Technical Education Program

221.C0

Building Systems Technology

Training Sector 7 Buildings and Public Works

Reach for your Dreams

Québec

Technical Education Program

221.C0

Building Systems Technology

Traning Sector

7

Buildings and Public Works

Formation professionnelle et technique
et formation continue

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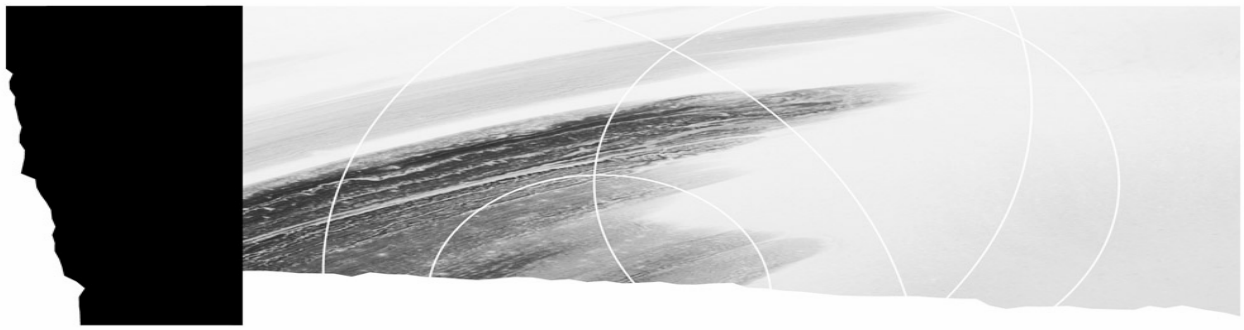


221.C0	**Building Systems Technology**

Year of approval: 2003

Certification:	Diploma of College Studies
Number of credits:	91 2/3 credits
Total duration:	2 670 hours of instruction

General education components:	660	hours of instruction
Program-specific component:	2 010	hours of instruction

Conditions for Admission:

To be admitted to the program, students must meet the general conditions for admission set out in section 2 of the *College Education Regulations*, as well as the following requirements, if applicable:

- Mathematics 436
- Physical Science 436

Introduction to the Program

The *Building Systems Technology* program is in keeping with the aims and orientations of technical education that guide the Ministère de l'Éducation. Designed in accordance with the framework for developing technical programs, this program is based on competencies, formulated in terms of objectives and standards.

The *Building Systems Technology* program includes a general education component common to all programs (16 2/3 credits), a general education component adapted to this program (6 credits), a complementary general education component (4 credits) and a program-specific component of 65 credits.

The program-specific component was also designed according to the framework for developing technical programs. This approach requires the participation of people working in the field and in education, and takes into account training needs, the job analysis and the general goals of technical education. The objectives and standards serve as the basis for the definition and the evaluation of learning activities, for which the colleges are responsible.

By successfully completing this program of study, students acquire not only the entry-level competencies required by the workplace to practise a trade or occupation, but also a range of knowledge, skills and attitudes that will ensure the students' versatility.

General Education Component Common to All Programs (16 2/3 credits)

0004 To analyze and produce various forms of discourse.

0005 To apply a critical approach to literary genres.

0006 To apply a critical approach to a literary theme.

00B2 To apply a logical analytical process to how knowledge is organized and used.

000G To apply a critical thought process to world-views.

0017 Appliquer les notions de base de la communication en français courant.

or

000A Communiquer en français avec une certaine aisance.

or

000B Communiquer avec aisance en français.

or

000C Traiter d'un sujet culturel et littéraire.

0064 To establish the role that being physically active plays amongst the lifestyle behaviours which promote health.

0065 To improve one's effectiveness when practising a physical activity.

0066 To demonstrate one's responsibility for being physically active in a manner which promotes health.

General Education Component Adapted to This Program (6 credits)

000L To communicate in the forms of discourse appropriate to one or more fields of study.

000U To apply a critical thought process to ethical issues relevant to the field of study.

0018 Appliquer des notions fondamentales de la communication en français, liées à un champ d'études.

or

000Q Communiquer en français dans un champ d'études particulier.

or

000R Communiquer avec aisance en français dans un champ d'études particulier.

or

000S Disserter en français sur un sujet lié au champ d'études.

Complementary General Education Component (4 credits)

000V To estimate the contribution of the social sciences to an understanding of contemporary issues.

000W To analyze one of the major problems of our time using one or more social scientific approaches.

000X To explain the general nature of science and technology and some of the major contemporary scientific or technological issues.

000Y To resolve a simple problem by applying the basic scientific method.

000Z To communicate with limited skill in a modern language.

0010 To communicate on familiar topics in a modern language.

0067 To communicate with relative ease in a modern language.

0011 To recognize the role of mathematics or informatics in contemporary society.

0012 To use various mathematical or computer concepts, procedures and tools for common tasks.

0013 To consider various forms of art produced by aesthetic practices.

0014 To produce a work of art.

Program-Specific Component **(65 credits)**

01UJ To analyze the job function.
01UK To take responsibility for health and safety.
01UL To analyze the stresses, forces and loads applied to building mechanical systems.
01UM To analyze the conditions for fluid flow in building systems.
01UN To use a computerized workstation.
01UP To interpret drawings and specifications.
01UQ To solve problems related to building systems using mathematical principles.
01UR To establish relationships between the operation of plumbing and piping systems.
01US To check the operation of electrical control circuits.
01UT To establish relationships between heating systems and their operation.
01UU To establish relationships between ventilation and air conditioning systems and their operation.
01UV To establish relationships between refrigeration systems and their operation.
01UW To determine the technical specifications for automatic system control systems.
01UX To operate systems.
01UY To consult the regulations.
01UZ To check that the technical drawings and specifications comply with regulations.
01V0 To prepare technical drawings of systems.
01V1 To establish work relations.
01V2 To design plumbing and piping systems.
01V3 To design heating systems.
01V4 To design ventilation and air conditioning systems.
01V5 To design refrigeration systems.
01V6 To supervise system maintenance.
01V7 To balance hydraulic and pneumatic components of building mechanical systems.
01V8 To estimate costs related to building mechanical systems.
01V9 To perform technical sales tasks.
01VA To optimize the operation of building mechanical systems.
01VB To coordinate the installation of a system.

Glossary

Program

A program is an integrated set of learning activities leading to the achievement of educational objectives based on set standards (*College Education Regulations,* section 1).

Competency

In the program-specific component of a technical program: a competency is the ability to act successfully and evolve in order to adequately perform work-related tasks and activities based on an organized body of knowledge, skills in a variety of fields, perceptions, attitudes, etc. (*Élaboration des programmes d'études techniques*, *Cadre-général – Cadre technique 2002*, p. 15).

Objective

An objective encompasses the competency, skills or knowledge to be acquired or mastered (*College Education Regulations,* section 1). It describes the competency to be acquired and includes the statement of the competency as well as the elements needed to understand it.

Statement of the Competency

In the program-specific component of a technical program, a statement of the competency is derived from the job analysis, the general goals of technical education and, in certain cases, other determinants. In the general education components, the statement of the competency is the result of an analysis of general education needs.

Elements of the Competency

In the program-specific component of a technical program, the elements of the competency include only what is necessary in order to understand the competency. They specify the major steps involved in carrying out a task or the main aspects of the competency.

In the general education components, the elements of the objective, formulated in terms of a competency, specify the main aspects of the competency. They include only what is necessary in order to understand and attain the competency.

Standard

A standard is the level of performance at which an objective is considered to be achieved (*College Education Regulations,* section 1).

Achievement Context

In the program-specific component of a technical program, the achievement context corresponds to the situation in which the competency is exercised at entry level on the job market. The achievement context does not specify the context for learning or evaluation.

Performance Criteria

In the program-specific component of a technical program, the performance criteria define requirements by which to judge the attainment of each element of the competency and, consequently, of the competency itself. The performance criteria are based on the requirements at entry level on the job market. The performance criteria are not the evaluation instrument but, rather, they serve as a reference for the development of the evaluation instrument. Each element of the competency requires at least one performance criterion.

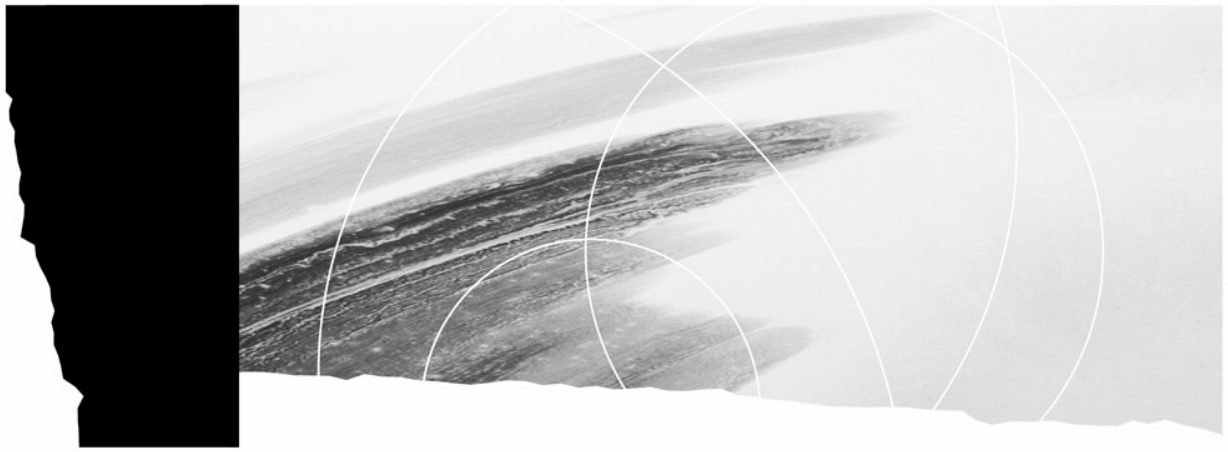
In the general education components, the performance criteria define the requirements for recognition of the attainment of the standard.

All the criteria must be respected for the objective to be recognized as having been attained.

Learning Activities

In the program-specific component of a technical program, the learning activities are classes (or labs, workshops, seminars, practicums or other educational activities) designed to ensure the attainment of the targeted objectives and standards. Colleges are entirely responsible for defining the learning activities and organizing the way in which programs are offered.

In the general education components, the elements of the learning activities that may be determined in whole or in part by the Minister are the field of study, the discipline(s), the weightings, the total hours of instruction, the number of credits and any details deemed essential.



Part I

Goals of the General Education Components

Educational Aims of the General Education Components

Objectives and Standards of the General Education Components

Goals of the General Education Components

In Québec, college is the next stage after the compulsory years of schooling in elementary and secondary school, during which students acquire basic knowledge and skills. It represents a major crossroads in that it places greater emphasis on the cultural content of education and leads directly to the job market or to university. The college system meets current needs with respect to technical and pre-university education. It allows students to further their education without narrowing their options, since they may switch from one type of program to the other. Finally, it provides students with a well-rounded, balanced education.

General education is an integral part of every program and comprises three components: a component common to all programs, a component adapted to the particular program and a complementary component. The aim of general education is threefold: to provide students with a common cultural core, to help them learn and develop generic skills, and to foster desirable qualities and attitudes. Its purpose is to educate students as individuals, to prepare them for their role as responsible members of society and to enable them to share in the common cultural heritage.

Common Cultural Core

The common cultural core is intended to help students:

- master the language of instruction as a tool for communication and reflection
- master the basic rules of rational thought, discourse and argumentation
- communicate in another language, primarily French or English
- be open to the world and to cultural diversity
- appreciate the riches of our cultural heritage through awareness of the accomplishments of human civilization
- relate to major currents in the history of human thought
- think independently and critically
- develop personal and social ethics
- acquire the knowledge essential for their physical and intellectual well-being
- become aware of the need to develop habits conducive to good health

Generic Skills

General education allows students to acquire and develop the following generic skills:

- conceptualization, analysis and synthesis
- coherent reasoning
- critical judgment
- articulate expression
- the ability to apply what they have learned to the analysis of situations
- the ability to apply what they have learned to decision making
- work methods
- the ability to reflect on what they have learned

Desirable Qualities and Attitudes

The common cultural core and generic skills help students acquire and develop the following qualities and attitudes:

- autonomy
- a critical sense
- awareness of their responsibilities toward themselves and others
- open-mindedness

- creativity
- openness to the world

These goals apply to the three general education components:

- General education component common to all programs, which is allotted 16 2/3 credits distributed as follows:

  – language of instruction and literature: 7 1/3 credits
  – humanities or *philosophie*: 4 1/3 credits
  – physical education: 3 credits
  – second language: 2 credits

- General education component adapted to programs, which introduces tasks or learning situations that are relevant to the program-specific component of a program. The breakdown of credits, for a total of 6, is as follows:

  – language of instruction and literature: 2 credits
  – humanities or *philosophie*: 2 credits
  – second language: 2 credits

- Complementary general education component, which provides students with learning activities chosen to balance their training and complement the program-specific component. Students may choose courses for a total of 4 credits in the following areas:

  – social sciences
  – science and technology
  – modern languages
  – mathematics and computer literacy
  – art and aesthetics

The knowledge and skills acquired in the general education components should be emphasized and, whenever possible, applied in the program-specific component, and vice-versa. Thus, general education and the program-specific component of a program enhance each other as they contribute to the students' overall education.

Each college-level institution must provide general education through learning activities that are consistent with its educational project, in keeping with the aims, subject areas and ministerial guidelines provided.

The objectives and standards in the general education components were developed according to the provisions of the *College Education Regulations* (R.S.Q., c. C-29, s. 18).

Educational Aims of the General Education Components

The educational aims describe how each field of study in the common, adapted and complementary components of general education contributes to achieving the goals of general education. For the common and adapted components, the educational aims include a general statement of the role of each field of study; the principles underlying this role; the expected outcomes that define, in terms of cultural knowledge, generic skills, and qualities and attitudes, the contribution of each field to the achievement of the goals of general education; and an explanation of the sequence of objectives and standards.

General Education Common to All Programs and General Education Adapted to Programs

English, Language of Instruction and Literature

General Education Common to All Programs

The three sets of objectives and standards in English, Language of Instruction and Literature, pursue two general goals: mastery of the language of instruction and exploration of the riches of the literary heritage. Achievement of these goals is intended to bring the students to a college level of proficiency in the areas of reading, writing, listening and speaking. Building on the skills developed by students on completion of secondary school, the English program places a marked emphasis on written production and reading comprehension while at the same time consolidating listening and speaking skills.

The mastery of language skills will be achieved through regular and ongoing observance of the rules of correct writing and speaking and the production of texts, supported by reading and the study of literature. Students will also be encouraged to develop an appreciation of literature by becoming acquainted with a number of significant literary works representative of various genres and periods and expressing a variety of literary themes. Both the aesthetic and cultural value of these texts and their formal aspects will be the objects of study.

All students entering college will begin their English studies with an introductory set of objectives and standards. This set has two possible formats. While both provide a range of reading, writing and literary activities, one includes additional reinforcement of reading and writing skills.

General Education Adapted to Programs

The set of objectives and standards for English, Language of Instruction and Literature, is placed in the context of general education and is a complement to the general education common to all programs. Students will develop the skills required in order to communicate in the forms of discourse appropriate to their field of study.

Expected Outcomes

Students, who have achieved the general education objectives in English, Language of Instruction and Literature, will be able to:

- demonstrate a college level of proficiency in the areas of reading, writing, listening and speaking
- develop their own ideas into arguments and theses, organize them and edit their work
- understand basic vocabulary and terminology used when discussing literature
- analyze literary works

Humanities

Humanities, as part of the core curriculum, is intended to promote personal and social development and to give students a foundation that will help them understand their roles in contemporary society as members of the labour force, citizens and individuals. The three sets of objectives and standards in Humanities propose common frameworks for understanding the experiences, ideas and values of human beings and their diversity. They are aimed at developing critical thinking, reinforcing the ancillary skills involved in careful reading, organized writing, and well-developed oral presentations, and, where appropriate, improving media and computer literacy. Once students have mastered the three-stage process of analysis, synthesis and evaluation, they will be able to reflect in an informed manner and to communicate what they have learned in an organized and coherent fashion.

Principles

1) Humanities constitutes a thematic, multidisciplinary, at times transdisciplinary, exploration of the human experience, including its accomplishments, failures, abilities, creations, ideas and values.
2) Humanities helps students to recognize, define and classify information and provides them with common frameworks for diverse methods of analyzing, synthesizing and evaluating conceptions of society, knowledge and values.
3) Humanities aims to prepare students for common civic responsibilities and the exercise of rights.
4) Humanities pursues the general goal of developing critical thought, valuing it and recognizing its limitations.

Expected Outcomes

Students who have achieved the general education objectives in Humanities will be able to:

- describe, explain and organize main elements, ideas, values and implications of a world-view in a coherent fashion
- compare world-views
- recognize the basic elements in a specific example of the organization, transmission and use of knowledge
- define the dimensions, limits, and uses of knowledge in appropriate historical contexts
- identify, organize and synthesize the salient elements of a particular example of knowledge
- situate important ethical and social issues in their appropriate historical and intellectual contexts
- explain, analyze and debate ethical issues in a personal and professional context

Sequence of Objectives and Standards

The first two sets of objectives and standards in Humanities, which are part of the general education component common to all programs, develop similar skills in a recursive fashion.

In the first set the emphasis is on how knowledge is defined, acquired, classified, transmitted and applied. Students examine both messages and media to identify the strengths and limitations of each. Students learn to situate knowledge in a social, historical and personal context, a skill they will need in order to become lifelong learners.

The second set focuses on how individuals, groups, societies or nations organize ideas, perceptions and values into explanatory patterns. Students explore major ideas and value systems by which diverse individuals, groups, societies or nations seek to explain the world and their place in it.

The third set, which is part of the general education component adapted to programs, is aimed at deepening and reinforcing the critical thinking skills developed in the first two sets. It is, therefore, sequenced so that students can build on the critical skills, knowledge and insights developed in the first two sets. By situating these issues in their appropriate world-view and knowledge contexts, students

develop a critical and autonomous approach to ethical values in general and to the values involved in their own fields of interest in particular. This final set also provides students with an opportunity to consolidate personal and social values.

Français, langue seconde

L'enseignement du français, langue seconde, contribue à la formation fondamentale de la personne, en même temps qu'il a pour objet de lui permettre de communiquer efficacement avec ses concitoyens et concitoyennes.

Principes

1) La maîtrise du français, langue seconde, est essentielle pour quiconque veut participer pleinement à la vie de la société québécoise, dont le français est la langue officielle. En conséquence, la formation générale en français, langue seconde, a pour finalité de rendre les étudiants et les étudiantes aptes à utiliser de façon efficace les moyens dont dispose la langue pour communiquer en société. À cette fin, ils devront acquérir des connaissances en vue de les déployer dans les formes de discours qu'il leur faudra pratiquer.
2) À leur arrivée au collégial, les étudiants et les étudiantes ont déjà acquis des compétences dans les quatre habiletés langagières, à savoir : parler, lire, écouter et écrire, mais sont, de façon générale, plus compétents en matière d'expression orale. En conséquence, la formation porte sur le développement des quatre habiletés langagières tout en mettant l'accent sur la lecture et l'écriture.
3) En tant que partie intégrante de la formation générale, le français, langue seconde, contribue au développement de la pensée critique et de l'expression structurée.

Résultats attendus

Tout étudiant ou toute étudiante qui a atteint les objectifs de formation générale en français, langue seconde, pourra, selon son niveau de compétence, montrer :

- que, sur le plan des connaissances, il ou elle :
  - sait faire une présentation orale structurée;
  - connaît les différentes formes du discours;
  - connaît les différentes techniques de lecture et d'écriture;

- que, sur le plan des habiletés, il ou elle :
  - est capable de questionner, d'analyser, de juger, et d'argumenter en français;
  - est apte à entretenir des rapports sociaux et à partager la vie culturelle du Québec;
  - est apte à établir, à poursuivre et à pratiquer des rapports professionnels en français;

- que, sur le plan des qualités et des attitudes à développer, il ou elle :
  - fait preuve d'ouverture par rapport aux différents aspects de la culture québécoise;
  - a conscience des différences et des similitudes entre sa culture d'origine et la culture québécoise francophone;
  - a la préparation voulue pour s'insérer dans la vie sociale et économique.

Séquence des objectifs et des standards

Pour répondre aux divers besoins d'apprentissage des étudiants et des étudiantes du collégial, les ensembles en français, langue seconde, sont répartis selon quatre niveaux. Chacun de ces niveaux permet d'amener les étudiants et les étudiantes à interpréter et à produire des textes de plus ou moins grande complexité.

La formation générale en français, langue seconde, comporte deux ensembles prévus en séquence. Le premier, qui fait partie de la formation générale commune à tous les programmes, a pour objet de

consolider les connaissances linguistiques déjà acquises et de les développer pour amener les étudiants et les étudiantes à communiquer de façon plus précise sur le plan tant du vocabulaire et de la syntaxe que de l'organisation textuelle.

Le second ensemble, qui fait partie de la formation générale propre aux programmes, s'appuie sur les acquis développés dans le premier ensemble en les enrichissant d'éléments de compétence liés aux champs d'études de l'étudiant ou de l'étudiante. On cherche à développer la précision de l'expression dans des situations de communication particulières qui relèvent du champ d'études de l'étudiant ou de l'étudiante.

Physical Education

Physical Education is aimed at promoting the development of the whole person and encouraging students to acquire responsible behaviours with respect to their health and quality of life.

Principles

1) Physical Education introduces students to different ways of being physically active with a view to making them aware that they are responsible for their health. Students learn concepts and acquire knowledge drawn from research, and methodically apply them to physical activities that will lead them to adopt healthy lifestyle practices.
2) Physical Education enables students to improve their efficiency in an activity and, in doing so, serves to increase their motivation and perseverance to remain physically active, and makes them aware of the contributing factors. To this end, students use a learning process designed to enhance their aptitudes (i.e. their skills and attitudes) for a given physical activity.
3) Physical Education helps students take responsibility for their own health through the maintenance and improvement of their physical fitness and through the sensible practice of physical activity. Students learn to combine being physically active in an effective manner with other factors that promote health.
4) Physical Education makes students aware of the importance of sharing the knowledge and behaviours they have acquired. The pleasure and sense of well-being students get out of Physical Education classes motivate them to encourage others to be physically active and to adopt healthy practices.

Expected Outcomes

Students who have achieved the general education objectives in Physical Education will be able to demonstrate:

- their knowledge of:
  - the relationship between physical activity, lifestyle and health based on the findings of scientific research
  - the scientific principles for improving or maintaining physical fitness
  - ways to assess their abilities and needs with respect to activities that can improve their health
  - the rules, techniques and conditions involved in different types of physical activity
  - a method for setting goals
  - the factors that help make physical activity part of their lifestyle

- the skills that will enable them to:
  - choose physical activities on the basis of their motivation, abilities and needs
  - establish relationships between lifestyle and health
  - apply the rules, techniques and conditions involved in different types of physical activity
  - set goals that are realistic, measurable, challenging, and situated within a specific time frame

- improve their mastery of the basic techniques, tactics and strategies associated with sports, outdoor and expression-oriented activities
- use their creative and communication skills, particularly in group activities
- evaluate their skills, attitudes and progress with respect to different forms of physical activity
- maintain or increase their level of physical activity and fitness on their own
- manage a personal physical activity program and assume responsibility in the organization of physical activities

- the attitudes and qualities that will enable them to:
  - understand the importance of taking responsibility for their health
  - be aware of the need to evaluate and respect their abilities and the conditions for carrying out an activity, before undertaking the activity
  - recognize the importance of self-confidence, self-control, respect for others and cooperation, through knowledge they have acquired and through participation in physical activity
  - respect the environment in which the activities are held
  - appreciate the aesthetic and play value of physical activity
  - promote a balanced and active lifestyle as a social value

Sequence of Objectives and Standards

The three sets of objectives and standards in Physical Education are designed in a learning sequence. The first two are prerequisites for the third.

The first set focuses on the relationship between health and physical activity as related to a healthy lifestyle. Students are required to try one or more activities and to relate them to their abilities, needs, motivation, lifestyle and knowledge of health prevention. This enables them to make an appropriate and justified choice of activities.

The second set looks at the improvement of effectiveness through the use of a goal-oriented approach in a sports, outdoor or expression-oriented activity. After making an initial assessment of their abilities and attitudes, students are called upon to evaluate them with respect to a physical activity, to set goals and to interpret their progress.

The third set is aimed at helping students integrate physical activity into their lifestyle, more particularly through more effective management of factors that facilitate such integration. During the hours of instruction, students apply the knowledge they have acquired in the first two sets of objectives. This is done through the safe and effective practice of physical activity and through the development, realization and evaluation of a personal physical activity program, which students follow and validate under their teacher's supervision. The hours allotted for individual work enable students to complete their personal programs.

Complementary General Education

Social Sciences

The two sets of objectives and standards aim to familiarize students with the social sciences and their particular approach to the human condition.

The first set supports learning activities that allow students to look at one or more of the social sciences in relation to major contemporary issues: subjects studied in the social sciences; contribution of the social sciences to an understanding of contemporary issues; issues facing the social sciences in the future.

The second set supports learning activities in the social sciences that allow students to rigorously analyze one of the major problems of our time, using one or more social scientific approaches.

Science and Technology

In Science and Technology, the educational aim is to present science and technology as a specific approach to reality in order to familiarize students with this field of knowledge. This general intention can take several forms, such as helping students gain experience with the scientific method or study the evolution, challenges and consequences of scientific and technological discoveries.

The first set of objectives and standards emphasizes the general nature and scope of science and technology. The second set emphasizes using the scientific method.

Modern Languages

The three sets of objectives and standards in Modern Languages introduce students to the basic language structures and vocabulary of a third language while making them aware of the culture of the people who speak the language.

Because some modern languages use different structures and writing systems, the three sets of objectives and standards have been designed accordingly. The degree of competency acquisition will therefore vary according to how distant the language is from our own language or system of thought. Furthermore, awareness of the culture of the people using a modern language does not figure as an element of competency, since learning a modern language necessarily implies developing such awareness.

Mathematics and Literacy Computer Science

In Mathematics and Literacy Computer Science, the two sets of objectives and standards are based on the aim of developing mathematical and computer culture.

The educational aim of the first set is to lead students to consider the place, role and evolution of this knowledge and these tools in our society and to describe their different uses. It consists of general education about the language of mathematics or computers, and does not include specialized training.

The second set targets the understanding and use of the language of mathematics or computers for everyday purposes. This intention refers mainly to the concepts, tools and general uses of mathematical or computer language in daily life.

Since the objectives and standards for the field of mathematics literacy and computer science are quite general, they can be used to define various learning activities that foster the development of competencies in mathematics or computer science, or in a combination of these two areas.

Art and Aesthetics

The educational aim of Art and Aesthetics is to help students to acquire general cultural knowledge by exploring various forms of art in one or more artistic fields. This basic education is intended to develop an artistic sensibility through exposure to works of art or experimentation in an artistic medium. Furthermore, it aims to teach the basic elements of the language of art and to enable students to make connections between those elements.

Through the first set of objectives and standards, students are introduced to works of art from contemporary culture and from other periods. This allows them to develop an appreciation for the dynamics of the imagination in art and to learn methods of analyzing artistic production.

Though the second set, students engage in creative or interpretive activities in a given artistic medium. As well, students are introduced to artistic works in that medium so that they may learn to recognize its primary forms of expression.

Language of Instruction and Literature	Code: 0004

Objective *Standard*

Statement of the Competency

To analyze and produce various forms of discourse.

Elements of the Competency	Performance Criteria
1. To identify the characteristics and functions of the components of discourse.	• Accurate explanation of the denotation of words • Adequate recognition of the appropriate connotation of words • Accurate definition of the characteristics and function of each component
2. To determine the organization of facts and arguments of a given discourse.	• Clear and accurate recognition of the main idea and structure • Clear presentation of the strategies employed to develop an argument or thesis
3. To prepare ideas and strategies for a projected discourse.	• Appropriate identification of topics and ideas • Adequate gathering of pertinent information • Clear formulation of a thesis • Coherent ordering of supporting material
4. To formulate a discourse.	• Appropriate choice of tone and diction • Correct development of sentences • Clear and coherent development of paragraphs • Formulation of a 750-word discourse
5. To edit the discourse.	• Thorough revision of form and content

Learning Activities

Discipline:	English
Weighting:	2-2-4 or 1-3-4
Credits:	2 2/3

Language of Instruction and Literature	Code: 0005

Objective	***Standard***

Statement of the Competency

To apply a critical approach to literary genres.

Elements of the Competency	**Performance Criteria**
1. To distinguish genres of literary discourse.	• Clear recognition of the formal characteristics of a literary genre
2. To recognize the use of literary conventions within a specific genre.	• Accurate recognition of the figurative communication of meaning • Adequate explanation of the effects of significant literary and rhetorical devices
3. To situate a discourse within its historical and literary period.	• Appropriate recognition of the relationship of a text to its period
4. To explicate a discourse representative of a literary genre.	• Selective use of appropriate terminology • Effective presentation of a 1000-word integrated response to a text

Learning Activities

Discipline:	English
Weighting:	2-2-3
Credits:	2 1/3

Language of Instruction and Literature	Code: 0006

Objective	***Standard***

Statement of the Competency

To apply a critical approach to a literary theme.

Elements of the Competency	**Performance Criteria**
1. To recognize the treatment of a theme within a literary text.	• Clear recognition of elements within the text which define and reinforce a theme and its development • Adequate demonstration of the effects of significant literary and rhetorical devices
2. To situate a literary text within its cultural context.	• Appropriate recognition of a text as an expression of cultural context • Adequate demonstration of the effects of significant literary and rhetorical devices
3. To detect the value system inherent in a literary text.	• Appropriate identification of expression (explicit/implicit) of a value system in a text
4. To explicate a text from a thematic perspective.	• Selective use of appropriate terminology • Effective presentation of a 1000-word integrated response to a text

Learning Activities

Discipline:	English
Weighting:	2-2-3
Credits:	2 1/3

Humanities	Code: 00B2

Objective *Standard*

Statement of the Competency

To apply a logical analytical process to how knowledge is organized and used.

Elements of the Competency	Performance Criteria
1. To recognize the basic elements of a field of knowledge.	• Appropriate description of the basic elements • Appropriate use of terminology relevant to fields of knowledge
2. To define the modes of organization and utilization of a field of knowledge.	• Adequate definition of the dimensions, limits and uses of fields of knowledge
3. To situate a field of knowledge within its historical context.	• Accurate identification of the main components in the historical development of fields of knowledge • Accurate description of the effects of historical development and societal milieu on the limitations and uses of a field of knowledge
4. To organize the main components into coherent patterns.	• Coherent organization of the main components
5. To produce a synthesis of the main components.	• Appropriate analysis of the components • Coherent synthesis of the main components • Appropriate expression, including a significant individual written component, of an analysis of the context, importance and implications of the organization and uses of knowledge

Learning Activities

Discipline:	Humanities
Weighting:	3-1-3
Credits:	2 1/3

Humanities	Code: 000G

Objective *Standard*

Statement of the Competency

To apply a critical thought process to world-views.

Elements of the Competency	Performance Criteria
1. To describe world-views.	• Accurate description of a society or group with a distinctive world-view • Appropriate use of terminology relevant to these societies or groups
2. To explain the major ideas, values and implications of a world-view.	• Adequate explanation of the salient components of a world-view
3. To organize the ideas, values and experiences of a world-view into coherent patterns.	• Coherent organization of ideas about a world-view • Appropriate expression, including a significant individual written component, of an analysis of the context, importance and implications of world-views
4. To compare world-views.	• Comparative analysis of these world-views • Appropriate inclusion of central elements, relationships and organizational principles of the societies or groups in the analysis

Learning Activities

Discipline:	Humanities
Weighting:	3-0-3
Credits:	2

Langue seconde (niveau I) Code: 0017

Objective	*Standard*

Statement of the Competency

Appliquer les notions de base de la communication en français courant.

Elements of the Competency	Performance Criteria
1. Dégager le sens d'un message oral simple.	• Repérage précis des difficultés de compréhension du message. • Utilisation pertinente des techniques d'écoute choisies. • Distinction précise du sens général et des idées essentielles du message. • Description précise du sens général et des idées essentielles du message.
2. Émettre un message oral simple.	• Repérage précis des difficultés d'expression. • Utilisation pertinente des techniques d'expression orales choisies. • Emploi pertinent du vocabulaire courant. • Expression intelligible du propos.
3. Dégager le sens d'un texte.	• Repérage précis des difficultés de compréhension du texte. • Utilisation pertinente des techniques de lecture choisies. • Distinction claire des principaux éléments du texte. • Description précise du sens général et des idées essentielles d'un texte de 500 mots.
4. Rédiger un texte simple.	• Repérage précis des difficultés d'écriture. • Utilisation pertinente des techniques d'écriture choisies. • Emploi pertinent du vocabulaire courant. • Formulation claire et cohérente d'un texte de 100 mots.

Learning Activities

Discipline: Français, langue seconde
Weighting: 2-1-3
Credits: 2

Langue seconde (niveau II)	Code: 000A

Objective	***Standard***

Statement of the Competency

Communiquer en français avec une certaine aisance.

Elements of the Competency	**Performance Criteria**
1. Interpréter un texte oral simple de trois minutes en français courant.	• Distinction claire des principaux éléments du texte oral. • Explication précise du sens des mots dans le texte. • Repérage précis des idées et des sujets traités dans le texte.
2. Produire un texte oral planifié de cinq minutes en français courant.	• Emploi pertinent du vocabulaire courant. • Respect du niveau de langue, du code grammatical et des règles de la prononciation. • Formulation claire et cohérente du propos.
3. Interpréter un texte écrit en français courant.	• Distinction claire des principaux éléments du texte. • Explication précise du sens des mots dans le texte. • Repérage précis des idées principales et de la structure d'un texte de 700 à 1000 mots.
4. Rédiger un texte simple en français courant.	• Respect du code grammatical et orthographique. • Utilisation judicieuse des principaux éléments du corpus. • Formulation claire et cohérente des phrases. • Articulation cohérente des paragraphes. • Rédaction d'un texte de 200 mots.

Learning Activities

Discipline: Français, langue seconde
Weighting: 2-1-3
Credits: 2

Langue seconde (niveau III)	Code: 000B

Objective *Standard*

Statement of the Competency

Communiquer avec aisance en français.

Elements of the Competency	Performance Criteria
1. Produire un texte oral planifié de cinq minutes de complexité moyenne.	• Emploi pertinent du vocabulaire courant. • Adaptation à l'interlocuteur ou à l'interlocutrice • Respect du niveau de langue, du code grammatical et des règles de la prononciation. • Formulation claire et cohérente du propos. • Agencement pertinent des idées.
2. Commenter un texte écrit de complexité moyenne.	• Distinction claire des principaux éléments d'un texte comprenant entre 2 500 et 3 000 mots. • Explication précise du sens des mots dans le texte. • Distinction précise des idées principales et secondaires, des faits et des opinions. • Formulation d'éléments implicites.
3. Rédiger un texte de complexité moyenne.	• Respect du code grammatical et orthographique. • Adaptation au lecteur ou à la lectrice. • Utilisation judicieuse des principaux éléments du corpus. • Formulation claire et cohérente des phrases, dont au moins trois sont complexes. • Articulation cohérente des paragraphes. • Rédaction d'un texte de 350 mots.

Learning Activities

Discipline: Français, langue seconde
Weighting: 2-1-3
Credits: 2

Langue seconde (niveau IV)	Code: 000C

Objective *Standard*

Statement of the Competency

Traiter d'un sujet culturel et littéraire.

Elements of the Competency	Performance Criteria
1. Analyser un texte culturel ou littéraire.	• Formulation personnelle des éléments principaux du texte. • Inventaire des thèmes principaux. • Relevé d'indices qui permettent de situer le texte dans son contexte socioculturel et historique. • Repérage des valeurs véhiculées. • Repérage juste de la structure du texte. • Articulation claire d'un point de vue personnel.
2 Rédiger un texte sur un sujet culturel ou littéraire.	• Respect du sujet. • Respect du code grammatical et orthographique. • Adaptation au lecteur ou à la lectrice. • Utilisation judicieuse des principaux éléments du corpus. • Formulation claire et cohérente d'un texte de 500 mots. • Articulation claire d'un point de vue personnel.

Learning Activities

Discipline: Français, langue seconde
Weighting: 3-0-3
Credits: 2

Physical Education	Code: 0064

Objective *Standard*

Statement of the Competency

To establish the role that being physically active plays amongst the lifestyle behaviours which promote health.

Elements of the Competency	Performance Criteria
1. To establish a relationship between their lifestyle and their health.	• Appropriate use of documentation • Appropriate connections between their lifestyle and their health
2. To be physically active in a manner that promotes health.	• Observance of the rules involved in physical activities, including safety rules • Respect for their abilities when engaging in physical activities
3. To recognize their needs, abilities and motivational factors with respect to regular physical activity.	• Appropriate use of quantitative and qualitative physical data • Statement of their main physical needs and abilities • Statement of their main motivational factors with respect to regular physical activity
4. To propose physical activities that promote health.	• Appropriate and justified choice of physical activities according to their needs, abilities, and motivational factors

Learning Activities

Discipline:	Physical Education
Weighting:	1-1-1
Credits:	1

Physical Education	Code: 0065

Objective	***Standard***

Statement of the Competency

To improve one's effectiveness when practising a physical activity.

Element of the Competency	**Performance Criteria**
1. To use a process designed to improve their effectiveness during a physical activity.	• Initial assessment of their skills and attitudes in relation to a physical activity • Statement of their expectations and needs with respect to their ability to carry out the activity • Appropriate formulation of personal objectives • Statement of the means selected to achieve their objectives • Observance of the rules involved in the physical activity, including safety rules • Periodic evaluation of their skills and attitudes in relation to the activity • Meaningful interpretation of the progress achieved and the difficulties experienced during the activity • Appropriate, periodic adjustments of their objectives or the means used to achieve them • Appreciable improvement of the motor skills required by the activity

Learning Activities

Discipline:	Physical Education
Weighting:	0-2-1
Credits:	1

Physical Education	Code: 0066

Objective — *Standard*

Statement of the Competency

To demonstrate one's responsibility for being physically active in a manner which promotes health.

Elements of the Competency	Performance Criteria
1. To make physical activity part of a healthy lifestyle.	• Practise of a physical activity while maintaining a balance between effectiveness and the factors promoting health
2. To manage a personal physical activity program.	• Statement of their priorities according to their needs, skills, and motivational factors in relation to regular physical activity • Proper formulation of the objectives for their personal programs • Appropriate choice of activity or activities for their personal programs • Appropriate planning of the conditions in which the activity or activities in their personal programs are carried out • Appropriate choice of criteria for measuring the attainment of their personal programs • Periodic assessment of the time invested and the activities carried out during the program • Meaningful interpretation of the progress achieved and difficulties experienced during the activities • Appropriate, periodic adjustment of their objectives or the means used to attain them

Learning Activities

Discipline:	Physical Education
Weighting:	1-1-1
Credits:	1

Language of Instruction and Literature	Code: 000L

Objective	***Standard***

Statement of the Competency

To communicate in the forms of discourse appropriate to one or more fields of study.

Elements of the Competency	**Performance Criteria**
1. To identify the forms of discourse appropriate to given fields of study.	• Accurate recognition of specialized vocabulary and conventions • Accurate recognition of the characteristics of the form of discourse
2. To recognize the discursive frameworks appropriate to given fields of study.	• Clear and accurate recognition of the main ideas and structure • Appropriate distinction between fact and argument
3. To formulate a discourse.	• Appropriate choice of tone and diction • Correctly developed sentences • Clearly and coherently developed paragraphs • Appropriate use of program-related communication strategies • Formulation of a 1000-word discourse • Thorough revision of form and content

Learning Activities

Discipline:	English
Hours of instruction:	60
Credits:	2

Humanities	Code: 000U

Objective *Standard*

Statement of the Competency

To apply a critical thought process to ethical issues relevant to the field of study.

Elements of the Competency	Performance Criteria
1. To situate significant ethical issues in appropriate world-views and fields of knowledge.	• Accurate recognition of the basic elements of ethical issues • Appropriate use of relevant terminology • Adequate identification of the main linkages with world-views and fields of knowledge
2. To explain the major ideas, values, and social implications of ethical issues.	• Adequate description of the salient components of the issues
3. To organize the ethical questions and their implications into coherent patterns.	• Coherent organization of the ethical questions and their implications • Appropriate expression, including a significant individual written component, of an analysis of the context, importance and implications of the issues
4. To debate the ethical issues.	• Adequate development of substantiated argumentation including context and diverse points of view • Clear articulation of an individual point of view

Learning Activities

Discipline:	Humanities
Hours of instruction:	45
Credits:	2

Langue seconde (niveau I)	Code: 0018

Objective	***Standard***

Statement of the Competency

Appliquer des notions fondamentales de la communication en français, liées à un champ d'études.

Elements of the Competency	**Performance Criteria**
1. Dégager le sens d'un message oral simple lié à un champ d'études.	• Repérage précis des difficultés de compréhension du message. • Distinction juste des caractéristiques du message. • Repérage juste du vocabulaire spécialisé. • Utilisation pertinente des techniques d'écoute choisies. • Distinction claire des principaux éléments du message. • Description précise du sens général et des idées essentielles du message.
2. Dégager le sens et les caractéristiques d'un texte lié à un champ d'études.	• Repérage précis des difficultés de compréhension du texte. • Distinction juste des caractéristiques du texte. • Repérage précis du vocabulaire spécialisé. • Utilisation pertinente des techniques de lectures choisies. • Distinction claire des principaux éléments du texte. • Description précise du sens général et des idées essentielles du texte.
3. Émettre un message oral simple lié à un champ d'études.	• Repérage précis des difficultés d'expression orale. • Utilisation pertinente des techniques d'expression orale choisies. • Utilisation pertinente du vocabulaire courant et spécialisé. • Expression intelligible du propos.

Langue seconde (niveau I)	Code: 0018
4. Rédiger un court texte lié à un champ d'études.	• Repérage précis des difficultés d'écrire. • Utilisation pertinente des techniques d'écriture choisies. • Utilisation pertinente du vocabulaire courant et spécialisé. • Formulation claire et cohérente du texte.

Learning Activities

Discipline:	Français, langue seconde
Hours of instruction:	45
Credits:	2

Langue seconde (niveau II)	Code: 000Q

Objective	***Standard***

Statement of the Competency

Communiquer en français dans un champ d'études particulier.

Elements of the Competency	**Performance Criteria**
1. Distinguer les types de textes propres au champ d'études.	• Distinction précise des caractéristiques formelles de chacun des principaux types de textes et des conventions utilisées.
2. Interpréter des textes représentatifs du champ d'études.	• Distinction claire des principaux éléments du texte. • Interprétation claire du vocabulaire spécialisé. • Repérage précis des idées et des sujets traités. • Utilisation pertinente des techniques de lecture et d'écoute.
3. Utiliser des techniques de production de textes appropriées au champ d'études.	• Emploi pertinent du vocabulaire spécialisé et des conventions. • Respect du niveau de langue et du code grammatical. • Formulation claire et cohérente du propos. • Utilisation pertinente des techniques d'expression.

Learning Activities

Discipline:	Français, langue seconde
Hours of instruction:	45
Credits:	2

Langue seconde (niveau III)	Code: 000R

Objective	***Standard***

Statement of the Competency

Communiquer avec aisance en français dans un champ d'études particulier.

Elements of the Competency	**Performance Criteria**
1. Commenter des textes propres au champ d'études.	• Distinction précise des caractéristiques formelles des principaux types de textes et des conventions utilisées. • Explication précise du sens des mots dans le texte. • Repérage précis de la structure du texte. • Reformulation juste des idées principales et secondaires, des faits et des opinions. • Emploi juste du vocabulaire spécialisé.
2. Produire un texte sur un sujet lié au champ d'études.	• Respect du sujet. • Emploi pertinent du vocabulaire spécialisé et des conventions. • Respect du niveau de langue et du code grammatical. • Formulation claire et cohérente du propos. • Agencement pertinent des idées. • Adéquation entre forme et fond.

Learning Activities

Discipline: Français, langue seconde
Hours of instruction: 45
Credits: 2

Langue seconde (niveau IV)	Code: 000S

Objective — *Standard*

Statement of the Competency

Disserter en français sur un sujet lié au champ d'études.

Elements of the Competency	Performance Criteria
1. Analyser un texte lié au champ d'études.	• Distinction précise des caractéristiques formelles des types particuliers de textes. • Formulation personnelle des éléments principaux. • Inventaire des thèmes principaux. • Repérage juste de la structure du texte. • Relevé d'indices qui permettent de situer le texte dans son contexte. • Articulation claire d'un point de vue personnel, s'il y a lieu. • Association juste des éléments du texte au sujet traité.
2. Rédiger un texte sur un sujet lié au champ d'études.	• Respect du sujet. • Emploi pertinent du vocabulaire spécialisé et des conventions. • Choix judicieux des principaux éléments du corpus en fonction du type de texte. • Formulation claire et cohérente du texte. • Respect du code grammatical et orthographique. • Articulation claire d'un point de vue personnel, s'il y a lieu.

Learning Activities

Discipline: Français, langue seconde
Hours of instruction: 45
Credits: 2

Social Sciences	Code: 000V

Objective — *Standard*

Statement of the Competency

To estimate the contribution of the social sciences to an understanding of contemporary issues.

Achievement Context

- Working alone
- In an essay of approximately 750 words on the contribution of the social sciences to an understanding of contemporary issues
- Using documents and data from the social sciences

Elements of the Competency	Performance Criteria
1. Recognize the focus of one or more of the social sciences and their main approaches.	• Formulation of the focus specific to one or more of the social sciences • Description of the main approaches used in the social sciences
2. Identify some of the issues currently under study in the social sciences.	• Association of these issues with the pertinent areas of research in the social sciences
3. Demonstrate the contribution of one or more of the social sciences to an understanding of contemporary issues.	• Presentation of contemporary issues by emphasizing the interpretation of the social sciences • Illustration of the interaction between certain social changes and the contribution of the social sciences

Learning Activities

Hours of instruction: 45
Credits: 2

Social Sciences	Code: 000W

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To analyze one of the major problems of our time using one or more social scientific approaches.	• Working alone • In an essay of approximately 750 words on a topic related to human existence • Using reference materials from one or more disciplines in the social sciences
Elements of the Competency	**Performance Criteria**
1. Formulate a problem using one or more social scientific approaches.	• Presentation of the background to the problem • Use of appropriate concepts and language • Brief description of individual, collective, spatiotemporal and cultural aspects of the problem
2. Deal with an issue using one or more social scientific approaches.	• Clear formulation of an issue • Selection of pertinent reference materials • Brief description of historical, experimental and survey methods
3. Draw conclusions.	• Appropriate use of the selected method • Determination of appropriate evaluation criteria • Identification of strengths and weaknesses of the conclusions • Broadening of issue studied

Learning Activities

Hours of instruction: 45
Credits: 2

Science and Technology	Code: 000X

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To explain the general nature of science and technology and some of the major contemporary scientific or technological issues.	• Working alone • Given a written commentary on a scientific discovery or technological development • In an essay of approximately 750 words

Elements of the Competency	**Performance Criteria**
1. Describe scientific thinking and the standard method.	• Brief description of the essential characteristics of scientific thinking, including quantification and demonstration • Organized list and brief description of the essential characteristics of the main steps in the standard scientific method
2. Demonstrate how science and technology are complementary.	• Definition of terms and description of the primary ways in which science, techniques and technology are interrelated: logical and temporal connections, and mutual contributions
3. Explain the context and the stages related to several scientific and technological discoveries.	• Pertinent and coherent explanation of the relationship between the determining contexts of several scientific and technological discoveries • List of the main stages of scientific and technological discoveries
4. Deduce different consequences and questions resulting from certain recent scientific and technological innovations.	• Brief description of important consequences (of different types) and the current major challenges resulting from several scientific and technological discoveries • Formulation of relevant questions and credibility of responses to the questions formulated

Learning Activities

Hours of instruction: 45
Credits: 2

Science and Technology	Code: 000Y

Objective — *Standard*

Statement of the Competency

To resolve a simple problem by applying the basic scientific method.

Achievement Context

- Working alone or in groups
- Given a simple scientific and technological problem that can be resolved by applying the standard scientific method
- Using common scientific instruments and reference materials (written or other)

Elements of the Competency	Performance Criteria
1. Describe the main steps of the standard scientific method.	• Organized list and brief description of the characteristics of the steps of the standard scientific method
2. Formulate a hypothesis designed to solve a simple scientific and technological problem.	• Clear, precise description of the problem • Observance of the principles for formulating a hypothesis (observable and measurable nature of data, credibility, etc.)
3. Verify a hypothesis by applying the fundamental principles of the basic experimental method.	• Pertinence, reliability and validity of the experimental method used • Observance of established experimental method • Appropriate choice and use of instruments • Clear, satisfactory presentation of results • Validity of the connections established between the hypothesis, the verification and the conclusion

Learning Activities

Hours of instruction: 45
Credits: 2

Modern Languages	Code: 000Z

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To communicate with limited skill[1] in a modern language.	• For modern Latin-alphabet languages: – during a conversation consisting of at least eight sentences of dialogue – in a written text consisting of at least eight sentences Or • For non–Latin-alphabet languages: – during a conversation consisting of at least six sentences of dialogue – in a written text consisting of at least six sentences • Based on learning situations on familiar themes • Using reference materials
Elements of the Competency	**Performance Criteria**
1. Understand the meaning of a verbal message.	Learning a modern language requires becoming aware of the culture of the people who use the language. • Accurate identification of words and idiomatic expressions • Clear recognition of the general meaning of simple messages • Logical connections between the various elements of the message
2. Understand the meaning of a written message.	• Accurate identification of words and idiomatic expressions • Clear recognition of the general meaning of simple messages • Logical connections between the various elements of the message

1 This refers to the limited use of the structures, grammar and vocabulary of the language studied. This limitation varies depending on the complexity of the modern language.

Modern Languages	Code: 000Z
3. Express a simple message verbally.	• Appropriate use of language structures in main and subordinate clauses • Appropriate application of grammar rules • Use of verbs in the present indicative • Appropriate use of basic vocabulary and idiomatic expressions • Comprehensible pronunciation • Coherent sequence of simple sentences • Spontaneous, coherent sequence of sentences in a dialogue
4. Write a text on a given subject.	• Appropriate use of language structures in main and subordinate clauses • Appropriate application of basic grammar rules • Use of verbs in the present indicative • Appropriate use of basic vocabulary and idiomatic expressions • Coherent sequence of simple sentences • Acceptable application of graphic rules for writing systems that do not use the Latin alphabet

Learning Activities

Hours of instruction: 45
Credits: 2

Modern Languages	Code: 0010

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To communicate on familiar topics in a modern language.	• During a conversation consisting of at least 15 sentences of dialogue • In a written text consisting of at least 20 sentences for Latin-alphabet languages • In a written text consisting of at least 10 sentences for non–Latin alphabet languages • Based on: – situations in everyday life – simple topics from everyday life • Using reference materials
Elements of the Competency	**Performance Criteria**
1. Understand the meaning of a verbal message.	Learning a modern language requires becoming aware of the culture of the people who use the language. • Accurate identification of words and idiomatic expressions • Clear recognition of the general meaning and essential ideas of messages of average complexity • Logical connection between the various elements of the message
2. Understand the meaning of a written message.	• Accurate identification of words and idiomatic expressions • Clear recognition of the general meaning and essential ideas of messages of average complexity • Logical connection between the various elements of the message
3. Express a simple message verbally, using sentences of average complexity.	• Appropriate use of language structures in main or subordinate clauses • Appropriate application of grammar rules • Use of verbs in the present indicative • Appropriate use of enriched basic vocabulary and idiomatic expressions • Comprehensible pronunciation • Coherent sequence of sentences of average complexity • Coherent dialogue of average complexity

Modern Languages	Code: 0010
4. Write a text on a given subject, using sentences of average complexity.	• Appropriate use of language structures in main or subordinate clauses • Appropriate application of grammar rules • Use of verbs in the present and past indicative • Appropriate use of enriched basic vocabulary and idiomatic expressions. • Coherent sequence of sentences of average complexity • Acceptable application of graphic rules for writing systems that do not use the Latin alphabet

Learning Activities

Hours of instruction**:** 45
Credits: 2

Modern Languages	Code: 0067

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To communicate with relative ease in a modern language.	• Working alone • During a conversation consisting of at least 20 sentences of dialogue • In a written text of medium length (at least 25 sentences for Latin-alphabet languages and 15 sentences for other languages) • Given documents of a sociocultural nature • Using reference materials for the written text
Elements of the Competency	**Performance Criteria**
	Learning a modern language requires being aware of the culture of the people who use the language.
1. Understand the meaning of a verbal message in everyday language.	• Accurate explanation of the general meaning and essential ideas of the message • Clear identification of structural elements of the language
2. Understand the meaning of a text of average complexity.	• Accurate explanation of the general meaning and essential ideas of the text • Clear identification of structural elements of the language
3. Have a conversation about a subject.	• Appropriate use of the structural elements of the language according to the message to be expressed • Appropriate use of everyday vocabulary • Accurate pronunciation and intonation • Normal flow in a conversation in everyday language • Coherence of the message expressed • Pertinent responses to questions
4 Write a text of average complexity.	• Appropriate use of the structural elements of the language according to the text to be written • Accurate vocabulary • Coherence of the text as a whole • Observance of presentation and writing rules
Learning Activities	

Hours of instruction: 45
Credits: 2

Mathematics Literacy and Computer Science — Code: 0011

Objective

Statement of the Competency

To recognize the role of mathematics or informatics in contemporary society.

Standard

Achievement Context

- Working alone
- In an essay of approximately 750 words
- Using several concrete examples selected by the student demonstrating the competency

Elements of the Competency	Performance Criteria
1. Demonstrate the acquisition of basic general knowledge in mathematics or informatics.	• Identification of basic notions and concepts • Identification of main branches of mathematics or informatics • Appropriate use of terminology
2. Describe the evolution of mathematics or informatics.	• Descriptive summary of several major phases
3. Recognize the contribution of mathematics or informatics to the development of other areas of knowledge.	• Demonstration of the existence of important contributions, using concrete examples
4. Illustrate the diversity of mathematical or informatics applications.	• Presentation of a range of applications in various areas of human activity, using concrete examples
5. Evaluate the impact of mathematics or informatics on individuals and organizations.	• Identification of several major influences • Explanation of the way in which mathematics or informatics have changed certain human and organizational realities • Recognition of the advantages and disadvantages of these influences

Learning Activities

Hours of instruction: 45
Credits: 2

Mathematics Literacy and Computer Science — Code: 0012

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To use various mathematical or computer concepts, procedures and tools for common tasks.	• Working alone • While carrying out a task or solving a problem based on everyday needs. • Using familiar tools and reference materials
Elements of the Competency	**Performance Criteria**
1. Demonstrate the acquisition of basic functional knowledge in mathematics or informatics.	• Brief definition of concepts • Correct execution of basic operations • Appropriate use of terminology
2. Select mathematical or computer tools and procedures on the basis of specific needs.	• List of numerous possibilities available with mathematical and computer tools and procedures • Analysis of concrete situations and recognition of the usefulness of mathematical or computer tools and procedures • Appropriate choice according to needs
3. Use mathematical or computer tools and procedures to carry out tasks and solve problems.	• Planned, methodical process • Correct use of tools and procedures • Satisfactory results, given the context • Appropriate use of terminology specific to a tool or procedure
4. Interpret the quantitative data or results obtained using mathematical or computer tools and procedures.	• Accurate interpretation, given the context • Clear, precise formulation of the interpretation

Learning Activities

Hours of instruction: 45
Credits: 2

Art and Aesthetics	Code: 0013

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To consider various forms of art produced by aesthetic practices.	• Working alone • Given a specified work of art • In a written commentary of approximately 750 words.

Elements of the Competency	**Performance Criteria**
1. Develop an appreciation for the dynamics of the imagination in art.	• Precise explanation of a creative process connected to the construction of an imaginary universe
2. Describe art movements.	• Descriptive list of the main characteristics of three art movements from different periods, including a modern movement
3. Give a commentary on a work of art.	• Coherent organization of observations, including identification of four basic elements of form and structure related to the language used as well as a justified description of the meaning of the work of art

Learning Activities

Hours of instruction: 45
Credits: 2

Art and Aesthetics	Code: 0014

Objective — *Standard*

Statement of the Competency

To produce a work of art.

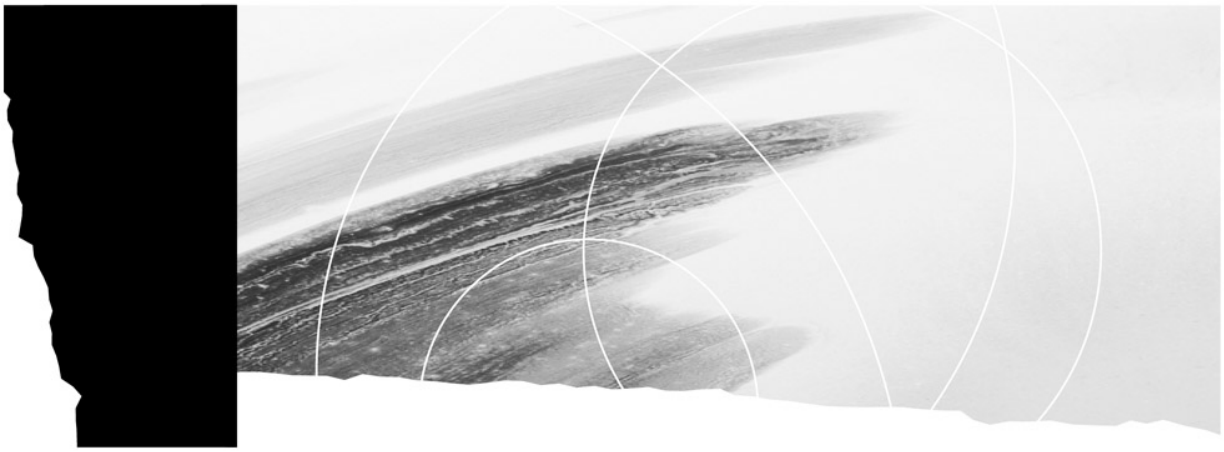
Achievement Context

- Working alone
- During a practical exercise
- In the context of a creation or an interpretation
- Using the basic elements of the language and techniques specific to the medium selected

Elements of the Competency	Performance Criteria
1. Recognize the primary forms of expression of an artistic medium.	• Identification of specific features: originality, essential qualities, means of communication, styles, genres
2. Use the medium.	• Personal, coherent use of elements of language • Satisfactory application of artistic techniques • Observance of the requirements of the method of production

Learning Activities

Hours of instruction: 45
Credits: 2



Part II

Goals of the Program-Specific Component

Educational Aims of the Program-Specific Component

Harmonization

Objectives and Standards of the Program-Specific Component

Goals of the Program-Specific Component

The *Building Systems Technology* program trains technicians to ensure the proper functioning of building systems and to manage the related energy costs. Building systems technicians work on plumbing, heating, ventilation, air conditioning, refrigeration and fire protection systems, some of which are equipped with electrical controls and automatic control circuits.

The activities of building systems technicians vary according to the size of the building, the systems involved and the work to be done. Technicians are responsible for one or more tasks and may work alone, in teams or in collaboration with specialists. They may be called upon to produce technical drawings, help design building systems or prepare plans, specifications and bids. They may also perform such tasks as checking mechanical systems and supervising their maintenance, inspecting systems and ensuring that they conform to regulations, acting as a technical representative, optimizing systems and managing energy costs. Tasks vary in importance and frequency depending on the company and on whether the technician is an employee or a contractor.

Depending on their abilities and potential, building systems technicians may be given responsibility for small projects in the first five years of their career. Thus, they may be called upon to supervise a construction site or coordinate the installation of a building system.

Graduates of this program may work in energy management consulting firms, in the manufacturing industry, or for contractors, sales agents, wholesalers, municipalities, or public or parapublic services.

They must consistently comply with building standards.

The *Building Systems Technology* program addresses two requirements of college-level training: versatility and the mastery of technical skills. In particular, versatility is ensured through the development of the general competencies needed to perform tasks autonomously and adapt to a variety of work situations in a changing industrial and technological context. Thus, the general competencies of this program allow technicians to apply the principles, methods and techniques related to building systems technology.

The mastery of a technique is ensured through the development of specific competencies directly related to the occupation. The competencies *To optimize the operation of building mechanical systems* and *To coordinate the installation of a system* integrate all of the knowledge, skills and attitudes needed to practise the occupation.

The goals of the program-specific component of the *Building Systems Technology* program are based on the general goals of vocational and technical training. These goals are:

- To help students develop effectiveness in the practice of a trade or occupation, that is:
  - to teach students to perform roles, functions, tasks and activities associated with the trade or occupation upon entry into the job market
  - to prepare students to progress satisfactorily on the job (which implies having the necessary technical and technological knowledge and skills in such areas as communication, problem solving, decision making, ethics, health and safety)

- To help students integrate into the work force, that is:
  - to familiarize students with the job market in general and the context surrounding the occupation they have chosen
  - to familiarize students with their rights and responsibilities as workers

- To foster students' personal development and acquisition of occupational knowledge, skills, perceptions and attitudes, that is:
  - to help students develop their autonomy and the desire to learn, and acquire effective work methods
  - to help students understand the principles underlying the techniques and the technology used in the trade or occupation
  - to help students develop self-expression, creativity, initiative and entrepreneurial spirit
  - to help students adopt the attitudes required to successfully practise the trade or occupation, and instill in them a sense of responsibility and a concern for excellence

- To promote job mobility, that is:
  - to help students develop positive attitudes toward change
  - to help students develop the means to manage their careers by familiarizing them with entrepreneurship

Educational Aims of the Program-Specific Component

Educational aims are based on important values and concerns and serve as guidelines for interactions with students. As a general rule, educational aims focus on important aspects of the students' professional and personal development, such as attitudes, work habits and intellectual skills, which have not been explicitly formulated in the program's goals, objectives and standards.

The following is a description of the aims of the program-specific component of the *Building Systems Technology* program. It aims to help students develop:

- the ability to work independently and with discipline
- the ability to establish interpersonal relations and work in a team
- curiosity in their work and a desire to search for information and explore ideas
- a desire to learn
- resourcefulness and versatility
- creativity
- productivity (accuracy, rigour, efficiency and rapidity)
- precision
- a concern for detail and a job well done
- a sense of observation
- the ability to make judgments

The program also aims to help students develop an analytical mind and problem-solving skills. Students will be encouraged to suggest ideas and propose solutions taking into account rapidly and constantly evolving technology and work methods. They will use technical documentation in both French and English.

Harmonization

The Ministère de l'Éducation harmonizes its vocational and technical programs by establishing similarities and continuity between secondary- and college-level programs within a particular sector or between sectors, in order to avoid overlap in program offerings, recognize prior learning and facilitate the students' progress.

Harmonization establishes consistency between training programs and is especially important in ensuring that the tasks of a trade or occupation are clearly identified and described. Harmonization makes it possible to identify tasks requiring competencies that are common to more than one program. Even if there are no common competencies, training programs are still harmonized.

Harmonization is said to be "inter-level" when it focuses on training programs at different levels, "intra-level" when it focuses on programs within the same educational level, and "inter-sector" when carried out between programs in various sectors.

An important aspect of harmonization is that it allows the common features of competencies to be identified and updated as needed. Common competencies are competencies that are shared by more than one program; once acquired in one program, they can be recognized as having been acquired in another. Competencies with exactly the same statement and elements are said to be identical. Common competencies that are not identical but have enough similarities to be of equal value are said to be equivalent.

Harmonization of the *Building Systems Technology* program has resulted in identifying competencies that are shared with other programs. Detailed information on the harmonization of this program and its results are presented in the document entitled *Tableaux d'harmonisation, Technologie de la mécanique du bâtiment.*

Code: 01UJ

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To analyze the job function.	• Given recent data on job functions in the field • Given recent data on businesses and establishments in the sector of activity
Elements of the Competency	**Performance Criteria**
1. Describe the job function and its employment conditions.	• Relevant information gathered • Thorough examination of the general characteristics of the job function and its employment conditions • Recognition of job prospects in the sector of activity • Recognition of the different work environments and the role of resource persons • Recognition of the different career path possibilities • Accurate delimitation of the field of activity and tasks with respect to related occupations
2. Examine the tasks and operations related to the job function.	• Thorough examination of the operations, conditions and performance criteria related to each task • Determination of the relative importance of the tasks • Association of the steps in the work process with the tasks related to the job function • Appropriate relationships established between the tasks related to the job function and those performed by other resource persons
3. Examine the skills, attitudes and behaviours required to practise the occupation.	• Appropriate relationships established between skills, attitudes and behaviours on the one hand, and the occupation on the other

4. Examine the work context.	• Recognition of the role, powers and responsibilities of associations and organizations in the sector of activity • Thorough examination of the labour standards related to the job function • Recognition of the rights and responsibilities of employers and employees • Thorough examination of the rules of professional ethics • Clear delimitation of the role and responsibilities of technologists with respect to those of other specialists
5. Recognize the possibilities for technological watch and continuing education.	• Accurate identification of the main reasons for the need for continuing education in the sector • Appropriate examination of the possibilities offered to building systems technologists • Detailed list of documentation, references and possibilities for continuing education

Code: 01UK

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To take responsibility for health and safety.	• Working alone and in a team • In conformity with the laws and regulations governing occupational health and safety in the construction industry • Referring to technical documentation • Referring to WHMIS data sheets and documents about the disposal of hazardous materials • Using individual and collective protection equipment
Elements of the Competency	**Performance Criteria**
1. Identify the risks inherent in the workplace.	• Accurate identification of high-risk workstations • Accurate identification of potentially dangerous work situations • Accurate inventory of equipment and hazardous materials • Accurate interpretation of WHMIS data sheets. • Clear communication of observations • Accurate recording of information
2. Gather information on means of preventing work accidents.	• Correct interpretation of the laws and regulations governing dangerous work situations • Relevant information gathered about the functional and ergonomic setup of workstations • Methodical and effective search for information in English and French documentation • Curiosity
3. Determine the measures to be taken in the event of an accident.	• Determination of the measures to be taken depending on the type and seriousness of the accident • Selection of most suitable protection equipment for a given situation • Detailed prevention plan

4. Follow administrative directives in the event of a work accident.	• Appropriate assessment of the accident and its seriousness • Proper application of safety standards in accordance with accident prevention plans • Proper application of the concepts and principles underlying safe behaviour • Effective communication with emergency services and interested parties • Proper completion of forms to be filled out in the event of a work accident • Accurate interpretation of instructions

Code: 01UL

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To analyze the stresses, forces and loads applied to building mechanical systems.	• Working alone and in a team • Performing tasks related to the design, maintenance, repair, etc., of building systems • Referring to technical documentation in English and French • Using a calculator, tables, charts and a computer • Using measuring instruments • Using the metric and imperial systems of measurement
Elements of the Competency	**Performance Criteria**
1. Analyze the stresses applied to a structure.	• Appropriate mapping of physical phenomena • Accurate calculation of the resultant of several concurrent and nonconcurrent forces • Consideration of: – principles of equilibrium – conditions for equilibrium, translation and rotation • Determination of the distribution of forces in the parts of a structure • Accurate interpretation of results for a given situation • Effective analytical skills
2. Analyze the resistance of materials.	• Clear distinction between the physical properties of materials under stress, in different types of systems • Accurate prediction of the causes of distortion of materials • Accurate calculation of physical and thermal constraints • Determination of the limitations and constraints of materials • Correct interpretation of results given the situation • Effective analytical skills

3. Analyze motion in an assembly (kinetics).	• Recognition of the types of motion in question • Determination of the parameters to consider given the type of motion • Appropriate measurements for each type of motion • Careful handling of measuring instruments • Accurate interpretation of results given the situation
4. Analyze the dynamic forces at work in an operating system.	• Accurate calculation of stresses and forces caused by motion • Accurate evaluation of vibrations and aseismic effects on building systems • Concern for taking precise measurements • Careful handling of measuring instruments • Accurate calculation of stresses and forces and their effects • Consideration of the principles of dynamics • Determination of the force required to generate a given motion • Accurate interpretation of results given the situation
5. Analyze the energy created in a mechanism in motion.	• Accurate calculation of the energy required to generate motion • Consideration of the principles of the conservation of energy and the laws of physics • Accurate calculation of power and energy efficiency • Determination of the coefficient of performance of a building mechanical system • Accurate interpretation of results given the situation

Code: 01UM

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To analyze the conditions for fluid flow in building systems.	• Working alone and in a team • Referring to the relevant technical documentation in English and French • Using a calculator, tables, charts and a computer • Using measuring instruments • Using the metric and imperial systems of measurement
Elements of the Competency	**Performance Criteria**
1. Assess the situation.	• Accurate interpretation of mandate • Close observation of facts • Accurate identification of problem
2. Perform an information search.	• Exhaustive search of relevant reference documents • Accurate identification of the physical and thermodynamic properties of fluids • Consultation of competent resource persons • Determination of analyses to be done
3. Perform analyses.	• Consideration of: – problem – feasibility • Appropriate use of technical documentation • Appropriate differentiation between the types of fluid in different systems and components • Thorough examination of the state of heated or cooled fluids • Consideration of the constraints and limitations of the fluids used

4. Examine the fluid flow properties in pipes.	• Accurate determination of fluid flow through pipes and ducts • Consideration of the factors that influence the fluid in different types of pipes and ducts • Observance of principles and laws related to the conservation of energy • Effective use of technical documentation • Careful, precise handling of measuring devices • Accurate calculation of pressure drops due to fluid flow • Accurate interpretation of calculations using the metric and imperial systems of measurement • Matching of fluid properties with desired results
5. Convey the results.	• Methodical processing of data • Relevant, logical ideas • Clarity of presentation

Code: 01UN

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To use a computerized workstation.	• Working alone • Given a computerized workstation connected to a network and the Internet • Referring to technical documentation in English and French • Using state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Prepare the workstation.	• Methodical verification of the installation of components • Observance of the rules of ergonomics with respect to the setup of the workstation and the posture to adopt • Methodical start-up and shutdown of an operating system • Appropriate preparation of diskettes and other work tools
2. Use the basic functions of an operating system.	• Appropriate use of the main functions of a graphic environment, such as windows, dialog boxes, menu bars, toolbars and scroll bars • Observance of procedure for creating, saving and printing documents • Observance of procedure for navigating and transferring data from one software or program to another • Appropriate use of the main functions of a file manager for different media such as a hard disk, a diskette and a CD-ROM • Observance of procedure for compressing and decompressing files • Personalization of graphic environment according to needs • Appropriate use of antivirus software
3. Solve software problems using the help function.	• Effective search for information • Appropriate interpretation and application of solutions • Accurate interpretation of technical terms in French software

4. Produce a short document using word processing software.	• Accurate selection of basic tools and formatting tools • Appropriate use of basic commands
5. Produce a simple document using a spreadsheet program.	• Accurate selection of basic tools and formatting tools • Appropriate use of basic commands
6. Use the Internet.	• Selection of the appropriate functions of communications software • Effective search for information • Observance of procedure for creating bookmarks • Observance of procedure for processing information and e-mail • Effective retrieval and printing of drawings, texts, articles or manufacturers' catalogues • Accurate interpretation of information in French

Code: 01UP

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To interpret drawings and specifications.	• Working alone and in a team • Given building plans, technical drawings of building mechanical systems and specifications • Referring to technical documentation in English and French • Referring to building codes • Using a computer system • Using the appropriate equipment and measuring instruments
Elements of the Competency	**Performance Criteria**
1. Gather information from drawings and specifications.	• Establishment of relationships between the different types of plans • Recognition of the documents included in a set of plans and specifications • Accurate location of building mechanical systems in the plans • Location of all information and technical data in the plans and specifications • Accurate interpretation of codes, standards, symbols and legends • Accurate interpretation of Canadian, American and international material codes • Adoption of an ergonomic work posture
2. Recognize the components of the systems and their interaction in technical drawings.	• Accurate location of the different mechanical systems • Accurate location of components • Establishment of relationships between the roles of the different components of a system
3. Locate information related to system installation.	• Accurate identification of the information required to install components • Collection of all the information required to install system components • Accurate reading of shop drawings, detail drawings, cross-sectional drawings and specifications • Appropriate interpretation of information • Accurate information located in documents

4. Locate dimensional measurements.	• Precise handling of measuring instruments • Appropriate use of measurement scales in calculations • Accurate location of measurements of length, area and volume • Accurate conversion of dimensional measurements from the metric to the imperial system and vice versa • Appropriate use of the metric and imperial systems of measurement
5. Establish relationships between plans and specifications.	• Establishment of the appropriate relationships between information contained in the plans and information contained in the specifications • Clear recording of relationships established • Organized approach

Code: 01UQ

Objective	***Standard***
Statement of the Competency To solve problems related to building systems using mathematical principles.	**Achievement Context** • Working alone and in a team • Referring to reference manuals, tables and graphs • Using state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Determine the dimensions and coordinates of an object.	• Relevant information gathered given the project or situation • Accurate geometric representation of an object • Accurate calculation of lengths, areas and volumes of geometric shapes • Precise application of the principles of trigonometry • Accurate algebraic description of relationships between variables (direct, inverse, finite and exponential) • Accurate calculation of coordinates • Accurate interpretation of results given the situation
2. Do quantitative estimations using matrices.	• Relevant information gathered given the situation • Proper matrix representation of the problem • Thorough analysis of the situation • Appropriate selection of matrix operation • Observance of equation-solving process • Determination of results of estimation • Accurate interpretation of results given the situation
3. Calculate the forces exerted on building mechanical system equipment.	• Relevant information gathered given the project or situation • Accurate graphic representation of situation in the form of force diagrams • Accurate vector determination • Appropriate selection of tools for solving equations or inequations • Determination of components of forces • Appropriate selection of vector operation • Determination of the resultant of the forces in question • Accurate interpretation of results

4. Determine variations in flow, speed and acceleration.	• Relevant information gathered given the project or situation • Accurate graphic representation of the situation • Determination of the phenomenon and variables in question • Establishment of relationships between the variables expressed as an algebraic equation • Determination of the type of differential equation representing the situation • Correct solutions to equations • Correct interpretation of results given the situation

Code: 01UR

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To establish relationships between the operation of plumbing and piping systems.	• Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Working with fluids such as water, oil, gases and compressed air • Referring to technical documentation in English and French • Using a computer system
Elements of the Competency	**Performance Criteria**
1. Describe plumbing systems and their components.	• Recognition of the types of systems used in different types of buildings • Accurate description of components, such as sinks and trash compactors, their functions and installation requirements • Accurate association of accessories with the different components • Recognition of the different applications depending on the type of fluid and building • Location of components in a plumbing system layout drawing
2. Describe the systems and components associated with piping.	• Accurate description of the type of pipes used for different purposes and fluids • Accurate description of vents and their functions and installation requirements • Accurate description of drainage systems, their components and accessories, and their functions and installation requirements • Recognition of the different applications • Location of the different systems and components in a plumbing system layout drawing
3. Recognize the operating principles of plumbing systems.	• Establishment of relationships between the different components • Recognition of fluid flow in a distribution circuit, as represented in a schematic diagram • Recognition of the operating parameters of components for the distribution of different fluids

4. Search for information about the components and their operation.	• Selection of appropriate documentation • Accurate location of technical data • Accurate interpretation of English and French technical terms • Appropriate information gathered about technological developments and trends • Organized filing of data

Code: 01US

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To check the operation of electrical control circuits.	• Working alone and in a team • Using the necessary professional resources • Performing tasks related to residential, commercial, institutional and industrial building mechanical systems • In accordance with the codes, standards and regulations in effect • Referring to technical documentation in English and French • Using the appropriate measuring instruments and tools
Elements of the Competency	**Performance Criteria**
1. Search for information.	• Recognition of the types of current used in different types of buildings • Recognition of the types of electrical control circuits used for different applications • Recognition of the methods of distributing electrical energy • Accurate interpretation of English and French technical terms • Location of the appropriate technical information in the documentation
2. Describe electrical control circuits.	• Accurate association of components with the different types of electrical control circuits • Consideration of the function and role of the components in different types of building mechanical systems • Recognition of the operating parameters of electrical control circuits, such as voltage, amperage and resistance • Accurate description of the types of connection used for different components and accessories • Proper use of technical documentation

3. Take measurements.	• Proper use of measuring instruments • Consideration of: – electrical power – relationships between voltage, wattage and resistance to current – direct and alternating current • Accurate calculations • Appropriate use of technical documentation • Consultation of authorized professional resources as needed
4. Draw schematic diagrams of electrical control circuits.	• Consideration of factors that influence the operation of electrical control circuits • Clear representation of circuits related to the operation and connection of components • Accurate location of components and accessories • Accurate identification of components and accessories • Appropriate use of: – Québec Electrical Code – symbols – technical documentation • Consideration of technological developments • Accurate interpretation of diagrams
5. Start up the circuits.	• Safe verification of operating condition of components and accessories • Precise use of measuring instruments • Consultation of authorized professional resources as needed • Appropriate use of technical documentation • Accurate association between the use of electrical control circuits, the basic principles of electricity and the expected results
6. Convey the results.	• Methodical processing of calculations and results • Clarity of presentation

Code: 01UT

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To establish relationships between heating systems and their operation.	• Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Working with fluids such as water, oil, gases and compressed air • Referring to technical documentation in English and French • Using a computer system
Elements of the Competency	**Performance Criteria**
1. Describe heating systems and their components.	• Recognition of the types of systems used in different types of buildings • Accurate description of components, such as boilers, heat exchangers, and piping, and their functions and installation requirements • Recognition of the applications of the different types of fluids used in heating systems • Location of components in a heating system layout drawing
2. Describe the accessories.	• Recognition of the functions and installation requirements of accessories • Accurate association of accessories with the different components • Location of the different accessories in a heating system layout drawing
3. Recognize the operating principles of heating systems.	• Establishment of relationships between the different components • Recognition of fluid circulation in a distribution circuit, as represented in a schematic diagram • Recognition of the operating parameters of components for the distribution of different fluids
4. Search for information about the components and their operation.	• Selection of appropriate documentation • Accurate location of technical data • Accurate interpretation of English and French technical terms • Appropriate information gathered about technological developments and trends • Organized filing of data

Code: 01UU

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To establish relationships between ventilation and air conditioning systems and their operation.	• Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • Using a computer system
Elements of the Competency	**Performance Criteria**
1. Describe ventilation and air conditioning systems and their components.	• Recognition of the types of systems used in different types of buildings • Accurate description of components, such as fans, humidifiers, and ducts, and their functions and installation requirements • Accurate description of the types of ducts used for different applications in different systems • Recognition of the various applications in different types of systems and buildings • Location of components in a system layout drawing
2. Describe the accessories.	• Recognition of the functions and installation requirements of accessories • Accurate association of accessories with the different components • Location of the different accessories in a system layout drawing
3. Recognize the operating principles of ventilation and air conditioning systems.	• Establishment of relationships between the different components and accessories • Recognition of air circulation in distribution and exhaust systems, as represented in a schematic diagram • Recognition of the operating parameters of components for the supply and exhaust of air

4. Search for information about the components and their operation.	• Selection of appropriate documentation • Accurate location of technical data • Accurate interpretation of English and French technical terms • Appropriate information gathered about technological developments and trends • Organized filing of data

Code: 01UV

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To establish relationships between refrigeration systems and their operation.	• Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • Using a computer system
Elements of the Competency	**Performance Criteria**
1. Describe refrigeration systems and their components.	• Recognition of the types of systems used in different types of buildings • Description of the different refrigeration cycles and their components, such as compressors, evaporators, condensers and piping • Recognition of the functions and installation requirements of components • Recognition of the applications of the different types of refrigerants • Location of components in a system layout drawing
2. Describe the accessories.	• Recognition of the functions and installation requirements of the accessories • Accurate association of accessories with the different components • Location of the different accessories in a system layout drawing
3. Recognize the operating principles of refrigeration systems.	• Establishment of relationships between the different components • Recognition of the distribution of refrigerants in a refrigeration system, as represented in a schematic diagram • Recognition of the operating parameters of the components for different refrigerants

4. Search for information about the components and their operation.	• Selection of appropriate documentation • Accurate location of technical data • Accurate interpretation of English and French technical terms • Appropriate information gathered about technological developments and trends • Organized filing of data

Code: 01UW

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To determine the technical specifications for automatic system control systems.	• Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to plans and specifications • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using a computer system and specialized software
Elements of the Competency	**Performance Criteria**
1. Determine the automatic control system required.	• Methodical collection of the technical data relevant to the needs expressed by the clients • Thorough examination of the factors that affect the automatic control of building mechanical systems • Consideration of: – possible applications – constraints and limitations – technological developments • Appropriate selection of system given the situation
2. Select the components.	• Accurate selection of components given the automatic control needs • Determination of the location of each component in the automatic control loop
3. Select the accessories.	• Location of the relevant data in the technical documentation • Consideration of the operating parameters of the accessories • Appropriate selection of the accessories given the type of automatic control

4. Record the information related to the operation of the automatic control system.	• Clear schematic diagram of the automatic control loop • Establishment of relationships between the different components • Accurate operating parameters for automatic system control • Sense of observation

Code: 01UX

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To operate systems.	• Working alone • Consulting professional resources as needed • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • Referring to technical drawings • Using tools and measuring instruments • Using individual and collective protection equipment
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate and thorough identification of the systems' operating procedures • Consideration of available power sources • Proper use of system design methods and technical data
2. Start up and shut down systems.	• Recognition of the types of systems used in different types of buildings (residential, commercial, institutional and industrial) • Compliance with manufacturers' instructions • Safe start-up of systems • Effective and appropriate use of the necessary tools depending on the system • Precise work
3. Check the operating condition of the systems and their components.	• Accurate interpretation of technical information about the operation of the systems and their components • Consideration of operating sequence • Accurate identification of the operating parameters of the systems and their components • Methodical, safe use of instruments • Correct interpretation of measurements taken by authorized professional resource persons • Consideration of the basic principles of physics • Detection and clear recording of malfunctions • Work in conformity with the desired result

4. Check the operating conditions of the automatic control systems.	• Recognition of the type of automatic control in question • Start-up in conformity with the type of automatic control system • Accurate measurement of operating parameters of components and electrical control circuits • Safe handling of tools and instruments • Operating condition of automatic control system in conformity with the desired results

Code: 01UY

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To consult the regulations.	• Working alone • Performing tasks related to residential, commercial, institutional and industrial building systems • In accordance with the codes, standards and regulations in effect • Referring to plans, technical drawings and specifications • Referring to technical documentation in English and French • Using a computer system connected to the Internet
Elements of the Competency	**Performance Criteria**
1. Identify the situation and context.	• Accurate identification of situation • Accurate interpretation of mandate • Accurate description of situation
2. Plan the information search.	• Appropriate selection of search method given the situation • Determination of documents related to the construction specialities • Organized planning
3. Collect data.	• Methodical consultation of printed and electronic documents • Accurate location of new regulations related to building mechanical systems • Appropriate data collected given the situation • Thorough recording of data
4. Analyze the data.	• Accurate interpretation of documentation, and the codes, standards and regulations in effect • Logical organization of information • Initiative and autonomy
5. Write a report.	• Appropriate selection of items to be included • Accurate observations • Relevant conclusions and synthesis • Clear, coherent report • Accurate English and French terminology related to building systems • Careful filing of study for future reference

Code: 01UZ

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To check that the technical drawings and specifications comply with regulations.	• Working alone and in a team • Referring to plans, technical drawings and specifications for the installation of a system • Referring to technical documentation in English and French • In accordance with the codes, standards, laws and regulations in effect • In accordance with standards for the production of drawings and specifications • Using the appropriate measuring instruments
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Selection of the necessary documentation • Proper planning of sequence of operations given the deadline • Well organized work
2. Interpret technical drawings.	• Accurate interpretation of data related to dimensions, areas, volumes and quantities of materials • Measurements in the technical drawings in conformity with the actual measurements taken • Accurate interpretation of the measurements and dimensions in the technical drawings of the systems • Inclusion of all the elements needed to design a project • Relevant information gathered from the technical drawings
3. Interpret construction specifications for building mechanical systems.	• Appropriate association of the information in the technical drawings with the information in the specifications • Relevant information gathered from the specifications

4. Analyze the technical drawings and specifications in terms of safety standards.	• Appropriate application of research and analysis techniques • Observance of measurement scales in calculations • Consideration of codes, standards, laws and regulations related to the construction of building mechanical systems • Appropriate use of design tools for calculations and modifications • Detection of all errors in technical drawings and specifications
5. Make recommendations.	• Recommendation of the proper measures • Accurate evaluation report • Clear communication of recommendations with respect to the observance of the codes, standards and regulations in effect • Clear, precise sketches of proposed modifications

Code: 01V0

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To prepare technical drawings of systems.	• Working alone • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to architectural and structure plans, technical drawings of systems and electrical circuit diagrams • Referring to technical documentation in English and French • In accordance with drafting standards and conventions • In accordance with the codes, standards and regulations in effect • Using drafting instruments and specialized software
Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Collection of the relevant reference documents • Appropriate selection of drafting instruments and computer equipment • Ergonomic and functional setup of workstation
2. Make schematics.	• Appropriate selection of parameters of drafting sheet • Accurate measurement of dimensions • Appropriate selection of types of projections • Compliance with standards and conventions related to lines and projections • Observance of shapes and proportions • Proper use of the metric and imperial systems of measurement • Accurate, neat sketch

3. Make professional quality technical drawings using a computer.	• Appropriate selection of parameters of drafting sheet • Accurate interpretation of lines, notes and dimensions in the preliminary sketch • Accurate representation of views and sections in orthographic projection • Views in conformity with the different representative types • Three-dimensional representation of object • Compliance with technical drafting standards and conventions • Observance of shapes, dimensions and proportions • Proper use of computer-aided drafting software
4. Dimension the sketch or drawings.	• Accurate calculation of dimensions • Appropriate positioning of dimensions • Clear dimensioning • Consideration of margin of error • Consideration of system of measurement used
5. Record notes and information in the title block.	• Inclusion of all information • Clear, accurate recording of information • Title block filled out properly • Clear notes recorded in the title block
6. Check the quality of the sketch or drawings.	• Observance of verification procedure • Sketches or technical drawings in conformity with: – requirements – the codes, standards and regulations in effect • Appropriate modifications made to drawings as the work progresses • Validation by authorized specialists
7. Print and save the drawings and technical documentation.	• Appropriate preparation of printing and reproduction equipment and software • Determination of the appropriate parameters • Thorough verification of conformity of printed copy with established parameters • Conformity of length of lines, measurement scales and dimensions after printing • Appropriate selection of method of saving drawings and reference documents • Appropriate filing of drawings and accompanying documents

Code: 01V1

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To establish work relations.	• With clients and different professional resources • In accordance with the jurisdictions recognized in the codes, standards and regulations in effect • Referring to the appropriate documentation • Using common communications tools
Elements of the Competency	**Performance Criteria**
1. Assess their relations in the light of occupational requirements.	• Consideration of their strengths and weaknesses in terms of interpersonal relations • Correct interpretation of behaviours in work relations • Adaptation of their way of interacting depending on the circumstances and the people involved • Accurate appreciation of the quality of interpersonal relations established • Openness to criticism
2. Convey and interpret information.	• Clear transmission of message • Adaptation of format of message depending on the receiver • Selection of the appropriate means of transmission • Appropriate selection of the types of questions needed to obtain the relevant information • Proper application of the rules of verbal communication • Use of appropriate terminology • Correct interpretation of messages
3. Solve problems related to work relations.	• Identification of the main causes of communication problems • Determination of possible solutions • Selection of the appropriate solution • Effective use of negotiating techniques • Accurate appreciation of the result of the intervention

4. Work in a team.	• Consideration of the responsibilities of each team member • Appropriate explanation of the nature of the work to be done • Effective coordination of their activities with those of the other team members • Effective resolution of problems faced by the team • Affirmative behaviours favouring feedback • Attitudes and behaviours favouring cooperation

Code: 01V2

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To design plumbing and piping systems.	• Working alone and in a team, under supervision, while respecting the occupational limits established in particular by laws and regulations • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments • Using a computerized workstation connected to the Internet and state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Relevant information gathered given: – expectations and constraints related to the project – automatic control needs – technical data • Accurate identification of all the measurements and determinants related to the design of plumbing and piping systems • Evaluation of the technical and financial feasibility of the project, taking into account: – the materials available on the market – the latest technological developments • Determination of logical sequence of steps in the design, given the deadline
2. Describe plumbing and piping systems and their components.	• Consideration of: – all the information gathered – operating conditions – installation requirements • Accurate calculation of estimated dimensions of: – components and accessories – piping • Appropriate use of charts, tables and documents needed to design the system

3. Define the initial concept.	• Appropriate selection of:
	  – materials
	  – piping, components and accessories
	  – safety devices
	• Accurate representation of the appropriate solutions in diagrams and sketches
	• Objective evaluation of the feasibility of the proposed solutions with respect to the desired results
	• Design in conformity with the standards, codes and regulations in effect
	• Openness to comments
	• Creativity

4. Develop an automatic control system.	• Appropriate selection of automatic control process for the plumbing systems in question • Determination of the operating conditions for automatic control system • Appropriate selection of components and accessories • Accurate representation of the appropriate solutions in diagrams and sketches • Objective evaluation of the feasibility of the proposed process with respect to the needs identified • Appropriate validation of initial concept and automatic control process by authorized specialists
5. Make sketches and technical drawings.	• Consideration of comments related to the design • Complete, representative drawings in conformity with standards, rules, conventions and the desired results • Proper use of symbols for plumbing components, piping and accessories • Clear presentation of diagrams and technical drawings for approval by authorized specialists • Accurate corrections made
6. Prepare the specifications.	• Proper use of the methods identified in the preparation of the documents • Full integration of all design parameters • Clear, objective presentation of the specifications • Appropriate justification of choices made during the design of the project in terms of expectations and constraints

Code: 01V3

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To design heating systems.	• Working alone and in a team, under supervision, while respecting the occupational limits established in particular by laws and regulations • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments • Using a computerized workstation connected to the Internet and state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Relevant information gathered given: – expectations and constraints related to the project – automatic control needs – technical data • Accurate identification of all the measurements and determinants related to the design of heating systems • Evaluation of the technical and financial feasibility of the project, taking into account: – the materials available on the market – the latest technological developments • Determination of logical sequence of steps in the design, given the deadline
2. Describe heating systems and their components.	• Consideration of: – all the information gathered – operating conditions – installation requirements • Accurate calculation of estimated dimensions of: – components such as boilers, heat exchangers and pipes – accessories • Appropriate use of charts, tables and documents needed to design the system

3. Define the initial concept.	• Appropriate selection of:
	  – materials
	  – components and accessories
	  – safety devices
	• Accurate representation of the appropriate solutions in diagrams and sketches
	• Objective evaluation of the feasibility of the proposed solutions with respect to the desired results
	• Design in conformity with the standards, codes and regulations in effect
	• Openness to comments
	• Creativity

4. Develop an automatic control system.	• Appropriate selection of automatic control process for the heating systems in question • Determination of the operating conditions for automatic control system • Appropriate selection of components and accessories • Accurate representation of the appropriate solutions in diagrams and sketches • Objective evaluation of the feasibility of the proposed process with respect to the needs identified • Appropriate validation of initial concept and automatic control process by authorized specialists
5. Make sketches and technical drawings.	• Consideration of comments related to the design • Complete, representative drawings in conformity with standards, rules, conventions and the desired results • Proper use of symbols for components and accessories • Clear presentation of diagrams and technical drawings for approval by authorized specialists • Accurate corrections made
6. Prepare the specifications.	• Proper use of the methods identified in the preparation of the documents • Full integration of all design parameters • Clear, objective presentation of the specifications • Appropriate justification of choices made during the design of the project in terms of expectations and constraints

Code: 01V4

Objective	***Standard***
Statement of the Competency	**Achievement Context**
To design ventilation and air conditioning systems.	• Working alone and in a team, under supervision, while respecting the occupational limits established in particular by laws and regulations • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments • Using a computerized workstation connected to the Internet and state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Relevant information gathered given: – expectations and constraints related to the project – automatic control needs – technical data • Accurate identification of all the measurements and determinants related to the design of ventilation and air conditioning systems • Evaluation of the technical and financial feasibility of the project, taking into account: – the materials available on the market – the latest technological developments • Determination of logical sequence of steps in the design, given the deadline
2. Describe ventilation and air conditioning systems and their components.	• Consideration of: – all the information gathered – operating conditions – installation requirements • Accurate calculation of estimated dimensions of: – components such as fans, humidifiers and ducts – accessories • Appropriate use of charts, tables and documents needed to design the system

3. Define the initial concept.	• Appropriate selection of:
	  – materials
	  – components and accessories
	  – safety devices
	• Accurate representation of the appropriate solutions in diagrams and sketches
	• Objective evaluation of the feasibility of the proposed solutions with respect to the desired results
	• Design in conformity with the standards, codes and regulations in effect
	• Openness to comments
	• Creativity

4. Develop an automatic control system.	• Appropriate selection of automatic control process for the ventilation and air conditioning systems in question • Determination of the operating conditions for automatic control system • Appropriate selection of components and accessories • Accurate representation of the appropriate solutions in diagrams and sketches • Objective evaluation of the feasibility of the proposed process with respect to the needs identified • Appropriate validation of initial concept and automatic control process by authorized specialists
5. Make sketches and technical drawings.	• Consideration of comments related to the design • Complete, representative drawings in conformity with standards, rules, conventions and the desired results • Proper use of symbols for components and accessories • Clear presentation of diagrams and technical drawings for approval by authorized specialists • Accurate corrections made
6. Prepare the specifications.	• Proper use of the methods identified in the preparation of the documents • Full integration of all design parameters • Clear, objective presentation of the specifications • Appropriate justification of choices made during the design of the project in terms of expectations and constraints

Code: 01V5

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To design refrigeration systems.	• Working alone and in a team, under supervision, while respecting the occupational limits established in particular by laws and regulations • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments • Using a computerized workstation connected to the Internet and state-of-the-art software
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Relevant information gathered given: – expectations and constraints related to the project – automatic control needs – technical data • Accurate identification of all the measurements and determinants related to the design of refrigeration systems • Evaluation of the technical and financial feasibility of the project, taking into account: – the materials available on the market – the latest technological developments • Determination of logical sequence of steps in the design, given the deadline
2. Describe refrigeration systems and their components.	• Consideration of: – all the information gathered – operating conditions – installation requirements • Accurate calculation of estimated dimensions of: – components such as compressors, evaporators, condensers and pipes – accessories • Appropriate use of charts, tables and documents needed to design the system

3. Define the initial concept.	• Appropriate selection of:
	  – materials
	  – components and accessories
	  – safety devices
	• Accurate representation of the appropriate solutions in diagrams and sketches
	• Objective evaluation of the feasibility of the proposed solutions with respect to the desired results
	• Design in conformity with the standards, codes and regulations in effect
	• Openness to comments
	• Creativity

4. Develop an automatic control system.	• Appropriate selection of automatic control process for the refrigeration systems in question • Determination of the operating conditions for automatic control system • Appropriate selection of components and accessories • Accurate representation of the appropriate solutions in diagrams and sketches • Objective evaluation of the feasibility of the proposed process with respect to the needs identified • Appropriate validation of initial concept and automatic control process by authorized specialists
5. Make sketches and technical drawings.	• Consideration of comments related to the design • Complete, representative drawings in conformity with standards, rules, conventions and the desired results • Proper use of symbols for refrigeration system components and accessories • Clear presentation of diagrams and technical drawings for approval by authorized specialists • Accurate corrections made
6. Prepare the specifications.	• Proper use of the methods identified in the preparation of the documents • Full integration of all design parameters • Clear, objective presentation of the specifications • Appropriate justification of choices made during the design of the project in terms of expectations and constraints

Code: 01V6

Objective	*Standard*
Statement of the Competency To supervise system maintenance.	**Achievement Context** • Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to drawings and specifications • Referring to technical documentation in English and French • Using the appropriate measuring instruments and tools • Using a computerized workstation and state-of-the-art software • Using individual and collective safety equipment
Elements of the Competency	**Performance Criteria**
1. Assess the situation.	• Identification of all the relevant information concerning: – the operation and maintenance of the systems and their components – automatic control – the history of malfunctions and breakdowns – the control card and work order • Accurate interpretation of statistics about the performance and frequency of use of systems • Technical drawings and specifications in conformity with the regulations in effect • Consideration of the client's expectations and needs

2. Plan the maintenance work.	• Appropriate selection of type of program (preventive, corrective, palliative or predictive) • Determination of time and frequency of controls • Fair distribution of tasks according to competencies and the number of hours of work required • Selection of the appropriate instruments • Accurate identification of the risks inherent in maintenance and in the handling of hazardous materials • Consideration of the information gathered from: – the control data – maintenance software – the selection of components and accessories • Establishment of a maintenance schedule in accordance with the availability of resources
3. Do the maintenance.	• Appropriate assessment of the operating condition of the components • Appropriate maintenance methods for the components and accessories established in collaboration with authorized professional resources • Methodical, precise adjustments in accordance with manufacturers' suggestions • Appropriate selection of corrective measures • Observance of maintenance program
4. Check the operation of the systems and their components.	• Safe testing of systems and components (e.g. fire safety system) • Attentive verification of operating parameters in collaboration with professional resources, if necessary • Accurate interpretation of signs and causes of defects • Thorough evaluation of the updated operating condition of components • Control cards properly adapted and filled out
5. Write a report.	• Appropriate recommendations of preventive, corrective and predictive measures • Accurate recording of the updated operating condition of the systems and their components • Accurate list of parts requiring replacement • Careful filing of technical documentation • Determination of distribution list for the report

Code: 01V7

Objective	*Standard*
Statement of the Competency To balance hydraulic and pneumatic components of building mechanical systems.	**Achievement Context** • Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments and tools • Using a computerized workstation connected to the Internet • Following occupational health and safety rules
Elements of the Competency	**Performance Criteria**
1. Prepare the work.	• Identification of all the data relevant to the work to be done • Determination of the expectations and constraints related to the need or request • Determination of the types of hydraulic and pneumatic systems to be balanced • Determination of the work to be done on the systems • Realistic identification of desired performance criteria • Careful preparation of equipment and instruments

2. Check the condition and operation of the installations.	• Installations in conformity with the technical drawings and specifications, and the regulations in effect • Safe testing of systems and automatic control • Accurate identification of strategic points for taking measurements and making adjustments • Visual verification of the cleanliness of the internal surfaces of the lines and pipes • Accurate application of the operating parameters established by the manufacturers • Operation of systems in accordance with expected results • Conformity of the electrical control circuits and defects observed conveyed clearly and concisely to the interested professional resources
3. Do balance tests on hydraulic and aeraulic systems.	• Appropriate selection of balancing method depending on the system • Appropriate selection of equipment and tools • Appropriate procedure • Accurate recording of balancing methods on the appropriate forms • Accurate identification of problems encountered during adjustment • Accurate interpretation of results in terms of the needs identified • Appropriate recommendation of adjustments and corrective measures • Information conveyed clearly to interested parties and authorized specialists • Methodical, safe testing of systems and components
4. Adjust the components and accessories to balance the systems.	• Determination of components and accessories to be adjusted • Proper application of operating parameters established by the manufacturers • Dexterity and precision in adjustments • Adjustments in conformity with desired results • Accurate recording of observations and adjustments on the appropriate forms

	Code: 01V7
5. Check the effectiveness of the automatic control of building mechanical systems.	• Verification of operation of systems, components and accessories in terms of automatic control • Determination of corrective measures • Accurate calibration and adjustment of automatic control components and accessories • Consideration of the expected performance criteria • Clear recording of adjustments on the appropriate forms
6. Convey the results.	• Compilation of the information on the forms into a clear report • Methodical interpretation of results taking into account the desired performance criteria • Results conveyed effectively to interested parties and authorized specialists • Appropriate filing of documents

Code: 01V8

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To estimate costs related to building mechanical systems.	• Working alone or in a team • Given a call for tenders, drawings and specifications • Referring to technical documentation in English and French • In accordance with the codes, standards, laws and regulations in effect • Using measuring instruments • Using estimating software
Elements of the Competency	**Performance Criteria**
1. Analyze the needs and the technical documentation.	• Collection of all the documents needed to prepare a bid • Location of the data needed: – for the estimation – given the expectations and constraints • Determination of the need for subcontracting
2. Determine quantities and costs related to materials.	• Appropriate use of methods and techniques for determining the material and component “take off” in a system • Determination of the quantities of materials and components needed • Consideration of: – the cost of materials and components that manufacturers and suppliers keep in stock – factors that affect the purchase cost of materials – the unit cost of materials and components • Accurate calculation of cost • Determination of cost of materials and components

3. Determine labour costs.	• Appropriate selection of method and techniques for estimating the labour requirements • Accurate calculation of the number of hours required • Consideration of: – factors affecting health and safety in the calculation of the number of workers needed – data related to a comparable project done in the past – the constraints and limitations of the work context – the efficiency of workers given their competencies • Determination of labour costs
4. Determine the total cost of the job.	• Consideration of: – the cost of components, materials and labour – fixed and variable costs – profit margin • Accurate breakdown of costs, if required • Accurate calculation of total cost of job
5. Prepare a bid.	• Determination of the type of bid based on the available documents • Complete, clear and accurate document • Clear submission of bid to interested parties • Compliance with official standards and regulations with regard to the preparation and presentation of bids

Code: 01V9

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To perform technical sales tasks.	• Working alone • Given a request from a client and clear instructions • Over the telephone and in person • In accordance with the codes, standards and regulations in effect • Using printed and electronic catalogues in English and French • Given samples
Elements of the Competency	**Performance Criteria**
1. Gather information.	• Accurate clarification of client's expectations • Attentiveness to client's expectations • Appropriate selection of different sources of information • Consideration of: – the possibilities and limitations of the request – the advantages of different products and services • Best selection of the appropriate products and services • Good judgment and autonomy
2. Suggest products or services.	• Accurate explanation of the technical characteristics of the products and services selected • Appropriate recommendations with respect to: – initial expectations – the type of building – the use of systems and components • Appropriate level of language used to answer the client's questions • Attentiveness to the client's objections, followed by the appropriate reformulation • Appropriate, tactful arguments in response to objections • Openness to the client's reactions

3. Negotiate an agreement.	• Observance of the principles of ethics as they relate to negotiations • Thoughtful adaptation of negotiating strategy depending on the situation • Clear confirmation of services offered and the quantity of products required • Accurate establishment of costs • Effective search for compromise • Good judgment • Proposed alternate solutions likely to satisfy both parties
4. Close the transaction.	• Clear establishment and confirmation of the terms of the agreement • Observance of the company's policies with respect to the signing of agreements with clients • Careful preparation of the appropriate documents describing the details of the order
5. Provide technical assistance.	• Technical information and advice related to: – installation requirements – operation of system components – methods for maintaining components – client's questions regarding the guarantee, delivery dates and so on • Proper application of occupational health and safety rules • Complete, clear and concise report of work done
6. File the technical documentation.	• Accurate updating of catalogues • Observance of filing methods

Code: 01VA

Objective	*Standard*
Statement of the Competency To optimize the operation of building mechanical systems.	**Achievement Context** • Working alone and in a team • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to plans, technical drawings, specifications and manuals • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate measuring instruments and tools • Using state-of-the-art software • Using individual and collective protection equipment
Elements of the Competency	**Performance Criteria**
1. Analyze the needs and the technical documentation.	• Identification of all the data related to the work to be done • Systematic, methodical analysis of all the steps in the process and their incidence on the situation • Consideration of objectives and financial and technical constraints • Determination of possible improvements with a view to optimization • Proper planning of work

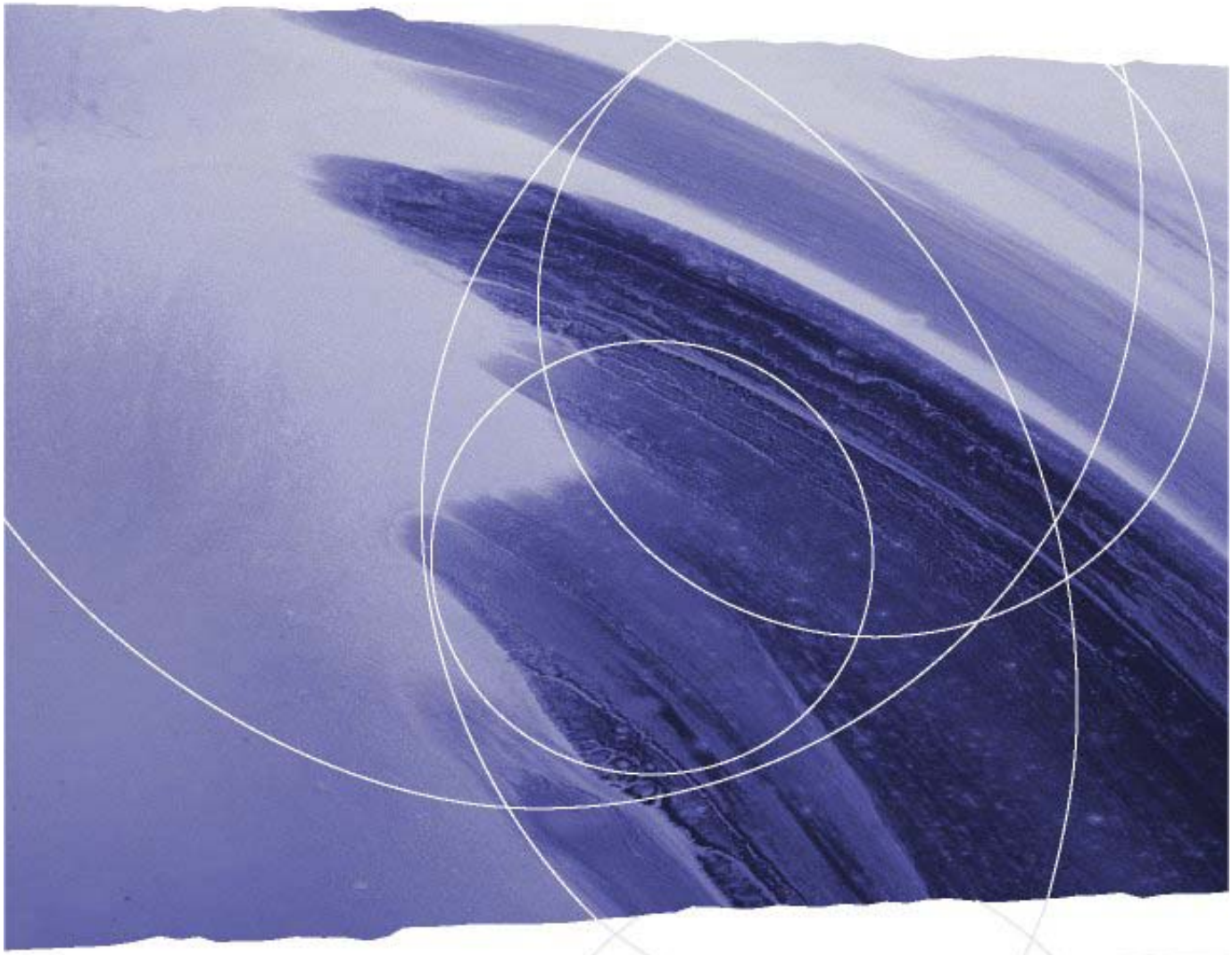
2. Evaluate the performance of the systems.	• In-depth analysis of the maintenance history and operation of the systems • Accurate verification of the operating parameters of system components and accessories • Accurate verification of performance and the effectiveness of the automatic control process in the building systems • Accurate identification of defects and nonconformities in building systems • Appropriate calculation of the effectiveness and efficiency of the components and accessories of the systems in question • Accurate interpretation of the effectiveness, efficiency, reliability and safety of the components and accessories • Accurate identification of elements and systems that could be optimized • Clear compilation of data related to the operation of the systems
3. Suggest solutions for the optimization of the systems.	• Critical analysis of problems related to the effectiveness and efficiency of the systems • Appropriate search for new developments • Logical proposal of different improvements in accordance with objectives and budgets • Accurate evaluation of possible gains and other effects of applying these improvements • Clear, persuasive presentation of recommendations to interested parties and authorized specialists using diagrams and sketches • Openness to comments
4. Implement the optimization project.	• Fair distribution of tasks and responsibilities according to competencies • Accurate ordering of the components needed to do the work • Consideration of the client's conditions for comfort • Application of corrective measures to facilitate energy savings in building systems, in collaboration with authorized professional resources • Application of the appropriate supervising techniques • Safe work method

	Code: 01VA
5. Evaluate the results.	• Accurate measurement of the operating parameters of the systems in collaboration with professional resources, if necessary • Accurate analysis of the advantages and costs of the different aspects of the project • Accurate analysis of the overall consequences of the project • Consideration of initial objectives and limitations • Appropriate, justified recommendations
6. Present the results.	• Clear, accurate recording of information • Consideration of initial objectives and limitations • Accurate, relevant comparative data • Appropriate conclusions • Objective presentation and justification of results

Code: 01VB

Objective	*Standard*
Statement of the Competency	**Achievement Context**
To coordinate the installation of a system.	• Working alone • Performing tasks related to residential, commercial, institutional and industrial building systems • Referring to building plans, technical drawings of systems and specifications • Referring to technical documentation in English and French • In accordance with the codes, standards and regulations in effect • Using the appropriate instruments • Using computer-aided drafting, project management and other types of software
Elements of the Competency	**Performance Criteria**
1. Analyze the information.	• Accurate interpretation of: – the client's needs – all of the technical documentation – the constraints and limitations related to the implementation of the project • Accurate location of the technical specifications related to the installation of the systems • Establishment of a logical sequence of steps, taking into account management techniques
2. Plan the work.	• Determination of the necessary material resources • Verification of the feasibility of the project on the basis of the information gathered • Determination of a realistic work plan and schedule • Fair distribution of tasks and responsibilities according to competencies • Determination of needs in terms of subcontracting

3. Organize the work.	• Appropriate selection of materials, components and accessories to be ordered • Thorough verification of the quality of the materials delivered in preparation for their approval by authorized specialists • Realistic expectations in terms of delivery dates • Functional, safe and ergonomic organization of the work environment and equipment • Appropriate application of project management techniques
4. Monitor the installation of systems.	• Observance of deadlines • Application of the appropriate supervision techniques • Information and comments conveyed tactfully to staff at the appropriate time • Application of occupational health and safety rules specific to construction sites • Appropriate selection of individual and collective protection equipment • Effective and objective problem-solving during the installation • Accurate identification of defects observed during the installation • Control cards properly adapted and filled out • Accurate recording of information conveyed during job meetings and operations
5. Check the conformity and quality of the work.	• Observance of installation standards and inspection procedure • Accurate identification of defects in the installation • Approval of modifications by authorized specialists • Clear, accurate documentation of observations
6. Write a report.	• Factual report carefully prepared in accordance with inspection standards • Determination of distribution list for the report • Concern for precision and detail



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