total stations, steel tapes and levels will be covered. Basic surveying calculations for direction, coordinates and area will be included.

Semester 2

AR2063 Construction Management and Law
Administration claims and disputes are a fact of life in the construction industry. Improper administration and legal disputes lead to disruptions and uncertainties affecting the ability of the contractor to carry on business. This course will assist the student to understand the duties, rights and responsibilities of a construction manager.

AR4213 Methods and Materials II
This course is designed to complement the Methods and Materials I/Detailing course at an Advanced level, and to prepare the students for the construction industry.

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.

EN1016 Engineering Materials and Testing
This course is primarily a laboratory course in concrete theory and soil mechanics. Ready mixed concrete is the most widely used construction material in the world. It is extremely versatile, strong, and economical in comparison to other materials. It lends itself well to a vast array of applications in construction. In addition, its attributes relative to sustainability are relevant to the entire construction industry. Concrete principles and theory constitute the first portion of this course.
The study of soil mechanics is important since soil is the most readily available construction material, and all structures must be supported on soil or rock. The student will learn the theory on which the most common laboratory and field tests are based and perform related tests.

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.

IN2353 CAD II for Construction Engineering
In this course, students will engage in a more applied approach to using Computer Drafting software. With a combination of theory and applicable practice, the student will learn the process of preparing Architectural, Civil and Structural Construction Drawings. Lessons will familiarize the students on Design Principles and procedures and prepare them to complete the term project.

SU3010 Municipal Engineering
Municipal Engineering involves the study of Engineering Surveys, Construction Surveys, blueprint reading and the design and construction of municipal infrastructure. Emphasis will be placed on sustainable urban infrastructure design and construction practices.

Semester 3

AR2024 Estimating I
Students are introduced to proper measurement techniques of construction items and components found in commercial and municipal projects. Emphasis is placed on accuracy of measurement, quantity take-off concept, sound estimating principles, and construction materials. Appropriate software solutions will be applied.

AR3016 Construction Management Placement
Whether one is entering the field of building and construction management for the first time or is an established pro, there is always something new and exciting that can be learned from those in the industry. Construction Management II is a placement program that makes industry the classroom, and placement host the associate instructor.

CV2213 Plans Examination and Building Studies
Students review existing construction documents, research materials and techniques and gain knowledge on how to find information in both the graphical and written parts of a tendering set.

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.

SU2003 Plane Survey I
Plane Survey I is a continuation of Survey Principles. A "hands-on" project-oriented approach is emphasized, wherein survey principles are practiced in the field. Projects will include operating an automatic level to run a level loop and operating a total station to measure the distances and interior angles of a survey traverse. Emphasis will be placed on maintaining proper field notes.

Semester 4

AR2023 Project Documentation
This Project Documentation course has been designed to equip professionals in the construction industry with the essential knowledge and skills required for the effective creation, management, and utilization of project documentation. This course covers various critical aspects, including the process of tendering a construction project, an examination of the documents integral to a standard construction contract, and key elements of project planning and scheduling. Throughout the course, students will gain practical insights into using the National Master Specification NMS, review the stipulated price contract outlined in CCDC2, understand the process of Contract Administration activities, understand Construction Tender procedures, apply Ontario specifications OPSS and OPSD for contract administration, utilize MS Project for creating construction project schedules, and using MS Excel for managing Construction Progress Payments and Project Forecasting. Pre-requisites: AR1016 Methods and Materials I/Detailing

AR2206 Ontario Building Code II
This course addresses the requirements of residential plans examination and code interpretation with reference to Part-9 of the Ontario Building Code. This program will give the students the basic level of knowledge and skills required to assist in the plans examination, design, and inspection of buildings

constructed under Part-9 of the Ontario Building Code. Pre-requisites: AR1016 Methods and Materials I/Detailing

AR3004 Estimating II
The purposes of this course are to give beginning estimators an understanding of the fundamental principles of estimating, provide beginning estimators with practical experience, and to give beginning estimators a basic understanding of how to use spreadsheets to increase their estimating productivity and reduce errors. Pre-requisites: AR2024 Estimating I

AR3034 Mechanical/Electrical Installations I
The course in Mechanical and Electrical Installations I introduce the student to basic Mechanical and Electrical Systems in the Commercial construction industry. In this course we will cover such topics as HVAC, piping, plumbing equipment and systems, Fire Protection, Introduction to Electricity, Communications, Life Safety, Security Systems, Electrical Design, Electrical Wiring, Lighting Design and Sustainable Design.

MA6023 Statistics
This course will cover such topics as: Measures of Central and Dispersion Tendencies; Distributions (Frequency, Probability, Binomial and Normal); Quality Process Control; Correlation and Regression Models and Hypothesis Testing. This course will have applications to various fields in engineering while using Microsoft Excel. Pre-requisites: MA1100 Mathematics I

SU1003 GIS
Gain an understanding of GIS fundamental concepts and terminology including the role of GIS in business, government, surveying, and natural resources. Learn how to create and manipulate data using GIS. Examine the collection, management, analysis and presentation of spatial data, concepts of database systems, data modeling and digital mapping.