



Construction Engineering Technician Program Standard

**The approved program standard for
Construction Engineering Technician
program of instruction leading to an
Ontario College Diploma delivered by
Ontario Colleges of Applied Arts and
Technology (MTCU funding code 58200)**

Ministry of Advanced Education and Skills Development
July 2016

Permission to Reproduce

Permission is hereby granted to the following institutions to reproduce this document, in whole or in part, in print or by electronic means, for the following specific purposes, subject to the conditions that follow.

1. By an Ontario college of applied arts and technology for the purposes of implementation of the program standard within a college program, including for the purpose of informing students, potential students, program advisory committees or others about programs of study.
2. By an educational institution or school, for the purpose of informing prospective college students about programs of study at Ontario colleges of applied arts and technology.

Conditions:

1. Every reproduction must be marked “© 2016, Queen’s Printer for Ontario” at the beginning of the document or any part of it that is reproduced.
2. No other uses may be made of the document.
3. The document may not be reproduced for sale.
4. The Ministry may revoke the permission to reproduce at any time.

For permission to copy this document, in whole or in part, for other purposes or by other institutions, please contact:

Ministry of Advanced Education and Skills Development
Programs Branch, Program Standards and Evaluation Unit

psu@ontario.ca

Inquiries regarding specific Construction Engineering Technician programs offered by colleges of applied arts and technology in Ontario should be directed to the relevant college.

© 2016, Queen’s Printer for Ontario

ISBN 978-1-4606-8541-9

Acknowledgements

The Ministry of Advanced Education and Skills Development acknowledges with thanks the significant contribution of the many individuals and organizations who participated in the development of this program standard. In particular, the Ministry of Advanced Education and Skills Development would like to acknowledge the important roles of

- all individuals and organizations who participated in the consultations;
- the faculty, co-ordinators and deans of the Construction Engineering Technician (Ontario College Diploma) programs for their assistance throughout the project,
- the project officers who led the development of the vocational standard, Christine Foster, Program Standards Project Officer and Louise Campagna, Program Standards Project Officer

Table of Contents

I. Introduction	1
Development of System-Wide Program Standards.....	1
Program Standards.....	1
The Expression of Program Standards as Vocational Learning Outcomes.....	2
The Presentation of the Vocational Learning Outcomes.....	2
The Development of a Program Standard.....	2
Updating the Program Standard	3
II. Vocational Standard	4
Preamble.....	4
Synopsis of the Vocational Learning Outcomes.....	6
The Vocational Learning Outcomes.....	7
III. Essential Employability Skills	21
Context.....	21
Skill Categories	21
Application and Implementation	22
IV. General Education Requirement	24
Requirement	24
Purpose.....	24
Themes	25

I. Introduction

This document is the Program Standard for the Construction Engineering Technician program of instruction leading to an Ontario College Diploma delivered by Ontario colleges of applied arts and technology (MTCU funding code 58200).

Development of System-Wide Program Standards

In 1993, the Government of Ontario initiated program standards development with the objectives of bringing a greater degree of consistency to college programming offered across the province, broadening the focus of college programs to ensure graduates have the skills to be flexible and to continue to learn and adapt, and providing public accountability for the quality and relevance of college programs.

The Program Standards and Evaluation Unit of the Ministry of Advanced Education and Skills Development have responsibility for the development, review and approval of system-wide standards for programs of instruction at Ontario colleges of applied arts and technology.

Program Standards

Program standards apply to all similar programs of instruction offered by colleges across the province. Each program standard for a postsecondary program includes the following elements:

- **Vocational standard** (the vocationally specific learning outcomes which apply to the program of instruction in question),
- **Essential employability skills** (the essential employability skills learning outcomes which apply to all programs of instruction); and
- **General education requirement** (the requirement for general education in postsecondary programs of instruction).

Collectively, these elements outline the essential skills and knowledge that a student must reliably demonstrate in order to graduate from the program.

Individual colleges of applied arts and technology offering the program of instruction determine the specific program structure, delivery methods and other curriculum matters to be used in assisting students to achieve the outcomes articulated in the standard. Individual colleges also determine whether additional local learning outcomes will be required to reflect specific local needs and/or interests.

The Expression of Program Standards as Vocational Learning Outcomes

Vocational learning outcomes represent culminating demonstrations of learning and achievement. They are not simply a listing of discrete skills, nor broad statements of knowledge and comprehension. In addition, vocational learning outcomes are interrelated and cannot be viewed in isolation of one another. As such, they should be viewed as a comprehensive whole. They describe performances that demonstrate that significant integrated learning by graduates of the program has been achieved and verified.

Expressing standards as vocational learning outcomes ensures consistency in the outcomes for program graduates, while leaving to the discretion of individual colleges, curriculum matters such as the specific program structure and delivery methods.

The Presentation of the Vocational Learning Outcomes

The **vocational learning outcome** statements set out the culminating demonstration of learning and achievement that the student must reliably demonstrate before graduation.

The **elements of the performance** for each outcome define and clarify the level and quality of performance necessary to meet the requirements of the vocational learning outcome. However, it is the performance of the vocational learning outcome itself on which students are evaluated. The elements of performance are indicators of the means by which the student may proceed to satisfactory performance of the vocational learning outcome. The elements of performance do not stand alone but rather in reference to the vocational learning outcome of which they form a part.

The Development of a Program Standard

In establishing the standards development initiative, the Government determined that all postsecondary programs of instruction should include vocational skills coupled with a broader set of essential skills. This combination is considered critical to ensuring that college graduates have the skills required to be successful both upon graduation from the college program and throughout their working and personal lives.

A program standard is developed through a broad consultation process involving a range of stakeholders with a direct interest in the program area, including employers, professional associations, universities, secondary schools and program graduates working in the field, in addition to students, faculty and administrators at the colleges themselves. It represents a consensus of

participating stakeholders on the essential learning that all program graduates should have achieved.

Updating the Program Standard

The Ministry of Advanced Education and Skills Development will undertake regular reviews of the vocational learning outcomes for this program to ensure that the Construction Engineering Technician Program Standard remains appropriate and relevant to the needs of students and employers across the Province of Ontario. To confirm that this document is the most up-to-date release, please contact the ministry:

psu@ontario.ca

II. Vocational Standard

All graduates of Construction Engineering Technician programs have achieved the thirteen vocational learning outcomes (VLOs) listed in the following pages, in addition to achieving the essential employability outcomes and meeting the general education (GE) requirement.

Preamble

Graduates of the Construction Engineering Technician program carry out technical functions related to a broad range of *construction projects** within government and the residential and industrial, commercial and institutional (ICI) construction sectors.

As members of the multi-disciplinary team, graduates work collaboratively with a range of *project stakeholders** to contribute to the accomplishment of construction project goals in accordance with project plans, workplace health and safety practices, *sustainability practices** and all applicable laws, codes, industry standards and ethical practices.

Through the application of science and engineering concepts, *basic technical mathematics** and the integration of industry-specific technologies, graduates are able to contribute to the planning and implementation of *construction projects**. Graduates collect, process and interpret *survey/geomatics, layout** and technical information and produce project documents to support *construction projects**. Graduates assist in the scheduling and monitoring of projects and perform *quality control** testing of equipment and materials.

Graduates of Construction Engineering Technician programs work in a range of employment settings including building developers, general contractors, materials suppliers, government building departments and engineering and construction offices.

Graduates are typically employed in entry-level positions in the field as materials testing and construction *quality control** technicians, cost estimators, building inspectors or technical representatives.

Graduates of the Construction Engineering Technician program develop and use strategies to enhance professional growth and ongoing learning in the construction field.

There may be opportunities for graduates to pursue further educational and occupational qualifications; through articulation agreements between the colleges, universities or professional organizations. Graduates may be granted credits towards a degree and certification. Students should contact individual

colleges and professional associations, such as the Ontario Association of Certified Engineering Technicians and Technologists (OACETT).

*See Glossary

Endnote: The Ontario Council on Articulation and Transfer (ONCAT) maintains the provincial postsecondary credit transfer portal, ONTransfer.

Synopsis of the Vocational Learning Outcomes

Construction Engineering Technician (Ontario College Diploma)

The graduate has reliably demonstrated the ability to

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 in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the construction engineering field.
4. carry out *sustainability practices** in accordance with contract documents, industry standards and environmental legislative requirements.
5. collaborate with and facilitate communication among *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**.

*See Glossary

Note: The learning outcomes have been numbered as a point of reference; numbering does not imply prioritization, sequencing, nor weighting of significance.

The Vocational Learning Outcomes

1. The graduate has reliably demonstrated the ability to

develop and use strategies to enhance professional growth and ongoing learning in the construction engineering field.

Elements of the Performance

- keep abreast of changes in the construction engineering field
- use appropriate self-management techniques (e.g., time management, stress management)
- identify the need for self-evaluation and explain the importance of lifelong learning
- seek out and act upon constructive feedback to enhance work performance
- seek assistance to resolve problems beyond own knowledge and skills
- identify the roles and benefits of professional organizations and certification (e.g., Ontario Association of Certified Engineering Technicians and Technologists (OACETT))
- develop a plan to keep pace with and adapt to changing workforce demands and trends, as well as technological advances in the construction engineering field
- identify training courses, workshops and mentoring opportunities to enhance employment in the construction engineering field
- identify strategies for building a professional network and for participating in professional associations and activities

2. The graduate has reliably demonstrated the ability to
comply with workplace health and safety practices and procedures in
accordance with current legislation and regulations.

Elements of the Performance

- identify employee rights and responsibilities associated with health and safety practices
- conduct self in a safe manner and in accordance with the requirements of work situation
- participate in health and safety training
- analyze a workplace setting and initiate action to handle unsafe or hazardous situations or materials
- ensure that worksite has appropriate health and safety signs
- inform site visitors and others related to health and safety practices
- carry out prescribed safety checks
- comply with all requirements of the current Ontario Health and Safety Act, 1990
- adhere to and maintain all required health and safety training and certification such as First Aid, Workplace Hazardous Materials Information System (WHMIS), Working at Heights and Confined Space Safety training where appropriate
- comply with and monitor requirements of the current Ontario Health and Safety Act, 1990
- select, wear and train others in the use of Personal Protective Equipment (PPE)
- verify excavation work sites have utility locates and that the guidelines for excavation are followed
- encourage and support a culture of safety in the workplace

3. The graduate has reliably demonstrated the ability to complete duties in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the construction engineering field.

Elements of the Performance

- identify relevant legislation and bylaws that apply in specific situations
- assist in the review and administration of contracts
- identify different types and elements of contracts, contract offers and acceptances
- read and interpret relevant building codes i.e., National and Ontario Building Codes
- assist in the implementation of project specifications and drawings
- review at the correct times the required agencies' approvals for *construction projects**
- identify how and where to access the most current information regarding codes and standards
- identify how current legislation, codes and standards and its regulations govern *construction projects**
- adhere to current legislation, standards, codes and bylaws that regulate the equipment and materials used in *construction projects**
- identify codes of ethics of the applicable provincial association, societies or workplaces
- apply ethical reasoning to social and contractual issues that evolve when implementing a *construction project**
- identify and adhere to labour-management principles and practices
- work effectively within the context of collective agreements

***See Glossary**

4. The graduate has reliably demonstrated the ability to carry out *sustainability practices** in accordance with contract documents, industry standards and environmental legislative requirements.

Elements of the Performance

- identify legislative requirements for environmental compliance
- apply the principles of sustainable development, combining environmental stewardship and economic performance in project work
- identify economic, social and environmental impacts of *construction projects**
- contribute to environmental site assessments and implement identified remediation strategies
- identify various types of contamination and environmental risks e.g., groundwater contamination, soil erosion, pollutants, noise pollution, etc.
- identify *sustainability practices** across the building lifecycle and rehabilitation/renewal practices
- use recycled materials when appropriate and alternative resources to reduce impact on environment
- minimize waste and use appropriate waste management strategies
- identify technologies with a lower carbon footprint, e.g., LEED processes
- collect relevant material for green certification
- assist in the analysis and design of advanced and alternate building systems and strategies that promote sustainable, healthy and environmentally responsible practices

*See Glossary

5. The graduate has reliably demonstrated the ability to collaborate with and facilitate communication among *project stakeholders** to support *construction engineering projects* *.

Elements of the Performance

- identify the disciplines involved in the planning, designing and implementation of *construction projects**, i.e., architecture and surveying along with structural, mechanical, electrical and environmental engineering
- identify the role performance expectations for various disciplines involved in *construction projects**
- describe own role as a member of a multi-disciplinary team to plan, implement and complete *construction projects**
- identify the rights, roles and responsibilities of *project stakeholders** associated with *construction projects**
- obtain assistance and clarification from the appropriate specialist to resolve problems
- use appropriate interpersonal skills using terminology suited to the situation and *project stakeholders**
- review documents and drawings from other disciplines
- participate as a team member during project-related meetings
- report in written, graphics and oral form the results of project-related meetings as required
- use communication technologies to facilitate clear and concise communication among project stakeholders e.g., email, file transfer etc.

*See Glossary

6. The graduate has reliably demonstrated the ability to collect, process and interpret technical data to produce written and graphical project-related documents.

Elements of the Performance

- collect, interpret and verify data by using systematic approaches in accordance with recognized standards and practices
- contribute to the identification and clarification of the information needs of the *project stakeholders**
- read and interpret construction documents including drawings, specifications, tenders and *survey/geomatics** data
- prepare and modify documents* according to established criteria and industry standards e.g., Canadian Construction Documents Committee (CCDC)
- prepare sketches and drawings in accordance with industry standards, formats, symbols and reference systems
- produce plans, drawings, details and presentation graphics using computer-assisted design (CAD) software
- record modifications to graphics to reflect as-built conditions
- use industry standard formats to prepare project-related written reports, correspondence, estimates and other documents for presentation to a variety of *project stakeholders**
- assist in the retrieval and presentation of construction project-related data to *project stakeholders**
- prepare project-related information in oral and written formats for a variety of *construction projects**
- keep ongoing, accurate project records, minutes and accounts of construction projects* according to established formats, policies and procedures
- use collected and stored information accurately and effectively to assist in decision making, reporting and *quality control**
- apply principles of information management to project records
- keep current, clear and accurate project records, minutes, accounts and project-evaluation records
- use and share project data in accordance with relevant privacy legislation, guidelines and data sharing agreements

*See Glossary

7. The graduate has reliably demonstrated the ability to contribute to the collecting, interpreting and applying of *survey/geomatics and layout information** to implement *construction projects**.

Elements of the Performance

- use appropriate strategies for the collection of *survey/geomatics and layout information**
- operate and check standard survey instruments and GIS and GPS software and hardware to layout a *construction project**
- ensure that *survey and layout information** collected are within expected accuracy parameters
- implement a construction survey and layout, including line, site, elevation and grade controls
- use and interpret aerial photographs, satellite and digital images and Global Navigation Satellite System (GNSS) data
- visualize, manipulate and analyze spatial data using a variety of data sources and technologies
- select and use appropriate methods for the collection and storage of *survey and layout information**
- identify potential and actual relationships between *construction projects** and their surrounding environment
- use check surveys systematically to evaluate collected data
- draw conclusions from geotechnical data from the site

*See Glossary

8. The graduate has reliably demonstrated the ability to identify and use industry-specific electronic and digital technologies to support the design and construction of projects.

Elements of the Performance

- keep abreast of changes in technology that affect construction engineering (e.g., Imaging, heavy equipment machine control systems, mobile integration, cloud accessibility and Drone technologies)
- identify how technology and technological change affect the construction industry
- use electronic systems to store and retrieve digital information
- use industry-specific electronic and digital technologies for the design of construction projects (e.g., Auto-CAD, Civil 3D, Building Information Modeling (BIM), 3D laser scanning technologies, etc.)
- use communication technologies to access and share information
- apply knowledge of computers and application software to solving construction problems
- use electronic technology to assist in various phases of *construction projects**
- collect, organize and file project-related information using paper-based and computerized techniques
- use computers and appropriate software to contribute to the organization of project related data

*See Glossary

9. The graduate has reliably demonstrated the ability to 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**.

Elements of the Performance

- identify the technical steps used to design, layout and construct projects
- participate in the resolution of technical problems in the project design, layout and construction by applying systematic approaches to problem solving and decision making
- apply mathematical, engineering and scientific concepts to the design, layout and construction of *construction projects**
- use mathematical and scientific terminology correctly in written and oral communication
- review the technical criteria used in the design, layout and construction of *construction projects**
- contribute to the analysis and documentation of building structures
- apply knowledge of building materials, methods, building envelope and environmental controls to solve building construction problems
- seek assistance to resolve situations in the analysis, design, or *construction projects** that are beyond the scope of the technician's training, knowledge or legal authority

*See Glossary

10. The graduate has reliably demonstrated the ability to assist in the scheduling and monitoring of the progression of *construction projects** by applying principles of construction project management.

Elements of the Performance

- participate as a member of the project team to establish the scope of the project in consultation with the *project stakeholders**
- identify the phases of the project and their component activities
- provide technical information for the development a project schedule
- update schedule with actual progress and forecast both schedule and costs to track project execution
- observe, record, monitor and report work activity
- contribute to the identification and resolution of problems related to materials, scheduling, resources and budgets in order to complete projects
- assist in the monitoring of the financial resources, human resources and timelines used in *construction projects**
- use organizational and time-management strategies to support *construction projects**
- develop a project schedule using project management tools and/or methods e.g., MS Project, Critical path, logic network or Gantt Chart
- use computers and scheduling software to contribute to the organization of project-related data
- complete project records including equipment and material inventories, time sheets, projected and actual costs records and quality-assurance records
- report deficiencies, problems with adherence to schedule and noncompliance with contract documents
- report time, cost and quality deviations

*See Glossary

11. The graduate has reliably demonstrated the ability to assist in the preparation of accurate estimates of time, cost, quality and quantity, tenders and bids.

Elements of the Performance

- contribute to the preparation of accurate cost estimates including preliminary, detailed, updated and actual costs
- contribute to labour-production-time studies to produce accurate unit prices of construction activities
- measure and categorize quantities using accepted methods of measurement such as the Canadian Institute of Quantity Surveyors (CIQS) standard methods of measurement
- collect and categorize data for cost control
- seek competent expert advice and analysis where inexperience may hinder accuracy

12. The graduate has reliably demonstrated the ability to perform *quality control** testing and monitoring of equipment, materials and methods involved in the implementation and completion of *construction projects**.

Elements of the Performance

- review the specifications, limitations, use and safety aspects of equipment and construction materials
- test and calibrate a variety of equipment and facilitate repairs in order to complete various project tasks and to ensure equipment accuracy and operational safety
- perform quality-assurance sampling and testing
- interpret test results and take corrective action if necessary
- record, plot and assist in the interpretation of the results of quality-assurance sampling and testing
- monitor and report deficiencies and non-compliance with project specifications to appropriate team member
- monitor that equipment is used in own work according to manufacturer's recommended directions and relevant legislation
- monitor the proper handling and use of materials
- perform quality-assurance sampling and testing
- use reports, minutes, field data and field notes to monitor *construction projects**
- maintain industry certifications for *quality control** testing where relevant

*See Glossary

13. The graduate has reliably demonstrated the ability to
apply teamwork, leadership and interpersonal skills when working
individually or within multidisciplinary teams to complete work on
*construction projects**.

Elements of the Performance

- take initiative and work independently with minimal supervision
- work as an effective team player to complete tasks while promoting a positive work environment
- use effective time-management and organizational techniques to prioritize tasks and to accomplish goals
- provide technical assistance to less experienced members of the team
- follow basic business and administrative principles and practices
- take responsibility for one's job related performance, as an individual and as a member of a multidisciplinary team
- contribute to the performance review of self and others
- provide motivation and positive feedback to others to accomplish tasks and goals
- use conflict resolution skills in work situations

*See Glossary

Glossary

basic technical mathematics – The application of foundational mathematical concepts to solve engineering problems. Basic technical math includes models, geometric representations or formula, elementary algebraic equations, descriptive statistical methods and mathematical reasoning (adapted from National Technology Benchmarks, 2014).

building science – Systematic theory and research related to construction work, building materials, methods, building envelope and environmental controls including physics, statics, mechanics and strength characteristics of materials.

construction projects – Includes the pre-construction, construction and post-construction phases of building construction projects. Construction projects may include a range of projects within the residential and industrial, commercial and institutional (ICI) construction sectors.

project stakeholders – Any group or individual who has a vested interest in the project including the clients, architects, quantity surveyors, engineers, sub-contractors, tradespersons, suppliers, management team, government authorities, building operators, building users and the public.

quality control – The control and improvement of construction projects by sampling, testing, calibrating, monitoring, correcting and enhancing performance. Quality control is based on the potential, specifications and limitations of materials, equipment, methods, human resources and environmental benefit/deficit.

survey/geomatics and layout information – A field of scientific and technical activities which uses an integrated approach to the measurement, analysis, management, storage and display of spatially referenced data; construction information includes construction layouts and levels, field data and survey/geomatics information relevant to construction projects.

sustainability practices – Includes the decisions and activities that apply the concepts of environmental, economic and social sustainability and lifecycle assessment into the planning, design, operation and evaluation of construction projects (adapted from The Canadian Society of Civil Engineering, *“Entrusted to Our Care” Guidelines for Sustainable Development*, 2007).

III. Essential Employability Skills

All graduates of the Construction Engineering Technician program of instruction must have reliably demonstrated the essential employability skills learning outcomes listed on the following pages, in addition to achieving the vocational learning outcomes and meeting the general education requirement.

Context

Essential Employability Skills (EES) are skills that, regardless of a student's program or discipline, are critical for success in the workplace, in day-to-day living and for lifelong learning.

The teaching and attainment of these EES for students in, and graduates from, Ontario's colleges of applied arts and technology are anchored in a set of three fundamental assumptions:

- these skills are important for every adult to function successfully in society today;
- our colleges are well equipped and well positioned to prepare graduates with these skills;
- these skills are equally valuable for all graduates, regardless of the level of their credential, whether they pursue a career path, or they pursue further education.

Skill Categories

To capture these skills, the following six categories define the essential areas where graduates must demonstrate skills and knowledge.

- Communication
- Numeracy
- Critical Thinking & Problem Solving
- Information Management
- Interpersonal
- Personal

Application and Implementation

In each of the six skill categories, there are a number of defining skills, or sub skills, identified to further articulate the requisite skills identified in the main skill categories. The following chart illustrates the relationship between the skill categories, the defining skills within the categories and learning outcomes to be achieved by graduates from all postsecondary programs of instruction that lead to an Ontario College credential.

EES may be embedded in General Education or vocational courses, or developed through discrete courses. However these skills are developed, all graduates with Ontario College credentials must be able to reliably demonstrate the essential skills required in each of the six categories.

Skill Category	Defining Skills: Skill areas to be demonstrated by graduates:	Learning Outcomes: The levels of achievement required by graduates. The graduate has reliably demonstrated the ability to:
Communication	<ul style="list-style-type: none"> • Reading • Writing • Speaking • Listening • Presenting • Visual literacy 	<ol style="list-style-type: none"> 1. communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. 2. respond to written, spoken or visual messages in a manner that ensures effective communication.
Numeracy	<ul style="list-style-type: none"> • Understanding and applying mathematical concepts and reasoning • Analyzing and using numerical data • Conceptualizing 	<ol style="list-style-type: none"> 1. execute mathematical operations accurately.
Critical Thinking & Problem Solving	<ul style="list-style-type: none"> • Analyzing • Synthesizing • Evaluating • Decision making • Creative and innovative thinking 	<ol style="list-style-type: none"> 1. apply a systematic approach to solve problems. 2. use a variety of thinking skills to anticipate and solve problems.

Skill Category	Defining Skills: Skill areas to be demonstrated by graduates:	Learning Outcomes: The levels of achievement required by graduates. The graduate has reliably demonstrated the ability to:
Information Management	<ul style="list-style-type: none"> • Gathering and managing information • Selecting and using appropriate tools and technology for a task or a project • Computer literacy • Internet skills 	<ol style="list-style-type: none"> 1. locate, select, organize and document information using appropriate technology and information systems. 2. analyze, evaluate and apply relevant information from a variety of sources.
Interpersonal	<ul style="list-style-type: none"> • Teamwork • Relationship management • Conflict resolution • Leadership • Networking 	<ol style="list-style-type: none"> 1. show respect for the diverse opinions, values, belief systems and contributions of others. 2. interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
Personal	<ul style="list-style-type: none"> • Managing self • Managing change and being flexible and adaptable • Engaging in reflective practices • Demonstrating personal responsibility 	<ol style="list-style-type: none"> 1. manage the use of time and other resources to complete projects. 2. take responsibility for one's own actions, decisions and their consequences.

IV. General Education Requirement

All graduates of the Construction Engineering Technician program must have met the general education requirement described on the following pages, in addition to achieving the vocational and essential employability skills learning outcomes.

Requirement

The General Education Requirement for programs of instruction is stipulated in the Credentials Framework (Appendix A in the Minister's Binding Policy Directive Framework for Programs of Instruction).

In programs of instruction leading to either an Ontario College Diploma or an Ontario College Advanced Diploma, it is required that graduates have been engaged in learning that exposes them to at least one discipline outside their main field of study and increases their awareness of the society and culture in which they live and work. This will typically be accomplished by students taking 3 to 5 courses (or the equivalent) designed discretely and separately from vocational learning opportunities.

This general education learning would normally be delivered using a combination of required and elective processes.

Purpose

The purpose of General Education in the Ontario college system is to contribute to the development of citizens who are conscious of the diversity, complexity and richness of the human experience; who are able to establish meaning through this consciousness; and who, as a result, are able to contribute thoughtfully, creatively and positively to the society in which they live and work.

General Education strengthens students' essential employability skills, such as critical analysis, problem solving and communication, in the context of an exploration of topics with broad-based personal and/or societal importance.

Themes

The themes listed below will be used to provide direction to colleges in the development and identification of courses that are designed to fulfil the General Education Requirement for programs of instructions.

Each theme provides a statement of Rationale and offers suggestions related to more specific topic areas that could be explored within each area. These suggestions are neither prescriptive nor exhaustive. They are included to provide guidance regarding the nature and scope of content that would be judged as meeting the intent and overall goals of General Education.

1. Arts in Society:

Rationale:

The capacity of a person to recognize and evaluate artistic and creative achievements is useful in many aspects of his/her life. Since artistic expression is a fundamentally human activity, which both reflects and anticipates developments in the larger culture, its study will enhance the student's cultural and self-awareness.

Content:

Courses in this area should provide students with an understanding of the importance of visual and creative arts in human affairs, of the artist's and writer's perceptions of the world and the means by which those perceptions are translated into the language of literature and artistic expression. They will also provide an appreciation of the aesthetic values used in examining works of art and possibly, a direct experience in expressing perceptions in an artistic medium.

2. Civic Life:

Rationale:

In order for individuals to live responsibly and to reach their potential as individuals and as citizens of society, they need to understand the patterns of human relationships that underlie the orderly interactions of a society's various structural units. Informed people will have knowledge of the meaning of civic life in relation to diverse communities at the local, national and global level and an awareness of international issues and the effects of these on Canada, as well as Canada's place in the international community.

Content:

Courses in this area should provide students with an understanding of the meaning of freedoms, rights and participation in community and public life, in addition to a working knowledge of the structure and function of various levels of government (municipal, provincial, national) in a Canadian and/or in an international context. They may also provide an historical understanding of major political issues affecting relations between the various levels of government in Canada and their constituents.

3. Social and Cultural Understanding:

Rationale:

Knowledge of the patterns and precedents of the past provide the means for a person to gain an awareness of his or her place in contemporary culture and society. In addition to this awareness, students will acquire a sense of the main currents of their culture and that of other cultures over an extended period of time in order to link personal history to the broader study of culture.

Content:

Courses in this area are those that deal broadly with major social and cultural themes. These courses may also stress the nature and validity of historical evidence and the variety of historical interpretation of events. Courses will provide the students with a view and understanding of the impact of cultural, social, ethnic or linguistic characteristics.

4. Personal Understanding:

Rationale:

Educated people are equipped for life-long understanding and development of themselves as integrated physiological and psychological entities. They are aware of the ideal need to be fully functioning persons: mentally, physically, emotionally, socially, spiritually and vocationally.

Content:

Courses in this area will focus on understanding the individual: his or her evolution; situation; relationship with others; place in the environment and universe; achievements and problems; and his or her meaning and purpose. They will also allow students the opportunity to study institutionalized human social behaviour in a systematic way. Courses fulfilling this requirement may be oriented to the study of the individual within a variety of contexts.

5. Science and Technology:

Rationale:

Matter and energy are universal concepts in science, forming a basis for understanding the interactions that occur in living and non-living systems in our universe. Study in this area provides an understanding of the behaviour of matter that provides a foundation for further scientific study and the creation of broader understanding about natural phenomena.

Similarly, the various applications and developments in the area of technology have an increasing impact on all aspects of human endeavour and have numerous social, economic and philosophical implications. For example, the operation of computers to process data at high speed has invoked an interaction between machines and the human mind that is unique in human history. This and other technological developments have a powerful impact on how we deal with many of the complex questions in our society.

Content:

Courses in this area should stress scientific inquiry and deal with basic or fundamental questions of science rather than applied ones. They may be formulated from traditional basic courses in such areas of study as biology, chemistry, physics, astronomy, geology or agriculture. As well, courses related to understanding the role and functions of computers (e.g., data management and information processing) and assorted computer-related technologies should be offered in a non-applied manner to provide students with an opportunity to explore the impact of these concepts and practices on their lives.