Architectural Technology Program Standard

The approved program standard for Architectural Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology. (MTCU funding code 60600)

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Inquiries regarding specific Architectural 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 Architectural Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario colleges of applied arts and technology (MTCU funding code 60600).

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 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 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 Training, Colleges and Universities will undertake regular reviews of the vocational learning outcomes for this program to ensure that the Architectural 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, contact the Ministry of Training, Colleges and Universities at the address or telephone number noted on the inside cover page.

II. Vocational Standard

All graduates of the Architectural Technology program of instruction must have achieved the 15 vocational learning outcomes listed in the following pages, in addition to achieving the essential employability skills learning outcomes and meeting the general education requirement.

Preamble

Graduates of the Architectural Technology Program, through successful achievement of the vocational standard and the essential employability skills, have the knowledge, skills, and attitudes that are necessary to perform their roles according to recognized Architectural Technology practices. Graduates are able to participate in the design* of buildings and building use by communicating architectural and related information effectively through the use of architectural drawings and other graphical representations. Graduates use design* solutions to meet established design* criteria through the application of relevant mathematical and building science* principles, and practices. This work requires the application of design* tools such as Computer-Aided Design (CAD) and two and three dimensional modelling. Graduates promote sustainability in the building industry through the application of sustainable design* and building practices. In addition, they will be able to evaluate assignments, establish objectives, set parameters, and determine appropriate procedures and actions. Finally, graduates adhere to applicable laws, exercise due diligence in the workplace, adhere to relevant building codes and standards, safety practices, and work in accordance with labour management principles and practices.

Graduates are prepared to assume responsibility for their work and may work independently as a self-employed architectural technologist or interdependently as part of an architectural or multidisciplinary building team. Also, graduates are prepared to contribute to the management of building projects.

For graduates of the Architectural Technology Program, there are employment and career opportunities in a variety of areas of business, industry, government, and public organizations. Graduates may find employment in careers including the design* of buildings, building interiors, or building systems; interpretation or preparation of specifications*, drawings, or instructions; sales and marketing; purchasing operations, field and customer service, building inspection, estimating, regulation enforcement, quality management, and production control; and management and supervision of building projects. With experience and ongoing professional development, graduates will be able to enhance their professional competence and expand their scope of work. Following a period of satisfactory performance in the workplace and professional upgrading, the graduate may pursue certification through several professional associations.

Graduates may, through articulation agreements between colleges and universities, be granted credits towards relevant degrees and certificates. Students should contact individual colleges for further details of a college's articulation agreements with other institutions or professional associations.

* See Glossary

Synopsis of the Vocational Learning Outcomes
Architectural Technology (Ontario College Advanced Diploma)

The graduate has reliably demonstrated the ability to

1.   **communicate with clients, contractors, other building professionals, and approval authorities.**
2.   **prepare, read, interpret, and revise drawings, and other graphical representations used in building projects.**
3.   **obtain, analyze, prepare, and revise specifications* and other project documents used in design* and construction.**
4.   **prepare estimates of time, costs, and quantity, and participate in the tendering process.**
5.   **solve technical problems related to building projects through the application of principles of building science* and mathematics.**
6.   **collaborate with and coordinate information from structural, mechanical, and electrical building systems professionals.**
7.   **contribute to the design* of architectural projects.**
8.   **contribute to the analysis, planning, and preparation of site planning documents.**
9.   **comply with the legal and ethical requirements of an architectural technologist in the practice of building design* and construction.**
10. **assess buildings and their interiors, and make recommendations for their repurposing and renovation.**
11. **ensure personal safety and contribute to the safety of others in the workplace.**
12. **participate in sustainable design* and building practices.**
13. **use and evaluate current and emerging technology to support building projects.**
14. **assist in the planning, scheduling, and monitoring of building projects.**
15. **apply business principles to design* and building practices.**

* 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*

communicate with clients, contractors, other building professionals, and approval authorities.

Elements of the Performance

- contribute to the writing and preparation of technical documents using industry terminology, style, and format;
- present and defend technical reports;
- interpret and communicate technical drawings and architectural concepts
- communicate technical information to clients;
- assist in the writing and preparation of proposals and contract documents*;
- prepare and deliver presentations;
- select and utilize current communications technology appropriately;
- employ accurate and timely oral, written, and graphic communication, with members of the building team;
- complete accurate and timely project related reports;
- complete accurately information and application forms for project development;
- employ appropriate business communication protocol.

* See Glossary

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

prepare, read, interpret, and revise drawings, and other graphical representations used in building projects.

Elements of the Performance

- collect, organize, and interpret graphical information for building projects;
- produce design* drawings, including two dimensional representations and three dimensional models and renderings;
- produce working drawings and details using current technology;
- prepare accurate and effective design* drawings employing freehand, hard-line and electronic drawing techniques;
- identify and apply current industry standards in the layout of drawings, and in the use of scales and drawing elements including graphic symbols;
- read and interpret architectural drawings.

* See Glossary

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

obtain, analyze, prepare, and revise specifications* and other project documents used in design* and construction.

Elements of the Performance

- identify relevant data sources and develop appropriate strategies for data collection;
- work with a variety of written specification types, and local, provincial, and federal codes including prescriptive and performance based criteria;
- coordinate the specifications* prepared by other building professionals;
- coordinate specifications* with design* drawings;
- interpret and assist in the preparation of specifications* using standard formats such as the National Master Specification (NMS);
- organize, write, and produce technical reports, schedules, letters, and other project documentation;
- coordinate specifications* with contract documents*;
- assist in the preparation of building products research.

* See Glossary

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

prepare estimates of time, costs, and quantity, and participate in the tendering process.

Elements of the Performance

- collect, collate, and organize data from drawings and specifications*;
- list quantity take-offs for use in preparing estimates for building projects;
- use appropriate known values, standards, handbooks, and tables of unit prices in preparing estimates at different design* stages;
- use current technology in the preparation of estimates;
- assist in the preparation of estimates for equipment and labour costs for building projects;
- assist in the preparation of budgets;
- assist in the preparation of tender documents by calling for tenders, and receiving, analyzing, and recommending contract award;
- identify major types and elements of construction contracts, including and not limited to Canadian Construction Document Committee (CCDC)* documents;
- assist in the review and preparation of contracts to ensure compliance with legal requirements and standards related to the tendering process.

* See Glossary

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

solve technical problems related to building projects through the application of principles of building science* and mathematics.

Elements of the Performance

- identify and access sources of technical information;
- investigate, evaluate, and recommend building materials and construction practices;
- solve architectural detailing problems through the application of principles of building science*;
- prepare architectural details which demonstrate control of air and water migration;
- prepare architectural details which demonstrate control of heat loss and energy efficiency;
- utilize knowledge of statics, strength of materials, and building structure analysis in solving building problems;
- solve technical problems using geometry, algebra, and trigonometry;
- analyze alternative solutions to technical problems;
- apply principles of sustainability through design*, selection of building materials, and construction methods.

* See Glossary

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

collaborate with and coordinate information from structural, mechanical, and electrical building systems professionals.

Elements of the Performance

- detail the use of concrete, masonry, structural steel, plastic, composite materials, and wood products in the design* of structures;
- provide relevant architectural information in the design* and specification of structural and electrical systems;
- provide relevant architectural information in the design* and specification of mechanical systems, including heating, ventilation, and air conditioning (HVAC) systems, plumbing, and fire protection systems;
- interpret structural, mechanical, and electrical (SME) systems drawings, specifications*, codes, standards, and technical literature;
- coordinate SME systems documentation with architectural documentation;
- identify the specific roles of SME professionals in the building process;
- apply basic knowledge of SME systems to collaborate with other building professionals;
- read, analyze, and integrate SME drawings in architectural design*;
- work within the role of the architectural technologist as a member of a multidisciplinary team to design, implement, complete, and evaluate building projects.

* See Glossary

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

contribute to the design* of architectural projects.

Elements of the Performance

- apply principles of architectural design*;
- design* building sub-systems, including building envelopes*, to suit user requirements and to accommodate effects of climate, region, topography, and orientation;
- identify client's requirements related to building design*;
- assess spatial and functional use requirements and contribute to conceptual design* solutions;
- apply principles of noise abatement, colour, and illumination theory to the design* of building interiors;
- apply barrier-free design* principles;
- apply principles of sustainable design* including the use of sustainable building assessment tools;
- investigate and apply criteria and requirements of codes and by-laws related to building design*;
- design small buildings independently, in accordance with legal and code limitations;
- assist in the interior design* of industrial, commercial, and institutional (ICI) buildings.

* See Glossary

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

contribute to the analysis, planning, and preparation of site planning documents.

Elements of the Performance

- read and interpret survey documents;
- use manual and/or electronic measuring instruments;
- participate in the site selection process and environmental impact analysis;
- identify required site services related to the building orientation and environmental factors;
- assess access opportunities and recommend ingress and egress routes;
- assess site topography and recommend building location and orientation;
- determine parking, loading, and vehicular and pedestrian site movement requirements and recommend design* solutions;
- determine maximum site coverage for required design* utilization;
- calculate building size based on applicable codes and zoning bylaws;
- assist in the preparation of site plans and documents for site plan control applications;
- prepare data matrix and building code reports;
- assist in the design* of a site grading plan;
- assist in the preparation of landscape plans;
- identify site inspection requirements and schedule site reviews.

* See Glossary

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

comply with the legal and ethical requirements of an architectural technologist in the practice of building design* and construction.

Elements of the Performance

- apply knowledge of the Ontario Building Code (OBC)*, zoning by-laws, building standards, and regulations;
- respect the legal requirements related to right-to-practice;
- identify and articulate workplace organizations and administrative hierarchies;
- demonstrate effective interpersonal relationships, teamwork, and self-management skills;
- evaluate situations of conflict in an unbiased manner;
- conduct work within the role of the architectural technologist in the design* and building industry;
- demonstrate competence and quality of work;
- participate in professional development activities to enhance knowledge and skills related to building design* and construction;
- demonstrate respect for diversity and equality in the workplace;
- promote the potential of technology for the betterment of society;
- comply with ethical requirements of architectural technology practice.

* See Glossary

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

assess buildings and their interiors, and make recommendations for their repurposing and renovation.

Elements of the Performance

- be familiar with industry recognized building measurement standards;
- carry out measurements of buildings;
- complete measured drawings of buildings;
- inspect and evaluate buildings and their interiors, and report existing conditions;
- prepare plans and specifications* for repurposing and renovation building projects;
- assist in the preparation and presentation of repurposing and renovation project proposals, documents, and reports.

* See Glossary

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

ensure personal safety and contribute to the safety of others in the workplace.

Elements of the Performance

- identify common hazards in the workplace and employ safe work practices;
- comply with the Workplace Hazardous Materials Information System (WHMIS);
- practice and promote fall prevention strategies;
- use personal protective equipment associated with the building industry;
- follow and promote industry safety practices related to mandatory job site postings;
- work in accordance with the *Occupational Health and Safety Act;*
- ensure that equipment, materials, and practices comply with safety standards and regulations.

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

participate in sustainable design* and building practices.

Elements of the Performance

- identify project stakeholders and obtain their input about building projects;
- identify potential environmental impact of building projects and recommend alternatives to minimize the impact;
- identify municipal, provincial, and federal acts that pertain to the environment;
- select, recommend, and evaluate sustainable design* strategies;
- keep up-to-date with available and emerging environmentally friendly building materials and systems;
- keep up-to-date with Canada Green Building Council Standards such as the Leadership in Energy and Environmental Design (LEED)*;
- promote sustainability for building design* and construction.

* See Glossary

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

use and evaluate current and emerging technology to support building projects.

Elements of the Performance

- develop and maintain computer skills relevant to architectural practice, including and not limited to the use of integrated modeling software;
- utilize the internet and emerging technology as sources of technical information pertaining to drawings and specifications*;
- import and integrate data between architectural drawings and database applications;
- use a variety of computer applications relevant to architectural practice, including and not limited to databases, spreadsheets, word processing, and presentation applications;
- evaluate software used in building projects;
- perform effective management of electronic architectural files including the application of file naming conventions.

* See Glossary

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

assist in the planning, scheduling, and monitoring of building projects.

Elements of the Performance

- apply project management principles, practices, and procedures;
- assist in the identification and documentation of project activities and tasks;
- develop a project schedule using project management software such as Critical Path Method (CPM) or Gantt Charts;
- assist in the preparation and processing of change orders, and progress and final billings, in accordance with contract provisions;
- apply cost control practices;
- assist in the planning, sequencing, phasing, and scheduling of work for building projects;
- assist in the preparation of building project status reports;
- facilitate and report on building project meetings;
- monitor contract compliance.

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

apply business principles to design* and building practices.

Elements of the Performance

- be self-directed and show initiative;
- establish working relationships with clients, consultants, and contractors;
- identify the opportunity for entrepreneurship within the architectural field;
- state the elements of a basic business plan;
- keep records and files as required;
- conform to usual business practices;
- describe risk management principles applicable to design* and building practices.

* See Glossary

Glossary

Building Science – the collection of scientific knowledge that focuses on the analysis and control of physical phenomena affecting buildings, including detailed analysis of building materials, building envelope* systems, and environmental controls.

Building Envelope – consists of the waterproof elements of a building which enclose conditioned spaces and systems through which thermal energy may be transferred to or from the exterior.

Canadian Construction Document Committee (CCDC) – a national joint committee responsible for the development, production, and review of standard Canadian construction contracts, forms and guides.

Contract Documents – forms of agreement between owner and contractor, specifications, and drawings defining the project.

Design – establishment and development of the project concept.

Leadership in Energy and Environmental Design (LEED) – a building environmental certification program developed and operated by the Canadian Green Building Council. The LEED Canada Rating System recognizes leading edge buildings that incorporate design, construction, and operational practices that combine healthy, high-quality, and high-performance advantages with reduced environmental impacts.

Ontario Building Code (OBC) – is a collection of regulations that regulate specific building practices, such as designing, constructing, or remodeling buildings. The purpose of the building code is to protect the health, safety, and welfare of the public and building occupants. The Ontario Ministry of Municipal Affairs and Housing administers the Ontario Building Code through application of the *Ontario Building Code Act*.

Specifications – written statements of building requirements describing the loading conditions, design practices, materials, and finishes relating to a specific building project.

Sustainable Design – a process that mitigates the possible negative effects on the environment and balances social, economic, and environmental priorities.

III. Essential Employability Skills

All graduates of the Architectural 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	3. *execute mathematical operations accurately.*
CRITICAL THINKING & PROBLEM SOLVING	• Analysing • Synthesizing • Evaluating • Decision making • Creative and innovative thinking	4. *apply a systematic approach to solve problems.* 5. *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	6. *locate, select, organize, and document information using appropriate technology and information systems.* 7. *analyze, evaluate, and apply relevant information from a variety of sources.*
INTERPERSONAL	• Team work • Relationship management • Conflict resolution • Leadership • Networking	8. *show respect for the diverse opinions, values, belief systems, and contributions of others.* 9. *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	10. *manage the use of time and other resources to complete projects.* 11. *take responsibility for one's own actions, decisions, and consequences.*

IV. General Education Requirement

All graduates of the Architectural 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 student's 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 fulfill 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, and 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 Canada 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 development 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.