



Computer Programming Program Standard

The approved program standard for Computer Programming programs of instruction leading to an Ontario College Diploma delivered by Ontario Colleges of Applied Arts and Technology (MTCU funding code 50503).

Ministry of Training, Colleges and Universities
November 2018

Acknowledgements

The Ministry of Training, Colleges and Universities acknowledges with thanks the significant contribution of the many individuals and organizations which participated in the development of this program standard. In particular, the Ministry of Training, Colleges and Universities would like to acknowledge the important roles of

- all individuals and organizations which participated in the consultations
- the Deans of Computer programs
- the faculty and coordinators of the Computer Programming (Ontario College Diploma) programs for their assistance throughout the project
- Bill Fallis, the Project Officer who led the development of the English vocational learning outcomes and Louise Campagna, the Project Officer who led the French review.

Table of contents

Computer Programming Program Standard	1
Acknowledgements.....	2
Table of contents	3
Introduction	1
Development of system-wide program standards.....	1
Program standards	1
The expression of program standards as vocational learning outcomes	2
The presentation of the vocational learning outcomes	2
The development of a program standard.....	2
Updating the program standard	3
Vocational standard	4
Preamble.....	4
Computer Programming (Ontario College Diploma).....	6
The vocational learning outcomes.....	8
List of Abbreviations.....	21
Essential employability skills	22
Context	22
Skill categories	22
Application and implementation.....	23
General education requirement	25
Requirement.....	25
Purpose	25

Introduction

This document is the Program Standard for the Computer Programming programs of instruction leading to an Ontario College Diploma delivered by Ontario Colleges of Applied Arts and Technology (MTCU funding code 50503).

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 Unit of the Ministry of Training, Colleges and Universities has 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 from 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 Training, Colleges and Universities will undertake regular reviews of the vocational learning outcomes for this program to ensure that the Computer Programming 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

Vocational standard

All graduates of Computer Programming programs have achieved the [thirteen vocational learning outcomes \(VLOs\)](#), in addition to achieving the essential employability outcomes and meeting the general education (GE) requirement.

Preamble

Increasingly, individuals and organizations look to computers, be they stand-alone or networked, to optimize workflow, establish a presence in global markets, improve communication, and just generally improve productivity. This pervasive integration of computers and their associated technologies has led to a vast array of job opportunities in the creation, integration, and support of information technology.

Ontario colleges of applied arts and technology offer a wide variety of information technology programs that prepare graduates for both existing and emerging opportunities in our society. At the heart of the information technology education provided to Ontario college students is the ability to think critically, solve problems, and acquire new skills quickly. While these abilities are practised and enhanced in the context of a particular expertise, they are also transportable, with a reasonable training period, to other areas of expertise involving computers and their associated technologies.

Graduates of Computer Programming Programs have honed their abilities, acquiring the expertise to develop, test, and deploy program code. As such, graduates are able to work individually or as part of a team to gather business requirements and support the recommendations for the improvement or automation of organizational workflow that correspond to the day-to-day requirements of individuals and organizations. From customizing software installations to performing routine maintenance of a database or code, graduates work in a broad range of employment settings in a variety of sectors in both large and small organizations.

Recently Computer Programming graduates have been hired into the following positions including: computer programmers and interactive media developers; web designers and developers; information systems analysts and consultants, and user support technicians.

While the vocational learning outcomes for programs, such as Computer Programming, articulate the depth and breadth of skills, knowledge, and attitudes required by graduates when entering the work force, individual college programs may choose to build on this standard by offering some degree of specialization. Irrespective of the specialization, graduates' learning is significantly enhanced by opportunities for as much practical experience as is feasible during their time in the program.

There are many opportunities for graduates to pursue further educational qualifications;

graduates may be granted credits towards a degree or certification through articulation agreements between the colleges and universities. Students should contact individual colleges for further details of a college's articulation agreements.

To be successful in an information technology environment requires an ongoing commitment from the graduate to continue to update his/her skills to stay current in this rapidly changing field. Making use of knowledge and experience gained during their studies, graduates may also choose to apply for professional designations from provincial, national, and international organizations as a further demonstration of their commitment to keep their skills current.

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

Synopsis of the vocational learning outcomes

Computer Programming (Ontario College Diploma)

Vocational Learning Outcomes (VLOs) 1 to 8 are common core outcomes that apply to all programs in the MTCU codes; 50503, 50504, 50505, and 50509. VLOs 9 to 13 are outcomes that relate specifically to Software Engineering Technician programs.

The graduate has reliably demonstrated the ability to:

1. identify, analyze, develop, implement, verify and document the requirements for a computing environment.
2. contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools.
3. implement and maintain secure computing environments.
4. implement robust computing system solutions through validation testing that aligns with industry best practices.
5. communicate and collaborate with team members and stakeholders to ensure effective working relationships.
6. select and apply strategies for personal and professional development to enhance work performance.
7. apply project management principles and tools when working on projects within a computing environment.
8. adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems.
9. support the analysis and definition of software system specifications based on functional and non-functional requirements.
10. contribute to the development, documentation, implementation, maintenance and testing of software systems by using industry standard software development methodologies based on defined specifications and existing technologies/frameworks.
11. apply one or more programming paradigms such as, object-oriented, structured or functional programming, and design principles, as well as documented requirements, to the software development process.

12. model, design, implement, and maintain basic data storage solutions.

13. contribute to the integration of network communications into software solutions by adhering to protocol standards.

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: identify, analyze, develop, implement, verify and document the requirements for a computing environment.

Elements of the performance

- a. Recognize the advantages and disadvantages of selecting various network structures and protocols in the design of a solution.
- b. Apply knowledge of a variety of analysis, design, and development concepts and methodologies.
- c. Analyze, design, develop, and maintain effective user interfaces.
- d. Prepare, present, and maintain current, clear, and accurate documentation.
- e. Apply industry standard tools to support documentation of hardware/software design.
- f. Apply a basic understanding of requirements determination and requirements gathering techniques to computing tasks.

2. The graduate has reliably demonstrated the ability to: contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools.

Elements of the performance

- a. Contribute to the formulation of troubleshooting procedures taking into account the problem and the environment.
- b. Document procedures and policies for keeping security systems up-to-date.
- c. Assist in monitoring, reviewing, and assessing the effectiveness of the troubleshooting procedure.
- d. Document the troubleshooting procedure clearly.
- e. Follow troubleshooting procedures and explain them clearly to others.
- f. Assess the impacts of the environment (e.g. hardware, software, operating system) on the installation and customization of computing systems.
- g. Document clearly the design conditions for the implementation and configuration of a solution.

3. The graduate has reliably demonstrated the ability to: implement and maintain secure computing environments.

Elements of the performance

- a. Describe the relationship between business continuity management and **ICT*** disaster recovery.
- b. Define key elements of a business impact analysis and a risk assessment.
- c. Implement backup and recovery solutions for business and organizational needs.
- d. Apply incident identification, evaluation and management to security and recoverability strategies for components of applied computing environments, e.g. networks, data, and applications.
- e. Assist in the documentation of recovery plans, and test concepts.
- f. Assist in the development and maintenance of appropriate security solutions for the protection of computing systems.
- g. Assist in conducting recovery tests, maintenance and update plans.
- h. Assist in the design, development, and testing of computing systems with respect to security against intrusion and the protection of data.
- i. Incorporate industry-standard security into the development of program code.
- j. Assist in the identification and assessment of vulnerabilities in deployed IT systems.

* [See list of abbreviations](#)

4. The graduate has reliably demonstrated the ability to: implement robust computing system solutions through validation testing that aligns with industry best practices.

Elements of the performance

- a. Minimize risk to clients when deploying computing system solutions by contributing to risk analysis.
- b. Apply knowledge of a variety of techniques to test and debug computing solutions.
- c. Assist in the selection of appropriate testing methodologies based on specifications, and document results of tests.
- d. Assist in the development and organizing of unit and integration testing.
- e. Prepare and complete systems tests, including user acceptance tests.
- f. Assist in the identification of security risks and mitigations.

5. The graduate has reliably demonstrated the ability to: communicate and collaborate with team members and stakeholders to ensure effective working relationships.

Elements of the performance

- a. Identify strategies for communication success in academic, personal and career areas in order to develop and maintain effective working relationships.
- b. Facilitate communication and workflow among project team members including online chat, video-conferencing or collaborative document production.
- c. Use appropriate language, terminology and etiquette in both face-to-face and electronic communication with team members and stakeholders.
- d. Investigate, plan and create documents for computing requirements, by applying critical thinking skills.
- e. Create effective messages, both oral and written, that accurately reflect the audience and the purpose.
- f. Gather and analyze information from a variety of sources to assist in analyzing communication and business situations.
- g. Document sources using appropriate writing protocols for technical communication.
- h. Create effective reports, presentations and charts, to convey applicable project information to team members and stakeholders.

6. The graduate has reliably demonstrated the ability to: select and apply strategies for personal and professional development to enhance work performance.

Elements of the performance

- a. Seek out and utilize external resources, including mentors, to support one's own learning goals.
- b. Exercise critical thinking skills when searching for information from various sources, including the Internet.
- c. Provide mutual support and feedback to peers using online sharing and communication tools.
- d. Recognize personal limits and seek assistance in a timely manner to resolve problems beyond one's own knowledge and skills.
- e. Identify and utilize various forms of content media in the pursuit of professional development.
- f. Recognize learning needs and develop adaptive strategies to expand one's personal and professional knowledge.
- g. Identify appropriate professional/trade organizations that support personal and professional development.
- h. Remain current with relevant technological change that could have an impact on the workplace.
- i. Identify appropriate information related to quality programs, practices, processes, and procedures which apply to the computing environment e.g. from **ISO***, **IEEE***, **ACM***, **CTAB***, **TAC***, **CIPS***.

* [See list of abbreviations](#)

7. The graduate has reliably demonstrated the ability to: apply project management principles and tools when working on projects within a computing environment.

Elements of the performance

- a. Participate in the planning, identification, scheduling, and assigning of tasks and resources involved in a project.
- b. Contribute to the monitoring of resources and expenditures to maintain cost effectiveness and timelines of a project, as required.
- c. Assist in consolidating project updates at regular intervals.
- d. Assist in estimating the time and cost required to complete project elements.
- e. Complete project elements according to schedule.
- f. Assist in the interpretation and use of relevant project planning documents and tools.
- g. Assist in identifying problems that will affect the project timeline and recommend changes as soon as possible.
- h. Maintain current, clear, and accurate project-related documents which adhere to organizational and industry standards and procedures.
- i. Apply project management software to various types of projects.
- j. Respond to changing requirements throughout the life cycle of a project.

8. The graduate has reliably demonstrated the ability to: adhere to ethical, legal, and regulatory requirements and/or principles in the development and management of computing solutions and systems.

Elements of the performance

- a. Identify special issues or constraints around projects regarding ethical, legal, and regulatory considerations.
- b. Research and report on ethical, legal, and regulatory considerations within the computing industry.
- c. Adhere to and advocate for ethical principles and standards.
- d. Apply knowledge of existing confidentiality, privacy, and reporting regulations to daily work.
- e. Comply with licensing requirements.
- f. Comprehend and apply guidelines from various computing sources that prescribe quality programs, practices, processes, and procedures.
- g. Maintain professional and honest relationships with stakeholders.
- h. Evaluate the ethical implications of information handling within computing solutions and systems.
- i. Discuss the ethical issues related to current and emerging technologies, such as Artificial Intelligence, data ownership, data privacy, etc. and comply with legislative and workplace policies, and, if applicable, suggest appropriate changes.
- j. Apply knowledge of confidentiality and privacy regulations, e.g. **FIPPA*** and other pertinent regulatory frameworks and/or compliancy requirements that apply to personal information collection, storage and distribution.

* [See list of abbreviations](#)

9. The graduate has reliably demonstrated the ability to: support the analysis and definition of software system specifications based on functional and non-functional requirements.

Elements of the performance

- a. Describe **SDLC*** and the development phases.
- b. Compare the approaches to system development; e.g. traditional, **RAD***, and agile development.
- c. Generate project requirements through requirements gathering techniques, and the analysis of business cases.
- d. Describe the role of models for design.
- e. Apply appropriate software development methodologies to support modelling of software system requirements.
- f. Apply principles of systems analysis and design to understand and define the scope of business **IT*** problems.
- g. Describe the specifications of a system based on requirements.
- h. Apply appropriate methodologies for the analysis and design phases.
- i. Deploy test plans to validate system requirements.
- j. Use best practices for project control with respect to business principles, such as teamwork, scheduling and communications.
- k. Design interactive web user-interfaces using storyboarding and wireframe prototyping techniques.

* [See list of abbreviations](#)

10. The graduate has reliably demonstrated the ability to: contribute to the development, documentation, implementation, maintenance and testing of software systems by using industry standard software development methodologies, based on defined specifications and existing technologies/frameworks.

Elements of the performance

- a. Describe **SDLC*** and the development phases.
- b. Contribute to the development, testing, documentation, and deployment of applications based on specifications.
- c. Follow a process for developing and testing software systems.
- d. Apply appropriate version control and debugging methods to maintain program integrity.
- e. Assist in creating program logic in a manner consistent with business programming standards.
- f. Apply the core elements of a programming language, e.g. constants, variables and expressions, input and output, branching and looping, arrays, functions, and strings for software systems development.
- g. Compare the approaches to system development e.g. traditional, **RAD*** and agile when developing software systems.
- h. Describe **SDLC*** as it relates to the development of a specific software system.
- i. Contribute to the assessment, selection and use of appropriate tools and techniques to develop and maintain programs.
- j. Deploy test plans to verify requirements are met.

* [See list of abbreviations](#)

11. The graduate has reliably demonstrated the ability to: apply one or more programming paradigms such as, (e.g. object-oriented, structured or functional programming,) and design principles, as well as documented requirements, to the software development process.

Elements of the performance

- a. Design, test, document, and deploy object-oriented and other types of programming applications based on basic specifications.
- b. Apply the concept of encapsulation through the design of simple classes.
- c. Assist in implementing ad-hoc polymorphism through overloaded methods or overloaded operators.
- d. Apply the concept of inheritance through the design of base and derived classes.
- e. Assist in implementing inclusion polymorphism through the design and use of abstract classes, interfaces or generics.
- f. Implement collection classes, such as linked lists or vectors.
- g. Assist in implementing parametric polymorphism / generics.
- h. Illustrate the effective use of a pre-determined set of abstract data types.
- i. Apply appropriate design architectures to the software development process.
- j. Apply elements of **UI*** design to enhance user experience.

* [See list of abbreviations](#)

12. The graduate has reliably demonstrated the ability to: model, design, implement, and maintain basic data storage solutions.

Elements of the performance

- a. Use various methods to create, update, filter, sort, validate and manage basic data storages tables, and queries.
- b. Create **SQL***, **DML***, **DDL*** and **DCL*** statements for basic data retrieval, filtering, sorting and definition.
- c. Analyze an organization's data requirements.
- d. Follow data storage practices and procedures to maintain a basic data storage for an organization.
- e. Follow database practices and procedures to create a basic database design for an organization.
- f. Prepare a basic data storage design report for an organization.
- g. Develop application code to incorporate data access for report generation.
- h. Apply normal forms to eliminate data redundancies in a database.
- i. Propose, justify, design and develop a basic integrated data storage solution based on an analysis of the business environment.
- j. Assist in the design, test, documentation, and deployment of data-driven application programs based on client requirements.

* [See list of abbreviations](#)

13. The graduate has reliably demonstrated the ability to: contribute to the integration of network communications into software solutions by adhering to protocol standards.

Elements of the performance

- a. Apply the devices and services used to support communications in data networks found in business environments according to current industry standards when developing software.
- b. Apply network protocols in data networks found in business environments, when developing software.
- c. Address and name schemes at various layers of data networks in **IPv4*** and **IPv6*** environments in keeping with industry best practices, when developing software.
- d. Apply subnet masks and addresses to fulfill basic requirements in **IPv4*** and **IPv6*** networks found in business environments in keeping with industry best practices.
- e. Build a simple Ethernet network using routers and switches as would be found in a business environment utilizing current technologies and techniques.
- f. Use appropriate tools to perform basic router and switch configurations for business environments according to current industry standards.
- g. Apply knowledge of multi-tier system architecture when designing a software system.
- h. Recognize the risk of data loss and data corruption in a networked environment.
- i. Apply knowledge of network and data security procedures and protocols when developing, deploying and maintaining programs.

* [See list of abbreviations](#)

List of Abbreviations

ACM: Association for Computing Machinery

CIPS: Canadian Information Processing Society

CTAB: Canadian Technology Accreditation Board

DCL: Data Control Language

DDL: Data Definition Language

DML: Data Manipulation Language

FIPPA: Freedom of Information and Protection of Privacy Act

ICT: Information and Communication Technologies

IEEE: Institute of Electrical and Electronics Engineers

IPv4: Internet Protocol, version 4

IPv6: Internet Protocol, version 6

ISO: International Organization for Standardization

IT: Information Technology

RAD: Rapid Application Development

SDLC: System Development Life Cycle

SQL: Structured Query Language

TAC: Technology Accreditation Canada

UI: User Interface

Essential employability skills

All graduates of the Computer Programming program of instruction must have reliably demonstrated the essential employability skills learning outcomes listed below, 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.

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.

General education requirement

All graduates of the Computer Programming program must have met the [general education requirement](#) described below, 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 Ontario 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.

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.

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.

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.

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.

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.

Permission to reproduce

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

1. By an Ontario College of Applied Arts and Technology for the purposes of implementation of the program standard within a college program, including for the purpose of informing students, potential students, program advisory committees or others about programs of study.
2. By an educational institution or school, for the purpose of informing prospective college students about programs of study at Ontario Colleges of Applied Arts and Technology.

Conditions:

1. Every reproduction must be marked “© 2018, Queen’s Printer for Ontario” at the beginning of the document or any part of it that is reproduced.
2. No other uses may be made of the document.
3. The document may not be reproduced for sale.
4. The Ministry may revoke the permission to reproduce at any time.

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

Ministry of Training, Colleges and Universities
Postsecondary Education Quality Assessment Branch, Program Standards Unit

psu@ontario.ca

Inquiries regarding specific Computer Programming programs offered by Colleges of Applied Arts and Technology in Ontario should be directed to the relevant college.

© 2018, Queen’s Printer for Ontario

978-1-4868-2895-1 PDF