Ontario

Civil Engineering Technology Program Standard

The approved program standard for Civil Engineering Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology (MTCU funding code 61003)

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

Acknowledgements

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I. Introduction

This document is the Program Standard for the Civil Engineering Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario colleges of applied arts and technology (MTCU funding code 61003).

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 Civil Engineering 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 Civil Engineering Technology programs have achieved the eleven 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 Civil Engineering Technology program carry out design and technical functions related to a broad range of civil engineering fields including structural, municipal, highway and transportation engineering, water resources, geotechnical engineering, environmental protection and infrastructure rehabilitation.

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

Graduates participate in the design and modeling phase of *civil engineering projects** by applying engineering concepts, *technical mathematics** and principles of science to the review, production and/or modification of project plans. They collect, process, analyze and coordinate technical data to produce written and graphical project-related documents. Graduates contribute to the scheduling, coordination, cost estimation, quality control* and monitoring of civil engineering projects* and monitor the progression of *civil engineering projects**.

Graduates apply communication, leadership and supervision skills to the role of the civil engineering technologist and participate in quality assurance and control processes.

Graduates of Civil Engineering Technology programs work in a range of employment settings including consulting engineering, civil construction and surveying firms, quality control* facilities and municipal government engineering or operations departments.

Graduates are typically employed in entry-level positions in the field as municipal design technologists, structural design technologists, pavement/geotechnical technologists, material testing technologists, construction inspectors, estimators or technical representatives.

Graduates of the Civil Engineering Technology program develop and use strategies to enhance professional growth and ongoing learning.

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

Civil Engineering Technology (Ontario College Advanced Diploma)

The graduate has reliably demonstrated the ability to

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

2. comply with workplace health and safety practices and procedures in accordance with current legislation and regulations.

3. complete duties and monitor that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the civil engineering field.

4. promote and carry out *sustainable practices** in accordance with contract documents, industry standards and environmental legislative requirements.

5. facilitate the collaboration and interaction among the project team and *project stakeholders** to support *civil engineering projects**.

6. collect, process, analyze and coordinate technical data to produce written and graphical project-related documents.

7. use industry-specific electronic and digital technologies to support *civil engineering projects**.

8. participate in the design and modeling phase of *civil engineering projects** by applying engineering concepts*, technical mathematics** and principles of science to the review, production and/or modification of project plans.

9. contribute to the scheduling and coordination and cost estimation of *civil engineering projects** and monitor their progression by applying principles of construction project management.

10. coordinate and perform *quality control** testing and evaluate equipment, materials and methods used in the implementation and completion of *civil engineering projects**.

11. apply teamwork, leadership, supervision and interpersonal skills when working individually or within multidisciplinary teams to complete *civil engineering 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 civil engineering field.

Elements of the Performance

- keep abreast of changes in the civil 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 civil engineering services field
- identify the career importance of 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 safe manner and in accordance with the requirements of work situation
- participate in health and safety training
- identify unsafe and hazardous situations or materials in the workplace
- initiate actions to mitigate risks to health and safety
- prepare and analyze accident reports
- identify and comply with workplace health and safety signs
- inform site visitors and others related to health and safety practices
- 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, Workplace Hazardous Materials Information System (WHMIS), Fall Arrest Protection and Confined Space Safety training where appropriate
- apply best safety practices when working on road construction e.g., Ontario Traffic Manual Book 7
- review and implement a site or project-specific health and safety plan
- 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 and monitor that work is performed in compliance with contractual obligations, applicable laws, standards, bylaws, codes and ethical practices in the civil engineering field.

Elements of the Performance

- identify relevant legislation and bylaws that apply in specific situations e.g., *Drainage Act (1990), Lakes and Rivers Improvement Act (1990), Water Resources Act (1990)* etc.
- read and interpret relevant building codes i.e., National and/or Ontario Building Codes
- prepare estimates and assist in the preparation of tender and construction bids
- review and assist in the preparation of typical contracts for compliance with legal principles and the tendering processes
- assess design or work elements and identify applicable codes, standards and jurisdictional requirements that may apply to *civil engineering projects**
- select and use equipment, materials and practices that comply with relevant legislation, standards, codes and bylaws
- identify codes of ethics of the applicable provincial association, societies or workplaces
- apply ethical reasoning to social and contractual issues that evolve when implementing *civil engineering projects**
- identify and adhere to labour-management principles and practices including applicable collective agreements
- read and interpret Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings

*See Glossary

4.   The graduate has reliably demonstrated the ability to

promote and carry out *sustainability practices** in accordance with contract documents, industry standards and environmental legislative requirements.

Elements of the Performance

- identify legislative requirements for compliance with environmental protection regulations
- read and interpret, the results of impact studies and assessments for specific *civil engineering projects**
- identify the *project stakeholders** and obtain their input about *civil engineering 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 economic, social and environmental impacts of *civil engineering projects**
- contribute to environmental site assessments and implement identified remediation strategies
- differentiate various types of contamination and compare different remediation techniques
- determine principal environmental risks, e.g., groundwater contamination, soil erosion, pollutants, noise pollution, etc. and associated remediation techniques
- promote sustainable practices across building and infrastructure lifecycle processes and rehabilitation/renewal practices
- minimize waste and use appropriate waste management techniques
- identify technologies with a lower carbon footprint, e.g., LEED processes
- evaluate and recommend the implementation of engineering solutions to support *sustainable practices**

*See Glossary

5.   The graduate has reliably demonstrated the ability to

facilitate the collaboration and interaction among the project team and *project stakeholders** to support *civil engineering projects**.

Elements of the Performance

- differentiate the contribution of architecture and surveying along with structural, mechanical, electrical and environmental engineering disciplines, to the planning, designing and implementation of *civil engineering projects**
- take into account theory and research of relevant disciplines when assisting in designing, implementing and evaluating *civil engineering projects**
- coordinate project designs between all disciplines in multidisciplinary *civil engineering projects**
- assess *civil engineering projects** for potential conflicts in the designs between disciplines and facilitate the resolution of issues of concern
- describe the rights, roles and responsibilities of the civil engineering technologist as a member of the project team
- participate as a member of a multi-disciplinary team to design, implement, complete and evaluate *civil engineering projects**
- describe the role of the civil engineering technologist as a member of the project team
- 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
- use communication technologies to facilitate clear and concise communication among *project stakeholders** e.g., email, file transfer etc.
- lead project-related team meetings
- report, in written, graphic and oral formats, the results of project-related meetings
- use appropriate interpersonal skills and terminology suited to the situation and *project stakeholders**
- build and maintain effective client service skills

*See Glossary

6.   The graduate has reliably demonstrated the ability to

collect, process, analyze and coordinate technical data to produce written and graphical project-related documents.

Elements of the Performance

- collect and interpret relevant information and data using systematic approaches in accordance with recognized standards and practices
- establish criteria, organize, coordinate and prepare documents according to industry standards e.g., Canadian Construction Documents Committee (CCDC)
- select and use appropriate technologies to produce documents for *civil engineering projects**
- evaluate and modify documents in a variety of formats
- coordinate and present civil engineering data and contribute to the making of recommendations to *project stakeholders**
- prepare and present project-related documents including formal technical reports in oral and written formats
- select and use relevant information to construct models for *civil engineering projects** using drawings and computer-assisted technologies
- transfer digital information effectively in required format and to specified standards
- assist with the development of appropriate strategies for the collection of technical data
- select, operate and supervise the use of a variety of civil engineering-related equipment
- measure, record and evaluate technical data to ensure data meet industry standards and are within expected parameters for precision and accuracy
- determine the type of data required and identify the most appropriate source(s) of data for a specific project
- select, retrieve, validate, organize and summarize data by using computerized techniques
- establish and implement an appropriate system to store and retrieve graphical and digital information
- keep ongoing, accurate project records, minutes and accounts of *civil engineering 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 and control
- ensure that project data is used and shared in accordance with relevant privacy legislation, guidelines and data sharing agreements

*See Glossary

7. The graduate has reliably demonstrated the ability to

use industry-specific electronic and digital technologies to support *civil engineering projects**.

Elements of the Performance

- keep abreast of changes in technology that affect civil engineering (e.g., Imaging, heavy equipment machine control systems, mobile integration, cloud accessibility and Drone technologies)
- identify the impact and application of technology throughout the lifecycle of *civil engineering projects**, i.e., field data collection, design and engineering, estimating and construction
- select and use industry-specific electronic and digital technologies to design projects, produce plans and to solve project-related problems (e.g., Computer-aided Design (CAD), hydrologic and hydraulic modeling software, 3D laser scanning technologies, etc.
- select and use standard survey instruments and Global Navigation Satellite Systems (GNSS) to verify and/or produce engineering and construction layouts
- apply survey techniques and use survey equipment (i.e., levels and total station)
- use and interpret satellite and other digital imagery
- visualize, manipulate and analyze spatial data using a variety of data sources and technologies

*See Glossary

8.   The graduate has reliably demonstrated the ability to

participate in the design and modeling phase of *civil engineering projects**
by applying engineering concepts, *technical mathematics** and principles
of science to the review, production and/or modification of project plans.

Elements of the Performance

- apply standard mathematical and scientific formulas, techniques and
  computer models accurately and within the limitations of their applicability
- select and apply established industry techniques including computer
  models to analyze the performance of civil infrastructure systems i.e.,
  structural, water/hydraulic and transportation while identifying the
  limitations under which the techniques remain valid
- use mathematical and scientific terminology correctly in written and oral
  communication
- plan and implement checks to ensure calculations and/or design concepts
  are accurate
- review the technical criteria used in the design, layout and construction of
  civil engineering projects*
- select and apply standards, codes and procedures to participate in the
  design of civil infrastructure components (i.e. sewers, water mains,
  structural elements of wood, concrete and steel, geotechnical
  infrastructure, storm water, potable water, waste water infrastructure and
  transportation infrastructure) while identifying the limitations of the
  standard, code or procedure selected
- perform assessments and inspections, analyzing structural, physical
  and/or environmental aspects to identify deficiencies and issues
- interpret issues found during inspections and provide recommendations
  and design repair solutions
- suggest modifications of design plans to suit site conditions
- seek assistance to resolve situations in the analysis, design, or
  construction of *civil engineering projects** that are beyond the scope of the
  technologists training, knowledge or legal authority

*See Glossary

9.	The graduate has reliably demonstrated the ability to

contribute to the scheduling and coordination and cost estimation of *civil engineering projects** and monitor their progression 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**
- contribute to establishing the phases of the project and their component activities
- contribute to the review of the work-phase criteria
- monitor project schedules and cost estimates
- recognize and interpret required data using appropriate statistical data analysis tools
- perform quantity surveys and cost estimates
- observe, record, assess and report work activity
- identify and seek assistance to resolve problems related to materials, scheduling, resources and project budgets in order to complete civil engineering projects*
- contribute to the identification of risks associated with *civil engineering projects** and implement risk management strategies in collaboration with project manager
- monitor the financial resources, project budgets, human resources and time-lines of *civil engineering projects**
- use organizational and time-management strategies to support *civil engineering projects**
- develop a project schedule using project management tools and/or software, e.g., MS Project, Critical path, Gantt Chart
- assist in implementing cost control principles to budget forecasts and project estimates

*See Glossary

10. The graduate has reliably demonstrated the ability to

coordinate and perform *quality control** testing and evaluate equipment, materials and methods used in the implementation and completion of *civil engineering projects**.

Elements of the Performance

- review and analyze 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, coordinate and/or supervise *quality control** sampling and testing, interpret results and make necessary adjustments or changes
- ensure that equipment is used according to manufacturer's recommended directions and relevant legislation
- ensure the proper handling and use of materials
- monitor, report and oversee the correction of deficiencies and non-compliance with project specifications
- monitor, report and resolve quality and cost deviations
- review failure analysis reports, logs and relevant technical data and make appropriate quality improvement recommendations

*See Glossary

11.   The graduate has reliably demonstrated the ability to

apply teamwork, leadership, supervision and interpersonal skills when working individually or within multidisciplinary teams to complete *civil engineering projects**.

Elements of the Performance

- take initiative and work independently with minimal supervision
- assume accountability for self in managing the use of time and resources to meet established project deadlines
- work as an effective team player to complete tasks while promoting a positive work environment
- provide leadership when working with sub-trades and general workers
- collaborate with *project stakeholders**
- recognize and respond to diverse stakeholders perspective
- take responsibility for one's job related performance, as an individual and as a member of a multidisciplinary team
- use effective time-management and organizational techniques to prioritize tasks and to accomplish goals
- organize, coordinate and supervise the work of a team
- provide support and guidance to technical staff
- provide motivation and positive feedback to others to accomplish tasks and goals
- use conflict resolution skills in work situations including coordination, cooperation and compromise
- organize and plan short term and long term project goals and adapt to unforeseen circumstances

**See Glossary

Glossary

civil engineering projects - The product of the practical application of applied sciences, math and technology and the technical tasks required to plan, design and construct structures and infrastructures primarily for transportation systems, municipal water and wastewater systems, storm water management systems and other related infrastructure development and rehabilitation/renewal activities.

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 civil engineering 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.

sustainability practices – 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 civil engineering projects (adapted from The Canadian Society of Civil Engineering, *"Entrusted to Our Care" Guidelines for Sustainable Development*, 2007).

technical mathematics - The application of mathematic concepts to solve civil engineering problems. Technical mathematics includes algebra, trigonometry, plane and analytical geometry, vectors, matrix, calculus, discrete math and statistics (adapted from National Technology Benchmarks, 2014).

III. Essential Employability Skills

All graduates of the Civil Engineering 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: 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	• Reading • Writing • Speaking • Listening • Presenting • 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. 2. respond to written, spoken or visual messages in a manner that ensures effective communication.
Numeracy	• Understanding and applying mathematical concepts and reasoning • Analyzing and using numerical data • Conceptualizing	1. execute mathematical operations accurately.
Critical Thinking & Problem Solving	• Analyzing • Synthesizing • Evaluating • Decision making • Creative and innovative thinking	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	• Gathering and managing information • Selecting and using appropriate tools and technology for a task or a project • Computer literacy • Internet skills	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	• Teamwork • Relationship management • Conflict resolution • Leadership • Networking	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	• Managing self • Managing change and being flexible and adaptable • Engaging in reflective practices • Demonstrating personal responsibility	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 Civil Engineering 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.