
# Building Renovation Technology Program Standard

**The approved program standard for Building Renovation Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology (MTCU funding code 67600)**

Ministry of Advanced Education and Skills Development
July 2016

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ISBN 978-1-4606-8549-5

# 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 Building Renovation Technology (Ontario College Advanced 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

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# I. Introduction

This document is the Program Standard for the Building Renovation Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario colleges of applied arts and technology (MTCU funding code 67600).

## 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 Building Renovation Technology 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 of Advanced Education and Skills Development at the address or email address noted on the inside cover page.

# II. Vocational Standard

All graduates of Building Renovation Technology programs have achieved the fourteen 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 Building Renovation Technology program, plan, implement and lead building, renovation and restoration projects and associated technical and business operations related to a range of building projects within the residential and light commercial sectors of the construction industry.

As leaders of the building and renovation team, graduates facilitate the collaboration and interaction among a range of tradespersons and *project stakeholders** in order to complete *building construction and renovation projects** in accordance with project plans, workplace health and safety practices, *sustainability practices** and all applicable laws, building codes, industry standards and ethical practices. Graduates employ effective leadership, supervision and interpersonal skills to support the building and renovation team.

Graduates apply principles of green building, *advanced technical mathematics** and *building science** to analyze and solve technical problems related to the design and implementation of *building construction and renovation projects**.

Graduates review and analyze building designs, construction drawings and specifications and produce technical sketches and documents to direct building processes and are adept at using technologies to obtain, analyze, organize and communicate building construction and renovation information.

Graduates of the Building Renovation Technology program select, maintain and safely operate hand and power tools and use “hands-on” skills to complete and lead *building construction and renovation projects**. Graduates complete all building stages, from site layout and footings to the application of interior and exterior finishes, in accordance with blueprint specifications.

Applying principles and tools of project management, graduates schedule, monitor and evaluate the progression of *building construction and renovation projects**.

Graduates of the Building Renovation Technology program design and implement business strategies to develop building, renovation and re-development enterprises.

Graduates are typically employed in entry-level positions in the residential and light commercial sectors of the construction industry as custom home builders and renovators, carpenters, general contractors, home and building inspectors, estimators, energy efficiency and green/sustainable builders and project managers.

Graduates of the Building Renovation Technology programs develop and use strategies to enhance professional growth and ongoing learning. There may be opportunities for graduates to pursue further educational qualifications through transfer pathways between the colleges and universities or occupational certifications through professional organizations. Graduates should contact individual colleges and professional associations for further information.

*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

## Building Renovation Technology (Ontario College Advanced Diploma)

The graduate has reliably demonstrated the ability to

1. develop and use strategies for ongoing professional development to remain current with industry changes, enhance work performance and explore career opportunities.
2. comply with and monitor health and safety practices and procedures in accordance with current legislation and regulations.
3. prepare quotes and monitor that work is completed in compliance with the rights and conditions of contractual obligations, the Ontario and/or National Building Codes, applicable laws, bylaws, standards and ethical practices in the building construction and renovation field.
4. promote and maintain *sustainability practices** in the implementation of *building construction and renovation projects**.
5. facilitate the collaboration and interaction among a range of tradespersons and *project stakeholders** to support timely completion of *building construction and renovation projects**.
6. review and interpret project plans and produce technical sketches and documents to support *building construction and renovation projects**.
7. use technologies to obtain, analyze, organize and communicate building construction and renovation information.
8. analyze and solve technical problems related to the design and implementation of *building construction and renovation projects** by applying the principles of *advanced technical mathematics**, building design and *building science**.
9. select, maintain and safely use hand tools, and portable and stationary power tools, when performing layout, cutting, fitting and assembly operations.
10. complete building and renovation stages, from site layout and footings to the application of interior and exterior finishes, in accordance with blueprint specifications and *conservation** principles.
11. evaluate the methods employed and the use of equipment and materials involved in the completion of *building construction and renovation projects**.
12. schedule, coordinate and monitor the progression of *building construction and renovation projects** by applying principles and strategies of project management.
13. design and implement business strategies to develop home building,

renovation and re-development enterprises.

14. apply leadership, supervision and interpersonal skills to manage *building construction and renovation 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 for ongoing professional development to remain current with industry changes, enhance work performance and explore career opportunities.

**Elements of the Performance**

- keep abreast of changes in the building construction and renovation 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 assistance to resolve problems beyond own knowledge and skills
- identify the roles and benefits of professional organizations
- seek out and act upon constructive feedback to enhance work performance
- develop a plan to keep pace with and adapt to changing workforce demands and trends, as well as technological advances in the building construction and renovation field
- identify training courses, workshops and mentoring opportunities to enhance employment in the building construction and renovation engineering field
- develop a plan for building a professional network and for participating in building construction and renovation professional associations and activities
  identify opportunities for entrepreneurship in the building construction and renovation field

2. The graduate has reliably demonstrated the ability to

comply with and monitor 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
- maintain a safe, clean and organized worksite
- interpret rigging hazards and apply safe rigging and access practices
- participate in health and safety training
- analyze a workplace setting and initiate action to mitigate unsafe or hazardous situations or materials
- write and analyze accident reports
- ensure that worksite has appropriate health and safety signage
- inform others related to health and safety practices
- lead crew and tradespersons in daily safety talks and maintain a safety log
- enforce health and safety practices
- comply with and monitor all requirements of the current Ontario Health and Safety Act,1990
- maintain all required health and safety training and certification e.g., Workplace Hazardous Materials Information System (WHMIS), Working at Heights and Confined Space Safety training where appropriate
- monitor adherence to occupational health and safety regulations
- select and use Personal Protective Equipment (PPE) and safety equipment
- perform safety Lockout/Tagout (LOTO) procedures for machinery and power sources
- prepare a site or project-specific health and safety plan
- inspect tools and equipment for damage and remove from service when appropriate

3. The graduate has reliably demonstrated the ability to

prepare quotes and monitor that work is completed in compliance with the rights and conditions of contractual obligations, the Ontario and/or National Building Codes, applicable laws, bylaws, standards and ethical practices in the building construction and renovation field.

**Elements of the Performance**

- apply legal principles to the review and administration of building construction and renovation contracts
- interpret types and elements of contracts, contract offers and acceptances
- identify the rights and obligations of parties to a building construction and renovation contract
- read and interpret building plans and specifications to determine required quantities of materials, equipment, time and labour
- measure and categorize quantities by using accepted methods of measurement such as the Canadian Institute of Quantity Surveyors (CIQS) standard methods of measurement
- complete purchase orders
- prepare project quotes in accordance with project specifications and construction drawings
- prepare contracts according to established criteria and industry standard documentation e.g., Canadian Construction Documents Committee (CCDC)
- relate how and where to access the most current information regarding codes and standards
- apply the current Ontario Building and National Codes and regulations to the construction of residential, small commercial and renovation projects
- identify and obtain from required municipal agencies' approvals for *building construction and renovation projects**
- coordinate inspections for approvals in relation to the construction phase and timing
- ensure that equipment, materials and practices adhere to current law, standards, codes and bylaws
- maintain current knowledge of changing codes, regulations and standards
- adhere to relevant codes of ethics in the construction industry
- apply ethical reasoning to resolve social and contractual issues that evolve when implementing a *building construction and renovation project**

*See Glossary

4. The graduate has reliably demonstrated the ability to

promote and maintain *sustainability practices** in the implementation of *building construction and renovation projects**.

**Elements of the Performance**

- identify and comply with legislative requirements for environmental protection that apply to *building construction and renovation projects**
- apply the principles of sustainable development, combining environmental stewardship and economic performance in project work
- identify and attempt, where possible, to reduce the negative political, social and environmental impacts of *building construction and renovation projects**
- conduct environmental site assessments and remediation in collaboration with other professionals
- differentiate various types of contamination and compare different remediation techniques
- identify sustainability practices, related to materials and techniques, used to extend the building lifecycle
- select and utilize materials and construction practices to minimize the presence of volatile organic compounds (VOC's)
- use recycled materials when appropriate and alternative resources to reduce impact on environment and promote sustainability
- minimize waste and comply with legislated waste diversion strategies
- identify energy requirements of the Ontario Building Code
- explore current energy performance labelling and certification e.g., Energy Star, R2000, Net Zero Energy
- apply Energuide Rating System and checklist to projects
- identify areas of energy loss within buildings and apply building and design techniques to minimize this loss
- identify areas of energy gain within buildings, apply building and design techniques to maximize gains
- identify the most cost-effective and energy-efficient solutions to project problems
- work with homeowners to identify and maximize the benefits of *sustainability practices**
- identify technologies with a lower carbon footprint, e.g., LEED processes
- identify opportunities to make existing construction more energy efficient, healthy and durable during the renovation process
- ensure subcontractors conform to the environmental protection laws and regulations
- apply principles of Integrated Design Process (IDP) to support building sustainability practices
- evaluate and recommend the implementation of building and renovation

solutions to support *sustainability practices**

*See Glossary

5. The graduate has reliably demonstrated the ability to

facilitate the collaboration and interaction among a range of tradespersons and *project stakeholders** to support timely completion of *building construction and renovation projects**.

**Elements of the Performance**

- differentiate the contribution of owners, architects, builders, renovators and tradespersons in the planning, designing and implementation of *building construction and renovation projects**
- participate as a member of a multi-disciplinary team to design, implement, complete and evaluate projects
- describe the role of the building construction and renovation technologist as a member of the project team
- identify the *project stakeholders** and obtain their input about *construction and renovation projects**
- establish and maintain good client relationships
- provide feedback to *project stakeholders**
- identify and keep informed the key *project stakeholders**
- support the roles, rights and responsibilities of *project stakeholders**
- facilitate interaction among *project stakeholders** by using effective individual and group interpersonal skills
- receive and give clear trade-related instructions orally and in writing
- obtain assistance and clarification from the appropriate specialist to resolve problems
- apply dispute resolution strategies including communication, negotiation and mediation
- assist in the coordination regarding clearances, locations and interferences between architectural, structural, mechanical and electrical services
- review documents and drawings from other disciplines
- lead project-related meetings
- report, in written, graphics, and oral formats, the results of project-related meetings
- use appropriate interpersonal skills and industry-specific terminology suited to the situation and *project stakeholders**

*See Glossary

6. The graduate has reliably demonstrated the ability to

review and interpret project plans and produce technical sketches and documents to support *building construction and renovation projects**.

**Elements of the Performance**

- assemble and interpret relevant project information and data
- identify and clarify the information requirements of the *project stakeholders**
- coordinate and analyze building documents including drawings, architectural, structural, electrical and mechanical plans and specifications
- prepare and present technical sketches in accordance with industry standards, formats, symbols and reference systems
- evaluate and record modifications to graphics to reflect as-built conditions
- apply industry standard formats, symbols and reference systems to design and prepare project-related written reports, correspondence, estimates and other documents for presentation to a variety of *project stakeholders**
- prepare, coordinate and present project-related information in oral and written formats to a variety of *project stakeholders**
- keep ongoing, accurate project records, minutes and accounts of construction projects and meetings according to established formats, policies and procedures
- use collected and stored information accurately and effectively to assist in decision making, reporting and quality assurance
- apply principles of information management to project records
- keep current, clear and accurate project records, site meeting notes, 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

use technologies to obtain, analyze, organize and communicate building construction and renovation information.

**Elements of the Performance**

- keep abreast of changes in technology that affect building construction and renovation
- select and use industry-specific electronic and digital technologies for the design of *building construction and renovation projects** (e.g., Auto-CAD, imaging and design software, building information modeling (BIM) etc.)
- use communication technologies to access and share information in various phases of b*uilding construction and renovation projects**
- select, retrieve, validate, organize and summarize data by using computer applications i.e., word processing and spreadsheets
- assist in the analysis of data by using systematic approaches to problem solving and decision making in accordance with recognized standards and practices
- establish and implement an appropriate system to store and retrieve graphical and digital information
- organize project-related data by using computers and appropriate software

*See Glossary

8. The graduate has reliably demonstrated the ability to

analyze and solve technical problems related to the design and implementation of *building construction and renovation projects** by applying the principles of *advanced technical mathematics**, building design and *building science**.

**Elements of the Performance**

- describe the structural requirements of buildings and the technical steps used to lay out and construct *building construction and renovation projects**
- resolve technical problems in the project layout and construction of *building construction and renovation projects**
- identify and describe the construction methods of particular periods and styles of heritage buildings.
- identify the age and identifying features of heritage and contemporary architectural styles
- applying the principles of controlling air, moisture, thermal and sound transmission to *building construction and renovation projects**
- complete linear counts, area and volumetric calculations as required for material take-off
- use systematic approaches to anticipate, resolve or arrange for the resolution of technical problems in the project design, layout and construction of *building and renovation projects**
- apply advanced technical mathematics* and building science* principles to the design, layout and construction of *building and renovation projects**
- use *building science** and construction terminology correctly and to the required degree of accuracy in written and oral communication
- assist in establishing the technical criteria necessary to design and construct *building and renovation projects**
- assist in the analysis and design of building structures
- apply knowledge of building materials, methods, building envelope and environmental controls to solve building construction and renovation problems
- incorporate accessibility design principles into *building construction and renovation projects** in order to accommodate diversity of age and ability

*See Glossary

9. The graduate has reliably demonstrated the ability to

select, maintain and safely use hand tools, and portable and stationary power tools, when performing layout, cutting, fitting and assembly operations.

**Elements of the Performance**

- select, use and maintain hand tools for boring, cutting, abrading, assembly, dismantling, measuring, squaring, marking and clamping of building materials
- select use and maintain portable power tools such as electric, pneumatic, battery-powered and gas-powered to complete cutting and assembly operations
- select, use and maintain stationary tools, such as table saws, planers and joiners to prepare building materials
- use and maintain powder-actuated tools according to manufacturers' specifications
- identify licensing and training requirements for the use of powder-actuated tools
- establish safe and proper use of tools according to manufacturer's recommendations
- identify and use hand signals for lifting, rigging and hoisting operations
- use lifting, rigging and hoisting equipment according to load application and follow inspection procedures
- select and use layout instruments, such as, total stations, digital theodolites, laser levels and builder's levels to prepare site layout
  apply proper safety procedures and basic skills to oxyacetylene brazing, cutting and shielded metal arc welding (SMAW) on non-structural building components

9. The graduate has reliably demonstrated the ability to

complete building and renovation stages, from site layout and footings to the application of interior and exterior finishes, in accordance with blueprint specifications and *conservation** principles.

**Elements of the Performance**

- apply specific survey information and municipal bylaws to determine and establish building location lines on a building site
- layout a building on a building lot in accordance with approved site plan
- design, build and dismantle access structures such as scaffolds, ladders, temporary stairs and ramps
- prepare materials and establish concrete footings and foundations
- frame footings and protect from elements in accordance with Building Code requirements
- layout and construct floors, walls, ceilings and roof systems
- apply insulation systems including rigid insulation, batt insulation air and vapour barriers
- install doors and windows into rough openings
- build decks, stairs, porches and platforms
- apply exterior finishes to a building including roof protection, exterior siding, soffit, fascia and eaves troughs
- apply methods to prevent water infiltration including flashings, membranes, sealants and caulking
- install interior stairs, doors and apply floor, wall and ceiling finishes and trim
- assemble and finish build-in and stand-alone cabinetry
- conduct deconstruction procedures safely and in accordance with requirements for the handling of waste materials
- recycle and repurpose building materials where possible
- identify when certain materials and/or equipment are to be used based on climate and weather conditions
- carry out the necessary alterations and/or additions in a manner that complements and enhances a building's distinctive historical features
- apply techniques to repair or replace building components that compliments and enhances buildings' distinctive historical features

*See Glossary

10. The graduate has reliably demonstrated the ability to

evaluate the methods employed and the use of equipment and materials involved in the completion of *building construction and renovation projects**.

**Elements of the Performance**

- identify and apply knowledge of the properties and characteristics of wood as a building material i.e., composition, moisture content, sizing, strength and grain
- assess the merits of new construction materials and their appropriateness for use in *building construction and renovation projects** i.e., insulated concrete forms (ICFs), pre-fabricated building systems, engineered hardwood and laminate, sound transmission class (STC) assemblies and countertop materials fabricated from stone, composite stone and concrete.
- compare and evaluate the appropriateness of a range of gypsum materials, fasteners, adhesives and hardware for use in *building construction and renovation projects**
- identify older construction materials and practices and integrate them with current methods and building code requirements
- communicate with manufacturer representatives or suppliers related to use of or problems with building materials and equipment
- review and analyze the specifications, limitations, use and safety aspects of equipment and construction materials
- ensure operational safety and accuracy of equipment
- ensure that equipment is used according to manufacturer's recommended directions
- ensure the proper handling and use of materials
- consider and report on the costs/benefits of methods and equipment employed
- monitor, report and correct non-compliance with project specifications
- monitor, report and resolve quality and cost deviations

*See Glossary

12. The graduate has reliably demonstrated the ability to

schedule, coordinate and monitor the progression of *building construction and renovation projects** by applying principles and strategies of 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**
- assist in establishing the phases of the project and their component activities
- assist in reviewing the criteria applicable to each phase of work
- identify and interpret required data using appropriate statistical data analysis tools
- produce project schedules prior to project commencement and evaluate and monitor progression throughout the duration of a project to final completion
- develop a project schedule using project management tools and/or software, e.g., MS Project, Critical path, Gantt Chart
- observe, record, assess and report work activity
- identify and seek assistance to resolve problems related to materials, scheduling, resources and budgets in order to complete *building construction and renovation projects**
- monitor the financial resources, human resources and time-lines of *building construction and renovation projects**
- use organizational and time-management strategies to support *building construction and renovation projects**
- apply principles of cost control and accounting to do budget forecasts and project estimates
- identify schedule-adherence problems and make necessary adjustments
- monitor, report and assist in the resolution of deficiencies and noncompliance with contract documents
- develop project records including equipment and material inventories, time sheets, projected-related and actual-costs records and quality-assurance records
- ensure accuracy, clarity and timeliness of project-evaluation records

*See Glossary

13. The graduate has reliably demonstrated the ability to

design and implement business strategies to develop home building, renovation and re-development enterprises**.**

**Elements of the Performance**

- use market research to identify business opportunities within the building construction and renovation field
- develop and implement a sales and marketing plan for a building construction or renovation enterprise
- discuss the impact of technological changes on marketing and sales strategies (e.g., E-commerce, social media, e-customer relationship management)
- identify relevant insurance and business licensing requirements
- identify critical issues in a home building or renovation enterprise and develop risk management strategies
- establish working relationships and network with other professionals within the building construction industry
- identify the impact of human rights, employment and labour legislation on business human resource strategies
- take into account labour-management principles and practices
- interpret and work within various collective agreements
- apply principles of cost accounting to prepare cost plans, elemental estimates, budget forecasts and project estimates

14. The graduate has reliably demonstrated the ability to

apply leadership, supervision and interpersonal skills to manage *building construction and renovation projects**.

**Elements of the Performance**

- work as an effective team leader to complete tasks while promoting a positive work environment among co-workers
- facilitate performance reviews and provide feedback and growth/development strategies
- develop effective organizational and time-management strategies for self and others according to accepted industry practice
- take responsibility for one's job related performance, as an individual and as a member of a multidisciplinary team
- apply human resource management principles to *building construction and renovation projects** to enhance cost, time and quality performance
- organize, coordinate and supervise the work of a team
- organize and plan short term and long term project goals
- provide motivation and positive feedback to others to accomplish tasks and goals
- use conflict resolution skills in work situations
- lead building team meetings
- perform supervisory functions on *building construction and renovation projects**

*See Glossary

## Glossary

**advanced technical mathematics** – The application of mathematical concepts to solve building construction and renovation problems. Advanced mathematics includes algebra, trigonometry, plane and analytical geometry (adapted from National Technology Benchmarks, 2014).

**building science** – Systematic theory and research related to construction work, building materials, methods, building envelope.

**building construction and renovation project(s)** – A field within the building and construction industry with an emphasis on the residential and small commercial sectors. Projects vary in scope and may include the building, renovation or rehabilitation of small commercial, single family, townhouse, multi-residential and custom home buildings.

**conservation –** Actions and/or processes that are aimed at safeguarding the character-defining elements of a cultural resource, including building structures, so as to retain its heritage value and extend its physical life. This may involve “Preservation,” “Rehabilitation,” “Restoration,” or a combination of these actions or processes (Government of Canada, The Standards and Guidelines for the Conservation of Historic Places in Canada, 2011).

**project stakeholders** – Any group or individual who has a vested interest in the project including the clients, designers, tradespersons, suppliers, management team and municipal authorities.

**sustainability practices** – Includes the decisions and activities that apply the concepts of environmental, economic and social sustainability and lifecycle assessment into the planning, design, implementation and evaluation of building construction and renovation projects. Sustainability practices also consider the concept of grey energy i.e., the energy consumed in the lifecycle of building materials from production to disposal (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 Building Renovation Technology 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:**<br><br>Skill areas to be demonstrated by graduates: | **Learning Outcomes:** The levels of achievement required by graduates.<br><br>The graduate has reliably demonstrated the ability to: |
|---|---|---|
| Communication | • Reading<br>• Writing<br>• Speaking<br>• Listening<br>• Presenting<br>• Visual literacy | 1. communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience.<br>2. respond to written, spoken or visual messages in a manner that ensures effective communication. |
| Numeracy | • Understanding and applying mathematical concepts and reasoning<br>• Analyzing and using numerical data<br>• Conceptualizing | 1. execute mathematical operations accurately. |
| Critical Thinking & Problem Solving | • Analyzing<br>• Synthesizing<br>• Evaluating<br>• Decision making<br>• Creative and innovative thinking | 1. apply a systematic approach to solve problems.<br>2. use a variety of thinking skills to anticipate and solve problems. |

| **Skill Category** | **Defining Skills:**<br><br>Skill areas to be demonstrated by graduates: | **Learning Outcomes:** The levels of achievement required by graduates.<br><br>The graduate has reliably demonstrated the ability to: |
|---|---|---|
| Information Management | • Gathering and managing information<br>• Selecting and using appropriate tools and technology for a task or a project<br>• Computer literacy<br>• Internet skills | 1. locate, select, organize and document information using appropriate technology and information systems.<br>2. analyze, evaluate and apply relevant information from a variety of sources. |
| Interpersonal | • Teamwork<br>• Relationship management<br>• Conflict resolution<br>• Leadership<br>• Networking | 1. show respect for the diverse opinions, values, belief systems and contributions of others.<br>2. interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. |
| Personal | • Managing self<br>• Managing change and being flexible and adaptable<br>• Engaging in reflective practices<br>• Demonstrating personal responsibility | 1. manage the use of time and other resources to complete projects.<br>2. take responsibility for one's own actions, decisions and their consequences. |

# IV. General Education Requirement

All graduates of the Building Renovation Technology 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.