



Electromechanical Engineering Technician Program Standard

**The approved program standard for
Electromechanical Engineering Technician
program of instruction leading to an
Ontario College Diploma delivered by
Ontario Colleges of Applied Arts and
Technology (MTCU funding code 51021)**

Ministry of Advanced Education and Skills Development
August 2016

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I. Introduction

This document is the Program Standard for the Electromechanical Engineering Technician program of instruction leading to an Ontario College Diploma delivered by Ontario colleges of applied arts and technology (MTCU funding code 51021).

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 Electromechanical Engineering Technician (Ontario College Diploma) 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 Electromechanical Engineering Technician programs have achieved the fifteen vocational learning outcomes (VLOs) listed in the following pages, in addition to achieving the essential employability skills (EES) learning outcomes and meeting the general education (GE) requirement.

Preamble

Today's industrial machinery integrates mechanical, electrical, and electronic/computer systems. The field of electromechanical engineering reflects the integration of four areas in engineering: mechanical, electrical, electronics, and automation. Graduates of Electromechanical Engineering Technician Programs carry out electromechanical engineering technician functions at an entry level within an engineering environment in a wide variety of industries. Program graduates are able to meet the rapidly changing demands of industrial environments and advanced manufacturing industries through their ability to install, maintain and repair increasingly sophisticated and automated equipment.

The vocational learning outcomes and their respective elements of the performance were articulated to define the range and level of skills, knowledge, and attitudes required by graduates in order to be successful as entry-level electromechanical engineering technicians. Graduates have the knowledge and skills to install and maintain a wide range of equipment in modern industrial plants. Achievement of the vocational learning outcomes will prepare the graduates of the Electromechanical Engineering Technician Diploma Programs to modify, maintain, troubleshoot, and repair electromechanical equipment, components, systems, and subsystems. In addition, graduates will be able to assist in purchasing, in customer service, and in quality-control and quality-assurance programs; and to apply communication, documentation, basic computer application, and teamwork skills to support the engineering activities of an organization. Program graduates are also able to develop personal and professional strategies and plans to remain current in the field and responsive to emergent technologies and national and international standards.

Graduates of Electromechanical Engineering Technician Programs work in a broad range of employment settings in businesses and industries using electromechanical engineering, in both large and small organizations. Their jobs could involve working with a variety of electromechanical equipment and systems including manufacturing, robotics and automation, systems integration, mobile technology, computer, and control systems. Graduates of this program may find employment in areas such as: manufacturing and automated process control equipment maintenance, hydraulic/pneumatic equipment maintenance, building and plant automation, PLC programming, robotic and motion control systems, process instrumentation and control, technical sales and services, renewable

energy, field service, and component testing and assembly. Industries include automotive, food processing, packaging, pharmaceuticals, telecommunications, utilities, power generation and others, as well as government.

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

Endnote¹: The Ontario Council on Articulation and Transfer (ONCAT) maintains the provincial postsecondary credit transfer portal, ONTransfer and the [Ontario Postsecondary Transfer Guide](#) (OPTG).

Synopsis of the Vocational Learning Outcomes

Electromechanical Engineering Technician

The graduate has reliably demonstrated the ability to:

1. fabricate and build electrical, electronic, and mechanical components and assemblies in accordance with operating standards, job requirements, and specifications.
2. interpret and produce electrical, electronic, and mechanical drawings and other related technical documents and graphics for a variety of stakeholders in compliance with industry standards.
3. select and use a variety of troubleshooting techniques and equipment to assess, maintain, and repair electromechanical circuits, equipment, processes, systems, and subsystems.
4. maintain and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications and to optimize production.
5. support the design and production of mechanical components by assisting in the specification of manufacturing materials and processes.
6. apply, analyze, build, install, commission, and troubleshoot a variety of mechanical, electrical, and electronic control systems, logic and digital circuits, passive AC and DC circuits, and active circuits
7. install and troubleshoot basic computer hardware and programming to support the electromechanical engineering environment.
8. maintain and troubleshoot automated equipment including robotic systems.
9. establish and maintain inventory, records, and documentation systems to meet organizational and industry standards and requirements
10. select and purchase electromechanical equipment, components, and systems that fulfill job requirements and functional specifications.
11. assist in applying quality control and quality assurance program procedures to meet organizational standards and requirements.
12. work in compliance with relevant industry standards, laws and regulations, codes, policies, and procedures.
13. develop strategies for ongoing personal and professional development to enhance work performance and to remain current in the field and responsive to emergent technologies and national and international standards.
14. contribute as an individual and a member of an electromechanical engineering team to the effective completion of tasks and projects.
15. support project management activities such as planning, implementation and evaluation of projects, and monitoring of resources, timelines, and expenditures as required.

*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

fabricate and build electrical, electronic, and mechanical components and assemblies in accordance with operating standards, job requirements, and specifications.

Elements of the Performance

- select, operate, and maintain hand and power tools according to standard practice
- apply soldering and de-soldering techniques
- assemble printed circuit boards (PCB)
- prepare wire and cable assemblies
- repair and replace electrical, electronic, and mechanical components
- use basic machine shop skills such as turning, milling, metal bending, drilling, tapping, machining, and cutting according to job specifications
- design, test, and troubleshoot electrical panel assemblies
- analyse components of a breadboard and a PCB
- operate equipment according to job requirements and specifications
- apply engineering principles to the analysis and construction of mechanical components and assemblies
- apply knowledge of mechanical, electrical, electronic, and automation technologies to solve routine problems and complete electromechanical engineering tasks

2. The graduate has reliably demonstrated the ability to

interpret and produce electrical, electronic, and mechanical drawings and other related technical documents, reports and graphics for a variety of stakeholders in compliance with industry standards.

Elements of the Performance

- produce or reproduce drawings using computer-aided drafting, including, where applicable, PLC ladder logic, and hydraulics and pneumatics in circuit diagrams
- produce and modify drawings effectively, including creating new drawings, legends and templates.
- interpret and prepare electrical, electronic, and mechanical specifications and project-related documents
- use computer software and other technology to produce effective sketches, diagrams, charts, tables, and graphs
- organize and prepare documents in accordance with recognized standards (e.g., company standards, CSA, ISO, electrical codes)

3. The graduate has reliably demonstrated the ability to

select and use a variety of troubleshooting techniques to assess, maintain, and repair electromechanical circuits, equipment, processes, systems, and subsystems.

Elements of the Performance

- use standard mechanical, electrical, and electronic testing and measurement equipment such as scopes, digital multimeter, protocol analysers, cable testers, calipers, Vernier's, and voltmeters
- use a variety of references including colleagues, manufacturers' manuals, handbooks, and electronic references (e.g., Internet, cloud-based) to complete troubleshooting
- apply mathematical and scientific analysis in accordance with the principles and practices of electromechanical engineering
- use the correct testing equipment and setup for the accurate assessment of equipment performance
- test, maintain, and repair equipment
- upgrade equipment when appropriate
- follow established service schedules
- diagnose electromechanical system problems using appropriate test instrumentation, schematics, and technical reference manuals
- determine whether a fault is electrical, electronic, software, or mechanical in nature
- recommend appropriate repair process and initiate repair
- support engineering teams in conducting Equipment Capability Studies
- follow industry best practices, including controlled documentation

4. The graduate has reliably demonstrated the ability to

maintain and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications and to optimize production.

Elements of the Performance

- install, configure, and commission components, equipment, and systems
- operate equipment according to functional specifications and safety procedures
- establish and follow regular inspection and service schedules
- select, install, troubleshoot, and repair equipment to keep operations running efficiently
- operate, adjust, and repair common types of instrumentation
- test, troubleshoot, and repair typical electromechanical systems such as replacing wiring, fluid power* components, and electromechanical devices
- repair electrical and electronic systems, including devices, subsystems, wiring, and cabling to circuit board level
- replace circuit boards (e.g., motherboards)

5. The graduate has reliably demonstrated the ability to

support the design and production of mechanical components by assisting in the specification of manufacturing materials and processes.

Elements of the Performance

- troubleshoot, source, and select mechanical power transmission components and systems
- analyse mechanical components and prototypes used in manufacturing processes and systems
- analyse properties of materials and assess their suitability for use in a mechanical system
- recognize the effects of manufacturing processes on materials and on the design and production of components
- use systematic approaches to assist in the identification and resolution of technical problems
- identify and apply material testing methods
- assist in sourcing material, tools, equipment, supplies, and services related to production of components
- apply knowledge of manufacturing techniques to support the manufacturing and handling of components

6. The graduate has reliably demonstrated the ability to

apply, analyze, build, install, commission, and troubleshoot a variety of mechanical, electrical, and electronic control systems, logic and digital circuits, passive AC and DC circuits, and active circuits.

Elements of the Performance

- demonstrate general knowledge of production and manufacturing systems.
- build, test, analyze and modify control processes and systems, applying knowledge of electric motor fundamentals, control relays and drives (e.g., variable frequency drive [VFD]), and digital sensors
- apply electromechanical knowledge to single- and three-phase industrial and domestic electrical distribution
- select and troubleshoot analog and digital circuits and sensors
- use, adjust, and maintain instrumentation
- apply, install, test, and troubleshoot Programmable Logic Control (PLC), Programmable Logic Device (PLD) and motion control systems, working with a variety of industrial components and machinery
- build, test, and troubleshoot mechanical systems, pneumatic circuits, and hydraulic components and systems.
- solve efficiency, power loss, and energy problems in electrical and hydraulic systems
- test and measure fluid pressures and flow characteristics
- test electrical, electronic, and mechanical controls used in electrical and fluid power* systems
- integrate motion control and electrical and fluid power* equipment
- integrate electronic control equipment (e.g., discrete devices, PLCs, sensors, robot application programs) into typical small Computer Integrated Manufacturing (CIM) work cell environments so that an overall system performs to specification
- recognize and apply knowledge of the technology inherent in devices and machinery to support the electromechanical engineering environment
- apply Ohm's Law, Kirchhoff's Law, Superposition and Thevenin's theorem to DC and AC circuit analysis
- identify and select passive components for AC and DC circuits to fulfill job requirements and functional specification
- identify, analyse, and distinguish waveform properties
- identify and select analog semiconducting devices to meet job requirements and functional specifications
- analyse and troubleshoot circuits such as linear and non-linear amplifiers, oscillators, pulse circuits, and active filters using discrete components and integrated circuits

7. The graduate has reliably demonstrated the ability to install and troubleshoot basic computer hardware and programming to support the electromechanical engineering environment.

Elements of the Performance

- use knowledge of computer systems and application software to resolve routine technical problems
- apply knowledge of hardware and application software to maintain effective computer operations

8. The graduate has reliably demonstrated the ability to maintain and troubleshoot automated equipment including robotic systems.

Elements of the Performance

- maintain and troubleshoot automated equipment including industrial robotic systems incorporating PLCs and fluid power* (industrial hydraulics and pneumatics components).
- analyse the effectiveness of robots in a variety of industrial processes
- troubleshoot integrated robotic systems
- test a variety of digital display and recording processes and systems
- install, maintain and repair automated manufacturing equipment found in manufacturing facilities
- apply knowledge of robot operating protocol

9. The graduate has reliably demonstrated the ability to establish and maintain inventory, records, and documentation systems to meet organizational and industry standards and requirements.

Elements of the Performance

- prepare technical documentation such as operator procedures, maintenance procedures, repair procedures, and installation procedures
- interpret and use information from technical manuals
- manage electronic and/or paper-based systems to store and retrieve information
- maintain current, clear, and accurate electromechanical engineering-related documents
- use records and inventories to prepare reports
- prepare and maintain parts inventory and installation records
- prepare and maintain maintenance and service logs
- document clearly work processes such as problem-solving methodologies, troubleshooting procedures, and prototype evolution (e.g., problems, modifications)
- follow established procedures of inventory control
- document the design, testing, modification, and application of electrical, electronic, and mechanical equipment and systems

10. The graduate has reliably demonstrated the ability to select and purchase electromechanical equipment, components, and systems that fulfill job requirements and functional specifications.

Elements of the Performance

- research and identify potential sources of equipment, components, and systems
- select and troubleshoot motors and drives
- contact clients, manufacturers, consultants, and suppliers to obtain information required to select and purchase appropriate equipment, components, and systems
- determine requirements and functional specifications of equipment, components, and systems for procurement
- recommend appropriate equipment, components, and systems
- determine adequate substitutes when necessary
- select equipment, components, and systems by consulting manufacturers' specifications, catalogues, and electronic sources (e.g., Internet, cloud-based)
- research, collect, process, and interpret data necessary to complete the purchasing process
- recognize the importance of using standardized parts to facilitate troubleshooting and reduce spare parts inventory

11. The graduate has reliably demonstrated the ability to

assist in applying quality control and quality assurance program procedures to meet organizational standards and requirements..

Elements of the Performance

- follow maintenance schedules and apply preventive and predictive maintenance techniques
- observe, record, assess, and report compliance with appropriate maintenance procedures and specifications
- inspect components using appropriate measuring instruments as required
- report test results in accordance with organizational maintenance procedures and specifications
- apply knowledge of maintenance procedures and programs to improve work performance
- apply functional specifications, procedures, and relevant standards applicable to electromechanical engineering
- select and use appropriate procedures, measurement, and testing equipment
- program test equipment to generate appropriate test vectors

12. The graduate has reliably demonstrated the ability to

work in compliance with relevant industry standards, laws and regulations, codes, policies and procedures.

Elements of the Performance

- follow appropriate procedures and practices (e.g., Lockout/Tagout Standard) to ensure proper shutdown of equipment before maintenance and servicing activities are performed
- adhere to applicable workplace codes including those relating to electrical and mechanical work environments, explosive environments, hazardous material handling, and safety
- demonstrate understanding of and follow safe working practices for working with high voltage, fault current, bonding, grounding, and arc flash
- comply with all relevant occupational health and safety requirements and applicable sections of the Technical Standards and Safety Authority (TSSA) and the Ontario Electrical Safety Code (OESC)
- follow all relevant policies and practices established by government agencies (e.g., the Occupational Health and Safety Agency, the Ministry of Labour, the Ministry of the Environment)
- test, store, and handle electrical, electronic, and mechanical equipment according to industry standards (e.g., American National Standards Institute, electrical codes)
- apply regulatory and licensing requirements (e.g., NEMA ratings) when completing installations, maintenance, and repairs of electrical, electronic, and mechanical equipment
- conduct safety inspections of the workplace to detect, report, and correct, where possible, hazardous conditions
- recognize legal principles affecting contracts with clients
- comply with work specifications and other technical documents
- understand and respect workers' rights, including those related to safety.
- apply knowledge of safety products such as safety relays and safety interlock devices and ground fault circuit interrupters
- respond appropriately to emergency situations according to organizational practices and procedures
- adhere to organizational policies, such as workplace discrimination, harassment and violence prevention policies, that strengthen an inclusive, equitable, respectful, safe and co-operative workplace environment
- 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
- apply principles of environmental sustainability to all aspects of electro-mechanical engineering processes

13. The graduate has reliably demonstrated the ability to formulate strategies for ongoing personal and professional development to enhance work performance and to remain current in the field.

Elements of the Performance

- apply a systematic approach to career decision making
- keep abreast of changes in the field of electromechanical engineering
- take into account the importance of active participation in professional associations and acquisition of professional certification
- use appropriate self-management techniques (e.g., time management, stress management)
- recognize the importance of ongoing professional development to enhance general job performance

14. The graduate has reliably demonstrated the ability to contribute as an individual and a member of an electromechanical engineering team to the effective completion of tasks and projects.

Elements of the Performance

- Contribute to the achievement of project goals and objectives while honouring the constraints of the project and the roles and responsibilities of other team members
- Use interpersonal skills adapted to the requirements of the project and the team to achieve desired outcomes
- Contribute to a team project or group decision-making process by applying group dynamics, conflict resolution, and negotiation techniques
- Outline the steps that assess the success of a project
- assist in the instruction and supervision of other workers
- apply principles of customer service when dealing with customers
- apply teamwork, self-management, and interpersonal knowledge and skills when communicating and working with clients, coworkers and supervisors as an employee and as a member of diverse local and multinational teams
- willingly accept a variety of assigned tasks
- exhibit cross-cultural awareness and sensitivity in professional interactions and communications
- work as an effective team player to complete tasks while promoting a positive work environment

15. The graduate has reliably demonstrated the ability to

support project management activities such as planning, implementation and evaluation of projects, and monitoring of resources, timelines, and expenditures as required.

Elements of the Performance

- assist in the development of cost benefit analyses
- assist in project management tasks including budget control, time-line control, resources management, and personnel management
- participate in meetings in a variety of work-related roles
- assist in the analysis of work activities in engineering environments through the appropriate use of data sampling and recording methods and the presentation of charts, diagrams, models, and reports
- prepare and deliver oral presentations to communicate project informatio

Glossary

Fluid Power is the study of Hydraulics and Pneumatics. It includes, but is not limited to, the design of control/logic systems and related component/system theory, including the properties of fluids, for both Hydraulic and Pneumatic systems.

III. Essential Employability Skills

All graduates of the Electromechanical 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 Electromechanical 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.